

ORDINANCE NO. 174

AN ORDINANCE OF NOCKAMIXON TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA AMENDING CHAPTER 234 OF THE NOCKAMIXON CODE OF ORDINANCES TO ADD A NEW ARTICLE THAT WILL REGULATE GROUNDWATER WITHDRAWAL WITHIN THE TOWNSHIP TO ENSURE THE AVAILABILITY OF RELIABLE, SAFE AND ADEQUATE WATER SUPPLIES TO SUPPORT PERMITTED LAND USES WITHOUT CAUSING DETRIMENTAL IMPACTS TO OTHER USERS BY ESTABLISHING THE STANDARDS FOR THE HYDROGEOLOGIC EVALUATIONS TO BE CONDUCTED PRIOR TO DRILLING NEW WELLS OR ALTERING EXISTING WELLS; STRIKING CHAPTER 228; AND MAKING CORRESPONDING AMENDMENTS TO CHAPTER 196 REGARDING SUBDIVISION AND LAND DEVELOPMENT REQUIREMENTS

WHEREAS, the Pennsylvania Municipalities Planning Code provides in Section 603(d) that “Zoning ordinances may include provisions regulating the siting, density and design of residential, commercial, industrial and other developments in order to assure the availability of reliable, safe and adequate water supplies to support the intended land uses within the capacity of available water resources.” 53 P.S. § 10603(d); and

WHEREAS, the Pennsylvania Municipalities Planning Code provides in Section 604(1) *inter alia* that “provisions of zoning ordinances shall be designed: (1) To promote, protect and facilitate any or all of the following: the public health, safety, morals, and the general welfare; . . . the provision of a safe, reliable and adequate water supply for domestic, commercial, agricultural or industrial use, and other public requirements; as well as the preservation of the natural, scenic and historic values in the environment and preservation of forests, wetlands, aquifers and floodplains;” 53 P.S. § 10604(1); and

WHEREAS, Section 1516 (53 P.S. § 66516) of the Pennsylvania Second Class Township Code provides that the corporate powers of the Board of Supervisors of Nockamixon Township (the “Board of Supervisors”) include the ability to plan for the development of the Township through Zoning, Subdivision, and Land Development Regulations under the Act of July 13, 1968 (P.L. 805, No. 247), known as the “Pennsylvania Municipalities Planning Code”;

WHEREAS, Section 1601 of the Second Class Township Code provides that the Board of Supervisors may adopt Ordinances in which general or specific powers of the Township may be exercised, and, by the enactment of subsequent Ordinances, the Board of Supervisors may amend, repeal, or revise existing Ordinances (53 P.S. § 66601);

WHEREAS, the residents and businesses of Nockamixon Township are dependent upon private wells for drinking water and agricultural, commercial and industrial water supply; and

WHEREAS, the use of private wells depends, in turn, upon the maintenance of a certain

quantity and quality of groundwater; and

WHEREAS, maintenance of a certain quantity and quality of groundwater is also important to ensure local stream health; and

WHEREAS, the Township wishes to account for drought conditions and ensure sufficient water quantity and quality is available without causing adverse impacts to downgradient users, natural resources and baseflow; and

WHEREAS, the proposed amendments are geared toward fulfilling the Township's obligations under Article I, Section 27 of the Pennsylvania Constitution, and of protecting the public health, safety, and welfare of Township residents and future generations;

WHEREAS, the Township wishes to adopt regulations to assure the availability of reliable, safe and adequate water supplies to support intended land uses within the capacity of available water resources by establishing regulations for drilling new wells and altering existing wells by establishing standards for hydrogeologic studies to be conducted prior to the drilling of new wells or the altering of existing wells; and

WHEREAS, the proposed amendments have been advertised, considered, and reviewed in accordance with the Municipalities Planning Code;

NOW, THEREFORE, in consideration of the foregoing, be it **ENACTED** and **ORDAINED** by the Board of Supervisors of Nockamixon Township, Bucks County, Pennsylvania as follows:

I. Chapter 234 of the Nockamixon Township Code of Ordinances is **AMENDED** as follows:

A. **STRIKE** existing **Section 234-34** and **REPLACE** it as follows:

§ 234-34. Provisions and use of water.

A. No water wells may be dug or drilled except as permitted by the appropriate state, Bucks County, Township or other governmental authorities.

B. All water wells shall comply with Article XIV Groundwater Protection and Water Wells, of the Nockamixon Township Zoning Ordinance.

B. **ADD** a new **Article XIV** to the Nockamixon Township Zoning Ordinance as follows:

ARTICLE XIV
Groundwater Protection and Water Wells

Section 234-109 **Intent**

The residents and businesses of Nockamixon Township are dependent upon private wells for drinking water and agricultural, commercial and industrial water supply. The use of private wells depends, in turn, upon the maintenance of a certain quantity and quality of groundwater.

The Township is underlain by bedrock aquifer systems that range from marginal yielding in terms of water supply potential to moderate yielding; and certain of these geologic units are also known to have ambient/natural groundwater quality problems such as the presence of arsenic. In some areas of the Township, the topography further limits the availability of groundwater resources.

This Article is adopted to outline procedures to assure the availability of reliable, safe and adequate water supplies for residential, agricultural, commercial, industrial and other developments which are proposed within the Township, such that utilization of water resources will not result in detrimental impacts to other users of the same resources or other natural resources dependent upon the continued availability and supply of groundwater. This Article outlines procedures for evaluating hydrogeologic conditions and determining the availability of groundwater resources such that utilization of these resources will not result in detrimental impacts to other groundwater users or other natural resources dependent on the continued availability and supply of groundwater. This Article also outlines protections for neighboring wells, and water quality testing and well construction requirements to ensure potable water and to protect water quality.

Section 234-110 Definitions

The following definitions shall apply in this Article, including all subparts thereof, unless otherwise specified:

- (1) **Abandoned well:** Any well which has been replaced by another well, is no longer in service because of the availability of a public water supply, or no longer serves its intended use due to loss of water quantity or quality. Wells which are connected to uses which are infrequently used and wells which are being held in reserve for development or installed in anticipation of development shall not be considered abandoned if the wells are properly capped and protected from contamination.
- (2) **Abandonment or Decommissioning of a Well:** The permanent closure or sealing of a well.
- (3) **Alter:** To enlarge, deepen, replace or in any other way change any portion of an existing water supply system. The terms "alteration" and "altered" shall be construed accordingly.
- (4) **Applicant:** A person required by this Article to obtain a Well Permit.
- (5) **Application:** The application form and accompanying documentation required by Nockamixon Township for approval to locate, construct, or alter a water supply.
- (6) **Added Drawdown:** The additional amount of drawdown in a well beyond what is normally expected for that well and that is caused by the pumping of another well nearby.
- (7) **Aquifer:** A formation, group of formations, or part of a formation that contains sufficient saturated permeable material to yield economic quantities of water to wells and springs.

- (8) **Aquifer, Confined:** An aquifer that is overlain by a confining bed (aquitard). The confining bed has a significantly lower hydraulic conductivity than the aquifer. Artesian aquifer is a synonym.
- (9) **Aquifer, Semi-Confined:** An aquifer overlain by a low-permeability layer that permits water to slowly migrate through to the aquifer. Also termed leaky artesian or leaky confined aquifer.
- (10) **Aquifer, Unconfined:** An aquifer in which there are no confining beds between the zone of saturation and the ground surface. Water-table aquifer is a synonym.
- (11) **Aquitard:** A low-permeability unit that can store groundwater and transmit water slowly from one aquifer to another (also see Aquifer, Confined).
- (12) **Baseflow:** The component of flow in a perennial stream due to groundwater discharging to the stream. Baseflow does not include stormwater runoff that causes flow to increase during precipitation events.
- (13) **BCHD:** Bucks County Health Department.
- (14) **Board:** The Nockamixon Township Board of Supervisors.
- (15) **Certified Laboratory:** Any laboratory, facility, consulting firm, government or private agency, business entity or other person that the Pennsylvania Department of Environmental Protection has licensed or accredited to perform certain types of analyses of drinking water samples.
- (16) **Confining Bed:** A body of low hydraulic conductivity material that is stratigraphically adjacent to one or more aquifers.
- (17) **Contaminant:** Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil quality.
- (18) **Contributing Area:** The area of land surface that supplies the withdrawal for a given groundwater well.
- (19) **DRBC:** Delaware River Basin Commission.
- (20) **Drawdown:** The lowering of the water table of an unconfined aquifer or the potentiometric surface of a semi-confined or confined aquifer caused by pumping of groundwater from a well or wells. Drawdown is determined by subtracting the depth to water during pumping from the static water level determined prior to the start of pumping.
- (21) **Flow Rate:** This term shall be interchangeable with pumping rate or pump rate.
- (22) **Fracture Trace:** The surface representation of a fracture zone.

- (23) **GPD:** Gallons per day.
- (24) **Groundwater:** Water beneath the surface of the ground within a zone of saturation, whether or not flowing through known and definite channels or percolating through underground geologic formations and regardless of whether the result of natural or artificial recharge. The term includes water contained in aquifers, artesian and nonartesian basins, underground watercourses and other bodies of water below the surface of the earth.
- (25) **Head:** the energy of water per unit weight comprised of elevation, pressure, and velocity components. In a groundwater system, because the velocity component is usually negligible, head is measured as the elevation of the surface of water in a well above a standard datum.
- (26) **Hydraulic Conductivity:** The measure of a geologic formation's ability to transmit water. It is expressed as the volume of water at the prevailing density and viscosity that will move in a unit time under a unit head gradient through a unit area.
- (27) **Head Gradient:** The change in head per unit distance in the direction of water movement.
- (28) **Hydrogeology:** The study of groundwater with particular emphasis given to its chemistry, mode of migration, and relation to the geologic environment.
- (29) **Infiltration:** The flow of water downward from the land surface into and through the upper soil layers. Synonym to percolation.
- (30) **Lot, lot, Lot in Question:** For the purposes of this Article, a designated parcel, tract or area of land established by a plat or otherwise as permitted by law to be used, developed or built upon as a unit and upon which a water supply well is proposed or additional water extraction for an existing land use is proposed. The lot is a parcel of land, used or set aside and available for use as the site of one or more buildings and any buildings accessory thereto or for any other purpose, in one ownership and not divided by a street, nor including any land within the right-of-way of a public or private street upon which said lot abuts, even if the ownership to such right-of-way is in the owner of the lot.
- (31) **Multi-Well Project:** Any proposed land use, activity, development, or project that involves the installation of more than one (1) water well as part of the proposed land use, activity, or project. Installation of a second water well on an existing residential property for an accessory use shall not be considered a multi-well project.
- a. **Small Multi-Well Project:** A multi-well project that proposes the installation of four (4) or fewer wells.
 - b. **Large Multi-Well Project:** A multi-well project that proposes the installation of more than four (4) wells.

- (32) **Maximum Contaminant Level (MCL):** The maximum permissible concentration of a constituent or contaminant in drinking water. The source of data for MCLs shall be federal and Pennsylvania law, and in the case of a conflict, the stricter (more protective of water quality) provision shall apply.
- (33) **Neighbor Notification Distance:** A distance between the boundary of the lot on which a test well is proposed and neighboring wells or groundwater sources that, for all owners of wells or other groundwater sources (e.g., springs) within the distance, the Applicant must notify as further set forth in Section 234-114. Distances are specified in Section 234-114.
- (34) **Observation Well:** A water well used to observe the elevation of the water table or the potentiometric surface, typically during a pump test or other aquifer test. An observation well is generally constructed similar to a test well.
- (35) **PaDEP:** Pennsylvania Department of Environmental Protection.
- (36) **Perennial Stream:** A body of water flowing in a channel or bed composed primarily of substrates associated with flowing waters and capable, in the absence of pollution or other manmade stream disturbances, of supporting a benthic macroinvertebrate community which is composed of two or more recognizable taxonomic groups of organisms which are large enough to be seen by the unaided eye and can be retained by a United States Standard No. 30 sieve (28 meshes per inch, 0.595 mm openings) and live at least part of their life cycles within or upon available substrates in a body of water or water transport system.
- (37) **Porosity:** The voids or openings in rock and soil. Porosity may be expressed quantitatively as the ratio of the volume of openings in a rock or soil to the total volume of the rock or soil.
- (38) **Porosity, Primary:** Openings in a rock formation where most water movement occurs.
- (39) **Porosity, Secondary:** Smaller opening in a rock formation.
- (40) **Porosity, Effective:** The amount of interconnected pore space available for fluid transmission.
- (41) **Potable Water:** Any water used, or intended to be used, for drinking and/or culinary purposes which is free from impurities in amounts sufficient to cause disease or harmful physiological effects, and complies with the bacteriological and chemical quality standards of the USEPA, PaDEP, and BCHD.
- (42) **Production Well:** A water well that supplies water to a given land use, activity, development, or project.
- (43) **Provisional Certificate:** Refers to a written approval issued by Nockamixon Township authorizing well construction and testing in accordance with the

Applicant's pre-construction and pre-testing/analysis submittal package under Section 234-120.B.1.

- (44) **Pump Rate:** The rate which water is removed from an aquifer by pumping a well, often expressed in gallons per minute. In this Article, this term is interchangeable with flow rate and pumping rate.
- (45) **Pump Test:** This shall be interchangeable with "pumping test."
- (46) **Qualified Hydrogeologist:** An individual licensed by the Commonwealth of Pennsylvania to practice geology, and who specializes in the practice of applying geologic and hydrogeologic principles to interpretation of groundwater conditions and conducting aquifer tests and the analysis of aquifer test data. The individual shall provide a resume or curriculum vitae to document licensure, education and experience requirements.
- (47) **Recharge:** The volume of water that infiltrates to an aquifer, often expressed in inches per year per unit area.
- (48) **Recharge Area:** An area at land surface where recharge occurs to a particular aquifer.
- (49) **Registrant:** A person required by this Article to register a water well.
- (50) **Replacement Well:** A well installed for the sole purpose of supplanting an existing well that can no longer provide sufficient water to the residence or business on the lot. Within 30 days of approval to operate the replacement well, the existing well must be decommissioned.
- (51) **Saturated Zone:** The zone in which the voids in the rock or soil are filled with water at a pressure greater than atmospheric. The water table is the top of the saturated zone in an unconfined aquifer.
- (52) **Static Water Level:** The depth from ground surface to water in a well undisturbed by pumping. Also reported as elevation referenced to a standard datum.
- (53) **Storage Coefficient (Storativity):** The volume of water an aquifer releases or takes into storage per unit surface area of the aquifer per unit change in head. It equals the product of specific storage and aquifer thickness.
- (54) **TDD:** Total Daily Demand.
- (55) **Total Daily Demand:** The total amount of water used or projected to be used each day by a household or facility, often expressed in gallons per day. In this Article, average daily demand and total daily demand shall be considered interchangeable.
- (56) **Test Well:** A water well drilled to gather data on water supply availability and

quality, and on aquifer characteristics.

- (57) **Transmissivity:** The rate at which water of a prevailing density and viscosity is transmitted through a unit width of an aquifer under a unit head gradient. Transmissivity equals hydraulic conductivity multiplied by aquifer thickness.
- (58) **Unsaturated Zone:** The zone between ground surface and the water table. Pore spaces in the unsaturated zone contain water at pressures less than atmospheric. Also referred to as “zone of aeration” and “vadose zone.”
- (59) **Water Table:** The surface for which water begins to fully occupy porespace. Water table depth (elevation) is measured by the level at which water stands in a well situated in a surficial aquifer.
- (60) **Well:** A hole or excavation larger than four inches in diameter or a hole or excavation deeper than 10 feet in depth that is drilled, bored, cored, driven, jetted, dug, or otherwise constructed for the purpose of removal of, or investigation of, or exploration for water, regardless of the intended use (e.g., residential, agricultural, industrial, etc.).
- (61) **Well Permit:** Refers to a written approval issued by Nockamixon Township authorizing the operation of a well or wells in accordance with the permit after the applicant has met the requirements of this Article, including but not limited to, submission of a final report under Section 234-120.B.3.
- (62) **Well Record:** A geologic log and the construction details of a well, which is completed by the well driller subsequent to well installation.

Section 234-111 Classification of Activities and Associated Requirements

A. Applicability of Article XIV. Unless otherwise specifically stated in this Article, all persons seeking subdivision and land development approval, any zoning approval (including but not limited to zoning permits and conditional use or special exception approval), building permits, and/or certificates of use and occupancy to construct additions or new buildings on an existing Lot, and who propose to drill and install a new water supply well, shall comply with the provisions of this Article XIV, as a condition of obtaining the relevant zoning or other permits. Section 234-111.B. and C. further identify who must obtain a well permit and who must register their well.

- 1. Classes. There are four classes of activities, land uses, projects, and/or wells according to proposed withdrawal amount, For the purpose of determining Class, the proposed withdrawal shall be the total withdrawal of all well/lots associated with the subject use, Land Development and/or Subdivision, as follows:
 - a. Class 1: proposed withdrawal is 1000 gallons per day (“gpd”) or less

- b. Class 2: proposed withdrawal is 2000 gpd or less, but greater than 1000 gpd
 - c. Class 3: proposed withdrawal is 10,000 gpd or less, but greater than 2000 gpd
 - d. Class 4: proposed withdrawal is greater than 10,000 gpd
2. Methods for determining the proposed withdrawal (i.e., the total daily demand (“TDD”)) are set forth in Section 234-112.E.2.
 3. Unless otherwise specified in this Article, in determining well class, the Applicant must consider all proposed uses of the proposed well. For example, if a proposed well is to serve a community building and landscaping operations in a large residential development, the projected water usage of both the community building and the landscaping operations would determine the well class.

B. Permit Requirement. Unless exempted by subsection C below, all wells, regardless of class, must obtain a well permit. The requirements for obtaining a well permit vary by class and by the proximity of existing wells and/or of streams and/or wetlands. These requirements are summarized in Table 234-111. Section 234-120 sets forth permit and registration application requirements and the Township’s review process. Additional standards are set forth below in Section 234-110.D. regarding multi-well projects.

C. Exemptions from Permit Testing Requirement; Well Registration Requirement for Exempted Activities.

1. The following types of land uses or changes to water wells are exempt from the well permit pump test and analysis requirements:
 - a. Applications for permits to construct building additions or accessory structures on an existing lot for Class 1 projects where the additional water extraction, if any, does not result in the lot extracting more than 150% of existing withdrawal or, 100 gallons per acre per day, whichever is greater.
 - b. Replacement of an existing well or alterations to an existing well that will not result in any increase in the equivalent dwelling unit (EDU) capacity of the lot.
 - c. Geothermal wells installed in a closed loop system. A closed loop system is one in which, groundwater is not extracted from and not discharged to the subsurface.
 - d. The well will be used for remediation of groundwater quality where said remediation is being conducted in accordance and in compliance with PaDEP regulations.

e. Modification or replacement of Class 1, 2, and 3 wells for existing Agricultural uses (uses consistent with Use A-1 Agricultural and Horticulture, A-4 Accessory Agricultural Sales, and A-7 Nursery & Greenhouse, of the Zoning Ordinance).

2. Exempted activities still must register a new well and any alterations to, or replacement of, an existing well (including but not limited to increases in water withdrawal) as a condition of making such changes or drilling such well.

a. This registration must include documentation of compliance with the well construction requirements in Sub-Article XIV-C.

b. Water quality testing under Sub-Article XIV-B, while not required for exempted activities, is recommended.

c. Exempted activities still must comply with and are subject to the general requirements of Sub-Article XIV-D (not including testing and analysis requirements).

D. Multi-Well Projects. Multi-well projects pose challenges in determining the availability and potability of water not present when an Applicant is seeking to install one well, or an additional building on a property with a new well. Examples of multi-well projects include, but are not limited to: residential subdivisions and business parks that propose the creation of multiple lots with proposed individual on-lot wells for each home, business, or lot; and multiple community wells shared with homes within a residential subdivision. The process below is the Township testing and review process for multi-well projects. Nothing in this subsection exempts multi-well projects from the other requirements in Article XIV, the Township's Zoning Ordinance, or the Township's Subdivision and Land Development Ordinance, including but not limited to well construction standards and responsibility for adverse impacts to neighboring wells, as set forth in Sub-Article XIV-D, and application requirements set forth in Section 234-120.

1. Testing Process

a. Pre-Decisional Development-Wide Testing

i. This testing shall be used by the Applicant and the Township to provide guidance on the amount of lots, homes, or other uses within the development that the aquifer may be capable of sustaining without harming neighboring uses and local natural resources.

ii. In determining the project class for pre-decisional development-wide testing, the Applicant must consider all proposed uses throughout the development and their water needs. For example, if a development project proposes 40 homes and a

community building, the total amount of projected water usage for the entire development will determine the well class and associated requirements (e.g., number of observation wells, whether extending monitoring must be conducted, parameters for a baseflow analysis).

iii. Number of and Location of Test Wells.

a. Small multi-well projects shall install the same number of test wells as there are production wells proposed for the small multi-well project. All test wells must be installed in the location of the proposed production wells and must be converted to production wells. The Township may require additional test wells depending on site conditions, including but not limited to the factors listed below for large multi-well projects.

b. Large multi-well projects shall consult with the Township on the number of and location of test wells to be installed for the development-wide test. Factors that the Township will consider include, but are not limited to: aerial extent of the proposed development; proposed layout of the development including ability to convert test wells to production wells; elevation change across development site; geologic features such as fracture locations; natural features such as streams/wetlands; and known water quantity/quality problem areas.

iv. Testing Multiple Wells.

a. All tests required by this Article, including any pumping tests and water quality tests, shall be performed on all proposed wells and/or all proposed septic systems (if septic analyses are required by Section 234-118) together.

b. For Class 2 small multi-well projects, the well located the closest to offsite well(s) must be tested based on rate/demand of all proposed wells combined to simulate worst case impact of proposed project. Remaining wells and all Class 1 small multi-well project wells shall be tested based on individual rate/demand required by this Ordinance.

c. In the alternate for Subsection b above, the applicant may choose to install all wells and test wells simultaneously based on individual rate/demand required by this Ordinance.

b. Post-Approval, Pre-Occupancy Individual Well Testing

1. Any individual well installed post-approval and that is to be used as a production well must undergo the pump test required by Sections 234-112 to 234-114, and the water quality sampling required by Sections 234-116 and 234-117. This testing must be performed as a prerequisite to obtaining a certificate of occupancy under Section 234-98 for each building or other structure to be served by the well.

2. Any observation well that is converted to a production well must undergo the pump test required by Sections 234-112 to 234-114, and the water quality sampling required by Sections 234-116 and 234-117. This testing must be performed as a prerequisite to obtaining a certificate of occupancy under Section 234-98 for each building or other structure to be served by the well.

3. Test wells installed as part of pre-development testing and that have been converted to production wells must undergo additional water quality sampling, in accordance with Sections 234-116 and 234-117, just prior to the intended occupancy of the structure being served by the well. Such testing shall be a prerequisite to obtaining a certificate of occupancy under Section 234-98 for each building or other structure to be served by the well.

E. Projects Subject to Multiple Agencies' Requirements

1. When a project is subject to the jurisdiction of the BCHD, the PaDEP, and/or the DRBC, materials used to satisfy those agencies' requirements shall be submitted as part of an application to the Township. Those materials may also be used to satisfy provisions of this Article and other applicable provisions so long as the materials contain and/or meet the standards under the Township's ordinances.

2. The Applicant shall coordinate with all applicable agencies to determine if the Applicant can conduct only one set of tests and analyses. The Applicant shall engage in such coordinated testing if all applicable agencies approve, and shall provide documentation of that approval to the Township as part of its application materials.

3. The Board may, upon request by an Applicant, and upon recommendation by the Township engineer and Zoning Officer, grant relief from the strict application of one or more requirements of this Article if the strict application would interfere with coordinated testing in accordance with all applicable agencies' requirements, including those of the Township. The Applicant shall demonstrate that the relief requested fulfills the purposes of this Article and results in the Applicant complying with a standard no less stringent than what this Article requires.

F. Conversion to Production Wells. All test wells must be converted to production wells, except as provided herein. Any test wells not converted to production wells must

be properly abandoned in accordance with the standards in Sub-Article XIV-C, unless the Township requires any unconverted well to be retained as a permanent monitoring well, in which case the well must be properly secured with a locking cap.

G. Emergency Permits. The Township may issue emergency permits for the correction of problems (either loss of water or loss of water quality) to an existing well that cause disruption of the availability of potable water. Any property owner requiring such emergency permit shall notify the Township of such water loss. The Township shall immediately issue an emergency permit upon confirmation of the emergency. The emergency permit shall be effective for 30 days only. After that period, the Permit Holder must comply with all applicable provisions of this Article, including obtaining a permit for a new well that may have to be drilled.

H. Violations. Failure of an applicant and a property owner to comply with this Article shall constitute a zoning violation, a threat to the public health, safety, and welfare of Township residents, and a nuisance.

I. When a conflict arises between the requirements of the Township's ordinances, including this Article XIV, and any requirement of the BCHD, the PaDEP, and/or the DRBC, the stricter standard shall apply.

Table 234-111 – Summary of Classifications and Requirements

Class	Exempted Activities	Class 1	Class 2	Class 3	Class 4
Examples	Replacing a well w/o increasing withdrawal Geothermal wells	Single family dwelling w/ 4 bedrooms 50 seat restaurant	4 small residence subdivision	10 unit apt. bldg. complex 100 student school	100 bed hospital 150 resident nursing home
Total Daily Demand ("TDD")	TDD ≤ 150% of exist withdrawal or 100 gal/ac, whichever is greater	TDD ≤ 1000 gpd	1000 < TDD ≤ 2000 gpd	2000 < TDD ≤ 10,000 gpd Prohibited if within 500 ft of an active well	TDD > 10,000 gpd Prohibited if within 1000 ft of an active well
Requirements					
<i>Is Permit Required?</i>	No. Only well registration.	Yes	Yes	Yes	Yes
<i>Is Successful Pump Test and Archival Required?</i> (Sections 234-112 to 114)	No, but recommended	Yes	Yes	Yes	Yes
<i>Is Contributing Area Analysis Required?</i> (Section 234-115.A)	No	Yes*, for multi well projects only, if an existing well is w/in 200 ft. of test well & is not avail. For observation.	Yes, if an existing well is w/in 500 ft. of test well & is not avail. For observation.	Yes, if an existing well is within 1000 ft. of test well and is not available for observation.	Required regardless of distance from test well to nearest existing well.
<i>Is Baseflow Analysis Required?</i> (Section 234-115.B.)	No	Yes*, if a perennial stream or a wetland is w/in 250 ft. of test well or withdrawal	Yes, if a perennial stream or a wetland is w/in 500 ft. of test well or withdrawal	Yes, if a perennial stream or a wetland is w/in 1000 ft. of test well or withdrawal	Required regardless of distance from test well to nearest perennial

		density > 100 gal/acre/day	density > 100 gal/acre/day	density > 100 gal/acre/day	stream or nearest wetland
<i>Water Quality Analysis?</i> (Section 234-116 to 117)	No, but recommended	Yes	Yes	Yes	Yes
<i>Septic System Water Quality Impact Analyses?</i> (Section 234-118)	No	No	No	Yes	Yes
<i>Well Construction Standards</i> (Sub-Article XIV-C)	Yes	Yes	Yes	Yes	Yes
<i>General Provisions</i> (Sub-Article XIV-D)	Yes (except test & analysis requirements)	Yes	Yes	Yes	Yes

- - Indicates not required for new or replacement wells for single dwellings constructed on lots existing prior to the date of adoption of this Ordinance.

SUB-ARTICLE XIV-A GROUNDWATER SUSTAINABILITY PROTECTION

Section 234-112 Groundwater Pump Testing Criteria and Standards

Table 234-112 Overview of Project Classification and Pump Testing Components

Test Component	Class 1 TDD ≤ 1000 gpd REQUIRED	Class 2 1000 < TDD ≤ 2000 gpd REQUIRED	Class 3 2000 < TDD ≤ 10,000 gpd REQUIRED	Class 4 TDD > 10,000 gpd REQUIRED

Baseline Assessment Phase	24 hours required, up to 1 week recommended	Same as Class 1	Same as Class 1	Same as Class 1
Peak Demand Phase				
<i>Flow Rate & Duration? (see below)</i>				
Residential:*	<p>Peak Demand Rate=(#baths)(3gal/min)</p> <p>Duration = (.66)(TDD/Peak Demand Rate)</p> <p>TDD = 100+(#bedrooms)(100 gal/day)</p> <p><i>See Section 112.E.2.a.</i></p>	Same as Class 1 Residential	Applicant may choose the Class 1 Residential method, or the Non-Residential method	Applicant may choose the Class 1 Residential method, or the Non-Residential method
Non-Residential:*	<p>Dependent on project (requires water use analysis report w/ project demand model)</p> <p><i>See Section 112.E.2.c.</i></p>	Same as Class 1 Non-Residential	Same as Class 1 Non-Residential	Same as Class 1 Non-Residential
Recording?	<p>Recording – every 5 sec. for the first 2 mins and then every 20 secs for the remainder of the duration. Every 20 secs for any observation well.</p>	Same as Class 1	Same as Class 1	Same as Class 1

Constant Head Phase				
<i>Flow Rate & Duration?</i>	Peak Demand Rate \geq Constant Head Pump Rate \geq TDD 2 hr min, 8 hr max duration	Peak Demand Rate \geq Constant Head Pump Rate \geq TDD 16 hr duration max	Peak Demand Rate \geq Constant Head Pump Rate \geq TDD 48 hr duration max	Peak Demand Rate \geq Constant Head Pump Rate \geq TDD 72 hr duration max
<i>Recording?</i>	Record every 30 min	Same as Class 1	Same as Class 1	Same as Class 1
Recovery Phase	Flow Rate=0 (pumping stops) and well observed for 24 hrs to determine if recovery of total drawdown occurs and to within 0.5 ft. of baseline levels	Same as Class 1	Same as Class 1	Same as Class 1
Extended Monitoring	<i>RECOMMENDED ONLY</i> Flow Rate \geq TDD with operating withdrawal schedule for 45 days then mini pump test for 2 days	Same as Class 1	Same as Class 1 Except REQUIRED when added drawdown in observation wells is greater than 1 foot but less than 2 feet	Same as Class 3

*Swimming Pools (requires external source of water for filling new pools and filling at beginning of each season, as set forth in Section 234-112.E.2.d.)

A. A groundwater pump test must be conducted at a sufficient rate and duration to determine aquifer characteristics such as transmissivity and storage coefficient. Groundwater pump tests are required for all well classes. As part of the pump test, test wells and observation wells (when observation wells are required as part of the test) shall be monitored as further provided in this Section. All phases of pump testing and reporting required below may be completed by well driller. Other analysis and reports required by this Ordinance shall be prepared by qualified engineer or hydrogeologist.

B. The pump test consists of the following phases. The first four phases are required and the fifth is recommended:

- (1) Baseline Assessment
- (2) Peak Demand
- (3) Constant Head
- (4) Recovery
- (5) Extended Monitoring (*recommended except **required** when Class 3 and 4 wells cause added drawdown in observation wells is greater than 1 foot but less than 2 feet, as further explained in Section 234-112.I.*)

C. General Pump Test Standards

1. In the event that the preliminary hydrogeologic evaluation indicates that a surface-water and/or groundwater divide separates the Lot in Question, a groundwater pump test will be required for each side of the divide.
2. The pump test(s) must be conducted at the location(s) most representative of site geologic conditions and locations most effective for evaluating the potential impacts to proximate users of the groundwater resource. Location of Class 1 wells shall also take into consideration convenience of location to proposed improvements. All wells shall comply with PaDEP/BCHD isolation requirements. The Applicant's decision shall be reviewed by the Township as part of its review of the Applicant's application materials. If it is not possible to meet objectives, then Applicant shall choose a location(s) to optimize location, subject to Township approval.
3. Section 234-114 of this Article outlines the requirements and procedures for notification of owners of existing wells and other groundwater sources (e.g., springs) within the Neighbor Notification Distance. Inadequate notification will require the pump test to be repeated after new notice.
4. Hydraulic fracturing (a.k.a. hydrofracking, hydrofracting).
 - (1) Any Applicant proposing to use hydraulic fracturing or a similar means to increase the yield of any well must notify the Township in advance.
 - (2) All relevant state, BCHD, DRBC, and/or federal permits for the use of hydraulic fracturing or other means being used to increase the well's yield must also be presented to the Township.
 - (3) The Applicant must also measure the amount of water put into the well to increase the well's yield, and provide that information in its post-test report along with a comparison to the amount of water

removed from the well. Any water put into the well must be potable, unless otherwise approved by the Township.

- (4) The Applicant must also, prior to commencing the pump test, remove the volume of water or other substance put into the well to increase the well's yield and allow the well to stabilize for 24 hours.

5. Precipitation.

- (1) No required phase of the pump test shall be conducted during a precipitation event or events in which total precipitation equals or exceeds 0.5 inches, or when any of the aforementioned precipitation events are forecast. With the exception of the following, a violation of this provision will require repeating the required phases of the pump test:

- i. If the length of the required phases of the pump test, when considered together, exceed three (3) days, precipitation exceeding 0.5 inches per day after the third day will not result in failure of the pump test as a whole. However, the Applicant's analysis must factor in the potential groundwater recharge from precipitation.
- ii. If over 0.5 inches of precipitation occurs during the recovery phase, the Applicant must either repeat the pump test beginning after a reasonable assessment phase, or provide precipitation amounts and technical documentation to show that the precipitation did not recharge the aquifer during the recovery and impair the test results. The requirement to repeat the test shall be at the Township's discretion if adequate documentation is not provided to verify that the test results were not impaired by precipitation. The extended monitoring phase shall be exempt from this requirement. For Applicants required to undertake extended monitoring, each Applicant shall monitor precipitation amounts and provide such data as part of its final analysis.

- (2) Precipitation must be recorded with a National Weather Service acceptable rain gauge on site during all phases of testing and measurements for each day must be included in the hydrogeologic report.

- (3) Precipitation shall include both snowfall and snowmelt.

6. Any pump test that must be repeated, restarted, or re-conducted at a reduced demand must satisfy all the requirements of this Article.
7. It is the Applicant's responsibility to collect sufficient data to determine hydrogeologic conditions and to ensure that any exogenous influences can be fully characterized, such as barometric pressure changes, or offsite pumping. Barometric measurements and additional water-level measurements can be made by the applicant to evaluate the change in water levels resulting from barometric pressure changes and/or influences from off-site pumping. If an applicant has insufficient data to assess these influences, it must repeat all required phases of the pump test. The earlier failure(s) will be taken into account during application review.
8. During all required phases of the pump test, water must not be withdrawn from any observation well installed by the Applicant. All testing must be repeated if there are insufficient observation wells as per this Article or if an observation well installed by the Applicant is pumped during any required phase of the pump test.
9. For neighboring wells that have been volunteered for observation, the well need not be fully shut down, including pump turned off, for the duration of required pump testing phases. However, lack of use is preferred. If neighboring volunteered observation wells are not fully shut down for any or all required phases of the pump test, the Applicant shall obtain available drawdown data from the volunteered observation wells, to differentiate neighboring observation well usage from the impacts of the Applicant's testing.
10. Depth-to-water measurements shall be made at the beginning and end of each pump testing phase.
11. General Recording and Equipment Requirements.
 - a. Test Well(s).
 - i. Measuring Equipment.
 - a. A calibrated meter(s) must be used to accurately measure the total volume of water pumped from the test well(s) and provide a digital reading of the flow rate. The total meter reading must be recorded prior to the start of peak demand phase, at the end of the peak demand phase, and at the end of the constant head phase. Calibration certificates for the meter(s) must be submitted with the final report. If the meter(s) has not been calibrated within one year of the testing date, the pump test must be repeated.

b. Calibrated loggers must be used to monitor the water level in the test well(s) throughout all phases of the pump test. Calibration certificates for the meter(s) must be submitted with the final report. If the meter(s) has not been calibrated within one year of the testing date, the pump test must be repeated.

ii. Pumping Equipment. All pumping equipment must have sufficient check valves to prevent backflow into the well from the water in the piping once the pump is shut down. If water drains back into the well from the piping, the test will be deemed to have failed and all required components of the pump test must be repeated.

b. Observation Wells. Observation wells shall be required to use a calibrated logger to measure water-level drawdown during the pump test and for the calculation of aquifer hydraulic characteristics. Calibration certificates for the meter(s) must be submitted with the final report. If the meter(s) has not been calibrated within one year of the testing date, the pump test must be repeated.

12. General Data Monitoring Requirements. All test and observation well(s) shall be monitored to determine and evaluate water-level drawdown, calculate aquifer characteristics, determine the radius of influence, determine added drawdown in observation wells, and predict and/or observe the effect of long-term pumping in the test well(s) on water levels in existing and future wells.

13. General Pumping Requirements.

- (a) If the flow rate varies by more than 10 percent, the entire test shall be repeated. The initial failure(s) will be taken into account during application review.
- (b) If the pump shuts down during any pumping phase, the entire test must be repeated. The test must be restarted at the beginning of the baseline assessment phase.
- (c) If water levels in the test well and/or observation wells exceed the measurement capacity of the devices used for measuring changes in water levels and measurements are not recorded with other devices in accordance with the requirements of this Article, the test must be repeated.
- (d) If the pumping data indicate a change in aquifer transmissivity as a result of fracture dewatering, all analyses of the contributing area and impacts to neighbors, streams, and wetlands must be conducted using the lower value of aquifer transmissivity. If this lower aquifer

transmissivity indicates that the anticipated demand cannot be supported by the aquifer beneath the site, the Applicant will need to review and adjust the proposed demand and/or extent of development. The Applicant's analysis must use transmissivity data obtained during the pump test.

- (e) The discharge from the test well(s) shall be directed so that it leaves the Lot in Question without infiltrating to the aquifer and/or impacting the observation wells. The pumped water discharge location must be at least 200 feet downgradient from the test well, whenever possible and shall not adversely impact adjoining properties. The Township may authorize the use of tanker trucks to contain the water if discharge is not possible due to lot or site conditions. Any and all permits required by the PaDEP and/or local authorities for the discharge of pumped water must be obtained prior to starting the test.

D. Baseline Assessment Phase

1. Baseline assessment phase testing shall commence no earlier than 3 days after the well is drilled so that water levels may stabilize.
2. The pumping equipment must be installed in the pumping well at least 24 hours prior to the start of the baseline assessment phase.
3. During the baseline assessment phase, a minimum of 24 hours of recording the water level with a five-minute frequency is required. Longer baseline assessment periods, such as one (1) week, may be undertaken to assess ambient fluctuations in the water level. It is the Applicant's responsibility to collect sufficient data to determine background conditions and to ensure that antecedent influences can be fully characterized.

E. Peak Demand Phase. The purpose of the Peak Demand Phase is to demonstrate that the well can provide the water required for peak usage.

1. Additional Standards.

On the day that the peak demand phase begins, water levels shall be collected from the test and observation wells to determine static water level conditions prior to the start of the phase.

(a) Water levels in observation wells on neighboring properties should be allowed to stabilize within a 0.5 foot of static prior to the start of pumping in the test well.

(b) For any observation well which has been pumped within the 24 hours preceding the peak demand phase, two depth-to-water

measurements, at least 1 hour apart, shall be collected to assess if the well has fully recovered prior to the start of pumping in the test well.

2. Peak Demand Phase Duration and Water Amount.

a. Class 1 and 2 Residential Projects

i. The flow rate shall be calculated as follows:

$$\text{Peak Demand Rate} = (\# \text{ of bathrooms})(3 \text{ gallons/minute})$$

ii. Total Daily Demand (“TDD”) must be calculated to determine the duration of the phase. The calculation shall be as follows:

$$\text{TDD} = 100 + ((\# \text{ of bedrooms})(100 \text{ gallons/day/bedroom}))$$

The first bedroom in every home shall be assumed to have two people in it (i.e., 200 gal/day). Every additional bedroom is assumed to have one person in it.

iii. The duration of the phase shall be calculated as follows:

$$\text{Duration} = (0.66)(\text{TDD}/\text{Peak Demand Rate})$$

b. Class 3 and 4 Residential Projects

These projects may choose between the Class 1 and 2 residential method, or the method specified for non-residential projects.

c. All Non-Residential Projects, Regardless of Class

i. All non-residential projects must submit a water use analysis report with a project peak demand model and must include at a minimum, a definition of duration and peak demand for the proposed project. The Applicant shall identify the means used to determine peak demand, and how its model, duration, and demand compare to established reference materials for non-residential uses (e.g., historic water meter records from equivalent uses/facilities, 25 Pa. Code Ch. 73 on-lot sewage design flow rates, published literature; PaDEP Public Water Supply Manual, most recent version of Guide for Determination of Required Fire Flow by the Insurance Services Office (ISO); American Water Works Association Standards and Manuals).

ii. The water use analysis report with project peak demand model must be approved by the Township in advance of the pump test being conducted. As part of its review, the Township may refer to published estimates of water usage to assist it in evaluating the Applicant's proposal.

d. Swimming pools regardless of project type.

Initial filling of new swimming pools, and filling of swimming pools at the beginning of each new season, shall be completed from a source other than an onsite water supply well per Chapter 222. "Top-offs" of already-filled pools from onsite water supply wells are not prohibited, in accordance with Article VI, 228-26

3. Recording Protocol For All Projects

a. Recordings from the test well shall be taken every five (5) seconds for the first two (2) minutes, and then every 20 seconds for the remainder of the duration of the phase.

b. Recordings from each observation well shall be taken every 20 seconds for the duration of the phase.

c. Confirmation of Meter Calibration. A calibrated bucket and stopwatch or a properly sized orifice and manometer system constructed in accordance with the Layne & Bowler protocol must be used to confirm the accuracy of the meter readings. The calibrated bucket and stopwatch method can be used for flow rates less than or equal to 10 gallons per minute. For flow rates in excess of 10 gallons per minute, an orifice and manometer system must be used to determine the flow rate. The flow rate as measured with the bucket/stopwatch shall be recorded periodically to verify consistent flow rate. Orifice and manometer must be recorded at the same frequency and duration as specified for recordings from the test well using a meter. All measurements along with the clock time, and the elapsed time since the peak demand phase started must be included in the final report.

4. If the well cannot be pumped at the required flow rate for the required duration, as calculated by the Applicant in accordance with this Article, the Applicant fails the Peak Demand Phase.

F. Constant Head Phase. This phase assesses the aquifer's ability to sustainably supply water on a daily basis.

1. General Requirements.

- a. This phase must begin immediately after the Peak Demand Phase without cessation of pumping.
- b. To obtain a constant head pump rate, the flow rate shall be incrementally decreased (or stepped-down) from the Peak Demand rate until a constant head is achieved in test well. A constant head is achieved when the change in head is less than 0.5 feet for a one hour period after the cessation of the Peak Demand Phase while the test well is being pumped at a flow rate that is equal to or in excess of the Total Daily Demand, but less than or equal to the Peak Demand Rate. If a constant head is not maintained, the Applicant fails the Constant Head Phase.
- c. When stepping the flow rate down, the flow rate must be incrementally reduced such that the water level in the well remains within 10 feet of the depth to water measurement made at the end of the Peak Demand Phase. For example, if at the end of the Peak Demand Phase, the water level in the well is 250 feet below ground surface, then for the Constant Head Phase, the water level in the well must be maintained below 240 feet below ground surface. If the water level increases more than 10 feet, then the flow rate should be increased to lower the water level to a point within 10 feet of the depth at which, the water level was measured at the end of the Peak Demand Test.
- d. The required duration of the Constant Head Phase, as specified below, shall begin after the constant head is achieved as set forth above.
- e. If the water level in the test well or any observation well changes more than 0.5 feet per hour, and/or the flow rate drops below the Total Daily Demand, the Applicant fails the Constant Head Phase and must restart the pump test at the baseline assessment phase.
- f. The Applicant may not pump the well at a rate lower than what will maintain a constant head in the well, even if the lower rate is still equal to or in excess of the Total Daily Demand. If the Applicant violates this provision, the Applicant fails the Constant Head Phase and must restart the pump test at the baseline assessment phase.
- g. All requirements set forth in Section 234-112.C. above shall also be met. To the extent there is a conflict, the stricter provision shall apply.

2. Constant Head Phase Duration and Water Amount.

- a. Class 1 and 2 projects. To pass the Constant Head Phase, the Applicant must remove a volume of water equal to the TDD while maintaining a constant head pump rate. Duration shall be as follows:

- i. Class 1: Minimum of 2 hours and a maximum of 8 hours.
- ii. Class 2: Minimum of 4 hours and a maximum of 16 hours.
- b. Class 3 and 4 projects. To pass the Constant Head Phase, the Applicant must remove a volume of water equal to **twice** the TDD while maintaining a constant head pump rate. Duration shall be as follows:
 - i. Class 3: Minimum of 8 hours and maximum of 48 hours.
 - ii. Class 4: Minimum of 16 hours and maximum of 72 hours.

3. Recording Protocol for All Projects. Recordings shall be taken from the test well and each observation well every 30 minutes for the duration of the phase.

G. Recovery Phase. This phase is the final step in the pump test.

1. General Requirements.

- a. All pumping must cease, after which recovery in the test well and all observation wells shall be monitored.
- b. Full recovery of total drawdown and to within 0.5 feet of baseline assessment phase conditions must be obtained in all wells.
- c. If such recovery is not obtained within 24 hours of pumping cessation, the well fails the test.

2. Recording Protocol for All Projects.

- a. The test well must be monitored every five (5) seconds for the first two (2) minutes after pumping stops, and then every 20 seconds for the remainder of the recovery phase duration.
- b. Observation wells must be monitored every 20 seconds for the duration of the recovery phase.

H. Extended Monitoring Phase

1. The extended monitoring phase is optional except for Class 3 and 4 applicants when the pumping test results in added drawdown of greater than 1 foot but less than 2 feet in any observation well.

2. The extended monitoring phase consists of the following components, which may be completed in any order:

- a. 45 Day Period at Operating Withdrawal Schedule.

i. The purpose of this phase is to determine whether there is a gradual declining trend due to the withdrawal.

ii. During this phase, water levels in the test well shall be recorded over a 45-day period at a 30-minute frequency. The well shall be operated on a cycling schedule based on the anticipated total daily demand and, where present, storage tank volume.

b. Two-Day High Frequency Recording (“Mini Pump Test”).

i. The purpose of this component of testing is to accurately characterize the drawdown/recovery relation of the well and aquifer.

ii. This test component consists of high frequency recording every 5 seconds over two days. Both water level and flow rate must be monitored.

a. During the first part of this test, the pump remains on until a constant head is achieved.

b. Once a constant head is achieved, the second part of the test begins. The pump must be shut off and head recovery must be observed. This procedure allows for determining the transmissivity and storage properties of the aquifer in the vicinity of the well.

3. Analysis of Data Obtained. The Applicant shall compare the data obtained through the extended monitoring phase to expected seasonal water level changes for the local area and the geology in which the test well is proposed. The Applicant shall account for measurement noise, and identify to what extent that influences the test results. The Applicant shall also determine storage and transmissivity based on data from the mini pump test phase using the Cooper, Bredehoeft, Papadopolos method.

4. Observation Well Monitoring.

a. Observation wells installed by the Applicant must be monitored for the duration of the entire extended monitoring phase.

b. If neighboring wells have been volunteered for observation, they must be monitored unless the neighbors withdraw consent for continued observation during the extended monitoring phase. Retesting is not required if consent is rescinded after test begins.

I. Failure Standards For Observation Well Added Drawdown - Required Phases of Pump Test (Excluding Extended Monitoring Phase)

1. If the added drawdown is measured to be more than 1 foot, but less than 2 feet, in any observation well, the Applicant's qualified hydrogeologist shall perform another pumping test, but with a modified Constant Head Phase.

a. This modified phase shall be conducted at the same flow rate as the initial pumping test. The use of any lower flow rate will result in test failure.

b. Duration and yield requirements for modified Constant Head Phase:

Class 1: test well must be pumped to yield one day of TDD while maintaining a constant head condition. If this cannot be done in 8 hours or less from when the modified Constant Head Phase began, the test well fails.

Class 2: test well must be pumped to yield two days of TDD while maintaining a constant head conditions. If this cannot be done in 48 hours or less from when the modified Constant Head Phase began, the test well fails.

Class 3: test well must be pumped to yield four days of TDD while maintaining a constant head conditions. If this cannot be done in 72 hours or less from when the modified Constant Head Phase began, the test well fails.

Class 4: test well must be pumped to yield four days of TDD while maintaining a constant head conditions. If this cannot be done in 96 hours or less from when the modified Constant Head Phase began, the test well fails.

c. Further analysis shall also be required by the Township engineer or an independent qualified hydrogeologist on behalf of the Township, including but not limited to pumping tests of observation wells not volunteered by neighbors.

d. Class 3 and 4 Applicants must also engage in extended monitoring, as set forth in Section 234-112.H. above.

2. If added drawdown of 2 feet or more is measured in any observation well, then the Township shall not issue an approval or permit and the aquifer will be deemed to have insufficient capacity to support the proposed demand and/or extent of development. The Applicant shall review and adjust the proposed demand and/or extent of development and proposed well locations to ensure that added drawdown will not exceed 2 feet in any observation well.

J. Review of Extended Monitoring Phase Data. If the data shows a declining water

level over the period of extended monitoring, after a comparison to expected seasonal water level changes and measurement noise, the Township will make a determination based on the data as to whether the Applicant must revise the project or take some other action.

Section 234-113 Observation Well Requirements

Table 234-113 Observation well requirements by project class

Test Component	Class 1 TDD ≤ 1000 gpd	Class 2 1000 < TDD ≤ 2000 gpd	Class 3 2000 < TDD ≤ 10,000 gpd	Class 4 TDD > 10,000 gpd
Observation wells required?	<p>*Not required if nearest existing well is more than 1000 ft away from the boundary of the lot on which the test well is proposed.</p> <p>No new observation wells need to be installed.</p> <p>*Monitoring wells not required for test new or replacement wells for a single dwelling on a lot existing prior to the date of adoption of this Ordinance</p>	<p>If wells exist within 1000 ft. of the boundary of the lot on which the test well is proposed, but are unavailable for testing, then at least one observation well must be installed between the test well and the closest neighboring well.</p>	<p>Same as Class 2</p> <p>Additionally, if no wells are available within 1000 ft. of the boundary of the lot on which the test well is proposed, one observation well upgradient of the test well and one observation well downgradient of the test well must be installed as close as practical to property boundary but neither observation well may be less than 90 degrees apart.</p>	<p>If wellheads exist within 2500 ft. of the boundary of the lot on which the test well is proposed, but are unavailable for testing, an observation well must be installed as close as possible to the neighboring well.</p> <p>Additionally, if no wellheads are available within 1000 ft. of the boundary of the lot on which the test well is proposed, one observation well upgradient of the test well and one observation well downgradient of the test well must be installed as close as practical to property boundary but</p>

				neither observation well may be less than 90 degrees apart.
Requests from Neighbors	Must accommodate requests from well or other groundwater source owners with such groundwater sources within 1000 ft of the boundary of the lot on which the test well is proposed	Same as Class 1	Must accommodate requests from well owners or other groundwater source owners with such groundwater sources within 2500 ft of the boundary of the lot on which the test well is proposed	Same as Class 3

- A. The test well(s) shall not be used to meet the observation well requirements. Multi-well projects should refer back to Section 234-111.D for requirements on pumping test wells.
- B. Any new wells drilled for observation purposes shall be completed to at least the same depth as the test well and intersect the same beds. In addition, Class 3 and 4 projects must determine the strike and dip of bedding and complete any newly-installed observation wells in accordance with the dip trend.
- C. All observation wells must be located and constructed in accordance with the standards set forth in Sub-Article XIV-C.
- D. The Township, in its review of the Applicant's plans, may require additional observation wells, changes in the location of proposed new observation wells, or other revisions pertaining to observation wells to ensure an accurate analysis of, among other things, potential impacts to neighbors.
- E. The Township may also authorize the Applicant to use any existing wells on the lot as observation wells.
- F. All observation wells installed as part of the pump test and that will not be used as part of the development or other land use shall be properly abandoned in accordance with Sub-Article XIV-C, unless the Township requires any such

observation wells to be retained as a permanent monitoring well, in which case the well must be properly secured with a locking cap.

- G. Well casings and ground surface elevations for the test well and the observation wells shall be surveyed to a common datum.
- H. The location of all test and observation wells shall be recorded by latitude/longitude coordinates (NAD 83) together with the USGS Datum elevation of the well head casing. The horizontal location of the well should be accurate to within +/- 10 feet and the elevation above the USGS Datum to within one foot.

Section 234-114 Neighbor Notification Requirements

A. Notification

- (1) The Applicant shall notify owners of existing wells and other groundwater sources (e.g., springs) with such water sources located within 1,000 feet (for Classes 1 and 2) and 2500 feet (for Classes 3 and 4) of the boundary of the lot on which the test well is proposed (the Neighbor Notification Distance) and shall be given an opportunity to have their wells/springs monitored during groundwater pump testing.
- (2) The Applicant must send notice via certified mail at least 45 days prior to the pump test to every qualifying property owner within the Neighbor Notification Distance and shall state the time and place of the pump test. An example notice acceptable to the municipality, and sample access agreement, is included as Appendix A.
- (3) The notice shall indicate that such existing well or other well head may be monitored, if agreed to by the well head owner, provided the well head is readily accessible as determined by the Township Engineer. Such notice shall indicate that the well head owner must respond within seven (7) days of notice receipt and the Applicant's responsibility is to monitor groundwater sources on properties located within the Neighbor Notification Distance when such owners request monitoring (where wells are reasonably accessible), and the Township and, where applicable, BCHD, PaDEP and/or DRBC, approves monitoring of volunteered wells.
- (4) The Applicant shall provide a certificate of insurance for itself and all contractors utilized and pay all costs associated with the monitoring of any existing residential well or other residential groundwater source.
- (5) All wells and equipment installed in each well or other groundwater source shall be disinfected each time they are opened for service or monitoring, unless the owner specifically waives the requirement for disinfection in writing.

- (6) The costs of extending, restoring or replacing a well and any ancillary well equipment (e.g., well hardware such as pumps and wires), or restoring or replacing any other groundwater source damaged as a result of testing shall be the responsibility of the applicant.
- (7) The applicant shall indemnify and hold the Township and its consultants and representatives harmless from any liability in connection with these testing requirements.

B. Response.

- (1) If the owner of a well or other groundwater source within the Neighbor Notification Distance volunteers to have his/her existing well or other groundwater source monitored, such owner shall notify the Applicant by certified mail or such other means that provide proof of when the notification was sent.
- (2) Such response shall be sent within 7 days of receipt of the certified notice from the Applicant.
- (3) If the Applicant receives no response within 14 days of when the Applicant sent the certified notice, the response shall be deemed to be negative.

C. Protection of Monitored Groundwater Source and Selection of Sources for Monitoring.

- (1) All reasonable efforts must be made to protect the potability of water from the monitored well or other groundwater source.
- (2) In the case when more than three water well or other groundwater source owners within the Neighbor Notification Distance decide to participate and to have their existing wells or other groundwater sources monitored, the Applicant shall consult with the Township and, as applicable, BCHD, PaDEP and/or DRBC, to determine a maximum number of wells to be monitored.
- (3) A map depicting the location of all wells or other groundwater sources to be monitored and a list of all individuals within the Neighbor Notification Distance that requested monitoring is to be submitted to the Township's Qualified Hydrogeologist for review and approval prior to implementing the test.
- (4) The observation wells and other groundwater sources on neighboring properties should be selected to assess the water-level drawdown impacts from the test well.

- (5) The Township reserves the right to retain a qualified hydrogeologist to review the proposed monitoring locations and to make recommendations to revise the locations to be monitored.

Section 234-115 Additional Groundwater Sustainability Analyses

This section specifies additional analyses to determine impacts to neighboring wells, perennial streams, ponds, lakes, reservoirs, and/or wetlands. When these analyses are required, as described below, they must be conducted. Septic system discharges may not be used in recharge calculations.

A. Contributing Area Analysis. This analysis examines how the addition of a new groundwater well within a certain distance of an existing well affects the contributing area to the existing well at the proposed well's total daily demand.

1. Thresholds for the Analysis. An Applicant must conduct a contributing area analysis under the following circumstances:
 - a. Class 1: when an existing well is within 200 feet of a proposed new well, and that existing well is not available for observation. Contributing area analysis is **not required for new or replacement wells for single dwellings constructed on lots existing prior to the date of adoption of this Ordinance, or new single well/lot residential projects.**
 - b. Class 2: when an existing well is within 500 feet of a proposed new well, and that existing well is not available for observation.
 - c. Class 3: when an existing well is within 1000 feet of a proposed new well, and that existing well is not available for observation.
 - d. Class 4: when an existing well is within 2500 feet of a proposed new well, , and that existing well is not available for observation.
2. Analysis.
 - a. Applicants must all use data obtained from the pump testing process, including any quantity data obtained from neighboring wells volunteered for observation during the testing.
 - b. When existing wells within the analysis range are present, but are not volunteered for observation, the Applicant must also use existing water quantity data and assumed operating conditions of the unmonitored existing wells to model the contributing area impact. The existing data must be representative of the geology in which the existing and proposed wells are located. Operating conditions assumed based on the unmonitored existing wells must be consistent with the type of land use

being served by the well(s) and existing literature on typical water demands. When modeling the impact, the assumptions on which the Applicant's model is based must be applicable to the geologic and other site conditions on the Lot and the surrounding area. The model used by the Applicant must also be one commonly used by qualified hydrogeologists.

3. Failure Standards.

a. When actual data exists from neighboring wells, the failure standards for the contributing area analysis shall be the same as the observation well added drawdown failure standard for the pump test.

b. When an Applicant must model the impact on neighboring wells, the following failure standards apply:

- 1) If the added drawdown is projected to be more than 1 foot, but less than 2 feet, at any existing unmonitored well, the Applicant's qualified hydrogeologist shall engage in modeling that has a modified Constant Head Phase as set forth under Section 234-112.I.1. Further analysis shall also be required by the Township engineer or an independent qualified hydrogeologist on behalf of the Township.
- 2) If added drawdown of 2 feet or more is projected in any existing unmonitored well, then the aquifer will be deemed to have insufficient capacity to support the proposed demand and/or extent of development. The Applicant will be required to review and adjust the proposed demand and/or extent of development and proposed well locations to ensure that added drawdown will not exceed 2 feet in any existing unmonitored well.

B. Baseflow Analysis. This analysis examines whether a proposed well will reduce or eliminate baseflow to nearby perennial streams and/or nearby wetlands, lakes, ponds, and/or reservoirs at the proposed well's total daily demand or otherwise adversely reduce or eliminate recharge to such water resources due to increased withdrawal density.

1. Thresholds for the Analysis. Except as provided in Section 234-115.B.4, an Applicant must conduct a baseflow analysis under the following circumstances:

a. Class 1: if a perennial stream or a wetland, lake, pond, and/or reservoir is within 250 feet of the proposed well, or the proposed withdrawal density is greater than 100 gallons per acre per day ("g/a/d"). **The baseflow analysis is not required for new or replacement wells for single dwellings constructed on lots existing prior to the date of adoption of this Ordinance, or new single well/lot residential projects.**

b. Class 2: if a perennial stream or a wetland, lake, pond, and/or reservoir is within 500 ft of the proposed well, or the proposed withdrawal density is greater than 100 gallons g/a/d

c. Class 3: if a perennial stream or a wetland, lake, pond, and/or reservoir is within 1000 ft of the proposed well, or the proposed withdrawal density is greater than 100 g/a/d

d. Class 4: Required for all applicants regardless of distance to nearest perennial stream or nearest wetland, lake, pond, and/or reservoir, and regardless of withdrawal density.

2. Analysis.

a. Applicants must use all data obtained from the pump testing process, including any quantity data obtained observation wells, including from neighboring wells volunteered for observation during the testing.

b. Applicants may either model the impact of the test well or choose to install one or more piezometers and stream gauges to assist with the baseflow analysis. If the Applicant installs stream or other surface monitoring devices, it shall follow protocols and guidance established by the DRBC, PaDEP, and/or Susquehanna River Basin Commission. If the Applicant models the impact, all assumptions on which the model is based must be applicable to the geologic and other site conditions on the Lot and the surrounding area. The model must also be one commonly used by qualified hydrogeologists.

3. Failure Standards. If drawdown is measured or projected:

a. To induce leakage from perennial streams and/or from wetlands, lakes, ponds, and/or reservoirs and/or

b. Deplete recharge, such that baseflow in such water resources will be diminished, depleted, or dewatered either in the short-term or over time, then the proposed demand and/or extent of development must be reduced to prevent adverse impacts to the perennial streams and the wetlands, lake, pond, and reservoir.

4. Exemption. Lakes and ponds wholly on the Lot on which the well is being tested are exempt from this analysis. The Applicant shall report in its final report all visible reductions or impacts in the lake or pond that occur during pump testing.

**SUB-ARTICLE XIV-B GROUNDWATER WATER QUALITY EVALUATION FOR
WATER WELLS**

Section 234-116 Groundwater Quality Testing

The purpose of the following groundwater quality testing requirements is to determine the potability of water to be withdrawn. In the event that one or more constituents do not meet applicable drinking water standards, standard treatment systems need to be readily available. If treatment systems are not available, the project must be abandoned. Water quality testing is required for all Applicants.

Section 234-117 Water quality analysis.

A. Each Applicant shall perform a water quality analysis. Registrants need not perform a water quality analysis, but it is highly recommended.

B. Water samples shall be collected and analyzed from each test well and each observation well installed by or under the control of the Applicant. One sample from each well shall be collected within the last hour of the constant head phase of the pump testing.

i. Multi-well projects must also comply with the post-approval, pre-occupancy testing requirements specified in Section 234-111.D.

ii. When initial water testing performed by the Applicant shows that water quality in certain production wells is noncompliant with the applicable drinking water standard, and therefore treatment mechanisms are required, Class 2 and above Applicants must retest water quality in the affected production wells as a prerequisite to obtaining a certificate of occupancy under Section 234-98 for each individual lot with an affected production well.

C. Water quality analyses must include the constituents listed below, be conducted to determine compliance with federal and Pennsylvania maximum contaminant levels (“MCLs”), whichever is more protective of water quality, and be analyzed by a Certified Laboratory. Current federal and Pennsylvania maximum contaminant limits are set forth below for Class 2 and above wells. These MCLs shall also apply to Class 1 wells. When federal or Pennsylvania MCLs are amended and/or updated, the new MCL shall apply in place of the standard listed below.

- (1) Class 1 wells:
 - Total Coliform
 - Fecal Coliform
 - E. coli
 - Nitrate
 - Iron
 - Manganese
 - pH

All Volatile Organic Compounds for which maximum contaminant levels (MCLs) have been established by federal and state law

Lead
Arsenic
Mercury
Copper
Total Dissolved Solids
Hardness
Gross Alpha Particle Activity
Total of all chlorinated alkanes and alkenes

(2) Class 2 and above wells:

(a) Physical Characteristics.

Turbidity 1 NTU units
Color 15 Color units
Threshold Odor Number 3 units
pH 6.5 - 8.5

(b) Chemical Characteristics.

Antimony 0.006 mg/L
Arsenic 10 micrograms/L
(ppb) (As+3 plus As+5)
Chloride 250 mg/L (ppm)
Chromium 0.1 mg/L (ppm)
Copper 1 mg/L (ppm)
Iron 0.3 mg/L (ppm)
Lead 15 micrograms/L
(ppb)
Sodium 20 mg/L (ppm)
Manganese 50 micrograms/L
(ppb)
Mercury 0.002 mg/L (ppb)
Nitrogen (as Nitrate + Nitrite) 10 mg/L (ppm)
Hardness 250 mg/L (ppm) as
CaCO₃
Detergent 0.5 mg/L (ppm) as
MBAS
Total Dissolved Solids 500 mg/L (ppm)
Total of all chlorinated alkanes and
alkenes 5 micrograms/L
(ppb)

MTBE - methyl tertiary butyl ether . . . 20 micrograms/L
(ppb)

(c) Bacteriological Characteristics.

Total coliform Presence/Absence
Total Plate Count Less than 500 CFU
per ml
Fecal Coliform Presence/Absence
E.coli Presence/Absence

(d) Radionuclides.

Gross Alpha 15 pCi/L
Combined Radium (226 + 228) 5 pCi/L

(e) The samples shall also be analyzed for volatile organic compounds for which the USEPA or PaDEP has determined MCLs using USEPA Method 524.2.

D. The Township may require additional testing of the Applicant, regardless of well class, for contaminants associated with the historical land uses of and/or operations on the Lot on which the proposed well is to be located to assess current and potential future impacts.

E. Based on past historical land uses and/or operations at nearby properties, the Township, in its discretion, may require additional analyses of the groundwater, regardless of well class, to assess current and potential future impacts.

F. The water quality analysis shall contain the results from each well. It shall also contain the range of values, and drinking water standard values as set forth in the Federal and Pennsylvania Safe Drinking Water Acts and associated regulations. All laboratory analyses shall be performed by a Certified Laboratory and shall be included in the study.

G. The analysis shall also contain any available water quality data that is obtained from nearby, adjacent groundwater sources including data collected by Nockamixon Township or from other studies performed for other developments with the Township or within one mile of the perimeter of the site.

H. No Well Permit will be issued for any lot unless the water quality of the well meets these standards or unless the plans for the proposed building, structure, and/or other development include detailed plans for a treatment system to bring the water into compliance with these standards. The plans must be certified by a professional engineer or other qualified individual.

I. The Applicant must agree that in the event the water is not in compliance with the aforementioned standards, that the Applicant will give the purchasers of the property (if different than the Applicant) a copy of the water results from the Certified Laboratory specifying each contaminant which does not comply with the standards and a written description (including plans) of the treatment system that will be installed to bring the water quality into compliance together with instructions as to how the system must be maintained.

Section 234-118 Septic System Water Quality Impact Analyses for Class 3 and 4 Applicants.

Each proposed septic system must complete this analysis, which is an evaluation of the potential impacts to groundwater quality from the discharge of domestic wastewater through a septic system. Septic system discharges may not be used in recharge calculations. These analyses are only required of Class 3 and 4 Applicants.

A. Post-Pump Test Evaluation Using Nitrate Dilution Model For On-Site Sewage Disposal Systems.

1. Applicants must provide a nitrogen dilution model (“NDM”) to predict the water quality impacts of on-site wastewater disposal systems. The model shall include an analysis of the nitrogen loading, the predicted concentration of nitrate at the property line, the septic effluent leach field area and precipitation input. Specific standards for this model are provided within the nitrate dilution models of the New Jersey Department of Environmental Protection (N.J.A.C. 7:15-4.5(c)), and the septic dilution model of the State of New Jersey Pinelands Commission.¹ An example of the use of an NDM is the method of Trela-Douglas. An equivalent PaDEP model may also be used.

2. In order to assure the availability of reliable and safe water supply to support the intended land uses and to protect the aquifer, no development, regardless of size, shall be approved which will increase nitrates by half the distance to 10 ppm from background nitrate level (taken from the water quality analysis under Section 234-117) as measured by a Certified Laboratory. The formula for calculating the maximum target nitrate concentration allowable is to subtract the background concentration of nitrate from 10 ppm and divide that number in half and add that to the background concentration of nitrate.

$$\text{Target nitrate concentration} = \text{Background conc.} + \frac{(10 \text{ ppm} - \text{Background conc.})}{2}$$

¹ <http://www.state.nj.us/pinelands/appli/tools/#7>

B. Class III and IV Applicants shall include a groundwater quality analysis for the dry year nitrate impact of on-site sewage disposal systems within the proposed subdivision. In particular, the analysis must include an estimate of the increase in nitrogen (nitrate, nitrite and ammonia) concentrations in the ground water and provide a discussion of background nitrogen concentrations. The analysis shall also include an estimate of the nitrogen concentration in the ground water beneath the downgradient property boundaries during the fifty-year drought.

SUB-ARTICLE XIV-C WATER WELL CONSTRUCTION REQUIREMENTS

Section 234-119 Construction and abandonment standards.

A. The following well construction standards are required:

(1) All wells shall be of the drilled type, cased and grout sealed into the bedrock.

(2) Well Depth. All wells shall be drilled to a minimum depth of 100 feet or to a greater depth to meet the requirements of the pump testing required by this Article. In addition, all wells must be drilled to a depth such that the minimum flow rate is 3 gallons/minute. The Board, after review and recommendation from the Township Engineer and the Zoning Officer, may allow a lower minimum flow rate of no less than 1 gallon/minute if an Applicant meets the following criteria:

- a. The Applicant is proposing a Class 1 well for a new single-family detached dwelling on a lot that was created prior to the enactment of this ordinance.
- b. The lot has never been developed or otherwise built on and is vacant.
- c. The Applicant is not proposing to subdivide the lot.
- d. The 3 gallon/minute required minimum flow rate would prevent the Applicant from constructing a single-family detached dwelling on the lot.
- e. The Applicant has passed the pump test required under this Article.
- f. The Applicant can and will provide adequate storage to accommodate daily demand.

g. The Applicant can demonstrate that a lower flow rate will not adversely impact the long-term availability of water for its use and surrounding property owners.

h. The Applicant provides notice that it intends to seek a lower flow rate to property owners within the Neighbor Notification Distance.

(3) Location.

(a) Every well shall be located in keeping with the following principles; except that replacement wells which will serve existing uses may be located where most appropriate based on topography and property size:

[1] At the highest point in the premises consistent with general layout and surroundings, but in any case, protected against surface wash.

[2] As far removed from any known or probable source of contamination as the general layout of the premises and the surroundings permit.

[3] At a distance of at least 100 feet from the septic system and located on the opposite side of the dwelling from the septic system and upgradient.

[4] Not located along a fracture or set of fractures intersecting the septic system or any other potential sources of pollutants.

[5] Within the minimum building setbacks as provided in the Township's Zoning Ordinance.

[6] Not located within any floodplain identified by FEMA mapping and/or site specific calculations.

[7] Not located within any riparian corridor, being measured 75 feet from top of watercourse bank.

[8] Prohibition on Placement of Class 3 and 4 wells. Class 3 wells are prohibited within 500 feet of an existing, active well. Class 4 wells are prohibited within 1000 feet of an existing, active well, unless well/property is in common ownership.

[9] When identifying proposed test well locations, the Applicant shall consider the layout of its proposed

development such that, when possible, test wells can be converted to production wells. Any test wells not converted to production wells must be properly abandoned in accordance with the standards in Sub-Article XIV-C, unless the Township requires any unconverted well to be retained as a permanent monitoring well, in which case the well must be properly secured with a locking cap.

(b) Minimum distances between wells and sources of contamination shall be in accordance with requirements of Nockamixon Township and the distance standards set forth in the BCHD's water well regulations and PaDEP regulations (e.g., re: distances from on-lot sewage disposal systems)

(c) With respect to buildings, the location of a well shall be made as follows:

[1] When a well is located adjacent to a building, it shall be located so that the centerline of the well extended vertically will clear any projection from the building by not less than two feet.

[2] Every well shall be located so that it will be reasonably accessible with proper equipment for cleaning, treatment, repair, test, inspection and such other attention as may be necessary.

[3] No well shall be located so that the top thereof will be within the basement of any building nor under a building having no basement.

(4) Well Casings. All wells shall be cased for a minimum of 10 feet into bedrock or a minimum of 50 feet from land surface, whichever is deeper. All casings shall be provided with a pitless adapter or a sanitary seal. All casings shall be in accordance with PaDEP, BCHD, and all other applicable rules and regulations, and current technology. Casing materials selected shall form a seal between the casing and the bedrock. All casings shall be raised at least 18 inches above final grade. Where a pump section or discharge pipes enter or leave a well through the side of the casing, the circle of contact shall be water tight. The annular space between the earth and outside of the casing shall be filled with cement grout or Bentonite to a distance of at least six feet below the ground surface.

(5) Well Casing Pipe. The minimum standard of quality for well casing pipe shall be new steel with a weight of 19 lbs. per linear foot, sized six-inch in diameter or greater.

(6) Connections and Joints. All connections to a well casing shall be correctly mated threaded pipefittings, welded connections, sanitary well seals or other approved connections. All joints between sections of casing shall be made by continuous welding.

(7) Driving or Installation of Pipe. Well casing pipe shall be driven and installed so that no injury affecting the safety of the water supply occurs.

(8) Watertight Caps or Plugs. Upon completion of drilling, the well will be equipped with a suitable watertight cap or plug to protect the well from tampering or the entrance of foreign matter.

(9) Preparation for Deepening. In the preparation for deepening, any sediment or debris in the bottom of the well shall be removed. The bottom shall be disinfected by distributing a chlorine solution over the bottom or adding such solution to water in the well. A concentration of 2,300 parts per million of chlorine should be attained for disinfection.

(10) Alignment. The centerline of a drilled or bored well shall not be out of plumb more than 12 inches per 100 feet of depth.

(11) Caving Protection. When caving or sloughing formations that would interfere with the proper functioning of a well or the pumping equipment are encountered, the entrance of foreign material shall be prevented by means of liner pipe, cementing or other approved methods.

(12) Sealing. Upon completing construction or reconstruction operations, the constructor of the well shall seal the well watertight after testing and sampling procedures are completed.

(13) Blasting. No person shall engage in the use of explosives for increasing or recovering the yield of any well without first giving notice of such use to the Township, and without first having obtained a license therefore from the applicable State agency, and a zoning permit from the Township.

(14) Increasing Well Yields. No person shall engage in the use of technology such as hydraulic fracturing (a.k.a. hydrofracking, hydrofracturing) or similar means to increase the yield of any well without first giving notice of such to the Township, and without first having presented to the Township all relevant state and/or federal permits for the use of hydraulic fracturing or other means being used to increase the well's yield. The person must also comply with the standards in this Article regarding pump test requirements when the use of hydraulic fracturing or similar means are used.

B. Standards for Abandonment or Decommissioning of Wells.

1. All existing wells on a lot on which a new well has been approved shall be abandoned or decommissioned if the existing wells are not being used or proposed to be used.

2. Wells to be abandoned or decommissioned, including existing wells, observation wells, or test wells not being converted to production wells and not being used as permanent monitoring wells, must be abandoned or decommissioned by a certified and licensed well driller in accordance with current BCHD, PaDEP, and Pennsylvania Department of Conservation and Natural Resources (“PADCNR”) standards.

3. Upon abandonment, the well owner and/or contractor performing abandonment/decommissioning shall present proof to the Township of well abandonment/decommissioning in conformance with the aforementioned standards.

SUB-ARTICLE XIV-D GENERAL PROVISIONS

Section 234-120 Application Requirements and Township Review Process

This section sets forth application requirements, and the Township’s review and decision process for well registration and well permits.

A. Well Registration Requirements and Township Decision. A well registration application consists of two parts. The pre-construction and pre-testing analysis submittal package must consist of the information contained in Section 234-120.B.1.A. and B.1.B. The post-construction final report must consist of the information contained in Section 234-120.B.3.A and B.3.B. If the Registrant chooses to conduct any voluntary testing, the Registrant must also submit the materials required in the remaining portions of Section 234-120.B.1. and 234-120.B.3. The Township will evaluate the cumulative impacts of the project. The Township will inspect wells at least once for compliance with the provisions of this Article prior to approval of well registration.

B. Well Permit Application Requirements. The Well Permit application process consists of three steps, as further outlined below. Multi-well projects shall refer back to Section 234-111.D. for further guidance in complying with the application requirements set forth below. Projects subject to multiple agencies’ requirements shall refer back to Section 234-111.E. for further guidance in complying with the application requirements below.

1. Pre-Construction and Pre-Testing/Analysis Submittal Package. An Applicant shall submit the following information, as further indicated below, prior to constructing and testing a well. Applicants who are not required to conduct, and are not voluntarily conducting, certain tests (e.g., a contributing area analysis)

need not include the information pertaining to such tests. Applicants who do voluntarily conduct tests must comply with the pertinent application requirements. The Township will review the information submitted for compliance with the requirements of this Article. The Township reserves the right to request additional information from the Applicant as needed to determine compliance prior to well construction and testing. The Applicant shall also, at the time of submission, pay an application fee in accordance with the Township fee schedule.

A. Proposed Well Location and Construction Information. This section must include the following:

- i. Applicant's name, address, and contact information
- ii. Property owner(s) of the Lot(s) in Question on which the proposed well(s) would be constructed, with name, address, and contact information
- iii. Tax map parcel information for the Lot(s) in Question
- iv. Well driller's name, address, contact information, and license information
- v. Name, address, and contact information of qualified hydrogeologist and/or other agents assisting Applicant
- vi. Proposed well construction, including proposed materials and methods
- vii. Proposed well depth, diameter, and land surface elevation
- viii. Geologic formation(s)
- ix. Existing and proposed land uses for the Lot(s) in Question.
- x. Site map superimposed on a topographic or LIDAR base map showing:
 - a. property boundaries;
 - b. proposed well location(s);
 - c. existing wells within 2500 feet of the proposed well;
 - d. existing and proposed septic and/or other sanitary sewage locations on the Lot(s) in Question and adjacent properties, and designs of such systems;
 - e. watercourses, wetlands, lakes, ponds, springs, seeps, and floodplains within at least 2500 feet;
 - f. geologic formation boundaries, when the Lot(s) in Question is underlain by different formations;
 - g. existing and proposed structures; and
 - h. Township, County, and/or state setback distances pertaining to water wells.
- xi. Any other information required to demonstrate compliance with the Township's water well construction requirements, set forth in Sub-Article XIV-C.

B. Proposed Withdrawal Information. This section must include the following:

- i. If existing withdrawals occur on the Lot(s) in Question, the existing TDD, the proposed additional withdrawal in gallons/day, and the proposed new TDD.
- ii. If no existing withdrawals occur on the Lot(s) in Question, the proposed TDD.
- iii. Water Use Analysis Report with Project Demand Model (Non-Residential Uses Only).
- iv. For Applicants subject to the jurisdiction of multiple agencies, documentation of Applicant's coordination efforts to engage in one set of tests to satisfy all applicable standards, and, if granted, such agencies' approval.

C. Groundwater Pump Test Information (Section 234-112). An Applicant must submit the following:

- i. Class 3 and 4 Projects: Preliminary geologic and hydrogeologic analysis, including but not limited to: bedrock geology and structure including strike and dip or other orientation measurements; likely groundwater flow directions and mechanisms beneath the site; fracture traces and other surficial geologic expressions; topography and surface water drainage; geologic logs and construction details of any existing wells onsite; soils and overburden composition.
- ii. If observation wells are required by Section 234-113: information on observation wells, including but not limited to: number of observation wells; location from proposed test well; observation well construction details, including proposed materials and methods; observation well depth, diameter, and land surface elevation; geologic formation(s) of observation well(s); geologic logs for existing wells; documentation of written permission from well owner (if an existing well is used) to use the owner's well for observation purposes.
- iii. If notification of neighbors is required by Section 234-114: Listing of all owners of wells or other groundwater sources (e.g., springs) within the Neighbor Notification Distance, and proof of neighbor notification, including a copy of the Applicant's notification letter.
- iv. For Class 2, 3, and 4 Projects: Maps identifying contributing areas for proposed wells, whether test or observation wells. An identification of contributing areas is separate from the analysis under Section 234-115.A. of whether the proposed test well will influence the contributing areas.

- v. Expected location including geographic coordinates for location where water pumped from well or wells will be discharged.
- vi. Map depicting all of the above-listed information under this subparagraph C, including the Neighbor Notification Distance (if neighbor notification is required by Section 234-114).
- vii. The qualifications of the person(s) and firm who will be performing the test.
 - a. Except for Class 1 wells, at a minimum, all testing must be supervised by a Qualified Hydrogeologist. The pre-construction and pre-testing/analysis submittal package must be signed and sealed by the Qualified Hydrogeologist.
 - b. Class 1 well applicants may use a licensed, reputable well driller for the testing. Any hydrogeologic analysis (e.g., contributing area or baseflow analysis) required by this Article still must be conducted and/or overseen by a Qualified Hydrogeologist.
- viii. Equipment to be used and measurement methods, both for the test well and the observation well
- ix. Water-level measurement and recording schedule for all required phases of testing
- x. Whether the Applicant intends to, or must, conduct extended monitoring (see Section 234-112.H. & J.), and, if so, information on any existing or proposed water holding tank(s), including volume (in gallons), typical pump duration, type of pressure regulator (if any), and pump on/off settings (e.g., pump turns on/off based on certain water levels).
- xi. Anticipated pumping duration and flow rates for the required phases of the pump test, and for the extended monitoring phase if chosen to be done, or required to be done.
- xii. Expected duration of baseline assessment phase
- xiii. Any other information required to demonstrate compliance with Sections 234-112 through 234-114.

D. Contributing Area Analysis Information.

i. If an Applicant is required to conduct a contributing area analysis by Section 234-115.A. it shall submit the information required for the pump test.

ii. Any other information required to demonstrate compliance with the contributing area analysis requirements, set forth in Section 234-115.A.

E. Baseflow Analysis Information. If an Applicant is required to conduct a baseflow analysis by Section 234-115.B., it shall submit the following:

1. Information on watercourses, wetlands, ponds, lakes, and reservoirs within the analytical distance required under this Article under Section 234-115.B., including but not limited to proximity to the proposed test well, whether the watercourse is a perennial stream and how that determination was made, the water body's Existing Use under 25 Pa. Code Chapter 93, and whether the water body supports any endangered and/or threatened species.
2. The methods to be used (e.g., piezometers, stream gauges, etc.) beyond observation wells to determine the impact on perennial streams and on wetlands, ponds, lakes, and reservoirs. If no additional monitoring methods are being used, the Applicant must specify the model it has used to determine impacts and identify the assumptions on which the model relies, and whether the model is commonly used by qualified hydrogeologists to determine baseflow impacts.
3. Any other information required to demonstrate compliance with the baseflow analysis requirements in Section 234-115.B.

F. Water Quality. This section must include the following:

1. Constituents (contaminants) to be tested
2. Certified Laboratory(ies) to be used for analysis of water samples, and name of person collecting samples
3. Identification of historic uses of the Lot(s) in Question and the proximity to any Superfund sites or known areas of groundwater contamination (e.g., TCE plumes).
4. Maps identifying septic system locations with soils and preliminary construction information as to the type of system that

will be employed for each unit.

5. Any other information required to demonstrate compliance with the Township's water quality testing requirements, set forth in Sub-Article XIV-B.

G. Escrow and Other Financial Security.

a. Escrow for Professional Review Expenses.

1. Applicants for Class 2 and above projects shall reimburse the Township for all reasonable administrative and professional expenses including, but not limited to, engineering, legal, and other consultant fees, and Township-incurred expenses related to collection of fees from the Applicant and disbursement to professional consultants.

2. Concurrent with the filing of an application, the Applicant shall pay to the Township the appropriate nonrefundable filing fee and an escrow deposit to defray the professional expenses incurred by the Township in accordance with the fee schedule adopted by the Board.

3. Thereafter, as the escrow deposit for expenses is depleted, the applicant shall make further deposits upon notice from the Township, until approval of the permit.

4. The required amount of initial escrow, and amount at which replenishment is required, shall be set by resolution of the Board of the Supervisors.

b. Financial Security for Adverse Effects. If required by Section 234-122, the Applicant shall provide security for remedying adverse effects to wells.

2. Well Construction, Testing, and Analysis. If the Township approves the Applicant's submittal package in the preceding section (Section 234-120.B.1.), the Township will issue to the Applicant a provisional certificate allowing well construction and testing in accordance with the submittal package. The provisional certificate is good for two (2) years only, after which time the Applicant must begin the application process again, or verify to the Township that the originally submitted application information remains accurate with respect to site and hydrogeologic conditions.

3. Final Report.

Reports submitted to the Township shall include all information required under this Article. Reports shall be prepared, signed, and sealed by a Pennsylvania licensed professional geologist with qualifications in hydrogeology.

A. General Well Location and Construction Information. This section must include, at a minimum, the following information:

1. The information required in the pre-construction and pre-testing/analysis submittal package.
2. Well Owner
3. Copy of PaDEP well record
4. Latitude, longitude, and land surface elevation
5. Summary of test well construction information (from PADEP well record)
6. Geologic log for each test well, describing the depth and types of soils and rocks encountered and the depth and yields of all water-bearing fracture zones. The log must include static water-level measurements and total yield estimates.
7. Depth and diameter of test well
8. Geologic formation(s)
9. Flow rate upon well installation
10. Initial water level
11. A site map with location of the proposed test wells, property boundaries and area, all wells within 2500 feet superimposed on a topographic base map, and all installed observation wells
12. Any other information required to demonstrate compliance with the Township's water well construction requirements, set forth in Sub-Article XIV-C.
13. Geologic logs and well construction details for any installed observation wells. The geologic log for each observation well must describe the depth and types of soils and rocks encountered and the depth and yields of all water-bearing fracture zones. The logs must include static water-level measurements and total yield estimates for each well.
14. Where available, the geologic log and well construction details of any neighboring wells used for observation.

B. Proposed Withdrawal Information. This section must include the following:

- i. If existing withdrawals occur on the Lot(s) in Question, the existing TDD, the proposed additional withdrawal in gallons/day, and the proposed new TDD
- ii. If no existing withdrawals occur on the Lot(s) in Question, the proposed TDD.
- iii. Water Use Analysis Report with Project Demand Model (Non-Residential Uses Only).
- iv. For Applicants subject to the jurisdiction of multiple agencies, documentation of Applicant's coordination efforts to engage in one set of tests to satisfy all applicable standards, and, if granted, such agencies' approval.

C. Groundwater Pump Test Information (Sections 234-112 to 234-114). This report section must document the design and implementation of the groundwater pump test, and include, at a minimum, the following information:

1. The information required in the pre-construction and pre-testing/analysis submittal package.
2. Name and license number of the well driller and pump installer.
3. Names of the persons and firm responsible for collecting the water-level measurements.
4. For Class 3 and 4 projects: A detailed hydrogeologic description of the aquifers encountered beneath the Lot in Question and adjacent properties.
5. For Class 3 and 4 projects: an evaluation of bedrock stratigraphic and structural characteristics, including an evaluation of the strike and dip of the bedding planes, orientation of faults, joints and fractures, and trends of folds and the influence these geologic features have on groundwater movement and replenishment.
6. For Class 2, 3, and 4 projects: Calculations of aquifer characteristics such as transmissivity and storage coefficient, calculations of the radius of influence, potential impacts to adjacent well owners, and an evaluation of the long-term sustained yield for the wells.
7. All water-level and precipitation measurements obtained during the pump test in electronic format acceptable to the municipality.
8. Calculations of the contributing area. An identification of contributing areas is separate from the analysis of whether a proposed well will influence the contributing areas of existing wells.
9. Data presented in Excel format – preferred format at Appendix B
10. All original, raw data from the pump testing in a format that allows for digital archiving.

11. For those that conduct extended monitoring: information on any existing or proposed water holding tank(s), including volume (in gallons), typical pump duration, type of pressure regulator (if any), and pump on/off settings (e.g., pump turns on/off based on certain water levels). All data from the extended monitoring shall be provided to the Township consistent with the requirements for providing data from the required phases of the pump test.

12. Any other information required to demonstrate compliance with Sections 234-112 through 234-114.

D. Contributing Area Analysis (Section 234-115.A.)

1. The information required in the pre-construction and pre-testing/analysis submittal package.

2. Analysis and results containing all required components under this Article.

E. Baseflow Analysis (Section 234-115.B.)

1. The information required in the pre-construction and pre-testing/analysis submittal package.

2. Analysis and results containing all required components under this Article.

F. Water Quality Information (Sub-Article XIV-B)

1. All water quality results obtained from each well tested, presented in Excel or similar electronic spreadsheet format allowing for review and comparison between wells and times of sampling, including samples taken from observation wells installed by or under the control of the Applicant.

2. All laboratory, sampling, and chain of custody paperwork including, but not limited to, paperwork documenting date and time of samples, methods used to sample, and results from the Certified Laboratory(ies) with data qualifiers. All paperwork may be submitted in electronic format.

3. Official certified communications from the Certified Laboratory(ies).

4. For Class 3 and 4 projects, in accordance with Section 234-118, a detailed evaluation of potential impacts from subsurface sewage disposal systems on groundwater quality, including:

a. A site plan or survey of the Lot in Question depicting topography, actual and planned well locations, septic leach field locations, and fracture trace locations at a minimum scale of 1-inch equals 200 feet. For any and all locations where a fracture or set of fractures intersects one or more wells and/or septic leach fields, a detailed assessment of treatment technologies must be included. The treatment technologies should provide adequate assurances that any and all groundwater pumped from the wells will satisfy Federal and Pennsylvania Drinking Water Standards (MCLs) and will not be degraded by the septic leach field discharges.

c. Maps depicting septic system mixing zones and calculations of nitrate loading from septic systems on groundwater resources as described in Section 234-118.A.

d. Nitrate dilution model being used, and nitrate dilution model evaluation (Section 234-118.A.)

e. An analysis of the dry year nitrate impact of on-site sewage disposal systems in accordance with Section 234-118.B.

5. If the water quality of the well does not meet the standards set forth in Sub-Article XIV-B, a copy of the plans for the proposed structure, building, and/or other development with detailed plans for a treatment system that will bring the water quality into compliance with the standards. This shall be certified by a professional engineer or other qualified individual.

6. Any other information required to demonstrate compliance with the Township's water quality testing requirements, set forth in Sub-Article XIV-B.

4. Cumulative Impacts. The Township reserves the right to evaluate the cumulative impacts of the project and to deny any project on the basis of cumulative impacts.

5. Site Inspection. The Township will inspect wells at least once for compliance with the provisions of this Article prior to issuance of a well permit.

C. Well Permit Decision.

1. Upon payment of all required fees, the completion of all testing requirements to the reasonable satisfaction of the Township's professional

consultants, securing of all related approvals for the well and its construction, including, but not limited to, PaDEP, BCHD, and DRBC permits, and, as applicable, the posting of the security provided for in Section 234-122, and completion of the inspection(s), the Zoning Officer shall either issue the well permit or deny the well permit and provide written reasons for the denial.

2. Upon a permit decision, the Township shall forthwith refund to the Applicant any uncommitted portion of the professional fees escrow deposit remaining after expenses incurred by the Township have been paid in full by the Applicant.

D. All well permits issued by Nockamixon Township shall be in effect as of the date of issuance. In the event that the well has not been put into operation under the permit within three years from the date of issuance, the permit shall expire, the validity of the permit shall cease and terminate, and all fees paid will be forfeited, except as exempted within the definition of Abandoned Wells in this Ordinance. However, water quality testing must be conducted prior to issuance of occupancy permit for any use utilizing a well in which current water quality testing is not available (less than three years old). Wells whose permits have expired must be properly abandoned in accordance with this Article.

Section 234-121 Presumption of Responsibility for Adverse Effect.

An Applicant, its successors and assigns, for a Class 2 and above well shall be presumed responsible for any adverse effect to any water supply well within 2500 feet of the property boundary of Lot in Question that occurs during a time period beginning with well construction, alteration, and/or yield enhancement (whichever is earlier) and ending at a date that is sixty (60) months from the date the last-installed of any of Applicant's Class 2 well(s) or above reach full production.

Section 234-122 Financial Security Pertaining to Potential Adverse Effects During Presumption Period Applicability.

An Applicant for any Class 2 and above well(s) shall deposit with the Township at the time of the application for the Well Permit financial security to cover potential adverse effects to surrounding water supplies. The financial security shall be in an amount based on the number of existing wells on surrounding properties in which the wellhead(s) are located within 2500 feet of the property boundary of the Lot in Question and may be set by a fee schedule, which the Board of Supervisors may from time to time adopt by resolution. Without limitation as to other types of financial security which the Township may approve, which approval shall not be unreasonably withheld, Federal or Commonwealth chartered lending institution irrevocable letters of credit and restrictive or escrow accounts in such lending institutions shall be deemed acceptable financial security. Such financial security shall be posted with a bonding company or Federal or Commonwealth chartered lending institution chosen by the party posting the financial security, provided said bonding company or lending institution is authorized to conduct business within Pennsylvania.

Section 234-123 Right to Hearing.

Any owners of a water supply well who experience an adverse effect in either quantity or quality to their water supply during the presumption period which they believe is due to a Class 2 or higher well for which a Well Permit has been issued, shall have the right to request a hearing pursuant to Section 234-124.

Section 234-124 Procedure for Hearing.

1. Any party desiring a hearing pursuant to Section 234-123 shall make demand therefore to the Township Manager in writing and with proof of service thereof on either the Applicant, its successors or assigns.
2. The Board shall schedule a hearing pursuant to the Pennsylvania Local Agency Law, 2 Pa.C.S.A. § 551 et seq., within not less than 15 days or more than 90 days after receipt of the demand for hearing, unless the applicant agrees in writing to an extension.
3. Notice of the hearing shall be given to the Applicant, its successors and assigns and the owner of the water supply well which is alleged to have suffered an adverse effect.
4. At the hearing, each party shall have the right to present evidence and to cross examine witnesses. The party making the demand for the hearing shall have the burden of proof to establish adverse effect of either quantity or quality of their water supply.
5. All testimony shall be stenographically recorded at the cost of the parties and a full and complete record shall be kept of the proceedings.
6. The decision of the Board on the applicability of responsibility under §234-125 shall be in writing, shall contain findings of fact and conclusions of law setting forth the reasons for the decision which shall be served upon all parties or their counsel personally or by mail.
7. Any party aggrieved by the decision of the Board may appeal therefrom in accordance with the 2 Pa.C.S.A. § 751.

Section 234-125 Responsibility of Applicants for Class 2 and Above Wells for Adverse Effects to, and Remediation For, Nearby Wells During Presumption Period.

1. In the event that it is finally determined pursuant to the provisions of this Article that Applicant and its successors and assigns are responsible for an adverse effect to a water supply well, then Applicant, or its successors and assigns, shall alleviate the problem, at no expense to the affected property owner(s).
2. The Applicant and its successors and assigns who adversely affect a water supply by contamination, interruption or diminution shall restore or replace the affected water supply with an alternate source of water that is:
 - a. adequate in quantity and quality for the purpose served by the supply;
 - b. at least equal to the preexisting condition of the affected water supply; and
 - c. uses the same means of dispensing water on the premises.
3. For the purpose of this Section, the term “water supply” includes an existing source of water or facility or system for the supply of water for human consumption, for agriculture, industrial or other uses. The first choice for an alternate supply of water is a new or deepened well. Under no circumstances

may a permanent alternate water supply provided by an Applicant or its successors and assigns to remedy an adverse effect to a water supply well consist of an external water tank (e.g., "water buffalo") or bottled water supplies.

4. A person that adversely affects another water supply within the meaning of this section shall provide temporary alternate water supplies until a permanent alternate water supply is secured. In no case may provision of temporary alternate water supplies occur for a total period of time of longer than two (2) years.
5. Applicant, or its successors and assigns, shall supply potable water to the groundwater source owner until the corrective work is completed and shall reimburse the owner(s) for any cost incurred by the owner(s) to secure potable water prior to Applicant, or its successors and assigns, doing so.

Section 234-126 Application of Security to Remedy Adversely Affected Wells.

In the event Applicant, or its successors and assigns, does not provide an alternate supply of potable water pursuant to Section 234-125 or does not commence to remedy the adversely affected water supply within 5 days of when it is finally determined pursuant to the provisions hereof that Applicant, or its successors and assigns, is responsible for an adverse effect to a water supply well, the Township may draw on the financial security posted pursuant to Section 234-122 and apply such security to provide an alternate supply of potable water and to take whatever action the Township deems necessary to cure the problem. In the event that the financial security is not sufficient to provide an alternate supply of potable water and to remedy the adverse effect, Applicant, or its successors and assigns, shall be responsible for any additional expense including legal, engineering and administrative costs, which are incurred in remedying the adverse effect.

Section 234-127 Return of Applicant's Security After Presumption Period.

At the end of the presumption period set forth in Section 234-121, the Applicant, or its successors and assigns, upon written request, shall have all financial security posted with the Township pursuant to Section 234-122 returned to the Applicant, or its successors and assigns, except for such security as may be necessary to remedy any pending claims of adversely affected wells which have not been finally determined pursuant to the provisions of this Article.

Section 234-128 Conditional Use Approval In Limited Circumstances.

A. The Board may, upon application of an Applicant, and upon recommendation by the Township engineer and Zoning Officer, grant conditional use approval to permit a deviation from compliance with one or more requirements of this Article in the following circumstances:

- 1) Where compliance with every requirement of this Article would prevent installation of a well for a new single family detached dwelling on a lot that was created prior to the enactment of this ordinance, and that has never been developed or otherwise built on and is vacant;

2) Where compliance with every requirement of this Article would result in the closure of an existing business, or prevention of reasonable changes or natural expansions that promote or ensure the existing business's viability in the Township and services to Township residents; for the purposes of this criterion, existing businesses shall include agricultural operations, as that term is defined in 53 P.S. § 10107(a);

3) Where compliance with every requirement of this Article would result in the spread of existing groundwater contamination beyond the known horizontal and vertical extent of contamination at the time of the Applicant's request; or

4) Where compliance with every requirement of this Article, in the case of any Class I and II wells, would create an exceptional and unusual financial hardship not created by the Applicant.

B. The Board shall make favorable findings on the following in addition to the relevant provisions of Article VII of this Chapter :

1) there will be no direct adverse effect on the public health and safety, including the long-term availability of water for its use and surrounding property owners

2) the issuance of the conditional use approval will not directly adversely affect the availability of reliable, safe and adequate water supplies to support the intended land uses within the capacity of available water aquifer resources

C. **AMEND Section 234-97.C.** to **STRIKE** the language "Chapter 228, the Township Well Ordinance" and **REPLACE** it with "Article XIV of the Nockamixon Township Zoning Ordinance."

D. **AMEND Section 234-9** as follows:

1. **STRIKE** the definition of "Wetlands" and **REPLACE** it with the following:

Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bog and similar areas. The term also includes, but is not limited to, wetland areas listed in the State Water Plan, the United States Fish and Wildlife Service Wetlands Inventory of Pennsylvania, the Pennsylvania Coastal Zone Management Plan and a wetland area designated by a river basin commission, or other wetland mapping adopted by the Township.

2. **ADD** the following:

WETLANDS DELINEATION – The process by which wetland limits are determined. Wetlands must be delineated by a qualified specialist according to the 1989 Federal Manuals (as amended) for the Delineation of Jurisdictional Wetlands (whichever is greater) or according to any subsequent Federal or State regulation. Qualified specialist shall include those persons being certified professional soil scientists as registered with Registry of Certified Professionals in Agronomy Crops and Soils (ARCPACS); or as contained on consultant's list of Pennsylvania Association of Professional Soil Scientists (PAPSS); or as registered with Soil Science Society of America (SSSA), or as certified by State and/or Federal certification programs; or by a qualified biologist/ecologist.

E. In Chapter 234-24.E Accessory use regulations, H-5 Swimming Pool, **ADD** the following sentence to subsection (5):

Initial filling of new swimming pools, and filling of swimming pools at the beginning of each new season shall be completed from a source other than an onsite water supply well per Chapter 222, and Chapter 234.

II. STRIKE Chapter 228 of the Nockamixon Township Code in its entirety and **REPLACE** it with “RESERVED.”

III. Chapter 196 of the Township Code of Ordinances is hereby **AMENDED** as follows:

A. STRIKE Section 196-408 and **REPLACE** it with the following:

A. All projects shall demonstrate compliance with Article XIV of Chapter 234 of the Township’s Code of Ordinances pertaining to water resources impact studies, water well information, and other water-related requirements.

B. All projects subject to the jurisdiction of the DRBC due to the size of a groundwater and/or surface water withdrawal must obtain DRBC approval. Copies of all submissions by the applicant to the DRBC shall be sent to the Township. Additionally, copies of all submissions to the PaDEP and all correspondence received by the applicant from the PaDEP shall be forwarded to the Township.

C. A water system that does not provide an adequate supply of water for the proposed use, considering both quality and quantity; and/or adversely affects nearby wells and streams shall not be approved by the Township, as further detailed by Article XIV of Chapter 234 of the Township’s Code of Ordinances.

D. All preliminary/final studies, plans, testing, and reports, as required by the Chapter 234 of the Township’s Code of Ordinances (Zoning Ordinance) shall be subject to review by the Township Engineer, appropriate township committee(s),

and a township-consulting qualified hydrogeologist (if determined necessary by the Township); and shall be approved by the Township prior to final plan approval, or in the case of Class 1 or 2 applicants, as a condition of final plan approval. However, in no case shall any subdivision or land development plan proposing a well be executed by the Township and released for recording prior to the requirements of Article XIV of Chapter 234 being addressed to the satisfaction of the Township.

B. STRIKE from Section 196-202 the term “water survey” and its definition.

C. STRIKE from Section 196-403.L.(4) and **REPLACE** it with the following:

(4) All information required by Article XIV of Chapter 234 of the Township’s Code of Ordinances pertaining to water resources impact studies, water well information, and other water supply related requirements.

D. STRIKE Section 196-411.B.(11) and **REPLACE** it with the following:

(11) When community or private wells are proposed for water supply, a discussion of existing groundwater characteristics of the property shall be submitted including, but not limited to, depth of groundwater, available groundwater withdrawal rates, and existing wells within 100 feet of the site. This discussion shall also include all information required by Article XIV of Chapter 234 of the Township’s Code of Ordinances pertaining to water resources impact studies, water well information, and other water supply related requirements.

E. ADD to Section 196-407.A the following:

Waste disposal systems with stream discharge are a last resort under the Township’s approved Act 537 Plan. If an applicant satisfies all Act 537 plan and other requirements for using such a system, the applicant shall also perform a unit aerial pollutant budget analysis approach to predict how much nitrogen would enter a given surface water resource.

(a) An applicant proposing a community waste disposal system with stream discharge must first delineate the watershed boundaries of the receiving water body of concern (e.g., lake, reservoir, stream, river, etc.)

(b) Once delineated, all of the land use within the watershed must be quantified in terms of surface area. Each land use category should have an ascribed surface area based on the most up-to-date map/digital data available.

(c) Empirically derived pollutant loading coefficients must be assigned to each land use category. These coefficients provide an estimate of the amount of a given pollutant (i.e., nitrogen, phosphorus, suspended sediments, and lead) that is generated on an annual basis for each particular land use category. These coefficients shall either

be obtained from the scientific literature or from field data collected at the site. The coefficients must be multiplied by the surface area of its respective land use category to obtain an estimate of the pollutant generated by that land use category per year.

(d) The data must then be used to develop a pollutant budget for the receiving water body. Current pollutant budgets shall be compared to future predictions of development to predict how such activities within the watershed will impact the water quality of the receiving water body. Predictions on future development shall be based on population data and projections that are readily available from regional, State, and local planning agencies.

F. STRIKE Section 196-519 and **REPLACE** it with the following:

A. Water Supply. All lots and leased units in a subdivision or land development shall be provided with adequate water supply by means of one of the following methods:

- (1) On-lot water supply.
- (2) Connection to a centralized water supply.

B. All new wells must comply with the Township's Zoning Ordinance, including but not limited to Article XIV on Groundwater Protection and Water Wells.

C. Requirements for Approval of Subdivision and Land Development Projects Proposing the Use of Groundwater Supplies.

(1) No subdivision and land development approval for a multi-well project, as that term is defined in the Zoning Ordinance, shall be issued without successful testing that complies with all applicable testing and analysis requirements, including Article XIV of the Township's Zoning Ordinance.

(2) It shall be a condition of every subdivision and land development approval for a project proposing the use of groundwater wells for water supplies that no building permit or occupancy certificate shall be issued absent compliance with the Township's Zoning Ordinance, including but not limited to Article XIV on Groundwater Protection and Water Wells. This condition shall apply regardless of whether the project proposes the use of a centralized water supply using groundwater wells, or individual on-lot wells.

D. Individual On-lot Wells.

Where individual on-lot wells are proposed within a new subdivision or land development, wells shall be drilled, installed, and tested in accordance with the Township's Zoning Ordinance. Where existing wells are proposed to be abandoned, such wells must be abandoned in accordance with the standards set forth in the Township's Zoning Ordinance, except as follows:

1. The Township may require an existing well to be temporarily retained and used as an observation well. If the Township does not require the Applicant to convert such well into a permanent monitoring well, as set forth below and in the Township's Zoning Ordinance, the well must be abandoned in accordance with the standards set forth in the Township's Zoning Ordinance.

2. The Township may require an existing well to be retained as a permanent monitoring well. Each permanent monitoring well must be properly secured with a locking cap.

E. Centralized Water Supply and Distribution Systems.

(1) If water is to be provided by means other than by private wells owned and maintained by the individual owners of lots within the subdivision or land development, applicants shall present evidence to the Board that an adequate supply of potable water is to be supplied by a certified public utility, a bona fide association of lot owners, or by a municipal corporation, authority, or utility. A copy of a Certificate of Public Convenience from the Pennsylvania Public Utility Commission or an application for such certification, a proposed declaration creating a homeowner's association to serve the area, or an agreement with an authority or other municipal body, providing for such water supply, shall be submitted.

(2) Water quality requirements for a proposed centralized water system shall conform to applicable standards of PaDEP and BCHD, and the Township's ordinances.

(3) Water mains shall be constructed by the developer in such a manner as to make adequate water service available to each lot, building or dwelling unit within the subdivision. A minimum pressure of 35 pounds per square inch shall be provided at each house or other building to be connected to the water supply main. The water supply must comply with regulations and standards of the PaDEP, and when applicable, the DRBC.

(4) The system shall also be designed with adequate capacity and appropriately spaced fire hydrants for firefighting purposes as determined by the Township. Hydrant locations shall be reviewed by the Fire Marshall and Fire Company servicing the area, and approved by the Township.

F. Applicant shall submit design plans to the servicing fire company, Township emergency management coordinator for comment regarding access and water supply for firefighting purposes.

G. **AMEND** Appendix B to Chapter 196 to **STRIKE** the Notice for On-Lot Wells and **REPLACE** it with the following:

C. Notice for On-Lot Water Supplies.

Notice When Individual Wells Not Drilled and Tested Prior to Plan Recording. The lots and/or building(s) in this development are planned to be served with water by means of individual wells constructed, owned and operated by the owner of the lot. No well water supply or quality testing has been conducted to verify suitability of individual wells for this purpose. It is possible that any or all of these lots do not have adequate soils or geology to provide an adequate volume or quality of on-site water. The lot well must be drilled and water supplies tested for volume and quality in accordance with Township requirements prior to occupancy of any building.

Notice When Individual Wells Drilled and Tested Prior to Plan Recording. The lots and/or building(s) in this development are planned to be served with water by means of individual wells constructed, owned and operated by the owner of the lot. Well water supply and/or quality testing has been conducted to verify initial suitability of individual wells for this purpose. The lot well still must be re-tested for water quality compliance in accordance with Township requirements prior to occupancy of any building. It is possible that any or all lots previously tested may not provide an adequate quality of on-site water.

IV. ADD the following to CHAPTER 222 – WATER, Subsection 222-5

A. § 222-5 Water Shortage declarations.

When the Township, PaDEP or DRBC declare(s) a water shortage, the following water uses are declared nonessential and are prohibited within Nockamixon Township:

- A. Watering of lawns.
- B. Watering of outdoor gardens, landscaped areas, trees, shrubs, and other outdoor plants, except between the hours of 5:00 p.m. and 9:00 a.m. by means of a bucket or pail at the minimum rate necessary.
- C. Washing of automobiles and trucks except when required for safety and operational purposes.
- D. Washing of streets, driveways, and sidewalks.
- E. Ornamental water use including, but not limited to, fountains, artificial waterfalls, and reflecting pools.
- F. Use of water for flushing-sewers or hydrants by any public or private individual or entity except as deemed necessary and approved in the interest of public health or safety by health officials or the Board of Supervisors.
- G. Use of fire hydrants by fire companies for testing fire apparatus and for fire drills except as deemed necessary in the interest of public safety and specifically approved by the Township.
- H. Use of fire hydrants by municipal road departments, contractors, and all others except as necessary for firefighting or protection purposes.

I. The use of water to fill and top off swimming pools.

B. § 222-6 Additional Water conservation measures.

A. Water saving fixtures and devices shall be required in all new construction regardless of public or private water supply in accord with the current unified building code regulations.

B. Initial filling of new swimming pools shall be completed from a source other than an on-site well.

V. Partial Repealer

All other provisions of the Nockamixon Township Code of Ordinances, as amended, shall remain in full force and effect. All other Ordinances or provisions of the Township's Code of Ordinances inconsistent herewith or in conflict with any of the terms hereof are, to the extent of said inconsistencies or conflicts, hereby specifically repealed.

VI. Severability

The provisions of this Ordinance are severable. If any section, clause, sentence, part or provision thereof shall be held illegal, invalid, or unconstitutional by a court of competent jurisdiction, the effect of such decision shall be limited to those provisions which are expressly stated in the decision to be invalid or ineffective, and such decision of the court shall not affect or impair any of the remaining sections, clauses, sentences, parts or provisions of this Ordinance. It is hereby declared to be the intent of the Board of Supervisors that this Ordinance would have been adopted if such illegal, invalid, or unconstitutional section, clause, sentence or part of a provision had not been included herein.

VII. Effective Date

All provisions of this Ordinance shall be in full force and effect five (5) days after the approval and adoption.

ORDAINED AND ENACTED this 21st day of September, 2023.

**BOARD OF SUPERVISORS OF
NOCKAMIXON TOWNSHIP, BUCKS COUNTY,
PENNSYLVANIA**



William Sadow, Chair



David DiPalantino, Vice-Chair

Vince Fleck, Member



John Haubert, Member

Jennifer McCandless, Member

Attest:



Keith DeLuca, Township Manager

APPENDIX A
Example Neighbor Notification Letter with Example Access Agreement
(See Section 234-114)

Date

[Name of Resident]

[Address]

Revere, Pennsylvania 18953

Re: Groundwater Pump Testing for Proposed Project Name, Nockamixon Township, Bucks County, Pennsylvania.

Dear Resident,

Groundwater pump testing for proposed groundwater withdrawals of up to _____ gallons per day from Proposed Project Name, located at _____, being TMP No. _____ (the "Lot in Question") has been tentatively scheduled for the week of _____, 20__.

_____ new wells are/will be located on the Lot in Question. The purpose of the wells is _____. One of these wells will be pumped and the remaining _____ wells will be monitored to determine aquifer coefficients and interference effects as per the Groundwater Protection and Water Wells provisions of the Nockamixon Township Zoning Ordinance. All test activities will be conducted in accordance with the Zoning Ordinance.

Your well or other groundwater source (e.g., spring) is located within _____ feet of the boundary of the lot on which a test well is proposed (Neighbor Notification Distance), and, in accordance with the Zoning Ordinance, you are hereby notified of the pending pump test. You may request that the water level in your well or other groundwater source be monitored during the pump test.

If your well or other groundwater source is monitored, the water-level measurements will be used to directly determine water-level drawdown interference effects from the proposed new wells and/or increased groundwater withdrawals on your groundwater source. The test will be enhanced if you are able to not use for well or other groundwater source for the duration of testing; however, non-usage is not required. If your groundwater source is not monitored, then the Applicant's hydrogeologist and the Township's appointed hydrogeologist will calculate potential water-level drawdown interference effects on your well from the data obtained from other wells observed during the test.

The costs of extending, restoring or replacing a well and any ancillary well equipment (e.g., well hardware such as pumps and wires) damaged as a result of testing shall be the responsibility of the applicant.

If you would like to participate in the monitoring of water levels during the groundwater pump test, please sign and return the enclosed Access Agreement form. The Access Agreement form should be returned to _____ on or before _____, 20__ . In addition, please include copies of all well construction details and a geologic log that you may have for your well. Based on the level of response to this request, not all well owners that request monitoring may be included in the test. The final decision of the number of wells to be monitored will be made by the Township and, as applicable, the Bucks County Health Department, the Pennsylvania Department of Environmental Protection, and/or the Delaware River Basin Commission.

If your well or other groundwater source is monitored during the pump test, the Applicant's hydrogeologist will conduct the following activities on your well and/or other groundwater source:

1. Collect a pre-test water sample, such as from a tap such as at your kitchen sink. The water sample will be analyzed for the presence/absence of bacteria in your groundwater.
2. Remove the top of your well to gain access. In the case of other groundwater sources, the Applicant's hydrogeologist will need to gain access to any structures (e.g., springhouses) or areas on your property where the groundwater sources to be monitored are located. All equipment placed into your well or other groundwater source for the test will be cleaned with a disinfectant to prevent the introduction of bacteria into your well or other groundwater source.
3. Install access tubing (dip tube) into the well, if necessary, to prevent the accidental entanglement of measuring equipment with pump discharge piping and pump wiring.
4. Install a pressure transducer with a data logging device in the dip tube. This instrumentation will be used to measure water level changes in your well and will be installed at least 24-hours before the start of pumping. Other equipment may be used to monitor non-well groundwater sources.
5. Install a temporary cover over your well to prevent rainwater or foreign matter entering your well. The Applicant's hydrogeologist will also take similar precautions as to other groundwater sources.
6. Periodically check your well, during the pump test, to directly measure water levels with an electronic measuring device or to download data from the pressure transducer. Similar monitoring of other groundwater sources will occur during the pump test.
7. Remove the pressure transducer and dip tube installed in your well for the pump test, and any equipment installed in or around other groundwater sources.
8. Add sufficient chlorine to your well to disinfect your well prior to replacing and securing the cap on your well. The water in your house should be run at all taps to ensure

adequate disinfection of the entire water supply system. After chlorine is noted at each tap, an outside tap can be used to further pump the well and dissipate the chlorine. The addition of chlorine will most likely result in a chlorine odor for one or more days.

9. Collect a post-test sample from the tap sampled prior to the test and analyze the sample for the presence/absence of bacteria.

If you require additional information regarding the groundwater pump test, please contact the Township Manager at 610-847-5058.

Sincerely,

Access Agreement

All expenses related to the performance of the groundwater pump test will be borne by the Applicant for Proposed Project Name. The costs of extending, restoring or replacing a well and any ancillary well equipment (e.g., well hardware such as pumps and wires) or similar equipment for other groundwater sources damaged as a result of testing shall be the responsibility of the Applicant. However, access to neighboring wells must be provided by the owners of those properties. All reasonable precautions will be observed by the applicant, the Applicant's hydrogeologist, and the well driller to avoid damage to any adjacent residential property including both the well itself and its surroundings.

The owner of the neighboring well or groundwater source, who signs below, agrees to provide access to a commonly used tap for the collection of water samples prior to and after testing for bacteria analysis. After the initial water sample is collected, the well will be opened to permit access to measure water levels and the well will remain unsealed during the testing process which will be a maximum of 72 hours. A dip tube may be installed within your well to facilitate the measurement of water levels.

All equipment placed in your well will be cleaned to minimize the potential introduction of bacteria. However, to ensure that no bacteria are accidentally introduced into your well during the testing process, chlorine will be added to your well at the conclusion of the testing procedures. If you would prefer that chlorine not be added to your well, please check the box below the signature line.

With your signature and submittal of this form, you request participation in the monitoring of water levels during the pump test on the Lot in Question, in accordance with the Water Resource Development provisions of the Nockamixon Township Zoning Ordinance, and that you have read and accept the requirements of this form.

Resident Signature _____ Date _____

Resident Name (Print) _____ Address _____

No-Chlorine Option: _____ (Initials) Please do not add chlorine to my well or other groundwater source at the conclusion of testing. I understand and will accept responsibility that bacteria may have been accidentally introduced into my groundwater source.

APPENDIX B
Suggested Pump Test Record Format (See Section 234-120.B.3.C.9)

Table 1 – Test Well

	Time (e.g., 3/14/2019 13:32)	Elapsed time (e.g., sec, min.)	Water level (e.g., ft BLS)	Drawdown (e.g., feet)	Flow rate (e.g., gal/min)
Baseline Assessment Phase					
Peak Demand Phase	- - -	- - -	- - -	- - -	- - -
Constant Head Phase	- - -	- - -	- - -	- - -	- - -
Recovery Phase	- - -	- - -	- - -	- - -	- - -
Extended Monitoring Phase	- - -	- - -	- - -	- - -	- - -

Table 2 – Observation Well 1

	Time (e.g., 3/14/2019 13:32)	Elapsed time (e.g., sec, min.)	Water level (e.g., ft BLS)	Drawdown (e.g., feet)	Flow rate (e.g., gal/min)
Baseline Assessment Phase					
Peak Demand Phase	- - -	- - -	- - -	- - -	- - -
Constant Head Phase	- - -	- - -	- - -	- - -	- - -
Recovery Phase	- - -	- - -	- - -	- - -	- - -
Extended Monitoring Phase	- - -	- - -	- - -	- - -	- - -

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