**GROUNDWATER WELL CHECKLIST**

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| Project Name: |       |
| Reviewed By: |       | Date: |       |

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| **General Information** |
| Location (NAD 83)LatitudeLongitude |  |
| Construction Class |  |
| Depth |  |
| Yield and DrawdownDuration:Sustained pumping rate: |  |
| Well Pumping Rate |  gpm  ft TDH |
| Well control scheme (describe): |

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| **Location and Construction of Well (also see 12 VAC 5-590-840)**  |
| Well site inspected by ODW personnel and approved?Date of approval:  | Yes [ ]  No [x]   |
| Well located in a [Groundwater Management Area](https://www.deq.virginia.gov/permits-regulations/permits/water/water-withdrawal/ground-water)?If yes, and production may exceed 300,000 gallons per month, has a groundwater withdrawal permit been obtained, or are efforts underway to obtain a groundwater withdrawal permit? | Yes [ ]  No [ ]  Yes [ ]  No [ ]  N/A [ ]  |
| **Community well lot (12VAC5-590-840 D)** |  |
| * Provide a distance of at least 50 feet from the well to all property lines?
* Future expansion considered?
* Access road provided and easement recorded if not adjacent to public road?
* graded to divert surface runoff away from the well and to prevent ponding on the well lot?
* final plat plan and dedication document prepared and recorded as described in 12VAC5-590-200? (or non-community if field office requires)
 | Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]   |
| M**inimum well location requirements (12VAC5-590-840 E)** |  |
| * The horizontal distance from the well to any septic tank, sanitary drainfield, pit privy, cesspool, barnyard, animal feed lot, cemetery, geothermal well or source of similar contamination, and all surface runoff from actual or potential sources of contamination is at least 50 feet?
* The horizontal distances from the well to any pipe carrying sewage or pipe in which sewage can back up is at least 50 feet?
* A separation of least 50 feet is between a fuel storage tank and a well; however, a lesser distance may be allowed if the fuel is propane or natural gas, or if it is liquid fuel meeting the following requirements:
	+ Liquid fuel tanks shall be located above grade.
	+ Liquid fuel tanks shall be double-walled with an inner wall leak-detection alarm or single-walled with a full-capacity containment system constructed of compatible material.
	+ Liquid fuel lines shall be located above grade or enclosed in a protective casing if below grade, and liquid fuel tanks shall be provided with a paved and curbed parking pad at the tank filling location.
* A spill response plan is provided if the fuel is stored within 50 feet of the well?
 | Yes [ ]  No [ ]  Yes [ ]  No [ ] Yes [ ]  No [ ] Yes [ ]  No [ ] Yes [ ]  No [ ] Yes [ ]  No [ ] Yes [ ]  No [ ]  N/A [ ]  |
| **Well construction, materials and development (12VAC5-590-840 F and G)** |  |
| Class II well construction or better?* Borehole Diameter (at least 3 in greater than casing couplings)
* Casing Depth (min 50 ft (II), 100 ft (I))
* Casing terminates in solid rock
* Casing Material, Diameter and Thickness:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Steel casing and liner pipe meet dimensions in Table 840.1?
* Steel casing and liner pipe meet applicable ASTM, NSF/ANSI/CAN or AWWA standards?
* Plastic well casing is PVC meeting ASTM F480-14, NSF/ANSI/CAN Standard 61-2020 or AWWA A100-20?
* Plastic well casing depth does not exceed published resistance to hydraulic collapse, taking into account the installation techniques and grouting methods.
* Lining Pipe Material: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Grout Type, Depth, and Installation:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Neat Cement Grout?
* Grouted to a depth of 50 ft (Class II) or 100 ft (Class I)
* Screen zones: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Outer Casing material, depth, thickness:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Screens when required:
	+ Constructed of material that will not be damaged by chemical action of groundwater or future cleaning operations
	+ Size of openings is based on sieve analysis of the formation to be screened and adequate to pass flows af 0.1 ft/sec or less
	+ Installed so that exposure above the pumping level will not occur
* Packers or other well construction materials are of material that will not impart taste, odors, toxic substances, or bacterial contamination to the water in the well.
 | Yes [ ]  No [ ]  Yes [ ]  No [ ]  Yes [ ]  No [ ]  Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ]  |
| Uniform Water Well Completion Report, Form GW-2 completed, submitted and accurate? (12VAC5-590-840 F) | Yes [ ]  No [ ]  |
| **Well yield and drawdown test (12VAC5-590-840 H)** |  |
| Results of yield and drawdown test submitted? Drawdown test minimum pumping interval of 48 hours?Noncommunity system pumping interval reduced to > 12 hours?ODW approved the reduced pumping interval in advance of the test?Nearby wells simultaneously tested or monitored if required by the well site approval?Aquifer test plan for a well in a GWMA includes yield and drawdown test?Aquifer test plan protocol approved by ODW in advance of testing? | Yes [ ]  No [ ]  Yes [ ]  No [ ]  Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ]   |
| **Water Quality Tests (12VAC5-590-840) K** |  |
| A new, modified, or reconditioned well or spring?Samples analyzed by DCLS or a laboratory certified by DCLS for each method/analyte? Analytical methods conform to requirements in 12VAC5-590-440?TNCs - nitrate and nitrite onlySOCs tests waived by ODW?Community and NTNC: inorganics, metals, radiological, VOCs, nitrate/nitrite, cyanide and SO's collected (unless SOCs waived)?Summarize sample results in the table on the last page of this checklist? | Yes [ ]  No [ ]  Yes [ ]  No [ ]  Yes [ ]  No [ ]  Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  Yes [ ]  No [ ]  Yes [ ]  No [ ]   |
| If any MCL exceedances, VOC detects, etc., are there adequate plans to treat? Summarize: | Yes [ ]  No [ ]  N/A [ ]  |
| New or deepened well (if yes, requirements follow)?20 MPNs collected, 30 min apart, during the last 10 hr. of yield and drawdown? Geometric mean total coliform: E. Coli detections:GWUDI determination/Date: Disinfection required?Modified or reconditioned well (if yes, requirements follow)?At least two MPN samples collected at least 30 minutes apart, while the pump is in continuous operation.Summarize sample results: | Yes [ ]  No [ ] Yes [ ]  No [ ]  Yes [ ]  No [ ] Yes [ ]  No [ ] Yes [ ]  No [ ]  Yes [ ]  No [ ]   |
| **Well Appurtenances (12VAC5-590-840 I)** |  |
| * Sanitary seal or water tight well cap (pitless adapter)?
* Well casing extends at least 12 inches above the concrete floor or well apron?
* Screened downward-facing vent, or suitable alternative?
* Suitable raw water sampling tap available?
* Totalizing flow meter (upstream of blowoff)? (12VAC5-590-1065 D 2)
* Equipment and appurtenances for measuring water level provided, corrosion resistant, and firmly supported by the drop pipe or pump column and in a manner to prevent entrance of foreign materials?
* All pitless well units, adapters, and watertight caps listed by the Water Systems Council as certified products or approved by ODW?
* Apron 6 in thick x 6 ft x 6 ft centered on well
 | Yes [ ]  No [ ]  Yes [ ]  No [ ] Yes [ ]  No [ ]  Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ]  |
| **Piping, valves, and meters (also see 12 VAC 5-590-1065)**  |
| Discharge Piping* Accessible check valve and gate valve provided?
* Control valves above floor?
* Standard pressure gauge displays under all conditions?
* Blowoff provided for pumping to waste away from source?
	+ Erosion protection at point of waste discharge? (recommended)
	+ Not cross connected?
	+ Discharge capped or screened?
* Protected against freezing?
 | Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ] Yes [ ]  No [ ]  N/A [ ]  |

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| **Well House (if applicable)** |
| Locking entrance?  | Yes [ ]  No [ ]  N/A [ ]  |
| Overhead access provided & adequately secured? | Yes [ ]  No [ ]  N/A [ ]  |
| Light & heat provided? (12 VAC 5-590-1040) | Yes [ ]  No [ ]  N/A [ ]  |
| **Well Pump** |
| Pump capacity |  gpm |
| Is pump capacity less than or equal to the well yield, or adequately throttled? | Yes [ ]  No [ ]  |
| Velocity through screen < 0.1 ft/s | Yes [ ]  No [ ]  N/A [ ]  |
| Pump operation scheme adequate? | Yes [ ]  No [ ]  |
| **GWMA Only requirements (12VAC5-590-840 B)**  |
| Not constructed with screens in multiple aquifers? | Yes [ ]  No [ ]  N/A [ ]  |
| Geophysical logging and formation sampling and Uniform Water Well Completion Report, Form GW-2, submitted? | Yes [ ]  No [ ]  N/A [ ]  |
| Observation and production wells constructed with gravel packs and grout in a manner that prevents movement between aquifers? | Yes [ ]  No [ ]  N/A [ ]  |
| Pump intake setting documented, and the pump intake not set below the top of a confined aquifer or the bottom of an unconfined aquifer that supplies water to the well? | Yes [ ]  No [ ]  N/A [ ]  |
| All zones containing water of undesirable quality or zones to be protected but excluded from final completion are grouted at least five feet above the zone to at least five feet below the zone. (12VAC5-590-840 M) | Yes [ ]  No [ ]  N/A [ ]  |
| **Gravel Packed Wells (12VAC5-590-840 N)** |  |
| * The gravel utilized is free of foreign material, properly sized, washed, and then disinfected before or during placement.
* The gravel refill pipes, when used, are incorporated within the pump foundation or concrete apron and terminated with screwed or welded caps at least 12 inches above the pump house floor or concrete apron.
* The gravel refill pipes in the grouted annular opening shall be surrounded by a minimum of 1-1/2 inches of grout.
* A means for the prevention of leakage of grout into the gravel pack of the screen shall be provided.
* The minimum protective casing and grouted depth shall be acceptable to the department.
* Wells located in a GWMA shall have gravel packing installed in accordance with 12VAC5-590-840 B 3.
 | Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  |
| **Flowing artesian wells (12VAC5-590-840 P)** |  |
| * Flowing artesian wells located outside a GWMA will be considered on an individual basis by the department.
* The well is equipped with a pitless adapter specifically designed for pressurized artesian wells?
* Contacted field office to determine special well construction, casing, and sealing for flowing artesian wells?
* If yes, describe requirements:
 | Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]   |
| **Disinfection (12VAC5-590-840 J)** |  |
| New, modified, or reconditioned groundwater well or spring is disinfected after placement of the final pumping equipment? | Yes [ ]  No [ ]  N/A [ ]  |
| Wells are disinfected in accordance with AWWA Standard C654-13? | Yes [ ]  No [ ]  N/A [ ]  |
| **Capacities of Wells (12VAC5-590-840 Q)** |  |
| Wells used for community waterworks meet the daily water demand? | Yes [ ]  No [ ]  N/A [ ]  |
| Capacity of wells located in consolidated rock formations is determined from the lesser of:* (A x 1440 min/day) / 1.8 = gpd well sustainable yield, where A = well yield (gpm) determined by the yield and drawdown test
* Installed well pump capacity.

Capacity of wells located in unconsolidated formations is determined from the lesser of:* well yield
* Installed well pump capacity.
 | Well Yield:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(gpd)Well sustainable yield:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(gpd)Well Pump Capacity:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(gpd)Well Capacity:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(gpd) |
| **Waterworks serving 50 or more residential connections (12VAC5-590-840 R)** |  |
| * Waterworks serving 50 or more residential connections employing only wells providing the source water include at least two wells?
* If only two wells are provided, then the second well is rated for at least 30% of the waterworks permit capacity.
 | Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]  |
| **Waterworks serving fewer than 50 residential connections (12VAC5-590-840 S)** |  |
| * A waterworks serving fewer than 50 residential connections with a single well providing the source water shall provide or have ready access to a replacement pump and other components and materials needed for pump replacement.
* Alternatively, the owner may provide 48 hours of total finished water storage volume based on the maximum daily water demand.
 | Yes [ ]  No [ ]  N/A [ ]  Yes [ ]  No [ ]  N/A [ ]   |

| Parameter | Detections Summary | Sample Date | Results Satisfactory?Treatment Required? |
| --- | --- | --- | --- |
| Nitrate |  |   |   |
| Nitrite |  |   |   |
| Metals |  |   |   |
| Inorganics |  |   |   |
| VOCs |  |   |   |
| Radiological |  |   |   |
| SOC – Carbamates |  |   |   |
| SOC – Chlorinated Acidic Herbicides |  |   |   |
| SOC – Semi-Volatile Organic Chemicals |  |   |   |
| SOC – Volatile Fumagants |  |   |   |
| SOC – Diquat |  |   |   |
| Cyanide |  |   |   |
| MPN Bacteria |  |   |   |