

**Township of Warminster
Bucks County, Pennsylvania**

**Chapter 26
Water and Stormwater Management
September 2009**

CHAPTER 26

WATER

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Part 1

Public Water

§101. Purpose.

An Ordinance establishing a system of Public Water within the Township; authorizing the construction of a public water system therefore and therein, prohibiting the construction of private wells by owners or occupiers of properties adjoining or adjacent to with the said public water areas; requiring connection to the public water system: requiring permits, prohibiting certain uses providing for penalties; providing for rules and regulations; providing for specifications; providing for the collections of assessments; rentals including fees; meter fees; maintenance fees; penalties and interest by lien, etc.

§102. Authorization.

Be it ordained and enacted by the Supervisors of Warminster Township, Bucks County, Pennsylvania and it is hereby ordained by authority of same, as follows.

§103. Definitions.

CROSS CONNECTION - an arrangement allowing either a direct or indirect connection through which backflow, including back siphonage, can occur between the drinking water in an individual water supply well or a public water system and a system containing a source or potential source of contamination, or allowing treated water to be removed from any public water system, and returned to the public water system. The term does not include connections to devices totally within the control of one or more public water systems and connections between water mains.

DEPARTMENT - the Warminster Township Water and Sewer Department.

FEES - water rates, tapping fees, meter fees, inspection fees, permit fees and any other fees associated with the public water system and adopted annually or as required by the Board of Supervisors.

FIRE HYDRANT - a discharge pipe with a valve and spouts or spouts at which water may be drawn from a water main for firefighting, water system maintenance or public health and safety considerations.

NOTICE - a written or printed notice, which shall be served upon the owner if he be found within the Township, or if he cannot be found with the Township, said notice may be served by any of the following methods: (i) By registered or certified U. S. mail addressed to the last known address of owner or (ii) by leaving the same with the owner's agent or the party in possession or (iii) by posting the same on the most public part of the premises concerning which the notice is directed.

OCCUPIED BUILDING - any structure erected and intended for continuous or periodic habitation, occupancy or use by human beings or animals and for which structure public water and thereof, is or may be required.

ORDINANCES - such ordinances of the Township of Warminster, herein or theretofore or hereafter adopted concerning public water systems or private wells.

PERSON - includes individuals, associations, partnerships, limited partnerships, joint stock companies and corporations.

PRIVATE WELL - any water supply serving a particular tax parcel within Warminster Township. This definition includes all wells as described or defined in §301.

PROPERTY ASSESSIBLE - each lot or piece of land adjoining, abutting on or which is adjacent to the public water systems.

PUBLIC WATER - any water supply and distribution system operated by the Department or any water supply and distribution system designated by written agreement with Warminster Township to operate within the Township boundaries.

PUBLIC WATER DISTRICT - such area as shall hereinafter be defined or designated from time to time, by the Supervisors of Warminster Township for the provision of public water.

PUBLIC WATER SYSTEM - a system which provides water to the public for human consumption which has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year. The term includes collection, treatment, storage and distribution facilities under control of the operator of the system and used in connection with the system. The term includes collection or pretreatment storage facilities not under such control which are used in connection with the system. The term also includes a system, which provides water for bottling or bulk hauling for human consumption. Water for human consumption includes water that is used for drinking, bathing and showering, cooking, dishwashing or maintaining oral hygiene.

TOWNSHIP - Township of Warminster, Bucks County, Pennsylvania.

§104. Administration.

1. Public Water Area. A distribution system of public water is hereby established and ordained including such distribution system as is currently displayed on a Township map dated August 20, 2003, as prepared by Carroll Engineering Corporation which is incorporated herein by reference.
2. Public Water Extensions. Any extension of the public water system beyond that displayed on the Township map dated August 20, 2003, shall be designated by ordinance and said ordinance shall be incorporated by reference thereto the provisions of this Part and any amendments thereto.
3. The public water system hereinbefore or hereinafter established, and designated on the maps and plans, which are made part of this and any ordinance adopted, shall be laid, as far as practicable along and within the lines of the public roads and highways of said Township, as on said plans or maps designated, and where such system diverges from said public roads or highways, as shown on the plan and maps, and passes through private property, the consent of the owners of such private property shall be first obtained by recorded easement, if possible, and if not, such public water system shall be constructed through such private property upon providing for compensation in accordance with the Act of Assembly in such a case made and provided.
4. In all cases where it becomes necessary to extend the Township public water system into an adjoining Borough or Township for the purpose of supplying water, the Supervisors of Warminster Township shall approve an agreement with such Borough or Township; or any of their authorized agencies, regarding rights-of-way through private property, ownership, maintenance and joint use of such lines.
5. All persons owning an occupied building now erected upon property accessible to the public water system shall at their own expense connect such building with the public

water system within ninety (90) days after notice to do so from the Township, or notice to do so from the Warminster Township Water and Sewer Department.

- A. All persons owning a property accessible to the public water system upon which a building is later erected shall upon the time of such erection and at their own expense connect such building with the public water system.
 - B. All persons owning any occupied building upon property which hereafter becomes accessible to the public water system shall at their own expense connect such building to the Public Water System within ninety (90) days after receipt of notice to do so.
6. All connections with said public water system shall be made only upon application and permit in prescribed form and shall be made in accordance with such rules and regulations and upon such terms and conditions as the Warminster Township Water and Sewer Department shall from time to time adopt and prescribe. Said rules and regulations when adopted shall have the same force and effect as if set at length in this Part.
 7. After the expiration of the periods specified in subsection 5 of this Section, if any owner of an occupied building on property accessible to the public water system shall have failed to connect such property with the public water system as required by said notice, the Warminster Township Water and Sewer Department may cause to be served on the owner of such property, so failing to connect to said public water system, and also upon the occupants of the building in question, a copy of this Part and a written or printed notice requiring such connection to be made, and such notice shall further state that its requirements shall be complied with within ninety (90) days from the date thereof.
 8. Upon failure of any such owner, who has been duly notified as hereinabove provided, to comply with the requirements of any such notice or with the provisions of this Part, the Warminster Township Water and Sewer Department shall cause the necessary connection to be made and upon completion of the work for the same, shall render a bill covering the cost of said work to the owner of such premises.
 9. In the event that any property owner shall fail to pay the assessment as hereinabove provided, it will be the duty of the Warminster Township Water and Sewer Department shall thereupon take the necessary action to effect the collection of such unpaid bills in the manner provided by law.
 10. All persons owning an occupied building now erected upon property accessible to the public water system and said property is served by a private well system may maintain the private well under the conditions set forth §301.
 11. All persons owning an occupied building now erected upon property accessible to the public water system and property is served by a private well system may abandon such well under conditions set forth in §301.
 12. All persons owning an occupied building now erected upon property accessible to the public water system is prohibited from drilling or constructing a private well for the purpose of domestic or household water supply. This includes all commercial and industrial properties.

§105. Rules and Regulations.

1. The Township Water and Sewer Department will maintain a set of rules and regulations for the Warminster Township public water system. These rules and regulations will be adopted by the Board of Supervisors and thereby be incorporated as part of this Part.
2. These rules and regulations may be updated from time to time to assure the security and the public safety of the Warminster Township public water system.

§106. Specifications.

1. The Township Water and Sewer Department will maintain a set of specifications for the Warminster Township water system. These specifications will be adopted by the Board of Supervisors and thereby be incorporated as part of this Part.
2. These specifications may be updated from time to time to assure the security and the public safety of the Warminster Township public water system.

§107. Fees.

1. Annually, the Warminster Township Board of Supervisors will adopt a fee schedule including all water rates, tapping fees, meter fees, inspection fees, permit fees and any other fee associated with the public or a private water system.
2. This fee schedule may be modified within the annual time period if required to reflect changes in economic conditions, legislation or any other condition which may impact the financial well being of the public water system.

§108. Penalties.

Any person, partnership or corporation who or which has violated or permitted the violation of the provisions of this Chapter shall, upon being found liable therefore in a civil enforcement proceeding commenced by Warminster Township, pay a judgment of not more than five hundred dollars (\$500.00) plus any court costs including reasonable attorney fees incurred by Warminster Township as a result thereof. No judgment shall commence or be imposed, levied or payable until the date of the determination of a violation by the district justice. If the defendant neither pays nor timely appeals the judgment, Warminster Township may enforce the judgment pursuant to the applicable rules of civil procedure. Each day that a violation continues shall constitute a separate violation, unless the district justice determining that there has been a violation further determines that there was a good faith basis for the person, partnership or corporation violating the ordinance to have believed that there was no such violation, in which event there shall be deemed to have been only one (1) such violation until the fifth (5th) day following the date of the determination of a violation by the district justice and thereafter each day that a violation continues shall constitute a separate violation. All judgments, costs and reasonable attorney fees collected for the violation of water ordinances shall be paid over to Warminster Township.

§109. Other Public Water System.

1. From time to time as required, the Township may allow other public water suppliers whose distribution system exists within the Township or on its borders with adjoining townships or boroughs to serve Warminster Township residents.
2. Any Warminster Township resident who is served by said other public water suppliers will be subject to all rules, regulations, specifications, fees and penalties of said supplier.

Part 2

Reserved for Future Use

Part 3

Well Rules and Regulations

§301. Purpose.

1. Purpose. Warminster Township is in the Southeastern Pennsylvania protected area as designated by the Delaware River Basin Commission. The purpose of these rules and regulations is to establish minimum standards for quality, quantity, location, construction, alteration or abandonment of water wells and water well installation; also, to require a permit for the construction of a water supply including production wells, test wells, test borings and monitoring wells, the installation of pumping equipment and other appurtenances, and the drilling of boreholes used for the installation of ground source heat pump equipment; also, to license all well contractors and pump installation contractors. After the effective date of adoption of these rules and regulations, no well (either individual, semipublic, public or geothermal borehole) shall be constructed, repaired or modified or any pump be installed, for new construction contrary to the provisions of these regulations. The code set forth herein replaces Warminster Township Ordinance 32 of 1955.
2. Scope. Except where clearly noted in the text, the provisions of this Part shall apply to all wells serving individual, semipublic water supply systems and boreholes drilled for the installation of closed-loop ground source heat pump equipment. Nothing in this Part is construed to exempt a public water system in Warminster Township from the requirements of the Pennsylvania Safe Drinking Water Act, (35 P. S. § 721. 1 et seq.) Note: All locations, construction, alterations, abandonment and permitting of individual private well water supplies, will be governed by Ordinances of the County of Bucks, Pennsylvania, and administered by rules and regulations set forth from time to time by the Bucks County Board of Health.

§302. Definitions.

The following words and terms when used in this Part shall have the following meaning unless the context clearly indicates otherwise.

ABANDONED WELL - any well where the drilling process has been completed in excess of one hundred eighty (180) days and the well has not been approved for use as a supply by the Department; or, wells that have not been used as a supply on a continuous basis for a period of one (1) year; or, wells which are in such a state of disrepair that continued use for the purpose of obtaining groundwater is impracticable, (such impracticability shall be determined by the Department); or, any well which has been replaced by a new well or a public water supply. Test wells and monitoring wells shall be considered abandoned wells when their use on a regular or prescribed basis has been discontinued.

ABANDONMENT - the process of properly filling and sealing a well, in accordance with these regulations.

AGRICULTURAL WATER SUPPLY - any water supply used specifically for irrigation of crops, irrigation of recreational or institutional grasslands, the watering of farm animals or other livestock, where the use of such water supply shall not be intended for human consumption.

ALTERATION - any action which necessitates entering a well with drilling tools; treating a well to increase yield; altering the physical structure or depth of the well; blasting; removal or replacement of well casing or modifications concerning grouting or curbing.

ANNULAR SPACE - the space between two (2) cylindrical objects, one of which surrounds the other, such as the space between a drill hole and a casing pipe and a liner pipe.

ANSI - American National Standards Institute.

API - American Petroleum Institute.

APPROVAL TO USE - written approval to use the well obtained from the Department in accordance with subsection 11.C within ninety (90) days of the completion of the well drilling process or, if new construction, within ninety (90) days of the completion of the well drilling process.

AQUIFER - a geological formation that contains and transmits water.

ASTM - American Society for Testing Materials.

AUTHORITY – Warminster Municipal Authority

AWWA - American Water Works Association.

BACK SIPHONAGE - the flowing back of used, contaminated or polluted water from a plumbing fixture or vessel or other sources into a potable water supply pipe due to negative pressure in such pipe.

BACKFILLING - the process of sealing a borehole for the purpose of abandoning a well or enclosing the close-loop of a ground source heat pump system.

CASING - an impervious durable pipe placed in a well to prevent the walls from caving in and to seal off surface drainage or undesirable water, gas or other fluids and prevent them from entering the well.

CLOSED-LOOP GEOTHERMAL BOREHOLE - a boring drilled to facilitate the installation of a pipe loop or tubing for a ground source heat pump system, whether circulating water, heat transfer fluid or refrigerant using direct exchange.

COLIFORM - any of several bacilli, especially *Escherichia coli* (e. coli) and members of the genus *Aerobacter*, commonly found in the large intestine of humans and certain other animals.

COMMUNITY WATER SYSTEM - a water system which serves at least fifteen (15) service connections used by year round residents or regularly serves at least twenty-five (25) year round residents.

CONSTRUCTION OF WELLS - all acts necessary to obtain groundwater, artificially recharge groundwater or acts necessary to install geothermal appurtenances. Provided however, such term does not include an exaction made for the purpose of obtaining or for prospecting for oil, natural gas, minerals or products of mining or quarrying, or for inserting media to repressure oil, or natural gas formations or for storing petroleum, natural gas or other products and services. Construction of wells includes the location and excavation or drilling of the well, installation of geothermal appurtenances, but excludes the installation of pumps and pumping equipment.

COUNTY - County of Bucks, Pennsylvania, or the Bucks County Board of Health.

CROSS CONNECTION - an arrangement allowing either a direct or indirect connection through which backflow, including back siphonage, can occur between the drinking water in an individual water supply well or a public water system and a system containing a source or potential source of contamination, or allowing treated water to be removed from any public water system, and returned to the public water system. The term does not include connections to devices totally within the control of one or more public water systems and connections between water mains.

DECOMMISSIONED WELL - any well that is no longer equipped in such a manner as to be able to draw groundwater. This shall include wells where the pump, piping and/or electrical components have been disconnected or removed.

FLOWING WELLS - a well that yields water by artesian pressure at the ground surface.

GEOHERMAL WELL - a well installed for the purpose of heating or cooling a facility. These shall include wells drilled as supply and/or return wells for open-loop systems, or closed-loop geothermal boreholes.

GEOHERMAL WELL INSTALLATION CONTRACTOR - any individual in immediate supervision of and/or responsible for the drilling of boreholes used for the purpose of geothermal heating or cooling of a facility and is licensed as a well contractor and geothermal well installation contractor by the Department. This individual is responsible for boring, pipe loop installation and backfilling of boreholes used for the installation of closed-loop ground source heat pump systems.

GROUND SOURCE HEAT PUMP EQUIPMENT - any components of a heating or cooling and pipe loops for use in closed-loop applications using a heat transfer fluid or direct exchange systems.

GROUNDWATER - water within the earth below the water table within the zone of saturation. Groundwater includes both water under water table condition and confined within deep aquifers.

GROUT - a permanent watertight joint or connection made by filling with concrete, neat cement or other approved impervious material between the casing and the undisturbed formation surrounding the well or between two (2) strings of casing.

INDIVIDUAL WATER SUPPLY - a system including wells, pumps and piping equipment, which supplies water to a private structure and does not meet the criteria of "semipublic water supply" or "public water supply."

INSTALLATION OF PUMPS AND PUMPING EQUIPMENT - the procedure employed in the placement and preparation for operation of pumps and pumping equipment, including all construction involved in making entrance to the well and establishing seals but not including repairs to existing installations.

MONITORING WELL - a well used to observe water levels and/or obtain samples of groundwater for the purpose of water quality analysis. Test wells shall be considered monitoring wells under this definition.

mg/L – milligrams per liter, equivalent to parts per million

NEW CONSTRUCTION - any new building or structure whether residential, commercial or industrial on a property. New construction also includes any change in use of an existing structure.

NONCOMMUNITY WATER SYSTEM - a public water system, which is not a community water system.

N. S. F. - National Sanitation Foundation.

N.T.U. – nephelometric turbidity units

PITLESS ADAPTER - a device or assembly of parts which will permit water to pass through the wall of the well casing or extension thereof, and which provides access to the well and to the parts of the water system within the well in a manner to prevent entrance of pollution into the well and the water produced.

PUBLIC WATER SYSTEM - a system which provides water to the public for human consumption which has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year. The term includes collection, treatment, storage and distribution facilities under control of the operator of the system and used in connection with the system. The term includes collection or pretreatment storage facilities not under such control which are used in connection with the system. The term also includes a system, which provides water for bottling or bulk hauling for human consumption. Water for human consumption includes water that is used for drinking, bathing and showering, cooking, dishwashing or maintaining oral hygiene.

PUMP INSTALLATION CONTRACTOR - any individual engaged in the business of installing or repairing pumps, pumping equipment, drop pipes, pitless adapters and the other equipment used for the extraction and conveyance of water from the aquifer to the distribution, heating or cooling system of the structure to be served.

PUMPS AND PUMPING EQUIPMENT - any equipment or materials utilized or intended for use in withdrawing or obtaining groundwater including, but not limited to, piping, seals and tanks, together with fitting and controls.

RELOCATION - any change in location of a proposed well which deviates from the permitted location.

SECOND WELL - any well drilled on the same property where an existing well, permitted as or intended to serve as a water supply, already exists.

SEMIPUBLIC WATER SUPPLY - a water supply system including wells, pumps and piping equipment which supplies water to one or several facilities such as industrial or commercial establishments, parks, camps, hotels, motels, school, institutions, eating and drinking establishments or water supply which services two (2) or more dwelling units and is not a public water system as defined by the Pennsylvania Safe Drinking Water Act (35 P. S. §721. 1 et seq.)

TEST WELLS - wells drilled for the sole purpose of measuring groundwater availability. Test wells shall be considered as monitoring wells under these regulations.

µg/L – micrograms per liter, equivalent to parts per billion

WELLS - any excavation that is drilled, cored, bored, washed, driven, dug, jetted or otherwise constructed when the intended use of such excavation is for the location, acquisition or artificial recharge of groundwater or for the installation of ground source heat pump equipment. This includes, but is not limited to, test wells, test borings, geothermal and monitoring wells, in addition to wells to be utilized as individual or semipublic or public water supplies.

WELL CONTRACTOR - any individual in immediate supervision of and/or responsible for the construction, test pumping or equipping or development of any well. Such individual shall have a minimum of three (3) years "hands on" experience in the actual drilling, casing and grouting of water wells and be licensed by Warminster Township.

WELL SEAL - an approved device or method used to protect a well casing or water system from the entrance of any external pollutant at the point of entrance into the casing of a pipe, electric conduit or water level measuring device.

WELL SYSTEM - when there are two (2) or more wells being utilized in an individual, semipublic or public water supply system.

§303. Drilled Water Supply Wells.

1. Licenses. Only Pennsylvania-licensed well drillers shall install wells within Warminster Township.
2. Location.
 - A. The source of supply shall be from a water bearing formation drawn not less than forty (40) feet from the ground surface.
 - B. Cap wells shall be located at a point free from flooding and at a higher elevation (wherever possible) and at the following distances to existing or potential sources of pollution.

Source Pollution: Minimum isolation distances from the proposed well to the features listed below:

WATER RELATED	Minimum Distance
1. Delineated wetlands or floodplains	25 feet
2. Lakes, ponds, spring prone areas or other surface waters	25 feet
3. Rainwater pits	25 feet
4. Storm drains, retention basins, storm water stabilization ponds	25 feet
SEWAGE RELATED	
1. Bio-solids disposal areas and seepage disposal sites	300 feet
2. Community sewage disposal systems.	200 feet
3. Farm silos, barnyards, manure pits or tanks or other storage areas of animal manure	100 feet
4. Subsurface sewage absorption areas, elevated sand mounds, cesspools, sewage seepage pits, community and single-family spray irrigation systems, etc.	100 feet
5. Septic tanks, aerobic tanks, sewage pump tanks, holding tanks	50 feet
6. Gravity sewer lines and drains carrying domestic sewage or industrial waste (except when the sewer line is cast iron pipe with either watertight lead caulked joints or joints filled with neoprene	50 feet (10 feet)

gaskets, or if solvent welded Schedule 40 (or SDR equivalent) or better polyvinylchloride (PVC) pipe)	
7. Sewage drains carrying domestic sewage or industrial waste under pressure (except welded steel pipe or solvent welded Schedule 40 or equivalent or better PVC pipe or concrete encased pipe.)	50 feet (10 feet)
CHEMICAL RELATED	
1. Preparation area or storage area of hazardous spray materials, fertilizers or chemicals; salt pipes	300 feet
CHEMICAL RELATED	
2. Surface or subsurface containers or tanks of over 1,000 gallons used for the storage of materials which cannot be properly renovated by passage through the soil. This includes, but is not limited to, gasoline and all other petroleum products. (except where tank installation meets current PA DEP Under Ground Storage Tank Regulations. Documentation must be supplied.)	300 feet (100 feet)
3. Surface or subsurface containers or tanks of 1,000 gallons or less used for the storage of materials, which cannot be properly remediate by passage through the soil. This includes, but is not limited to, gasoline and all other petroleum products. For example, the type of tanks frequently found in homes using oil for heating purposes.	30 feet
4. Driveways, parking lots or paved areas, Curbed driveways (6" min) parking lots or paved areas	10 feet
5. Dedicated road right-of-way	15 feet
6. Property lines, rights-of-ways, easements	10 feet
7. Metal or masonry storage buildings on a cement slab	10 feet
Any other source of pollution	As approved

C. Individual Neighboring Well 50 feet

D. Any proposed deviation from the distances prescribed in subsection(s) 2.B. above must be requested in writing by the Applicant and submitted to the Authority for approval, with reasons stated for such deviation.

2. Construction.

A. Casing.

1. All wells serving as a water supply shall be equipped with a watertight and durable wrought steel casing equivalent to schedule 40 280 wall thickness. The section of casing shall be joined together by threaded couplings or joints, by welding. The casing shall be carried to a minimum depth of forty (40) feet and (then) extended an additional five (5) feet into firm bedrock or other impervious strata and grouted in place.

2. The criteria established in AWWA Standard A100-84 must be followed. Casings shall terminate a minimum of eighteen (18) inches above the surrounding, finished ground surface grade. All casings for water supply or geothermal return wells shall be fitted with an insect resistant well cap.

B. Grout Materials.

1. All grout information (type of cement or bentonite and number of bags of cement or bentonite used for grouting) must be submitted in writing on the form(s) provided by the Authority to the Authority by the well driller within thirty (30) days of completion of the well drilling process.
2. In all well installations an annular space shall be provided between the well casing and the earth formation. The annular space shall be completely filled with approved grout materials, in one continuous operation, under pressure from the bottom to the natural land surface, within twenty-four (24) hours after completion of the drilling. In the event that grouting is done following the completion of all drilling operations, care must be taken to prevent the entrance of drillers mud into the annulus during the completion of the borehole by the use of a rubber packer or other acceptable method. The annular space shall be completely cleared of all obstructions prior to the placement of the grout material. Exterior grouting methods must be used in this instance. The casing shall be sealed effectively against entrance of water from water bearing zones which are subject to pollution, through which the casing may pass, by grouting a minimum of ten (10) feet above and ten (10) feet below the polluted or undesirable water-bearing zone. During the installation of the pitless adapter, grout material may be removed from the exterior of the casing in order to provide a watertight seal between the casing and the pitless adapter.
3. A curing time of twelve (12) hours for Type III Portland cement must be provided immediately following the placement of the grout. Drilling is not permitted during the curing period. If casings of smaller diameter are used in the lower portions of the well, effective watertight seals shall be provided between the casings where they telescope for a minimum distance of four (4) feet.
4. The annular space of all well installations must be filled with one of the following listed grout materials.
 - a. Neat cement grout shall consist of a mixture of API Class G (or Class B similar to ASTM C150 Type II) and water in the ratio of 0.67 cu. ft. (0.019 m³) of water per 94 lb. (42.7 kg) sack weighing approximately 228 lbs./cu. ft. A maximum of six (6) percent by weight bentonite and two (2) percent by weight of calcium chloride may be added.
 - b. Bentonite grout shall be a pure bentonite with at least 20% solids by weight when mixed with water. Hydration of the bentonite must be delayed until bentonite mix has been placed down the well. This can be done by using additives with the dry bentonite or in water; mixing calcium bentonite with sodium bentonite or by using granular bentonite which has less surface area.

- c. In all well installations if rapid loss of grout material occurs during placement, coarse fill material (e.g. sand, gravel, crushed stone, dry cement) may be used in the zone or zones in which the rapid loss is occurring. The remainder of the annular space shall be grouted as provided below. In no case shall pouring, dumping or shoveling of grout material into the annular space be deemed an approved method of grout placement.

C. Grout Placement.

1. Grout Pipe Outside Casing. The minimum annular space of 1 1/2 inches around the entire outside of the casing shall be provided by drilling a borehole three (3) inches larger than the outside diameter of the casing to be inserted. All grout shall be placed by pumping through the grout pipe. The entire interval to be grouted shall be open and without obstructions. The grout pipe may remain extended to the bottom of the interval during and after grouting or it may be raised slowly as a grout is placed provided that the discharge end of the grout pipe remains submerged in the emplaced grout at all times until grouting is completed. In the event of interruption in the grouting operations, the bottom of the grout pipe shall be raised above the grout level and should not be resubmerged until the air and water have been displaced from the grout pipe.
2. Grout Pipe Inside Casing. The bottom of the casing if fitted with a packer arrangement, also referred to as a cementing shoe or float shoe, and the casing is placed in the borehole a short distance off the bottom. The float shoe allows grout to be pumped through the grout pipe and upward into the annular space, while preventing grout leakage into the casing during grouting and after removal of grout pipe. Grouting is continued until cement appears at the surface at which time the grout pipe is disconnected from the float shoe. The float shoe is drilled out after the grout sets and hardens sufficiently.
3. Interior Method Two Plug. The first plug separates the grout from the fluid in the casing, and the other separates the grout from the water pumped in above it. First, the casing is placed a short distance off the bottom. After pumping water through the casing to circulate fluid in the annular space and clear any obstructions from the hole, the first plug is inserted, and the casing is capped. A measured volume of grout is pumped in, which is sufficient to fill the annular space. The casing then is opened, and the second plug inserted. A measured volume of water is pumped in above the second plug until it is pushed to the bottom of the casing and most of the grout is expelled up and into the annular space. The water in the casing is held under pressure to prevent the backflow of grout until it has set and hardened.
4. Interior Method Upper Plug. The casing is placed a short distance off the bottom, and the water is pumped into the casing to circulate fluid through the annular space to clear any obstructions from the hole. A measured quantity of grout slightly greater than that needed to fill the annular space is pumped into the capped casing. Because this grout is in direct contact with the drilling fluid, there will be a narrow zone of weak grout between the drilling fluid and good grout; however, this zone should remain inside

the casing and not be forced into the annular space. The casing is opened, and a drillable plug is inserted. A measured volume of water is pumped in above the plug until it is pushed to the bottom of the casing and most of the grout is expelled up and into the annular space. The water in the casing is held under pressure until the grout sets and hardens.

5. Interior Method Capped Casing. The casing is placed a short distance off the bottom, and water is pumped into the casing to circulate fluid in the annular space and clear any obstructions from the hole. The grout pipe passes through an airtight cap at the top of the casing and is positioned three (3) to four (4) feet above the bottom of the casing. The grout pipe is assembled so that it can be pulled through the cap a distance of about twenty (20) feet after the injection of grout is completed. A bleeder valve is provided to release air from inside the casing as it is filled with water. The first step is to fill the casing and annular space with water. With the upper end of the casing closed, grouting is started by forcing the cement through the grout pipe upward into the annular space. Grouting is continued until the cement overflows around the casing at ground surface. Just enough water is pumped to clear the cement from the grout pipe, and the grout pipe is lifted free of the grout. Both the casing and grout pipe shall be kept tightly closed under pressure until the cement sets and hardens.
 6. Grout Displacement Method. The hole is filled with the estimated volume of grout required to fill the annular space, and the casing is lowered into the hole. The bottom of the casing is closed in a tight, drillable plug. Guides often are used to keep the casing centered in the hole. As the casing is lowered, the grout is forced upward around it to fill the annular space. If the pipe does not sink to the bottom under its own weight, it is filled with water.
 7. Unconsolidated Formations. When drilling through an unconsolidated formation a steel drive shoe shall be required. Grouting shall be done in accordance with the following:
 - a. If caving conditions are experienced on wells deeper than thirty (30) feet, the annular space shall be grouted from the point where caving occurred or from a depth of thirty (30) feet, whichever is greater, to land surface.
 - b. If the annular space cannot be grouted in accordance with these regulations, the well shall be abandoned and sealed in accordance with §307 of this Part.
 8. Other grouting methods and materials may be used subject to prior written approval of the Department.
- D. Packers. Packers, when used, shall be of materials that will not impart taste, odor, toxic substances or bacterial contamination to the well water.
- E. Well Screens. Well screens, when used, shall:
1. provide the maximum amount of open area while still maintaining structural strength.

2. Have the size of openings in the screen based on a sieve analysis of the material contained in the surrounding geological formation or gravel pack.
 3. Be constructed of materials resistant to damage by chemical action of groundwater or cleaning operations.
 4. Have sufficient diameter to provide adequate specific capacity and low aperture velocity. Usually, the entrance velocity should not exceed 0.1 feet per second.
 5. Be installed so that the pumping water level remains above the screen under all operating conditions.
 6. Be designed and installed to permit removal or replacement without adversely affecting watertight construction of the well.
 7. Be provided with a bottom plate or wash down bottom fitting of the same material as a screen.
- F. Gravel Packs. Gravel packs when used:
1. Shall be well rounded particles, 95% siliceous material, that are smooth and uniform, free of foreign material, properly sized, washed and disinfected immediately prior to or during replacement.
 2. Shall be placed in one uniform continuous operation.
 3. Gravel refill pipes, when used, shall be Schedule 40 steel pipe incorporated within the pump foundation and terminated with screwed or welded caps at least twelve (12) inches above the pump house floor or concrete apron.
 4. Gravel refill pipes located in the grouted annular opening shall be surrounded by a minimum of 1.5 inches of grout.
 5. Protection from leakage of grout into the gravel pack or screen shall be provided.
- G. Pit Installations. Pit installations are used where the casing terminates below the ground surface. Where well pits are used, such pits shall be maintained free of water at all times. The floor of the pit shall be a watertight reinforced concrete platform at least four (4) inches thick poured around the casing and shall be provided with a watertight seal. The floor of the pit shall extend at least two (2) feet from the center of the casing in all directions. In all cases, the pit shall be sized to allow adequate working space. The casing shall extend above the floor for at least twelve (12) inches. An insect resistant well cap shall be installed. The surface of the floor shall be pitched toward a drain which has a minimum diameter of four (4) inches and discharged by gravity to the surface of the ground in an area not subject to flooding or to a basement which is effectively protected against flooding. Drain openings shall be effectively screened to prevent the entrance of insects and rodents. The drain shall not be connected to any sewer or other drain. The pit shall have watertight reinforced concrete walls four (4) inches thick or equivalent which provide for an effective watertight seal against the floor. The top of the pit shall be a watertight reinforced monolithic concrete slab at least four (4) inches thick, which shall be sealed with the wall so as to effectively prevent the entrance of water. The top of the pit shall not be more

than six (6) inches below the ground surface. A durable watertight manhole shall be installed in the top of the pit centered over the casing and effectively sealed with the top to prevent the entrance of water. This manhole shall be at least twenty-four (24) inches in diameter. It shall extend at least three (3) inches above the surrounding ground surface and be covered by an impervious durable cover of concrete, steel or equivalent material which overlaps the manhole vertically by at least two (2) inches. The manhole cover shall be effectively secured to the manhole by bolting, locking or equivalent means and shall be kept so secured. Pit installations shall not be used in areas subject to flooding by ground or surface water or where the groundwater level rises to within one (1) foot of the bottom of the proposed pit. Where pipes enter the pit, the annular space between the pipes and the wall shall be effectively sealed by a watertight permanent seal.

- H. Pitless Installations. Pitless installations are those installations where the casing terminates above the ground surface.
1. Where pitless installations are used, they shall be of a design which provides an effective seal against the entrance of ground or surface water into the well, access casing and into the piping leading to the pump. All buried suction lines shall be effectively encased, or otherwise protected to prevent external damage or contamination. Pitless installations must be so designed as to be structurally sound and to provide for ready removal of drop piping without excavation. The access casing shall be effectively protected against corrosion and shall extend at least eighteen (18) inches above the natural ground surface and to a point below the frost line. The ground level at this point shall be elevated above the adjacent ground level and graded to drain away in all directions. The top of the access shall be effectively sealed against the entrance of waters, insects and rodents. An insect resistant cap shall be installed. The pitless adapter shall not be submerged in water or used in areas used by automobiles and other vehicles.
 2. Where surface installations (i.e., hand pumps, pump rooms, etc.) are used a watertight reinforced concrete platform at least four (4) inches thick and extending for at least two (2) feet in all directions from the center of the casing shall be poured around the casing to provide an effective watertight seal with the casing, or shall be made watertight with an effective permanent seal. The surface of the platform shall slope to the edges. The casing shall extend through the slab for a least twelve (12) inches and shall be effectively sealed against the entrance of contamination. An insect resistant well cap shall be installed where appropriate. All pumping equipment shall be protected against freezing. If a pump room is proposed, it shall be so sized to allow adequate working space.
- I. Venting. Where venting is required, an overlapping cover or pipe with the opening facing downward shall be required. Such venting shall be effectively protected against the entrance of insects and rodents. An insect resistant well cap shall be installed. In no case shall openings be less than twelve (12) inches from the ground, or, in the case of pit installations, the floor.

J. Individual Water Supply System Standard.

1. An individual water supply system shall produce not less than four hundred eighty (480) gallons of water in a two-hour period, at least twice each day, twelve (12) hours apart.
2. If the sustained yield of the individual well or individual well system is not capable of meeting the total individual water supply system standard, sufficient storage shall be required. Borehole capacity and/or a storage tank shall provide storage capacity.

K. Minimum Yield for Individual Wells.

1. All potable water supply wells intended to serve as an individual water supply shall be approved for yield in accordance with this subsection. Replacement wells servicing existing improved properties may be exempt from this requirement or wells servicing new construction may be released from this requirement at the discretion of the Manager or his authorized representative.
2. The criteria for approval shall be a minimum well yield of one (1) gallon per minute.
3. For wells with yields of two (2) gallons per minute or less, a minimum of four hundred (400) gallons of storage capacity shall be provided. Borehole storage shall be measured from the pump level to the top of the static water column. Wells with yields between two (2) and four (4) gallons per minute shall provide the storage capacity required to meet the individual water supply standard described in §303.2.J.
4. If the well does not meet the yield requirement of §303.2.K.(2), a second well shall be required. If the combined yield of this well system does not provide the required yield, the Department will allow the use of this well system, utilizing the appropriate release agreement, provided the well system meets the individual water supply system standard in §303.2.J. The permittee may propose to construct additional wells in an attempt to meet the yield requirement.
5. The minimum well yield requirements set forth in this §303.2.K. are deemed sufficient to supply an adequate quantity of water for normal indoor household or equivalent usage. A supplemental source of water may be needed to support outdoor or other nonconsumptive uses.
6. A report that documents the well testing shall be submitted to the Authority that contains the following:
 - a. The name, address and telephone number of the well driller and personnel conducting the test.
 - b. A complete description of the test well(s) that includes the horizontal and vertical dimensions of the well(s), the casing installed with specifications and the specifications of the grouting material used.
 - c. Date the well(s) was drilled.

- d. Depth of the well(s).
- e. Method used to drill the well(s).
- f. Type of casing and grouting used.
- g. Distance of the well from water related, sewage related, chemical related or individual neighboring well.
- h. Location and distance to public sewer lines.
- i. Type and quantity of storage to be provided (if applicable)
- j. A list of rock formations identified during drilling.
- k. The static water level immediately prior to the testing for yield.
- l. A hydrograph of the depth to the water surface during pump testing and the recovery period at the test well(s) showing corresponding pump and discharge rate in gallons per minute and the time at which readings were taken.
- m. A statement of water quality conditions and degree of compliance with §311.2.B.
- n. A mapping of well location on the property showing all other data required by the Part.
- o. Recommended depth for the pump.

§304. Groundwater Monitoring Wells and Test Wells.

- 1. Licenses Only Pennsylvania-licensed well drillers shall install wells within Warminster Township.
- 2. Monitoring Wells
 - A. Due to the variability in the information to be obtained, groundwater monitoring wells shall not be subject to strict compliance with the isolation distances given in §303 of these regulations. The construction of each monitoring well must first receive written approval of the Authority in the form of a permit. Each monitoring well must be designed to minimize potential contamination of the aquifer and to maximize the information obtained from each installation. Analysis and reports prepared on monitoring wells must be submitted to the Authority.
 - B. Continued upkeep and safe operation and maintenance of all monitoring wells shall be the ultimate responsibility of the property owner.
 - C. Whenever a property on which a monitoring well is located is sold or subsequently changes ownership, the Authority shall be informed of the change. All information regarding the owner and any entity responsible for operation and maintenance of the well, shall be kept current at all times.
 - D. The property owner shall be responsible to inform the Authority of the operational status of the well. This shall be required on an annual basis within thirty (30) days of the anniversary of the original issuance date of the permit for each monitoring well.

- E. When a monitoring well is no longer going to be actively used it shall be considered as an abandoned well according to §302 of these regulations and is required to be sealed in accordance with the abandonment procedures given in §307.
- F. Failure to comply with the above requirements relating to ownership, reporting and the operation, maintenance or abandonment of any monitoring well may result in legal action being initiated against the property owner by this Authority.

3. Test Wells

- A. Test wells require a permit and must meet the isolation distances and construction standards of §303 of these regulations for water supply wells.
- B. Test wells are temporary and therefore are not permitted as permanent supply wells. Once the intended use of the well has been completed, the well shall be considered abandoned according to §302 of these regulations and shall be sealed according to §307.
- C. Test wells may be converted for use as a permanent supply well. To be converted for use as a supply well, the owner shall submit a new application and the applicable fee for a new well permit to the Authority and meet the requirements of §310 of this Part. Forms required for test well conversion are available from the Authority.
- D. The converted test well will not be granted approval for use until the required forms and a water quality analysis showing that the water meets the requirements of §311 is submitted to this Authority. In addition, documentation that the supply well meets the individual supply system standard in §303.2.J. and minimum yield requirements in §303.2.K. must be submitted to this Authority prior to well approval.
- E. Failure to comply with these regulations regarding test wells may result in the initiation of legal action against the property owner by this Authority.

§305. Geothermal Wells

- 1. Licenses Only Pennsylvania-licensed well drillers shall install wells within Warminster Township.
- 2. Open-Loop Geothermal Systems
 - A. The geothermal delivery and return wells that depend on groundwater supplies for heating and cooling must meet all Authority isolation distance requirements listed in this Part.
 - B. The geothermal delivery well must be tested for all specified water quality standards listed in §311.2.B.
 - C. If the geothermal delivery well will also be used as a drinking water supply, all Authority water quality requirements listed in §311.2.A. must be met.
- 3. Closed-Loop Geothermal Boreholes
 - A. Location.

1. The following minimum isolation distances to existing or potential sources of pollution shall be maintained. Minimum isolation distances from the proposed closed-loop borehole to the facilities listed below:

WATER RELATED	Minimum Distance
1. Delineated wetlands, floodplains, lakes, ponds or other surface waters	10 feet
2. Rainwater pits	10 feet
3. Storm drains, retention basins, stormwater stabilization ponds	10 feet
SEWAGE RELATED	
1. Surface sewage absorption areas, elevated sand mounds, cesspools, sewage seepage pits	50 feet
2. Spray irrigation site perimeter, sewage sludge and seepage disposal sites	50 feet
3. Septic tanks, aerobic tanks, sewage pump tanks, holding tanks	25 feet
4. Sewer drains, public sewer laterals	5 feet
CHEMICAL RELATED	
1. Preparation area or storage area of hazardous spray materials, fertilizers or chemicals, salt piles. (If borehole is cased and grouted inside and out)	300 feet (150 feet)
2. Surface or subsurface containers or tanks of greater than 1,000 gal. used for storage of materials which cannot be properly renovated by passage through soil. This includes, but is not limited to, gasoline and all other petroleum products. (If borehole is cased and grouted inside and out)	300 feet (150 feet)
3. Surface or subsurface containers or tanks of 1,000 gal. or less used for storage of materials which cannot be properly renovated by passage through soil. This includes, but is not limited to, gasoline and all other petroleum products. For example, the type of tanks frequently used in homes using oil for heating purposes.	30 feet
MISCELLANEOUS	
1. Dedicated road right-of-way	10 feet
2. Property lines, rights-of-way, easements	5 feet
Any other source of pollution	As approved

2. Any proposed deviation from the isolation distances prescribed above must be approved in writing by the Authority, with reasons stated for such deviation.

B. Construction

1. Closed-loop geothermal boreholes shall be located, drilled and finished in a manner that will protect the borehole structure from damage from surface activities or other natural occurrences so that the quality of the groundwater cannot be affected.

2. The well contractor shall be responsible for insuring that the borehole is drilled in the permitted location. Deviation from the permitted location must receive prior written approval from Warminster Authority.
 3. Casings Are Not Required. Casings may be necessary to hold the borehole open during the drilling process. Casing may be left in the borehole at the discretion of the well contractor. When a casing is used, grouting the annular space is required.
 4. The pipe loop is to be installed by a contractor who is certified in the proper method of heat fusion specified by the pipe manufacturer. The well contractor shall be responsible for insuring that the pipe loop is installed in accordance with the specifications of the ground source heat pump system manufacturer, the pipe manufacturer and that the borehole is properly backfilled.
 5. Grouting of a closed-loop geothermal well shall be conducted via tremie pipe starting at the bottom of the well and proceeding upward. Grouting mixtures for closed-loop geothermal wells must have permeability less than 10^{-7} cm/s.
- C. Permitting. Closed-loop geothermal boreholes shall be permitted in accordance with §310. Each borehole must be permitted using a single application. A separate fee will be charged for each borehole.
- D. Only water or non-toxic, biodegradable fluids may be used as the circulating fluid for the ground loop portion of geothermal systems.

§306. Pumps and Other Equipment.

1. Head Pump Installations.
 - A. The pump head shall be designed and constructed to prevent contamination from reaching the water chamber and other interior surfaces of the pump.
 - B. The pump shall be designed and constructed to provide an effective watertight seal with the well casing or stored water reservoir.
 - C. The pump cylinder or foot valve shall be installed below the pumping level of the well.
 - D. The pump shall be designed where necessary for protection against freezing.
 - E. All pump information must be submitted in writing on forms provided by the Authority.
2. Power Pump Installations.
 - A. The base of a pump installed directly over a well casing or pipe sleeve shall be designed to provide an effective watertight seal with the casing or pipe sleeve.
 - B. All power pumps shall be installed on a firm base in an area free from flooding.
 - C. Where power pumps are installed in pits, the pits shall meet the requirements of §303.2.G. In addition, the pit shall be ventilated with a pipe of a diameter of at least one and one-half (1 1/2) inches.

- D. Location and installation of the pump and all related equipment shall permit convenient access, removal, maintenance and repair.
 - E. The pump suction opening shall be placed at least two (2) feet below the maximum drawdown of the water in the well. However, the pump suction opening shall be placed at a sufficient distance from the bottom of the well so as to prevent agitation of accumulated sediment.
3. Well Cap Replacement. Whenever a pump is repaired or replaced, the pump installer shall insure that an insect resistant well cap is installed on the well. Caps other than insect resistant caps shall be replaced with insect resistant caps. If an existing insect resistant cap is to be reinstalled on a well, the pump installer shall inspect the condition of the cap and either clean or replace the cap as necessary to insure that the integrity and operation of the well is maintained. The new well cap should be a watertight locking cap with "O" ring seals.

§307. Abandonment of Wells.

- 1 One (1) of the following methods of abandonment described below must be used in accordance with the geological formations penetrated and in such a manner as to prevent the borehole being sealed from acting as a channel for pollution, or the escape of subterranean gases. A report, form provided by the Authority, as required above, of the method of sealing shall be filed with the Authority.
- A. A well in unconsolidated deposits shall be filled with neat cement grout or concrete grout.
 - B. The section of a well in a cavernous or creviced rock (such as cavernous limestone or diabase, creviced granite, etc.) shall be filled with concrete or neat cement grout or alternate layers of concrete or neat cement grout, gravel or stone aggregate. The filling shall be completed at the top by a layer of neat cement grout, concrete grout or bentonite extending at least twenty (20) feet (6.1 m) above the top of the cavernous rock or to the ground surface.
 - C. The section of a wall in sandstone strata shall be filled with neat cement grout, concrete grout or sand. The filling shall be completed at the top of the formation by a layer of neat cement grout, concrete grout or bentonite extending at least twenty (20) feet (6.1 m) above the top of the sandstone or to the ground surface.
 - D. The flow in a flowing well shall be confined and the well filled in accordance with preceding paragraphs or the well shall be sealed by pressure grouting.
 - E. Abandonment of wells containing subterranean gases requires special precautions and a casing in such a well shall be sealed with neat cement grout, concrete grout or bentonite.
 - F. Debris or obstructions that may interfere with sealing operations shall be removed from the well.

§308. Disinfection.

1. Following the completion of the construction of an individual, semipublic water or public supply and installation of the pumping equipment, or alterations, repairs or maintenance work, the well shall be pumped continuously until the water discharged is clear. The

well, pump, piping system and other fixtures, shall be filled with water containing a concentration of not less than one hundred (100) parts per million of free chlorine. A portion of the chlorine solution shall be recirculated directly to the well in order to insure proper agitation. The water shall not be used for a period of twenty-four (24) hours. Other combinations of concentration and time intervals may be used as are demonstrated to be equally effective.

2. Disposal of the purged water shall be at a point so as to minimize adverse effects to aquatic life and further, the purged water shall not be discharged into any subsurface sewage disposal system. One ounce (28 g/0.8 kg) of dry calcium hypochlorite (70% available chlorine), dissolved in 52.5 gallons (200 l) of water, makes a 100 ppm strength disinfectant solution. Various proportions can be worked out using the approximate quantities shown in the following table:

Diameter of the Well Casing	Water Standing in Well	Amount of dry powder (HTH or equivalent) to make at least 110 ppm chlorine solution
4 inches (10.16 cm)	100 feet (31 m) 65.5 gallons (247 l)	3 tablespoons or 1/4 cup (36.7 g)
6 inches (15.24 cm)	100 feet (31 m) 147 gallons (556 l)	7 tablespoons or 1/2 cup (82.3 g)
8 inches (18.32 cm)	100 feet (31 m) 261 gallons (998 l)	12 tablespoons or 3/4 cup (146.2 g)
10 inches (25.4 cm)	100 feet (31 M) 408 gallons (1,554 l)	1 1/4 cups (228.5 g)
12 inches (30.5 cm)	100 feet (31 m) 587 gallons (2,222 l)	1 3/4 cups (328.7 g)

§309. Cross Connections.

1. Every potable water distributing pipe shall be protected against cross connection with, and backflow from, any plumbing fixture or other piece of equipment or appliance capable of affecting the quality of the potable water by having the outlet end from which the water flows spaced a minimum distance of twice the diameter of the water supply pipe above the flood level rim of the receptacle into which the potable water flows, except:
2. Where it is not practicable to provide this minimum distance, the connection to the fixture, equipment or appliance shall be equipped with a cross connection prevention assembly of a type and location approved by the Authority.
3. For semipublic supplies, the Authority shall require a cross connection prevention device of a type and location approved by the Authority be installed at any fixed potable water outlet to which a hose may be connected. This subsection shall apply to all semipublic water supplies constructed after the effective date of this Part. Existing semipublic water supplies shall be subject to this requirement within one (1) year from the effective date of this Section.
4. Public water systems shall comply with the requirements of the Pennsylvania Safe Drinking Water Act (35 P.S. 721. 1 et seq.)

§310. Permit Procedure.

1. All individual, semipublic or public water supplies and geothermal wells, monitoring wells and test wells shall be constructed in strict compliance with the specifications set forth in this Section of these rules and regulations.
2. It shall be unlawful for any person to locate, drill or have drilled any well, to install or have installed any related pumping equipment, to alter an existing well or its pumping equipment, until a permit for such location, drilling, installation, or alteration shall have been issued by the Authority.
3. No individual, semipublic or public water supply may be used and no structure served by an individual, semipublic or public water supply may be occupied until the Authority shall have issued a certificate indicating that such well and pumping system have been located and constructed in accordance with the terms of the permit(s) issued by the Authority.
 - A. A community public water system may not be used until the owner receives approval from the Pennsylvania Department of Environmental Protection.
 - B. No monitoring well, test well, or geothermal well shall be used until it has received written approval for use from the Authority.
4. If an emergency condition exists, that is, if the lack of water poses an immediate and significant danger to the health and welfare of persons, livestock or domestic fowl or crops, then the Department shall issue a permit within twenty-four (24) hours of receipt of the completed permit application. It is the responsibility of the well contractor and/or property owner or tenant to substantiate that an emergency condition exists by submission of a signed statement to the Department. Emergency permits will not be issued over the telephone except in such instances where the Department may be closed for a period of time in excess of twenty-four (24) hours, and then only to replace an existing water supply where the lack of water poses an immediate and significant threat to human health or when the Department determines that other exceptional circumstances exist. When permits are issued over the telephone, the well contractor must submit the required signed statement and the completed well application to the Department by 9:00 a.m. on the next regularly scheduled Department workday.
 - A. The drilling process for an emergency well must begin within twenty-four (24) hours of receipt of the permit or verbal approval or said permit/verbal approval is void except where inclement weather conditions or other abnormal circumstances occur.
 - B. The well contractor must have the well permit and/or verbal approval well permit number in his possession at the specific job site during all aspects of the well drilling process.
5. Within thirty (30) days of the completion of the well drilling process the well contractor must submit written drilling and grouting information to the Department utilizing form WTWSD-01 and WTWSD-02 in addition to the Well Driller's Log Form FM-TGS-15. Approval to use the well will not be granted until all of the requirements outlined in §303.2. and §310.3. have been satisfied.
 - A. Within thirty (30) days after the completion of the pump installation process for supply wells, the pump installation contractor must submit written information to the Authority as described on the forms provided by the Authority.

- B. Second wells on existing properties or agricultural/irrigation wells on farm/commercial properties must receive "approval to use" from the Authority no more than ninety (90) days from the completion of the drilling process.
- C. Failure to comply with these regulations will result in legal action being taken against the property owner/equitable owner and/or well contractor and/or pump installation contractor. Neither the well contractor nor the pump installation contractor shall refuse to submit the information required in this Part due to the nonpayment for his or her services.

§311. Water Quality.

- 1. Water quality for public water supplies shall be regulated by the Pennsylvania Safe Drinking Water Act (35 P.S. 721.1 et seq.)
 - A. All water samples to be tested must be drawn by a trained Department of Environmental Protection (DEP) certified laboratory employee or a Township licensed well driller. Qualified engineers or environmental consultants may also draw samples.
 - B. All water test results to be submitted to the Authority must contain the following information: (i) permittee's name; (ii) address of origin of sample; (iii) the name of the person who took the water sample; (iv) statement indicating if the sample was treated or untreated.
 - C. Only an original laboratory analysis report of the water quality of a supply well will be accepted for final approval to use.
 - D. Falsification of any document submitted to this Authority may result in the initiation of legal action against the property owner and/or the responsible party.
- 2. Water quality for new individual and semipublic water supplies shall conform with the following:
 - A. Microbiological Water Quality Requirements. Procedures for testing for microbiological contaminants shall be approved by and conducted by a laboratory certified by the Commonwealth of Pennsylvania for the technique used. Evidence of such tests shall be given to the Department verifying that the tests have been conducted by a laboratory approved by the Pennsylvania Department of Environmental Protection (DEP).
 - B. Microbiological, Physical and Chemical Water Quality Requirements. Individual and semipublic water supplies must meet the following standards or maximum contaminant levels (MCL):

Secondary Contaminants	MCL
pH	6.5-8.5 pH units
Chloride	250
Sulfate	250
Total Dissolved Solids (TDS)	500
Color	15 color units
Odor	3 threshold odor numbers
Turbidity	0.5 to 1 NTU
Iron	0.3
Manganese	0.05

Microbiological Contaminants	MCL
Total Coliforms*	0 col/100 mL

* if positive analyze for fecal coliform

Inorganic Chemicals	MCL (mg/L)
Arsenic	0.01
Barium	2
Cadmium	0.005
Chromium	0.1
Copper	1
Lead	0.005
Mercury	0.002
Nitrate + Nitrite (as Nitrogen)	10

Volatile Organic Chemicals (VOCs)	MCL (mg/L)
Benzene	0.005
Carbon Tetrachloride	0.005
o-Dichlorobenzene	0.6
para-Dichlorobenzene	0.075
1,2-Dichloroethane	0.005
1,1-Dichloroethylene	0.007
cis-Dichloroethylene	0.07
trans-1,2-Dichloroethylene	0.1
Dichloromethane	0.005
1,2-Dichloropropane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
Styrene	0.1
Tetrachloroethene	0.005
Toluene	1
1,2,4-Trichlorobenzene	0.07
1,1,1-Trichloroethane	0.2
1,1,2-Trichloroethane	0.005
Trichloroethene	0.005
Vinyl Chloride	0.002
Xylenes (Total)	10

- C. All water quality tests must be conducted for each category listed in §311.2.B. by a laboratory, certified by the Commonwealth of Pennsylvania, verifying that the tests have been conducted by a laboratory approved by the PADEP.
- D. For either individual or semipublic water supplies, additional analyses and treatment of the water may be required if the applicant, Bucks County Department of Health or the Department, the Authority, or the Township has reason to suspect that harmful substances are present in the water in amounts that are significantly adverse to human health, safety or comfort.

- 1) In those areas identified as "areas of concern" due to their proximity to either suspected or confirmed Superfund sites, leaking underground storage tanks and other areas of documented groundwater contamination, the Authority will require testing of new wells for the contaminants known to be associated with the specific site.
3. All individual private well supplies must be tested every third year for total and fecal coliform. Test must be performed by a qualified lab or through the Bucks County Department of Health Testing Program. The Department will notify residents of the test due dates. The well owner will be required to submit the original copy of the test results to the Department.

§312. Water Source Replacements.

1. Whenever a public water supply or another well replaces an existing well, it shall be the responsibility of the property owner to have the existing well properly abandoned by a licensed well contractor in accordance with §307 Abandonment of Wells, of these regulations. No well may exist in a decommissioned state.
2. All wells that are to be abandoned, or wells that are removed from use or a useable status such as decommissioned wells or any well that meets the definition of an abandoned well according to §302. shall be abandoned according to the requirements of §307 Abandonment of Wells.
3. A well that has been replaced by another well shall not be required to be abandoned if the property owner has made written request to the Authority to maintain the well for purposes that will not endanger groundwater, the environment or public health, and has received written approval to maintain the well from the Authority.
4. A well that has been replaced by a public water supply shall not be required to be abandoned if the property owner has submitted a written request to the Authority for approval to continue to maintain the well, and has received written approval to maintain the well from the Authority.
5. Wells that have been replaced by public water supplies may not be used or maintained where any Federal, State or local agency has determined that the continued use or maintenance of the well could interfere with the cleanup of contaminated groundwater or a contaminated site.
6. Any well given approval by the Authority when replaced by a public water supply cannot have any kind of hard connection with the public water supply.
7. Well permits will not be issued in areas where a public water supply exists if the location of the new well is within the cone of influence of an existing municipal well.

§313. Agricultural Water Supplies.

1. Agricultural water wells must meet all Authority isolation requirements as noted in this Part.
 - A. Wells used specifically for irrigation of crops, irrigation of recreational or institutional grasslands or other non-consumptive use must be tested for coliform bacteria and nitrates.

- B. Test results must be submitted to the Authority prior to the use of the well. It will not be required that the supply be treated if the parameters are outside of the standard listed in this Part.
2. Wells used for watering dairy livestock must be tested for pH, coliform, bacteria and nitrates and the results must be submitted to the Authority prior to usage.
- A. If total coliform is not within the specified standards noted in §311.2.B., treatment is recommended.
 - B. If the pH of the water is below 6.5 or the nitrates are higher than 30 ppm, treatment is recommended.
 - C. Wells used solely for watering livestock in the field must be tested for coliform bacteria and nitrates, but treatment will not be required if the parameters are outside the standards listed in §311.2.B.

§314. Fees and Penalties.

- 1. Fees. A fee schedule will be established for these rules by the Authority.
- 2. Penalties.
 - A. Any person, firm or corporation who shall violate any provision of this Part, upon conviction thereof in an action brought before a district justice in the manner provided for the enforcement of summary offenses under the Pennsylvania Rules of Criminal Procedure, shall be sentenced to pay a fine of not more than one thousand dollars (\$1,000) plus costs and, in default of payment of said fine and costs, to a term of imprisonment not to exceed ninety (90) days. Each day that a violation of this Part continues or each Section of this Part which shall be found to have been violated shall constitute a separate offense.
 - B. All prosecutions for violation of the Ordinance, shall be by summary proceedings, brought in the name and for the use of the Township of Warminster before a Justice of the Peace in said Township. All fines shall be paid to the Treasurer of Warminster Township to apply to general funds.

Part 4

Stormwater Management

ARTICLE A. GENERAL PROVISIONS

§401. Title.

This Part shall be known as the "Warminster Township Stormwater Management Ordinance."

§402. Statement of Findings.

The Board of Supervisors of Warminster Township finds that:

- A. Inadequate management of stormwater runoff from development in a watershed increases flood flows and velocities, erodes and/or silts stream channels, pollutes water, overloads existing drainage facilities, undermines floodplain management in downstream communities, reduces groundwater recharge, and threatens public health and safety.
- B. Inadequate planning and management of stormwater runoff resulting from land development and redevelopment throughout a watershed can also harm surface water resources by changing the natural hydrologic patterns, accelerating stream flows (which increase scour and erosion of stream-beds and stream-banks thereby elevating sedimentation), destroying aquatic habitat and elevating aquatic pollutant concentrations and loadings such as sediments, nutrients, heavy metals and pathogens. Groundwater resources are also impacted through loss of recharge.
- C. A comprehensive program of stormwater management (SWM), including minimization of impacts of development, redevelopment and activities causing accelerated erosion and loss of natural infiltration is fundamental to the public health, safety, welfare and the protection of the people of the municipality and all the people of the Commonwealth, their resources, and the environment.
- D. Stormwater can be an important water resource by providing groundwater recharge for water supplies and base flow of streams, which also protects and maintains surface water quality.
- E. Impacts from stormwater runoff can be minimized by using project designs that maintain the natural hydrologic regime and sustain high water quality, groundwater recharge, stream baseflow and aquatic ecosystems. The most cost-effective and environmentally advantageous way to manage stormwater runoff is through nonstructural project design that minimizes impervious surfaces and sprawl, avoids sensitive areas (i.e., stream buffers, floodplains, steep slopes), and considers topography and soils to maintain the natural hydrologic regime.
- F. Public education on the control of pollution from stormwater is an essential component in successfully addressing stormwater.

- G. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for storm water discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).
- H. Non-stormwater discharges to municipal separate storm sewer systems can contribute to pollution of waters of the Commonwealth by the municipality.

§403. Purpose.

The purpose of this Part is to promote the public health, safety, and welfare within the Township by maintaining the natural hydrologic regime and minimization of the impacts described in §402 of this Part through provisions designed to:

- A. Promote alternative project designs and layouts that minimize the impacts on surface and groundwater.
- B. Promote nonstructural Best Management Practices (BMPs).
- C. Minimize increases in stormwater volume.
- D. Minimize impervious surfaces.
- E. Manage accelerated stormwater runoff and erosion and sedimentation problems and stormwater runoff impacts at their source by regulating activities that cause these problems.
- F. Provide review procedures and performance standards for stormwater planning and management.
- G. Utilize and preserve existing natural drainage systems as much as possible.
- H. Manage stormwater impacts close to the runoff source, requiring a minimum of structures and relying on natural processes.
- I. Focus on infiltration of stormwater to maintain groundwater recharge, to prevent degradation of surface and groundwater quality, and to otherwise protect water resources.
- J. Maintain existing base flows and quality of streams and watercourses.
- K. Meet legal water quality requirements under state law, including regulations at 25 Pa. Code Chapter 93 to protect, maintain, reclaim, and restore the existing and designated uses of the waters of this Commonwealth.
- L. Address the quality and quantity of stormwater discharges from the development site.
- M. Provide a mechanism to identify stormwater controls necessary to meet NPDES permit requirements.
- N. Implement an illegal discharge detection and elimination program that addresses non-stormwater discharges into the municipality's separate storm sewer system.
- O. Preserve the flood-carrying capacity of streams.
- P. Prevent scour and erosion of stream banks and streambeds.

- Q. Provide performance standards and design criteria for watershed-wide stormwater management and planning.
- R. Provide proper operation and maintenance of all permanent stormwater management facilities and BMPs that are implemented in the municipality.

§404. Statutory Authority.

The Board of Supervisors of Warminster Township, pursuant to the Pennsylvania Stormwater Management Act, Act No. 167 of October 4, 1978 (P.L. 864), and the laws of second class townships, hereby enacts and ordains this Part as the "Warminster Township Stormwater Management Ordinance." This Part shall apply to the activities defined in §405 of this Part.

§405. Applicability.

- 1. This Part shall apply to all areas of Warminster Township.
- 2. This Part contains those stormwater runoff control criteria and standards which are necessary or desirable from a total watershed perspective.
- 3. The following activities are defined as regulated activities and shall be regulated by this Part:
 - A. Land development.
 - B. Subdivision.
 - C. Construction of new or additional impervious surfaces (driveways, parking lots, etc.).
 - D. Construction of new buildings or additions to existing buildings.
 - E. Diversion or piping of any natural or manmade stream channel.
 - F. Installation of stormwater systems or appurtenances thereto.
- 4. Additional stormwater management design and construction criteria such as inlet spacing, collection system details, construction material specifications, etc., shall be as described in the Warminster Township Subdivision and Land Development regulations [Chapter 22].
- 5. This Part shall apply to all regulated activities detailed above. The more stringent requirements of this Part, the Zoning Ordinance [Chapter 27], the Subdivision and Land Development regulations [Chapter 22], or other requirements of Warminster Township shall apply if any regulated activity requires compliance with other ordinances and regulations of Warminster Township.
- 6. Earth disturbance activities and associated stormwater management controls are also regulated under existing state law and implementing regulations. This Part shall operate in conjunction with those parallel requirements; the requirements of this Part shall be no less restrictive in meeting the purposes of this Part than state law.

§406 Exemptions

- 1. General Exemptions: the following land use activities are exempt from stormwater management requirements of this Part:

- A. Use of land for gardening for home consumption.
- B. Agriculture when operated in accordance with a conservation plan, nutrient management plan or erosion and sediment control plan approved by Bucks County Conservation District, including activities such as growing crops, rotating crops, tilling of soil, and grazing animals. Installation of new, or expansion of existing, farmsteads, animal housing, waste storage, and production areas having impervious surfaces shall be subject to the provisions of this Part unless exempt pursuant to §406.2.
- C. Public road replacement, replacement paving, repaving and/or driveway maintenance (without expansion).
- D. Installation of less than one thousand (1000) square feet of new impervious surface.
- E. Repair and reconstruction of on-lot sewage disposal systems where work is performed in accordance with a valid permit issued by Bucks County Department of Health.

2. Stormwater Peak Rate Control Exemption:

All Regulated Activities as described in §405 of this Part shall comply with the Stormwater Management requirements hereof (refer §424) except those activities listed in “Stormwater Management Exemption Criteria” table. Those activities listed in “Stormwater Management Exemption Criteria” table are, to the extent stated herein, exempt from certain provisions of this Part. Any Regulated Activities that meet the exemption criteria established in this section are exempt from stormwater management requirements of Article C and Stormwater Management Plan submission requirements of Article D of this Part. This requirement shall apply to the total development even if development is to take place in phases. The starting point from which to consider tracts as “parent tracts” is the date of adoption of this Ordinance. All impervious surface area constructed on or after said date shall be considered cumulatively. Impervious surface existing on the “parent tract” prior to the date of adoption shall not be considered in cumulative impervious area calculations for exemption purposes. An exemption shall not relieve the applicant from implementing such stormwater control measures and erosion control measures as are necessary to protect health, safety, and property.

Table 405.1 Stormwater Management Exemption Criteria	
1. Regulated activities included within §405.3.C and D are exempt where the amount of impervious surface on a parcel conforms to the following:	
Total Parcel Area (acres)	Maximum Exempt Impervious Surface Area (square feet)
< 0.5	1,000
0.5 to 2.0	2,000
2.0 to 5.0	3,500
> 5.0	5,000

2. Construction or reconstruction of buildings or additions to existing buildings or other impervious surface (activities regulated pursuant to §405.3.C and D) are exempt where the following conditions are met: A. An area of impervious surface is removed from the site equal to, or in excess of, the proposed impervious surface area. B. The area where existing impervious surface is removed pursuant to Item 2.A. above must be restored with a minimum of twelve (12) inches of topsoil and stabilized groundcover.
3. Grading Permit applications, required in accordance with Township Ordinances, where the addition of impervious surfaces is 1,000 square feet or less.
4. Lot line adjustment subdivision applications are exempt when no increase in impervious surface is proposed.

3. Additional Exemption Criteria:

- A. An exemption shall not relieve the applicant from implementing such measures as are necessary to protect public health, safety, and property.
 - B. An exemption shall not relieve the applicant from implementing measures to meet Water Quality requirements per §422.
 - C. HQ and EV streams – An exemption shall not relieve the applicant from meeting special requirements for watersheds draining to high quality (HQ) or exceptional value (EV) waters.
 - D. Exceptions shall not be granted for any Regulated Activity where the area of disturbance is greater than 0.5 acres.
4. The municipality, upon request by the applicant, may grant an exemption from the provisions of this Part for a project qualifying under §406.2. If an exemption is granted, the municipality may require the applicant to pay a fee in an amount established by separate Resolution of the Board of Supervisors to the Municipal Stormwater Management Capital Fund.
5. All applicants seeking an exemption of stormwater management requirements based upon criteria contained in §406.2 shall be required, at a minimum, to submit the following documentation for review:
- A. Three (3) copies of the completed Township Stormwater Management Plan Application form.
 - B. Stormwater Management Exemption Review Fee and Escrow, as established by separate resolution of the Board of Supervisors.
 - C. Three (3) copies of a plot plan for the parcel which is the subject of the exemption application containing, at a minimum, the following information:
 - 1. property boundaries and area of the site, based on deed information or field survey.
 - 2. location map identifying the site relative to streets and other parcels in the vicinity of the site.
 - 3. location of significant natural features pursuant to Ordinance requirements [Chapter 22, Part 6] and existing man-made features

including wetlands, watercourses, woodlands, steep slopes, structures, parking areas, driveways, utilities, wells, and septic systems within 100 feet of the proposed limits of earth disturbance and/or impervious surface, regardless of the location of the property boundary.

4. location and dimensions of existing and proposed impervious surface and other improvements, with setbacks drawn to relate the location of same to property lines, streets, and existing features.
5. north arrow and plan scale, graphic and written.
6. information regarding existing/proposed topography and drainage patterns within 100 feet of proposed limits of earth disturbance and/or impervious surface based on field survey and/or field observation.
7. other information deemed necessary by the Township Engineer to determine compliance with exemption criteria contained in §406.

§407. Compatibility with Other Ordinance Requirements.

Approvals issued pursuant to this Part do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act or ordinance.

To the extent that this Part imposes more rigorous or stringent requirements for stormwater management, the specific requirements otherwise contained in this Part shall be followed.

Nothing in this Part shall be construed to affect any of the municipality's requirements regarding stormwater matters that do not conflict with the provisions of this Part, such as local stormwater management design criteria (e.g. inlet spacing, inlet type, collection system design and details, outlet structure design, etc.). Conflicting provisions in other municipal ordinances or regulations shall be construed to retain the requirements of this Part addressing State Water Quality Requirements.

ARTICLE B. DEFINITIONS

§411. General.

1. Unless otherwise expressly stated, the following terms shall, for the purpose of this Part, have the meaning indicated below.
2. Words used in the singular include the plural and words in the plural include the singular. The word "building" shall be construed as if followed by the words "or a part thereof." The word "may" is permissive; the words "shall" and "will" are mandatory.

§412. Terms.

ACCELERATED EROSION - the removal of the surface of the land through the combined action of human activities and the natural processes, at a rate greater than would occur because of the natural process alone.

APPLICANT - a landowner, as herein defined, or agent of the landowner, who has filed an application for a storm water management permit.

BMP (BEST MANAGEMENT PRACTICE) - an activity, facility, design, measure or procedure used to manage stormwater impacts from regulated earth disturbance activities, to meet State water quality requirements, to promote groundwater recharge and to otherwise meet the purposes of this Part. BMPs include, but are not limited to, infiltration, filter strips, low impact design, bioretention, wet ponds, permeable paving, grassed swales, forested buffers, sand filters, and detention basins.

BUILDING - any structure, either temporary or permanent, having walls and a roof, designed or used for the shelter of any person, animal or property, and occupying more than one hundred (100) square feet of area.

CISTERN - an underground reservoir or tank for storing rainwater.

CONSERVATION DISTRICT - the Bucks County Conservation District.

CULVERT - a pipe, conduit or similar structure including appurtenant works which carries surface water.

DEDICATION - the deliberate devotion of property by its owner for general public use.

DEP - the Pennsylvania Department of Environmental Protection.

DESIGN STORM - the magnitude of precipitation from a storm event measured in probability of occurrence (e.g. fifty (50) year storm) and duration (e.g. twenty-four (24) hour), and used in computing stormwater management control systems.

DETENTION BASIN - a basin designed to retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate.

DEVELOPER - a person, partnership, association, corporation or other entity, or any responsible person therein or agent thereof, that undertakes any regulated activity of this Part.

DEVELOPMENT SITE - the specific tract of land for which a regulated activity is proposed.

DRAINAGE EASEMENT - a right granted by a landowner to a grantee, allowing the use of private land for stormwater management purposes.

EROSION - the removal of soil particles by the action of water, wind, ice or other geological agents.

EROSION AND SEDIMENT CONTROL PLAN - a plan for a project which identifies BMPs to minimize accelerated erosion and offsite sedimentation.

GROUNDWATER RECHARGE - replenishment of existing natural underground water supplies.

IMPERVIOUS SURFACE - a surface that prevents the infiltration of water into the ground. Impervious surface includes, but is not limited to, any roof, parking or driveway areas, and any new streets and sidewalks. Any surface areas designed to be initially gravel or crushed stone shall be assumed impervious surfaces.

INFILTRATION STRUCTURES - a structure designed to direct runoff into the ground (e.g. french drains, seepage pits, seepage trench).

LANDOWNER - the legal, beneficial, equitable owner or owners of land, including the holder of an option or contract to purchase (whether or not such option or contract is

subject to any condition), a lessee (if he is authorized under the lease to exercise the rights of the landowner), or any other person having a proprietary interest in land.

LAND DEVELOPMENT

- A. The improvement of one (1) lot or two (2) or more contiguous lots, tracts or parcels of land for any purpose involving:
 - 1. A group of two (2) or more residential or nonresidential buildings, whether proposed initially or cumulatively, or a single nonresidential building on a lot or lots regardless of the number of occupants or tenure; or
 - 2. The division or allocation of land or space, whether initially or cumulatively, between or among two (2) or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups or other features.
- B. A subdivision of land.

NPDES - National Pollutant Discharge Elimination System, the Federal government's system for issuance of permits under the Clean Water Act, which is delegated to DEP in Pennsylvania.

OUTFALL - "point source" as described in 40 CFR §122.2 at the point where the Township's storm sewer system discharges to the surface waters of the Commonwealth.

PABMP MANUAL - "Pennsylvania Stormwater Best Management Practices Manual," December 30, 2006 or as last revised and/or amended.

PEAK DISCHARGE - the maximum rate of flow of stormwater runoff at a given point and time resulting from a specified storm event.

POINT SOURCE - any discernable, confined and discrete conveyance including, but not limited to, any pipe, ditch, channel, tunnel or conduit from which stormwater is or may be discharged, as defined in State regulations at 25 Pa. Code §92.1.

PROJECT SITE - The specific area of land where any regulated activities in the municipality are planned, conducted or maintained.

REGULATED ACTIVITIES - actions or proposed actions which impact upon proper management of stormwater runoff and which are governed by this Part as specified in §404.

REGULATED EARTH DISTURBANCE ACTIVITY - earth disturbance activity one (1) acre or more with a point source discharge to surface waters of the Warminster Township storm sewer system, or five (5) acres or more regardless of the planned runoff. This includes earth disturbance on any portion of, or during any stage of, a larger common plan of development. For road maintenance activities, this only includes those activities involving twenty-five (25) acres or more earth disturbance.

RELEASE RATE - the percentage of the pre-development peak rate of runoff for a development site to which the post-development peak rate of runoff must be controlled to protect downstream areas.

RETENTION BASIN - a basin designed to retain stormwater runoff so that a permanent pool is established.

RIPARIAN BUFFER or CORRIDOR - An area of trees and other vegetation located in areas adjoining and upgradient from surface water bodies and designed to intercept surface runoff, wastewater, subsurface flow, and deeper groundwater flows from upland sources for the purpose of removing or buffering the effects of associated nutrients, sediment, organic matter, pesticides, or other pollutants prior to entry into surface waters and groundwater recharge areas.

ROAD MAINTENANCE - Earth disturbance activities within the existing road cross-section, such as grading and repairing existing unpaved road surfaces, cutting or cleaning road banks and/or drainage ditches and other similar activities.

RUNOFF - the part of precipitation which flows over the land.

SCS - Soil Conservation Service, U.S. Department of Agriculture.

SEDIMENT - solid material, both mineral and organic, that is in suspension, is being transported or has been moved from its site of origin by water.

SEDIMENTATION BASIN - a barrier, dam, retention or detention basin to retain sediment.

SEEPAGE PIT/SEEPAGE TRENCH - an area of excavated earth filled with loose stone or similar material and into which water is directed for infiltration into the ground.

SEMI-IMPERVIOUS SURFACE - a surface such as stone, rock, concrete or other material which prevents some percolation of water into the ground.

SEPARATE STORM SEWER SYSTEM - a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) primarily used for collecting and conveying stormwater runoff.

SOIL-COVER COMPLEX METHOD - a method of runoff computation developed by SCS [issued under Technical Release 55] which is based upon relating soil type and land use/cover to a runoff parameter called a curve number.

STATE WATER QUALITY REQUIREMENTS, as defined under State regulations - protection of designated and existing uses (see 25 Pa. Code Chapters 93 and 96) including:

- A. Each stream segment in Pennsylvania has a "designated use," such as "cold water fishery" or "potable water supply," which are listed in Chapter 93. These uses must be protected and maintained, under State regulations.
- B. "Existing uses" are those attained as of November 1975, regardless of whether they have been designated in Chapter 93. Regulated earth disturbance activities must be designed to protect and maintain existing uses and maintain the level of water quality necessary to protect those uses in all streams, and to protect and maintain water quality in special protection streams.
- C. Water quality involves the chemical, biological and physical characteristics of surface water bodies. After regulated earth disturbance activities are complete, these characteristics can be impacted by addition of pollutants such as sediment, and change in habitat through increased flow volumes and/or rates as a result of changes in land surface area from those activities. Therefore, permanent

discharges to surface waters must be managed to protect the stream bank, streambed, and structural integrity of the waterway to prevent these impacts.

STORM SEWER - a system of pipes or other conduits which carries intercepted surface runoff, street water, and other waters or drainage, but excludes domestic sewage and industrial wastes.

STORMWATER - the surface runoff generated by precipitation reaching the ground surface.

STORMWATER MANAGEMENT PLAN - the plan for managing stormwater runoff adopted by Bucks County for the Neshaminy Creek Watershed and the Little Neshaminy Creek Watershed as required by the Act of October 4, 1978, P.L. 864 (Act 167), and known as the "Stormwater Management Act."

STREAM - a watercourse.

SUBAREA - the smallest unit of watershed breakdown for hydrologic modeling purposes for which the runoff control criteria have been established in the Stormwater Management Plan.

SUBDIVISION - the division or re-division of a lot, tract or parcel of land by any means into two (2) or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, transfer of ownership or building or lot development.

SURFACE WATERS OF THE COMMONWEALTH - any and all rivers, streams, creeks, rivulets, impoundments, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs and all other bodies or channels of conveyance of surface water, or parts thereof, whether natural or artificial, within or on the boundaries of the Commonwealth of Pennsylvania.

SWALE - a low lying stretch of land which gathers or carries surface water runoff.

WATERCOURSE - any channel of conveyance of surface water having defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

WATERSHED - region or area drained by a river, watercourse or other body of water, whether natural or artificial.

ARTICLE C. STORMWATER MANAGEMENT REQUIREMENTS

§421. General Requirements.

1. The standards contained in this Part shall apply as minimum design standards; however Federal, State, and other Warminster Township regulations may impose additional standards subject to their jurisdiction.
 - A. All regulated activities within the municipality shall be designed, implemented, operated, and maintained to meet the purposes of this Part, through these two elements:
 1. Erosion and sediment control during the earth disturbance activities (e.g. during construction); and

- A. Prevent erosion damage and to satisfactorily carry off, detain or retain, and control the rate of release of stormwater.
 - B. Manage the anticipated peak discharge from property being subdivided or developed and existing runoff being contributed from all land at a higher elevation in the same watershed.
 - C. Convey stormwater along or through the property to a natural outfall. If a developer concentrates dispersed stormwater flow or redirects stormwater flow to exit at another location on the property, the developer is responsible for constructing an adequate channel on the adjacent property and on all downstream properties until a natural outfall is reached.
 1. Natural outfall shall have sufficient capacity to receive stormwater without deterioration of the facility and without adversely affecting property in the watershed. This natural outfall may be a river, creek or other drainage facility so designated by Warminster Township for the proposed system.
4. Where applicable, stormwater management facilities or programs shall comply with the requirements of Chapter 102 "Erosion Control," Chapter 105 "Dam Safety and Waterway Management," and Chapter 106 "Floodplain Management," of Title 25, Rules and Regulations, of the DEP.
 5. Stormwater management facilities which involve a State highway shall be subject to the approval of PennDOT.
 6. Stormwater management facilities located within or affecting the floodplain of any watercourse shall also be subject to the requirements of any Warminster Township ordinance which regulates construction and development within areas which are subject to flooding.
 7. Access to facilities shall be provided for maintenance and operation. This access shall be a cleared access that is a minimum of ten (10) feet wide. Proximity of facilities to public rights-of-way shall be encouraged in order to minimize the length of accessways. Multiple accesses shall be encouraged for major facilities.
 8. Additional studies and higher levels of control than the minimum provided in the requirements and criteria of this Part may be required by the Board of Supervisors to ensure adequate protection to life and property.
 9. Prohibited Discharges: No person in Warminster Township shall allow, or cause to allow, stormwater discharges into the municipality's separate storm sewer system which are not composed entirely of storm water, except (i) as provided in §461, and (ii) discharges allowed under a State or Federal permit.
 10. Prohibited Connections: The following connections are prohibited, except as provided in §461.
 - A. Any drain or conveyance, whether on the surface or subsurface, which allows any non-stormwater discharge including sewage, process wastewater, and wash water, to enter the separate storm sewer system, and any connection to the storm drain system from indoor drains and sinks.
 - B. Any drain or conveyance from a commercial or industrial land use to the separate storm sewer system which has not been documented in plans, maps or equivalent records, and approved by Warminster Township.

11. Requirements for Erosion and Sediment Control: No regulated earth disturbance activities within Warminster Township shall commence until approval has been granted by the Township of an erosion and sediment control plan in accordance with §427.
12. Post-construction Stormwater Runoff Controls for New Development and Redevelopment. Including Operations and Maintenance of Stormwater BMPs. Post-construction runoff control requirements:
 - A. No regulated earth disturbance activities within Warminster Township shall commence until approval has been granted by the Township of a plan which demonstrates compliance with the State Water Quality Requirements after construction is complete.
 - B. The BMPs (Best Management Practices) must be designed to protect and maintain existing uses (e.g. drinking water use; cold water fishery use) and maintain the level of water quality necessary to protect those uses in all streams, and to protect and maintain water quality in "Special Protection" streams, as required by statewide regulations at 25 Pa. Code Chapter 93 (collectively referred to herein as "State Water Quality Requirements").
 - C. To control post-construction storm water impacts from regulated earth disturbance activities, State Water Quality Requirements can be met by BMPs, including site design, which provide for replication of preconstruction stormwater infiltration and runoff conditions, so that post-construction stormwater discharges do not degrade the physical, chemical or biological characteristics of the receiving waters. As described in the DEP Comprehensive Stormwater Management Policy (#392-0300-002, September 28, 2002), this may be achieved by the following:
 - 1) Infiltration - Replication of preconstruction stormwater infiltration conditions.
 - 2) Treatment - Use of water quality BMPs to ensure filtering out of chemical and physical pollutants from the storm water runoff.
 - 3) Streambank and Streambed Protection - Management of volume and rate of post-construction stormwater discharges to prevent physical degradation of receiving waters (e.g. from scouring and erosion).
 - D. DEP has regulations that require municipalities to ensure design, implementation and maintenance of BMPs that control runoff from new development and redevelopment (hereinafter "development") after regulated earth disturbance activities are complete. These requirements include the need to implement post-construction stormwater BMPs with assurance of long-term operations and maintenance of those BMPs.
 - E. Evidence of any necessary permits for regulated earth disturbance activities from the appropriate DEP regional office or the Bucks County Conservation District must be provided to the Township. The issuance of an NPDES Construction Permit (or permit coverage under the statewide General Permit (PAG-2)) satisfies the requirements of subsection A.

§422. Water Quality Requirement.

1. No regulated earth disturbance activities within the municipality shall commence until approval by the municipality of a plan which demonstrates compliance with State Water Quality Requirements post-construction has been granted.
2. The BMPs shall be designed, implemented, and maintained to meet State Water Quality Requirements, and any other more stringent requirements as determined by the municipality.
3. The volume of additional stormwater runoff to be captured, stored, and treated is called the Water Quality Volume (WQ_V).
 - A. The formula for determining WQ_V (in acre-feet) is:
$$WQ_V = [P \times R_v \times A] / 12 \text{ where}$$
 1. P = rainfall depth in inches, using “first flush” rainfall amount, 1.5 inches
 2. A = project area in acres
 3. R_v, volume runoff coefficient = $[0.05 + 0.009 \times I]$ where I is the impervious surface percentage $[\text{impervious area} \div \text{total project area}] \times 100\%$
 - B. In Special Protection Watersheds, as described in Pa Code 25, Chapter 93, this volume is required to remain onsite through infiltration and other methods, to protect water quality. Guidance can be obtained from PaDEP “Pennsylvania Stormwater Best Management Practices Manual,” latest edition.
4. The following factors must be considered when evaluating the suitability of BMPs used to control water quality at a given development site:
 - A. Total contributing drainage area
 - B. Permeability and infiltration rate of the site soils
 - C. Slope and depth to bedrock
 - D. Seasonal high water table
 - E. Proximity to building foundations and well heads
 - F. Erodibility of soils
 - G. Land availability and configuration of the topography
 - H. Peak discharge and required volume control
 - I. Streambank erosion
 - J. Efficiency of the BMPs to mitigate potential water quality problems
 - K. Volume of runoff that will be effectively treated
 - L. Nature of the pollutant being removed
 - M. Maintenance requirements
 - N. Creation/protection of aquatic and wildlife habitat
 - O. Recreational value

P. Enhancement of aesthetic and property value

To accomplish the above, the applicant shall submit original and innovative designs for review. Such designs may achieve the water quality objectives through a combination of BMPs.

5. The applicant may, subject to approval of Warminster Township, use any of the following non-structural stormwater credits in computing the required water quality volume.

Stormwater Credit	Description
Natural Area Conservation	Conservation of natural areas such as forest, wetlands, or other sensitive areas in a protected easement thereby retaining their predevelopment hydrologic and water quality characteristics. Using this credit, a designer may subtract conservation areas from the total site area when computing the required water quality volume.
Vegetated Roof	Credit may be given for water quality and volume benefits for vegetated roof covers where vegetation is grown on, and completely covers, an otherwise flat or pitched roof (less than or equal to 30° slope). Green roof, if adequately designed, may be counted as lawn for runoff calculations.
Disconnection of Rooftop Runoff	Credit may be given when rooftop runoff is disconnected and then directed over a pervious area where it may either infiltrate into the soil or filter over it. Credit is typically obtained by grading the site to promote overland flow or by providing bioretention on single-family residential lots. If a rooftop area is adequately disconnected, the impervious area may be deducted from the total impervious cover.
Disconnection of Non-Rooftop Runoff	Credit may be given for practices that disconnected surface impervious cover by directing it to pervious areas where it may either infiltrate into the soil or filter over it. As with rooftop runoff, if area is adequately disconnected, the impervious area may be deducted from the total impervious cover.
Stream Buffer Credit	Credit may be given when a stream buffer effectively treats stormwater runoff. Effective treatment constitutes capturing runoff from pervious and impervious areas adjacent to the buffer and treating runoff through overland flow across a grass or forested area. Areas treated in this manner may be deducted from total site area.
Grass Channel / Open Section Roads	Credit may be given when open grass channels are used to reduce the volume of runoff and pollutants during smaller storms. If designed according to appropriate criteria, these channels may meet water quality criteria for certain types of residential development. Curbs may be eliminated where adequately designed swales or bioretention facilities are located in or adjacent to parking areas.
Environmentally Sensitive Rural Development	Credit may be given when a group of environmental site design techniques are applied to low density or rural residential development. This credit eliminates the need for structural practices to address water quality volume.
Removal of Additional Impervious Areas	Credit may be given when existing impervious areas are removed and restored to lawn or other landscape areas representing a net reduction in impervious cover. The stormwater volume reduction resulting from the restoration may be counted toward water quality and recharge volume requirements.

For design and applicability of non-structural BMPs refer to Chapter 5 of the "Pennsylvania Stormwater Best Management Practices Manual," December 2006 or latest edition. For the non-structural BMPs proposed, the applicant shall utilize and submit appropriate checklists included in Chapter 8, Section 8.8 of said manual to demonstrate that the BMPs are applicable to the project and to determine the amount of volume or peak rate credit applicable.

6. The volume and rate of any stormwater discharges allowed under this Part shall be managed to prevent the physical degradation of receiving waters, such as by streambank scour and erosion. If a detention facility is proposed which is part of the

BMPs approved for the project, the facility(ies) shall be designed to provide for a twenty-four (24) hour extended detention of the one (1) year, twenty-four (24) hour storm event as measured from the time of peak inflow to the facility to zero outflow.

§423. Recharge Volume Requirements Applicable

1. Prevention of excess stormwater runoff is a key objective of State Water Quality Requirements because runoff can change the physical, chemical, and biological integrity of waterbodies thereby impacting water quality.
2. The project plan shall describe how water quality protection requirements with regard to volume control will be met. Infiltration BMPs shall be evaluated and utilized to the maximum extent possible to manage the net change in stormwater runoff generated so that post-construction discharges do not degrade the physical, chemical or biological characteristics of the receiving waters. These BMPs may be used to satisfy all or part of the requirements in §422.
3. Post-construction stormwater infiltration of runoff shall replicate preconstruction infiltration of runoff to the maximum extent possible.
4. In calculating the volume of runoff that can be infiltrated at a site, the following methodology shall be used:

A. Methodology:

$Re_v = [S \times R_v \times A] / 12$ where

Re_v = Recharge Volume (acre-feet)

A = Site area contributing to the recharge facility (acres)

R_v = Volumetric runoff coefficient = $0.05 + 0.009 \times I$ where I is the impervious surface percentage [impervious area ÷ total project area] x 100%

S = Soil specific recharge factor (inches) based on the hydrologic soil group as provided in the table below:

<u>Hydrologic Soil Group</u>	<u>Recharge Factor, S</u>
A	0.38
B	0.26
C	0.14
D	0.07

If more than one hydrologic soil group (HSG) is present at a site, a composite recharge volume shall be computed based upon the proportion of total site area within each HSG.

B. In selecting the appropriate infiltration BMPs, the applicant shall consider the following:

1. Permeability and infiltration rate of the site soils
2. Slope and depth to bedrock
3. Seasonal high water table and groundwater elevation
4. Proximity and elevation relative to building foundations, basements, and well heads. Infiltration BMPs should be located downgrade of these structures.

5. Erodibility of soils
 6. Land availability, configuration, and topography
 7. Peak discharge and required volume control
 8. Streambank erosion
 9. Efficiency of the BMPs to mitigate potential water quality problems
 10. Volume of runoff that will be effectively treated
 11. Nature of the pollutant being removed
 12. Maintenance requirements
 13. Creation/protection of aquatic and wildlife habitat
 14. Recreational value
 15. Enhancement of aesthetic and property value
- C. The recharge volume provided at the site shall be directed to the most permeable HSG available, except where other considerations.
- D. The plan shall include safeguards against groundwater contamination for uses which may cause groundwater contamination should there be a mishap or spill. The Township may require installation of mitigative layer or an impermeable liner in BMPs where the possibility exists. A detailed hydrogeologic investigations study may be required by the Township.
- E. The requirements for volume control are applied to all disturbed areas, even if they are ultimately to be a pervious or permeable land use given the extent to which development-related disturbance leads to compaction of the soils and reduces their infiltrative capacity.

§424. Stormwater Runoff Peak Rate Requirements and Districts.

1. Location.
 - A. Mapping of Stormwater Runoff Peak Districts. In order to implement the provisions of the Neshaminy Creek Watershed Stormwater Management Plan and the Little Neshaminy Creek Watershed Stormwater Management Plan, Warminster Township is hereby divided into Stormwater Runoff Peak Rate Districts consistent with said plans. The boundaries of the districts are shown on an official Stormwater Runoff Peak Rate Districts Map which is available for inspection at the Warminster Township Municipal Building.
 - B. The exact location of the Stormwater Runoff Peak Rate District boundaries as they apply to a given development site may also be determined by mapping the boundaries using the two (2) foot or five (5) foot topographic contours provided as part of the stormwater management plan developed for the site in accordance with the technical reports. The district boundaries as originally drawn coincide with topographic divides or, in certain instances, are drawn from the intersection of the watercourse and a physical feature such as the confluence with another watercourse or a potential flow obstruction (road, culvert, bridge, etc.) to the topographic divide consistent with topography. The location of the Stormwater

Management District boundary on a stormwater management plan shall be reviewed and verified by the Township Engineer.

2. Description of Stormwater Runoff Peak Rate Districts.

A. Release Rate Districts. These watershed areas require that the postdevelopment peak rate of storm runoff be controlled to the stated percentage of the predevelopment peak rate of storm runoff for design storms greater than one (1) year, twenty-four (24) hour storm in order to protect downstream watershed areas. The release rate districts and their respective release rate control design criteria for peak flow are as follows:

Neshaminy Creek	Release Rate Percentage
(by subarea)	
Entire portion within Warminster Township	75
Little Neshaminy Creek	
(by subarea)	
83	100
84, 87, 91-99, 104, 105, 108-121,131	75
Pennypack Creek	
2-year storm event, postdevelopment	1-year storm, predevelopment
5-year storm event, postdevelopment	2-year storm, predevelopment
All other storm events	100

§425. Stormwater Design Standards and Criteria.

1. Design Storms.

A. Any stormwater management controls required by this Part and subject to the water quality requirement (§422), recharge volume requirement (§423), and the stormwater runoff peak rate requirements (§424.2) shall meet the applicable water quality and peak rate requirements for the one (1), two (2), five (5), ten (10), twenty-five (25), fifty (50), and one hundred (100) year return period runoff events (design storms) consistent with the calculation methodology specified in §426. Provisions must also be made for safely passing the runoff greater than that occurring from the largest design storm.

B. Runoff Volume Standard – Postdevelopment stormwater runoff volume being discharged from any regulated activity shall not exceed predevelopment stormwater runoff volume being discharged for up to the two (2) year design storm for each watershed or design point on the site.

2. For a proposed development site located within a single release district (§ 424.2.A), the total runoff from the site shall meet the applicable release criteria. For development sites within a single release rate district with multiple points of concentrated runoff discharge, individual drainage points may be designed for up to one hundred (100) percent release rate so long as the total runoff from the site is controlled to the applicable release rate. All points of concentrated discharge, however, must meet the applicable water quality requirement (§422) for the specific drainage areas of the site draining to the discharge points.

3. Runoff Control Measures or Best Management Practices (BMPs).
 - A. Stormwater runoff which may result from Regulated Activities listed in §405 shall be controlled by permanent stormwater runoff BMPs that will provide the required standards within §§ 422, 423, and 424. The methods of stormwater control or best management practices (BMPs) which may be used to meet the required standards are described in this Part and “Pennsylvania Stormwater Best Management Practices Manual,” December 2006, as amended. The choice of BMPs is not limited to the ones appearing this Part and/or the manual, however any selected BMP must meet or exceed the required water quality, recharge volume, and runoff peak rate requirements of this Part.
 - B. Any stormwater facility located on state highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation.
 - C. Developers are encouraged to use BMPs other than the minimum BMPs specified in this subsection, if appropriate, to provide for additional water quality improvement and groundwater recharge. In evaluating potential stormwater BMPs, the order of preference shall be as follows:
 1. Infiltration BMPs.
 2. Wet ponds.
 3. Artificial wetlands.
 4. Minimum first flush detention or dual purpose detention (where appropriate)
 - D. Infiltration Best Management Practices (BMPs). Infiltration BMPs shall be designed in accordance with the design criteria and specifications in the PaBMP Manual and shall meet the following minimum requirements:
 1. A detailed soils evaluation of the project site shall be performed to determine the suitability of infiltration BMPs per protocol in Appendix B. The evaluation shall be performed by a qualified professional and, at a minimum, address soil permeability, depth to bedrock, susceptibility to sinkhole formation, and subgrade stability. The site testing shall include adequate sampling of all portions of the site not limited by one hundred (100) percent protected natural resources to determine areas of the property which are suitable for infiltration BMPs. The general process for designing infiltration BMPs shall be:
 - a. Analyze hydrologic soil groups as well as natural and man-made features within the site to determine general areas of suitability for infiltration BMPs.
 - b. Provide field testing data at the elevation of the proposed infiltration zone (bottom surface of the infiltration facility) to determine appropriate percolation rate and/or hydraulic conductivity. Field testing guidelines are identified in Appendix B.
 - c. Design infiltration BMPs for required stormwater volume based on field determined capacity per step (b) above.

2. Soil characteristics: Subject to the specific considerations in subsection (f) below:
 - a. Infiltration BMPs are particularly appropriate in hydrologic soil groups A and B, as described in the SCS TR-55 Manual.
 - b. Low-erodibility factors ('K' factors) are preferred for the construction of basins.
 - c. There shall be an infiltration and/or percolation rate sufficient to accept the additional stormwater load and to drain completely as determined by field tests.
 - d. A minimum of ten (10) feet of undisturbed fill or compacted impermeable material shall separate the foundation wall of any building and an infiltration BMP.
 - e. A minimum of fifty (50) feet of undisturbed fill or compacted impermeable material shall separate water supply wells and an infiltration BMP.
 - f. A minimum of fifty (50) feet shall separate a septic system disposal area and an infiltration BMP unless specific circumstances allow for a reduced separation distance.
 - g. Infiltration in native soils without prior fill or disturbance is preferred but not always possible. Areas that have experienced historic disturbance or fill are suitable for infiltration provided sufficient time has elapsed and the Soil Testing indicates that infiltration is feasible. In disturbed areas it may be necessary to infiltrate at a depth beneath soils that have previously been compacted by construction methods or long periods of mowing.
 - h. The infiltration system shall have positive overflow controls to prevent storage within one foot of the finished surface grade.
 - i. Surface inflows shall be designed to prevent direct discharge of sediment into the infiltration system.
3. Any infiltration BMP shall be capable of completely infiltrating the impounded water within forty-eight (48) hours from the peak of the storm.
4. Special attention shall be paid to proper installation of infiltration-oriented stormwater management systems during construction and to careful avoidance of soil compaction during site development.
5. Caution shall be exercised where salt or chloride would be a pollutant since soils do little to filter this pollutant, and it may contaminate the groundwater. Caution shall be exercised where infiltration is proposed in source water protection areas. The qualified design professional shall evaluate the possibility of groundwater contamination from the proposed infiltration/recharge facility and perform a hydrogeologic justification study if required by the Township Engineer.
6. Infiltration BMPs shall be constructed on soils with an infiltration or percolation rate of greater than 0.20 inches per hour, and shall have the

following separation between the bottom of the facility and seasonal high water table and/or bedrock and/or groundwater (limiting zones);

- a. for runoff from impervious surfaces associated with residential land use and/or pervious surface runoff associated with both residential uses and nonresidential uses: A minimum depth of thirty-six (36) inches between the intended bottom of facility and limiting zones.
 - b. for runoff from impervious surface associated with nonresidential uses: A minimum depth of thirty-six (36) inches between the bottom of facility and limiting zones. The minimum required separation between the limiting zone may be increased at the Township's discretion if project specific conditions, such as anticipated contaminants, dictate greater prevention of groundwater contamination.
 - c. for rooftop runoff: A minimum depth of twenty-four (24) inches between the intended bottom of the facility and limiting zones.
7. Soils with infiltration rates in excess of 6.0 inches per hour may require an additional soil buffer, such as an organic layer over the bed bottom, if the Cation Exchange Capacity (CEC) is less than 5 and pollutant loading is expected to be significant.
8. All infiltration BMPs shall be designed to, as a minimum:
- a. Provide adequate storage to accommodate the volume of runoff calculated as the difference between the predevelopment runoff volume and the postdevelopment runoff volume based on the largest required design storm.
 - b. Control the postdevelopment peak rate of runoff to the predevelopment peak rate of runoff for design storms greater than one (1) year, twenty-four (24) hour storm.
 - c. Provide an overflow or spillway which safely permits the passing of runoff greater than that occurring during the largest design storm.
 - d. Release Rate requirements of §424.2 may be met by use of infiltration BMPs alone or in combination with other facilities.
- E. Wet Pond and Artificial Wetland Best Management Practices (BMPs).
1. Wet pond and artificial wetland BMPs shall be designed in accordance with the design criteria and specifications in the PaBMP Manual.
 2. Artificial Wetland Facilities shall meet the following minimum requirements:
 - a. At least 80% of the wetland shall be developed as a shallow water emergent wetland, with a water depth between 8 inches and 12 inches. It is recommended that the shallow water emergent wetland area be separated into "high marshes" (0 to 6 inches below normal water surface) and "low marshes" (6 to 18 inches

below normal water surface). The remainder shall be constructed as open water with depths between 2 feet and 4 feet.

- b. The length of the constructed treatment wetland between the inflow and outflow points shall be maximized. The minimum length to width ratio for all wetland systems shall be 3:1. A medial berm may be used to reduce flow width and improve flow distribution and length.
 - c. Constructed treatment wetlands shall be constructed on hydric or wet soils and/or soils which have an infiltration rate of less than 0.1 inches per hour. A base flow of 0.10 cfs/50 acres is recommended for all constructed treatment wetland facilities, unless a source of recharge is available such as a natural spring or well.
 - d. A shallow forebay shall be provided adjacent to all inflow areas, unless the inflow area provides less than 10% of the total inflow to the facility. The forebay serves to enhance sediment trapping and pollutant removal, as well as concentrating accumulated sediment in an area where it can be readily removed. To create a forebay, a baffle may be introduced to restrict hydraulic communication between the inlet and the remainder of the retention basin. The minimum standards for forebays are as follows:
 - i. Minimum length shall be 10 feet.
 - ii. Sufficient storage volume shall be provided to trap sediment between clean-out intervals (typically 5 to 15 years). At a minimum, the forebay shall be sized to contain 0.25 inches per impervious acre of contributing drainage.
 - iii. The forebay shall be 3 to 5 feet deep.
 - iv. The height of the berm or baffle separating the forebay from the pond shall be one (1) foot below the one-year water surface elevation or at the normal water surface elevation, whichever is higher.
 - v. The forebay shall be accessible and stabilized to accommodate equipment used in removing accumulated sediment.
 - e. A planting plan prepared by a Landscape Architect shall be developed for the artificial wetland showing all proposed aquatic, emergent, and upland plantings. The planting plan shall be developed to provide a diversity of species resulting in a dense stand of wetland vegetation.
3. Retention Basins/Wet Ponds shall meet the following minimum requirements:
- a. Constructed treatment wetlands shall be constructed on hydric or wet soils and/or soils which have an infiltration rate of less than 0.1 inches per hour. A base flow of 0.10 cfs/50 acres is

recommended for all constructed treatment wetland facilities, unless a source of recharge is available such as a natural spring or well.

- b. The length of the pond between the inflow and outflow points shall be maximized, and an irregular shoreline shall be provided. The minimum length to width ratio for all wetland systems shall be 2:1.
- c. A shallow forebay shall be provided adjacent to all inflow areas, unless the inflow area provides less than 10% of the total inflow to the facility. The forebay serves to enhance sediment trapping and pollutant removal, as well as concentrating accumulated sediment in an area where it can be readily removed. To create a forebay, a baffle may be introduced to restrict hydraulic communication between the inlet and the remainder of the retention basin. The minimum standards for forebays are as follows:
 - i. Minimum length shall be 10 feet.
 - ii. Sufficient storage volume shall be provided to trap sediment between clean-out intervals (typically 5 to 15 years). At a minimum, the forebay shall be sized to contain 0.25 inches per impervious acre of contributing drainage.
 - iii. The forebay shall be 3 to 5 feet deep.
 - iv. The height of the berm or baffle separating the forebay from the pond shall be one (1) foot below the one-year water surface elevation or at the normal water surface elevation, whichever is higher.
 - v. The forebay shall be accessible and stabilized to accommodate equipment used in removing accumulated sediment.
 - vi. Non-erodible material shall be used to construct the forebay berm. Armoring, such as rip-rap, is generally preferred to stabilize the upgradient face of the berm.
- d. Wet ponds shall be designed with public safety as a primary concern. An aquatic safety bench shall be provided around the perimeter of the permanent pool. The aquatic safety bench shall be a minimum of ten (10) feet wide with a maximum slope of 10:1. A 3:1 slope shall lead from the edge of the safety bench toward the deep water portion of the pond for at least 15 feet. Slopes on the remainder of the pond below the permanent pool elevation shall be a maximum of 2:1. The portion of the pond devoted to storage and peak attenuation of storm runoff, the terrestrial bench, shall be nearly level and shall be planted with shrubs and trees that shade the pool and mitigate thermal impacts. Terrestrial bench shall be at least ten (10) feet wide.

- e. A planting plan prepared by a Landscape Architect shall be developed for the wet pond showing all proposed aquatic, emergent, and upland plantings.
- f. The perimeter slope above the terrestrial bench shall have a maximum slope of 4:1
- g. Wet ponds shall have a deep water zone to encourage gravity settling of suspended fines and to prevent stagnation and possible eutrophication. The maximum depth shall not exceed eight (8) feet.
- h. Wet ponds shall be capable of being substantially drained by gravity flow. Where possible, wet ponds shall be equipped with a manually operated drain that can be secured against unauthorized operation.
- i. The preferred method of low flow discharge from a pond is a submerged, reverse-slope pipe that extends downward from the outlet structure to an inflow point one foot below the normal water surface elevation. Alternative methods may be employed and shall include provisions to prevent debris clogging of the structure.

F. Bioretention Facilities and Rain Gardens

- 1. All concentrated discharges directed to a bioretention facility shall be conveyed through a pretreatment filter strip. The filter strip shall be designed to reduce the incoming velocities and to filter out coarser sediment particles. Examples of pretreatment filter strips include sand or gravel diaphragms, grass swales, sand filters, stone check dams, etc.
- 2. Bioretention facilities shall meet the following minimum standards:
 - a. minimum width of 10 feet, excluding side slopes
 - b. minimum length of 20 feet
 - c. minimum length to width ratio of 2:1
 - d. maximum shallow ponding depth of 6 inches
 - e. minimum planting soil bed depth of 2 feet for herbaceous plants and 3 feet for trees and shrubs
- 3. All bioretention facilities shall incorporate an organic mulch layer. The organic mulch layer shall be standard landscape style, single or double, shredded hardwood mulch or chips. The mulch layer shall be well aged, uniform in color, and free of other materials such as weed seed, soil roots, etc. The mulch layer shall be applied to maximum depth of three (3) inches. Grass clippings shall not be used as mulch material.
- 4. Planting soil shall be a loam soil capable of supporting healthy vegetative cover. Soils shall be amended with a composted organic material consisting of 20-30% compost material and 70-80% soil base, preferably topsoil. A soil analysis of the planting bed soil shall verify that the soils meet the following:

- a. pH range between 5.5 and 6.5
 - b. Organic matter content 5% to 10%
 - c. Magnesium provided at 35lbs per acre, minimum
 - d. Phosphorus provided at 75lbs per acre, minimum
 - e. Potassium provided at 85 lbs per acre minimum
 - f. Soluble salts shall be less than 500ppm
 - g. Clay content between 0% and 10%
 - h. Silt content between 30% and 55%
 - i. Sand content between 35% and 60%
5. All bioretention facilities shall incorporate landscaping and shall be provided with a Landscaping Plan prepared by a Landscape Architect that meets the following standards:
- a. Plant species shall be selected based on the ability to tolerate urban stresses such as pollutants, variable soil moisture and ponding fluctuations. A list of acceptable native plants is provided in the PaBMP Manual.
 - b. A minimum of three (3) species each of trees, shrubs, and/or herbaceous plants shall be selected to insure diversity.
6. In cases where the coefficient of permeability of the existing soils is less than 0.1 inches per hour, an underdrain facility shall be provided. The underdrain facility shall be protected from sediment accumulation with filter fabric.
7. Where underdrain is proposed, an eight (8) inch deep sand bed shall be provided between the planting soil bed and the underdrain system.
8. An overflow spillway or storm drain shall be provided to adequately convey the 50 year storm event. The spillway or storm drain facility shall be set above the maximum proposed ponding depth.

G. Permeable Pavement

1. The type of permeable pavement material (perforated brick pavers, concrete grid pavers, porous bituminous concrete, porous concrete, etc.) shall be determined based on required surface infiltration rates, total surface area of pavement, and proposed use of the pavement/parking area.
2. Permeable pavements shall be constructed with a perimeter overflow edge. The edge is intended to intercept runoff from the pavement if for any reason the permeable surface were to become clogged. The perimeter overflow edges shall connect directly into the base layer of the pavement.
3. Soil percolation/infiltration rates shall equal or exceed 0.2 inches per hour. Soils with infiltration rates in excess of 6.0 inches per hour may

require an additional soil buffer, such as an organic layer over the bed bottom, if the Cation Exchange Capacity (CEC) is less than 5 and pollutant loading is expected to be significant.

4. Permeable pavement recharge beds shall dewater within 72 hours.
5. A minimum depth of 24 inches between the intended bottom of the facility and the seasonal high water table and/or bedrock and/or groundwater (limiting zones). The minimum required separation between the limiting zone may be increased at the Township's discretion if project specific conditions, such as anticipated contaminants, dictate greater prevention of groundwater contamination.
6. All recharge bed bottoms shall be flat (0% slope). Porous pavement surface slopes shall not exceed 2% and are encouraged to be designed at 1%. In certain cases, the Township may allow surface slopes up to 3% if natural grades are left largely undisturbed.

H. Extended Detention / Dual-Purpose Detention

1. Detention Basin BMPs shall be designed in accordance with the design criteria and specifications in the PaBMP Manual and shall meet the following the following minimum requirements.
2. Grading of detention basins shall be designed to utilize the natural contours of land whenever possible. When such design is impractical, the construction of the basin shall utilize slopes as shallow as possible to blend the structure into the terrain.
 - a. Maximum depth of stored water in detention basins shall be five (5) feet, unless a greater depth is approved by the Board of Supervisors.
 - b. Maximum side slopes shall be a four (4) to one (1) ratio, horizontal to vertical. A ten (10) foot wide access shall be provided for maintenance of the facility with a maximum slope of 10:1 ratio.
 - c. A minimum grade of two (2) percent shall be maintained for all areas in the basin where sheet flow occurs. A one (1) percent minimum grade shall be maintained for channel flow in the basin.
3. The top width of the embankment shall be a minimum of ten (10) feet for storage volumes greater than 15,000 cubic feet. The top width of the embankment may be reduced to five (5) feet for maximum storage volumes under 15,000 cubic feet.
4. A cutoff trench shall be provided along the centerline of any dam or earth fill embankments. The trench shall have a bottom width of not less than four (4) feet, but adequate to allow use of equipment necessary to obtain proper compaction. Side slopes of cutoff trench shall be no steeper than one to one (1:1) ratio. The trench shall be filled with successive thin layers of relatively impervious material, each layer being thoroughly compacted.
5. All basin embankments shall be placed in lifts not to exceed eight (8) inches in thickness and each lift shall be compacted to a minimum of

ninety-five (95) percent of Modified Proctor Density as established by ASTM D-1557. Prior to proceeding to the next lift, the compaction shall be checked by a Soils Engineer employed by the applicant/developer. Compaction tests shall be run on the leading and trailing edge of the berm along with the top of the berm. Verification of required compaction shall be submitted to the Township prior to utilization of any basin for stormwater management.

6. Spillways shall be provided to convey storm runoff around or under the embankment in a controlled manner to prevent overtopping. The spillway also must convey the water from the basin to a stable outlet below without damage to the downstream slopes.
 - a. Primary Spillway. The riser shall be solidly attached to the barrel and all connections for riser and pipe barrel shall be watertight. The barrel and riser shall be placed on a firm foundation. The fill material around the primary spillway shall be placed in four (4) inch lifts and compacted to at least the same density as the adjacent embankment. If the basin is being used as a temporary sediment control facility during construction, the riser shall be constructed in accordance with specifications set forth by PaDEP and SCS in the "Erosion and Sediment Pollution Control Manual," latest edition.
 - b. Emergency Spillway. Whenever possible, the emergency spillway for detention basins shall be constructed on undisturbed ground. Emergency Spillways constructed on undisturbed ground may be constructed of reinforced vegetated earth. All other spillways shall be constructed of rip-rap, concrete checkerblocks, or similar materials approved by the Township Engineer.
 - i. The minimum capacity of all emergency spillways shall be equal to the peak flow rate from the one hundred (100) year design storm.
 - ii. Emergency spillways shall extend along the upstream and downstream berm embankment slopes. The upstream edge of the spillway material shall be a minimum of three (3) feet below the spillway crest elevation. The downstream slope of the spillway shall extend to the toe of the berm embankment. The emergency spillway shall not discharge over earthen fill or easily erodible material.
 - c. The minimum freeboard through the emergency spillway shall be one (1) foot. Freeboard is defined as the difference between the design flow elevation through the spillway and the elevation of the top of the settled basin berm. Six (6) inches, minimum, is required between the one hundred (100) year water surface elevation and the emergency spillway crest.
 - d. Anti-seep collars shall be installed around the principal spillway pipe barrel within the normal saturation zone. The collars and their connections to the pipe shall be water-tight. The maximum spacing shall be approximately fourteen (14) times the minimum

projection of the collar measured perpendicular to the pipe. The minimum projection shall be two (2) feet.

- e. All basin outlets which discharge to surface waters shall have energy dissipating devices designed in accordance with the PaDEP "Erosion and Sediment Pollution Control Manual," latest edition.
 - f. Basins shall be protected against erosion by vegetative means as soon as practical after construction and before runoff is directed to the facility via storm conveyances. Areas that have eroded during construction shall be regraded and stabilized prior to final seeding procedures. Basins shall receive a minimum of eight (8) inches of topsoil, conditioned as needed, prior to seeding.
 - g. Vegetative Cover: Basins shall be landscaped in accordance with §523 of the Subdivision and Land Development Ordinance [Chapter 22].
- I. Regional or Sub-Regional Control Alternatives. The initiative and funding for any regional or sub-regional runoff control alternatives are the responsibility of prospective developer(s). The design of any regional control facility must incorporate reasonable development of the entire upstream watershed. The peak outflow of a regional facility would be determined on a case-by-case basis using the hydrologic model of the watershed consistent with protection of the downstream watershed areas. "Hydrologic model" refers to the calibrated Neshaminy Creek and/or Little Neshaminy Creek models as developed for the stormwater management plan. Nevertheless, the Water Quality requirement of §422 and the Recharge Volume requirement of §423 must be met by the regional facility design.
- J. All stormwater control facility designs shall conform to the applicable standards and specifications of the following governmental and institutional agencies:
- 1. American Society of Testing and Materials (ASTM).
 - 2. Asphalt Institute (AI)
 - 3) Bucks County Conservation District
 - 4. Federal Highway Administration (FHWA)
 - 5. National Crushed Stone Association (NCSA)
 - 6. National Sand and Gravel Association (NSGA)
 - 7. Pennsylvania Department of Environmental Protection (DEP)
 - 8. Pennsylvania Department of Transportation (PennDOT)
 - 9. U.S. Department of Agriculture, Soil Conservation Service, Pennsylvania (SCS)
- K. If special geological hazards or soil conditions, such as carbonate derived soils, are identified on the site, the developer's engineer shall consider the effect of proposed stormwater management measures on these conditions. In such

cases, the Township may require an in-depth report by a competent soils engineer.

§426. Runoff Calculation Methodology.

1. To calculate the potential increase in total runoff and peak flow rate resulting from a proposed site development, the "Cover Complex" method will be used as outlined in "Urban Hydrology for Small Watersheds," U.S. Department of Agriculture, Soil Conservation Service, Technical Release 55 (NTIS PB87-101580) and following mathematical analyses described in Computer Program for Project Formulation-Hydrology (SCS Technical Release 20, 1983).
2. Farm field or disturbed earth pre-development cover conditions (existing conditions) of a site or portion of a site used for modeling purposes shall be considered as "meadow" when developing the necessary "Cover Complex" calculations.
3. Impervious surfaces of a site used for modeling purposes which are in excess of the maximum impervious cover allowance in the existing condition [refer existing non-conformity] shall be considered meadow in the pre-development cover conditions when developing the necessary "Cover Complex" calculations.
4. The Soil Conservation Service Type II twenty-four (24) hour rainfall distribution shall be used in the soil cover complex calculations. The twenty-four (24) hour rainfall depths for the return periods used in the soil cover complex methods shall be:

Return Period	24 Hour Rainfall Depth
1 year	2.7 inches
2 year	3.3 inches
5 year	4.2 inches
10 year	5.0 inches
25 year	5.8 inches
50 year	6.4 inches
100 year	7.2 inches

5. The design of any stormwater management facility intended to meet the requirements of this Part shall be verified by routing the design storm hydrographs through the proposed facility.
6. Rational Method may be used to calculate runoff and peak flow rates for drainage areas less than ten (10) acres or as approved by the Township Engineer.
 - A. Runoff coefficients for existing and proposed conditions for use in the Rational Method are noted in Table A-5 in Appendix A.
 - B. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration for overland flow and return periods from the Design Storm Curves from PennDOT Design Rainfall Curves (1986) provided in Appendix A. Times of concentration for overland flow shall be calculated using the segmental approach presented in Chapter 3 of Urban Hydrology for Small

Watersheds, NRCS, TR-55 (as amended). Times of concentration for channel or pipe flow shall be computed using Manning's equation.

7. The Township has the authority to require that computed existing runoff rates be reconciled with field observations and conditions. If the design professional engineer can substantiate through actual physical calibration that more appropriate runoff and time-of-concentration values should be utilized at a particular site, then appropriate variations may be made upon review and recommendations of the Township Engineer. Calibration shall require detailed gauge and rainfall data for the particular site in question.

§427. Erosion and Sediment Control Standards and Criteria.

1. Whenever the vegetation and topography are to be disturbed, such activity must be in conformance with Chapter 102, Title 25, Rules and Regulations, Part I, Commonwealth of Pennsylvania, Department of Environmental Protection, Subpart C, "Protection of Natural Resources," Article II, "Water Resources," Chapter 102, "Erosion Control," and in accordance with DEP Bureau of Soil and Water Conservation and Bucks County Conservation District policies and the standards and specifications of the appropriate municipal government.
2. No regulated earth disturbance activities within the municipality shall commence until the municipality approves an Erosion and Sediment Control Plan for construction activities.
3. DEP has regulations that require an Erosion and Sediment Control Plan for any earth disturbance activity of 5,000 square feet or more, under 25 Pa. Code §102.4(b). Bucks County Conservation District requires an Erosion and Sediment Control Plan for any disturbance greater than 1,000 square feet.
4. In addition, under 25 Pa. Code Chapter 92, a DEP "NPDES Construction Activities" permit is required for regulated earth disturbance activities when there is land disturbance greater than one acre.
5. Evidence of any necessary permit(s) for regulated earth disturbance activities from the appropriate DEP regional office or County Conservation District must be provided to the municipality. The issuance of an NPDES Construction Permit (or permit coverage under the statewide General Permit, PAG-2) satisfies the requirements of §427.1.
6. A copy of the Erosion and Sediment Control Plan, Narrative Report, and any required permit, as required by DEP regulations, shall be available on the project site at all times.
7. Additional erosion and sediment control design standards and criteria are recommended to be applied where infiltration BMPs are proposed. They shall include the following:
 - A. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase to maintain maximum infiltration capacity. Barriers such as orange construction fencing should be used to protect and keep construction traffic away from the area where infiltration BMPs are proposed. Inlets or pipes that are installed to these systems should be completely sealed or protected and monitored until the drainage areas are completely stabilized.
 - B. Infiltration BMPs shall not be constructed nor receive runoff until the entire contributory drainage area to the infiltration BMP has achieved final stabilization.

8. Sediment traps per design criteria presented in the PaDEP "Erosion and Sediment Pollution Control Program Manual" are recommended to be used in lieu of sediment basins.
9. Detailed construction schedules shall be included in all erosion and sediment control plans and stormwater management plans reviewed by the Bucks County Conservation District.

§428. Permit Requirements by Other Government Entities.

The following permit requirements may apply to certain regulated earth disturbance activities and must be met prior to commencement of regulated earth disturbance activities, as applicable:

- A. All regulated earth disturbance activities subject to permit requirements by DEP under regulations at 25 Pa. Code Chapter 102.
- B. Work within natural drainage ways subject to permit by DEP under 25 Pa. Code Chapter 105.
- C. Any stormwater management facility that would be located in or adjacent to surface waters of the Commonwealth, including wetlands, subject to permit by DEP under 25 Pa. Code Chapter 105.
- D. Any stormwater management facility that would be located on a State highway right-of-way, or require access from a state highway, shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).
- E. Culverts, bridges, storm sewers or any other facilities which must pass or convey flows from the tributary area and any facility which may constitute a dam subject to permit by DEP under 25 Pa. Code Chapter 105.

ARTICLE D. STORMWATER MANAGEMENT PLAN REQUIREMENTS.

§431. General Requirements.

For any of the regulated activities of this Part, prior to the final approval of subdivision and/or land development plans, or the issuance of any permit, or the commencement of any land disturbance activity, the owner, subdivider, developer or his agent shall submit a stormwater management plan for approval by the Board of Supervisors unless exempt under the provision of §406. In addition to the requirement of this Part 4D, the plan shall meet the requirements of Title 25, Rules and Regulations of the DEP, Chapter 102, "Erosion Control," Chapter 105, "Dam Safety and Waterway Management," and Chapter 106, "Floodplain Management."

§432. Stormwater Management Plan Contents.

The following items must be included in the stormwater management plan:

- A. Written Report.
 1. General description of project.
 2. Feasibility Analysis that evaluates the potential application of infiltration, flow attenuation, bioretention, wetland or wet pond BMPs, including

rationale for those developments not intending to use such facilities. Analysis shall provide:

- a. general assessment of the anticipated additional runoff based on design storms and post-development condition and utilizing the calculation procedures required in §426.
 - b. indication of drainage areas on the development site resulting in impervious, pervious, and rooftop runoff.
 - c. indication of type of land use (residential, non-residential) generating the impervious surface runoff.
 - d. delineation of soils on the site from the SCS, Soil Survey of Bucks County, latest edition, and onsite soil study. Soil study shall be conducted by a soil scientist and shall include sufficient probes/deep holes to evaluate application of BMPs.
 - e. indication of soils generally suitable for infiltration and/or wet pond/artificial wetland BMPs, including specification of those soils requiring modifications.
 - f. rationale for the decision to not proceed with implementation of wet pond or artificial wetland BMPs such as insufficient soil suitability.
 - g. rationale for not proceeding with infiltration oriented BMPs in accordance with §425.3.C. of this Part.
3. General description of proposed stormwater management controls and facilities both during and after development, including operation and maintenance requirements for each facility and responsible party for maintenance.
 4. General description of erosion and sediment controls including those contained in any required erosion and sediment control plan.
 5. Complete hydrologic, hydraulic, and structural computations for all stormwater management facilities.

B. Maps.

1. Drafting Standards:
 - a. The plan shall be drawn at a scale of one (1) inch equals one hundred (100) feet or greater. (1" = 50', etc.)
 - b. Dimensions shall be set in feet and decimal parts thereof; and bearings in degrees, minutes and seconds.
 - c. Each sheet shall be numbered and shall show its relationship to the total number of sheets.
 - d. The plan shall be so prepared and bear an adequate legend to indicate clearly which features are existing and which are proposed.

- e. The boundary line of the subdivision or land development shall be shown as a solid heavy line.
- f. Plans shall be on sheets no smaller than eighteen (18) inches by twenty-four (24) inches and no larger than thirty (30) inches by forty-two (42) inches.

2. General Information:

- a. Name or identifying title of project and tax parcel number (if applicable).
- b. Total acreage of the tract and Area to be disturbed.
- c. Name and address of the owner/applicant/developer, and Name and address of individual who prepared the plan.
- d. A location map for the purpose of locating the site at a scale not less than eight hundred (800) feet to the inch showing the relation of the tract to adjoining property and to all streets, roads and Township boundaries existing within one thousand (1,000) feet of any part of the tract.
- e. Plan date and date of latest revision to plan, north point, graphic scale, and written scale.
- f. Note on plan indicating any area that is to be offered for dedication.
- g. Certificate, signed and sealed by an individual registered in the Commonwealth of Pennsylvania and qualified to perform such duties, indicating compliance with the provisions of this Part:

“(Design engineer), on this date (date of signature), has reviewed and hereby certifies that the stormwater management plan meets all design standards and criteria of the Warminster Township Stormwater Management Ordinance.”
- h. Statement on the plan acknowledging the stormwater BMPs and management facilities to be a permanent fixture that can be altered or removed only after approval by the Township of a revised plan which shall be applicable to all future land owners.

3. Existing Features:

- a. Complete outline survey of the property to be subdivided or developed shall be provided showing all courses, distances and area, and tie-ins to all adjacent intersections.
- b. The location, names and widths of streets, the location of property lines and names of owners within two hundred (200) feet; the location of streams, lakes, ponds or other watercourses outside the project area which will be affected by runoff from the project.
- c. The location, size, and ownership of all underground utilities and services (e.g. wells, onsite sewage disposal systems), storm drains, channels, and similar features within two hundred (200)

feet of property boundary, and any rights-of-way or easements within the property.

- d. The location of existing buildings, streets and other significant features within the property, the location and area of all floodplains, forests, lakes, ponds, watercourses, (including drainage swales), wetlands, slopes eight (8) to fifteen (15) percent, steep slopes fifteen (15) to twenty-five (25) percent, and very steep slopes twenty-five (25) percent or steeper.
- e. Contours at vertical intervals of two (2) feet, vertical intervals of five (5) feet for very steep slopes (greater than twenty-five (25) percent).
- f. An overlay showing soil types and boundaries and a statement as to where the soils data was obtained. Overlay shall include a table identifying each soil type, hydrologic soil group, construction limitations and resolutions.
- g. Stormwater management district boundaries and sub-watersheds applicable to the site.

4. Proposed Features:

- a. Proposed land use, total number of lots and dwelling units, and extent of commercial, industrial or other nonresidential uses.
- b. Locations and dimensions of all proposed streets, sidewalks, lot lines, building locations, parking compounds, impervious and semi-impervious surfaces (total area), sanitary sewer facilities, water facilities, and areas proposed for public dedication.
- c. Proposed changes to land surface and vegetative cover including areas to be cut or filled as shown on a plan for surface drainage.
- d. Final contours at vertical intervals of two (2) feet, vertical intervals of five (5) feet for very steep slopes (greater than twenty-five (25) percent).
- e. Plans and profiles of proposed stormwater management facilities including horizontal and vertical location, size, and type of material. This information shall be of the quality required for the construction of all facilities and include all calculations, assumptions, and criteria used in the design of the facilities.
- f. Construction detail(s) of all proposed stormwater management facilities and appurtenances.
- g. Operation and maintenance requirements for all stormwater management facilities including responsible party or parties.
- h. The locations of septic tank infiltration areas and wells when infiltration methods such as cisterns, seepage beds or trenches, infiltration basins or porous pavement are used. Also, soil test data and test locations to substantiate infiltration rates used in the drainage calculations.

addition to the detailed stormwater management plan for the proposed section. This generalized plan shall demonstrate how the stormwater of the proposed section will relate to the entire development. If temporary facilities are required for construction of a section, such facilities shall be included in the submitted stormwater management plan.

- G. The Stormwater Control and BMP Operations and Maintenance Plan for the project site shall establish responsibilities for the continuing operation and maintenance of all permanent stormwater controls and BMPs, as follows:
 - 1. If a plan includes structures or lots which are to be separately owned and in which streets, sewers, and other public improvements are to be dedicated to the municipality, stormwater controls and BMPs may also be dedicated to and maintained by the municipality.
 - 2. If a plan includes operations and maintenance by a single ownership, or if sewers and other public improvements are to be privately owned and maintained, then the operation and maintenance of stormwater controls and BMPs shall be the responsibility of the owner or private management entity.
- H. The municipality shall make the final determination on the continuing operations and maintenance responsibilities. The municipality reserves the right to accept or reject the operations and maintenance responsibility for any or all of the stormwater controls and BMPs.

§433. Plan Submission.

- 1. For regulated activities specified in §405.3.A and B:
 - A. The stormwater management plan shall be submitted by the developer to the Code Enforcement Officer as part of the preliminary plan submission for the subdivision or land development.
 - B. Four (4) copies of the stormwater management plan shall be submitted.
 - C. Distribution of the stormwater management plan shall be made by the Code Enforcement Officer as follows:
 - 1. One (1) copy to the Board of Supervisors.
 - 2. One (1) copy to the Planning Commission.
 - 3. One (1) copy to the Township Engineer.
 - 4. One (1) copy to the Township file.
 - D. Applicant shall be responsible to make applications to Buck County Planning Commission and Bucks County Conservation District. The Township shall be copied on all correspondence.
- 2. For all other regulated activities specified under §405.3:
 - A. Stormwater Management Plan Application [Appendix F] shall be submitted by property owner to the Code Enforcement Officer as part of the “Earth Disturbance Permit.”

- B. The stormwater management plan shall be accompanied by the requisite fee as set forth in §452 of this Part.
 - C. Two (2) copies of the stormwater management plan shall be submitted.
 - D. Distribution of the stormwater management plan shall be made by the Code Enforcement Officer as follows:
 - 1. One (1) copy to the Township Engineer.
 - 2. One (1) copy to the Township file.
 - E. Applicant shall be responsible to make applications to Bucks County Conservation District. The Township shall be copied on all correspondence.
3. For regulated activities requiring permits from PaDEP or the U.S. Army Corps of Engineers, the applicant shall make all submittals directly to the agency with all required submittal documents and fees. The Township shall be copied on all correspondence.

§434. Plan Review and Approval.

- 1. The Board of Supervisors shall review, and approve or disapprove, the stormwater management plan submitted pursuant to §433.1 within a time frame consistent with established procedures under the Pennsylvania Municipalities Planning Code (Act 247 of 1968, as amended) and the Warminster Township Board of Supervisors Subdivision and Land Development Ordinance [Chapter 22].
- 2. The Township Building Permit/Zoning Officer shall review, and approve or disapprove, the stormwater management plan submitted pursuant to §433.2 within thirty (30) days following formal submission of the plan.
- 3. The Township Engineer shall review the stormwater management plan for consistency with the adopted Neshaminy Creek and/or Little Neshaminy Creek Watershed Stormwater Management Plan, as applicable, as embodied by this Part and against any additional storm drainage provisions contained in the Township Subdivision and Land Development [Chapter 22] or Zoning Ordinance [Chapter 27], as applicable.
- 4. The Bucks County Planning Commission (BCPC or appointed representative) shall provide an advisory review of the stormwater management plan for consistency with the Neshaminy Creek and/or Little Neshaminy Creek Watershed Stormwater Management Plan, as applicable.
- 5. Any subdivision or land development (regulated activities §405.3.A. and B) or building permit application (regulated activities §405.3.C. and D) shall not be approved if the stormwater management plan has been found to be inconsistent with the Neshaminy Creek Watershed Stormwater Management Plan or the Little Neshaminy Creek Watershed Stormwater Management Plan.
- 6. The decision of the Board of Supervisors concerning stormwater management plans submitted pursuant to §433.1 shall be in writing and shall be communicated to the developer personally or mailed to him at his last known address no later than fifteen (15) days following the decision. When the stormwater management plan is not approved in terms as submitted, the decision shall specify the defects found in the stormwater management plan and describe the requirements which have not been met and shall, in each case, cite the provisions of the ordinance relied upon. Failure of the Board of Supervisors to render a decision and communicate it to the developer within the time

and in the manner required herein shall be deemed an approval of the stormwater management plan in terms as presented unless the developer has agreed in writing to an extension of time or change in the prescribed manner of presentation of communication of the decision, in which case, failure to meet the extended time or change in manner of presentation of communication shall have like effect.

7. The municipality shall review the Stormwater Control and BMP Operations and Maintenance Plan for consistency with the purposes and requirements of this Part, and any permits issued by DEP.
8. The municipality shall notify the applicant in writing whether the Stormwater Control and BMP Operations and Maintenance Plan is approved.
9. The municipality shall require an "As-Built Drawing" of all stormwater controls and BMPs, and an explanation of any discrepancies with the Operations and Maintenance Plan.

§435. Modification of Plan.

A modification to a submitted stormwater management plan for a proposed development site which involves a change in control methods or techniques, or which involves the relocation or redesign of control measures, or which is necessary because soil or other conditions are not as stated on the stormwater management plan (as determined by the Township Engineer) shall require a resubmission of the modified stormwater management plan consistent with §433 subject to review per §434 of this Part. Minor design changes may be permitted as authorized by the Board of Supervisors and advised by the Township Engineer without submission consistent with §433 and §434 of this Part. It shall be unlawful to alter or remove any permanent stormwater control and BMP required by an approved Stormwater Control and BMP Operations and Maintenance Plan, or to allow the property to remain in a condition which does not conform to an approved Stormwater Control and BMP Operations and Maintenance Plan.

§436. Operations and Maintenance Agreement for Privately Owned Stormwater Controls and BMPs.

1. The Applicant shall sign an operations and maintenance agreement with the municipality covering all stormwater controls and BMPs that are to be privately owned. The maintenance agreement shall be transferred with transfer of ownership. The agreement shall be substantially the same as the agreement in Appendix E.
2. Other items may be included in the agreement where determined necessary to guarantee the satisfactory operation and maintenance of all permanent stormwater controls and BMPs. The agreement shall be subject to the review and approval of the municipality.

§437. Stormwater Management Easements.

1. Stormwater management easements are required for all areas used for stormwater control located on private property, unless a waiver is granted by the Board of Supervisors.
2. Stormwater management easements shall be provided by the applicant or property owner if necessary for access for inspections and maintenance, or the preservation of stormwater runoff conveyance, infiltration, and detention areas and other stormwater controls and BMPs, by persons other than the property owner. The purpose of the easement shall be specified in any agreement under §436.

§438. Recording of Approved Stormwater Control and BMP Operations and Maintenance Plan and Related Agreements.

1. The owner of any land upon which permanent stormwater controls and BMPs will be placed, constructed or implemented, as described in the Stormwater Control and BMP Operations and Maintenance Plan, shall record the following documents in the Office of the Recorder of Deeds for Bucks County, within 15 days of approval of the Stormwater Control and BMP Operations Plan by the municipality:
 - A. The Operations and Maintenance Plan, or a summary thereof;
 - B. Operations and Maintenance Agreements under §436; and
 - C. Easements under §437.
2. The municipality may suspend or revoke any approvals granted for the project site upon discovery of failure on the part of the owner to comply with this Section.

ARTICLE E. PERMIT REQUIREMENTS AND PROCEDURES

§441. General.

In accordance with §404 of this Part, a regulated activity as defined in §405 of this Part shall not be initiated until a stormwater management permit has been issued.

§442. Application Requirements.

1. The applicant shall obtain the required stormwater management permit for regulated activities specified in §405.3.A. and B. after obtaining the required subdivision or land development plan approval and stormwater management plan approval as specified in Part 4D. The stormwater management permit will be issued by the Board of Supervisors concurrently with the final subdivision and land development approval.
2. The applicant shall obtain the required stormwater management permit for regulated activities specified in §405.3.C. and D. after obtaining the required building permit approval and stormwater management plan approval as specified in Part 4D. The stormwater management permit will be issued by the Code Enforcement Officer concurrently with the issuance of the building permit.
3. The applicant shall obtain the required stormwater management permit for regulated activities specified in §405.3.E. and F. from the Code Enforcement Officer after obtaining the necessary State permits specified in Part 4D.
4. The applicant shall obtain a letter approving stormwater management exemption as specified in §406 from the Township Engineer after review of materials submitted in §406.E.

§443. Application for Permit.

Application for stormwater management permits required by this Part shall be made on forms (see Appendix F) supplied by the Township. Such applications shall provide a brief description of the stormwater management controls and regulated activities. This application shall become part of the stormwater management plan submission required by Part 4E.

§444. Modification of Plans.

A modification to an approved stormwater management plan, when required under §435 of this Part, shall require a new stormwater management permit. The permit shall be issued following approval of the revised plan.

§445. Expiration and Renewal.

1. All stormwater management permits shall expire twenty-four (24) months from the date of issuance, unless construction is commenced prior to this date or an extension of time is approved.
2. An extension of an expired stormwater management permit shall be issued by the Township following the submission of a written request if, in the opinion of the Township Engineer, the subject property or affected surrounding area has not been altered in a manner which requires alteration to the stormwater management plan.
3. A renewal of an expired stormwater management permit may be issued by the Township following a resubmittal of the permit application form and review by the Township Engineer to determine if any changes have occurred in project site conditions or stormwater management plan requirements since the original permit was issued. If such changes have occurred, the Township may require the applicant to resubmit the stormwater management plan for a new review pursuant to Part 4D.
4. The refusal of the Township to reissue an expired stormwater management permit shall contain the reasons for such refusal.
5. A stormwater management permit shall not expire while a request for an extension is pending.

§446. Suspension and Revocation.

1. Any stormwater management permit issued under this Part may be suspended or revoked by the Board of Supervisors for:
 - A. Noncompliance with, or failure to implement any provision of the permit.
 - B. A violation of any provision of this Part or any other applicable law, ordinance, rule or regulation relating to the project.
 - C. The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or nuisance or which endangers the life or property of others.
2. A suspended stormwater management permit shall be reinstated by the Township when:
 - A. The Township Engineer has inspected and approved the corrections to the stormwater management control measure(s), or the elimination of the hazard or nuisance; and/or,
 - B. The Board of Supervisors is satisfied that the violation of the ordinance, law or rule and regulation has been corrected.
3. A stormwater management permit which has been revoked by the Township cannot be reinstated. The applicant may apply for a new permit under the procedures outlined in this Part.

ARTICLE F. ADMINISTRATION

§451. Schedule of Inspections.

1. Prior to construction of the stormwater management facilities specified in the approved stormwater management plan, the developer must provide a schedule of inspections along with a final inspection and submission of "as-built" drawings to the Township Engineer. These inspection provisions pertain only to construction activities regulated by the land preparation provisions of Part 4D. However, any activities granted exemption from plan preparation provisions as described in §406 and therefore exempt from the inspection provisions must manage stormwater in the manner specified in the other provisions of this Part.
2. The Township Engineer shall inspect all phases of development of the site including, but not limited to:
 - A. Completion of preliminary site preparation including stripping of vegetation, stockpiling of topsoil, and construction of temporary stormwater management and erosion control facilities.
 - B. Completion of rough grading, but prior to placing top soil, permanent drainage or other site development improvements and ground covers.
 - C. During construction of the permanent stormwater facilities.
 - D. Upon completion of permanent stormwater management facilities, including established ground covers and plantings.
 - E. Upon completion of any final grading, vegetative control measures or other site restoration work done in accordance with the approved stormwater management plan and permit.
3. No work shall begin on a subsequent stage until the proceeding stage has been inspected and/or approved by the Township Engineer.
4. It is the responsibility of the developer to notify the Township Engineer forty-eight (48) hours in advance of the completion of each phase of development.
5. Any portion of the work which does not comply with the approved stormwater management plan must be corrected by the developer within ten (10) days. No work may proceed on any subsequent phase of the stormwater management plan, the subdivision or land development, or building construction until the required corrections have been made.
6. If at any stage of the work the Township Engineer determines that the soil or other conditions are not as stated or shown in the approved application, the same may refuse to approve further work and the Township may revoke existing permits until a revised stormwater management plan is submitted and approved, as required by §435 of this Part. If the revised stormwater management plan cannot remedy the situation, Warminster Township reserves the right to cancel its approval and halt all work except for that work required to eliminate the activity and return the site to pre-activity conditions as much as is reasonably possible.
7. If the Township Engineer discovers that the facilities or measures installed may be in violation of Chapter 102, "Erosion Control," of the Clean Streams Law provision, the Township Engineer will refer these violations to the Bucks County Conservation District.

8. When the developer has completed all the required facilities, he shall notify Warminster Township in writing by certified or registered mail, and shall send a copy of such notice to the Code Enforcement Officer of Warminster Township. The Board of Supervisors shall, within ten (10) days after receipt of such notice, authorize the Township Engineer to inspect the required facilities. Following this final inspection, the Township Engineer shall promptly file a report, in writing, with the Board of Supervisors and shall mail a copy of the report to the developer by certified or registered mail. The report shall be made and mailed within thirty (30) days after receipt by the Township Engineer of the aforesaid authorization by the Board of Supervisors.
9. Following final inspection, the developer shall submit drawings bearing the seal of a Pennsylvania registered professional engineer indicating the "as-built" improvements called for in the approved plan.

§452. Fees and Expenses.

1. Fees shall be established by resolution of the Board of Supervisors which at a minimum will cover:
 - A. The review of stormwater management plans. Review shall mean all technical review, meetings and discussions relative to the plan.
 - B. Stormwater management permit issuance.
 - C. Site inspection.
 - D. Inspection of required controls and improvements during construction.
 - E. The final inspection upon completion of the controls and improvements required in the plan.
 - F. Any additional work required to enforce any permit provisions regulated by this Part, correct violations, and ensure the completion of stipulated remedial actions.
2. No permit to begin any work on the project shall be issued until the requisite fees have been paid.
3. If it is determined that a modification to the existing stormwater management plan is required under §435 of this Part, a new stormwater management permit shall not be issued until the additional fees have been paid by the applicant.

§453. Financial and Maintenance Guarantees.

1. Performance Guarantees.
 - A. The Board of Supervisors shall, prior to the issuance of a stormwater management permit and/or approval of a final subdivision/land development plan and stormwater management plan, require financial security as a performance guarantee for stormwater management control facilities in a form to be approved by the Warminster Township Solicitor. If required by the developer, in order to facilitate financing, the Board of Supervisors may furnish the developer with a signed resolution indicating approval of the subdivision/land development plan and stormwater management plan contingent upon the developer obtaining a satisfactory financial security. The record plan shall not be signed nor recorded until a financial improvement agreement is executed. The resolution or letter of

contingent approval shall expire and be deemed to be revoked if the financial security agreement is not executed within ninety (90) days, unless a written extension is granted by the Board of Supervisors; such extension shall not be unreasonably withheld and shall be placed in writing at the request of the developer.

- B. Where required, the developer shall file with the Board of Supervisors financial security in an amount sufficient to cover the costs of the stormwater management facilities. Without limitation as to other types of financial security which the Township may approve, such approval shall not be unreasonably withheld; Federal or Commonwealth chartered lending institution irrevocable letters of credit and restrictive or escrow accounts shall be deemed acceptance financial security. Such financial security shall be posted with a bonding company or Federal or Commonwealth chartered lending institution chosen by the developer, provided said bonding company or lending institution is authorized to conduct such business within the Commonwealth. Such bond or other security shall provide for, and secure to the public, completion of the stormwater management facilities which may be required on or before the date fixed in the formal action of approval or accompanying agreement for completion of the improvements.
- C. The amount of financial security shall be equal to one hundred ten (110) percent of the cost to install the required facilities estimated as of ninety (90) days following the date scheduled for completion.
- D. If a developer requires more than one (1) year from the date of posting of the financial security to complete the required facilities, the amount of financial security may be increased by an additional ten (10) percent for each one (1) year period beyond the first anniversary date from posting of financial security or to an amount not exceeding one hundred ten (110) percent of the cost of completing the required facilities as reestablished on or about the expiration of the preceding one (1) year period by using the above bidding procedure.
- E. The amount of financial security required shall be based upon an estimate of the cost of the facilities submitted by the developer and prepared by a professional engineer licensed as such in this Commonwealth and certified by such engineer to be a fair and reasonable estimate of such cost. The Board of Supervisors, upon the recommendation of the Township Engineer, may refuse to accept such estimate for good cause shown. If the developer and the Board of Supervisors are unable to agree upon an estimate, then the estimate shall be recalculated and recertified by another professional engineer licensed as such in this Commonwealth and chosen mutually by the Board of Supervisors and the developer. The estimate certified by the third engineer shall be presumed fair and reasonable and shall be the final estimate. In the event that a third engineer is so chosen, fees for the services of said engineer shall be paid equally by Warminster Township and the developer.
- F. In the case where development is projected over a period of years, the Board of Supervisors may authorize submission of stormwater management plan applications by sections or stages of development so as to required or guarantee that stormwater management facilities in both current and future stages of development will provide the protection of the finally approved stage of the development.

- G. As the work of installing the required stormwater facilities proceeds, the developer may request the Board of Supervisors to release or authorize to release, from time to time, such portions of the financial security necessary for payment to the contractor or contractors performing the work. Any such requests shall be in writing addressed to the Board of Supervisors which shall have forty-five (45) days from receipt of such request within which to allow the Township Engineer to certify, in writing, to the Board of Supervisors that such portion of the work upon the facilities has been completed in accordance with the stormwater management plan and permit. Upon such certification, the Board of Supervisors shall authorize release by the bonding company or lending institution of an amount as estimated by the Township Engineer fairly representing the value of the facilities completed, or, if the Board of Supervisors fails to act within a forty-five (45) day period, the Board of Supervisors shall be deemed to have approved the release of funds as requested. The Board of Supervisors may, prior to final release, require retention of ten (10) percent of the estimated cost of the aforesaid facilities. The final release of the financial security provisions shall be permitted only after receipt by the Board of Supervisors of certification and "as-built" as required by §451.2. and by §451.9.
 - H. In the event that any stormwater management facilities which may be required have not been installed as provided in this Part or in accordance with the approved stormwater management plan, the Board of Supervisors has the power to enforce any corporate bond or other security by appropriate legal and equitable remedies. If proceeds of such bond or other security are insufficient to pay the cost of installing or making repairs or corrections to all the facilities covered by said security, the Board of Supervisors may, at its option, install part of such facilities in all or part of the development and may institute appropriate legal or equitable action to recover the monies necessary to complete the remainder of the facilities. All of the proceeds, whether resulting from the security or from any legal or equitable action brought against the developer, or both, shall be used solely for the installation of the stormwater management facilities covered by such security and not for any other purpose.
2. Maintenance Responsibility and Guarantees.
- A. The maintenance responsibilities for permanent stormwater runoff control facilities shall be determined based upon the type of ownership of the property which is controlled by the facilities.
 - 1. Single Entity Ownership. Where the permanent stormwater runoff control facilities are designed to manage runoff from property in a single entity ownership as defined below, the maintenance responsibility for the stormwater control facilities shall be with the single entity owner. The stated responsibility of the entity related to owning and maintaining the facilities shall be submitted with the stormwater management plan for determination of their adequacy. Approval of the stormwater management plan shall depend upon the approval of these terms. These terms shall be in writing, shall be in recordable form and shall, in addition to any other terms deemed necessary by the Board of Supervisors, contain a provision permitting inspection at any reasonable time by the Township Engineer of all such facilities deemed critical in the public welfare. A single entity shall be defined as an association, public or

private corporation, partnership, firm, trust, estate or any other legal entity empowered to own real estate, exclusive of an individual lot owner.

2. Township Ownership. Where the Board of Supervisors has accepted an offer of dedication of the permanent stormwater management facilities, the Board of Supervisors shall be responsible for maintenance. Upon approval of the stormwater management facilities by the Board of Supervisors, the developer shall provide a financial security, in a form approved by the Warminster Township Solicitor for maintenance guarantees, as follows:
 - a. *Construction Maintenance Bond.* The Board of Supervisors may require the posting of a maintenance bond to secure the structural integrity of said facilities as well as the functioning of said facilities in accordance with the design and specifications as depicted on the approved stormwater management plan for a term not to exceed eighteen (18) months from the date of acceptance of dedication. Said financial security shall be the same type as required in §453.1. with regard to installation of such facilities, and the amount of the financial security shall not exceed fifteen (15) percent of the actual cost of installation of said facilities. A cash contribution can be used as the financial security in lieu of a maintenance bond, although the contribution must be equivalent to the amount that would be estimated for the maintenance bond.
 - b. *Long-Term Maintenance Bond.* The long-term maintenance bond shall be in an amount equal to the present worth of maintenance of the facilities for a ten (10) year period. The estimated annual maintenance cost for the facilities shall be based on a fee schedule provided by the Township Engineer and adopted by the Board of Supervisors. The fee schedule must be reasonable. A cash contribution can be used in lieu of the long-term maintenance bond, although the contribution must be equivalent to the amount that would be estimated for the maintenance bond.
 - c. *Documentation.* The terms of the maintenance guarantees shall be documented as part of the stormwater management phase as per §432.C, §436, §438 of this Part.

For certain types of facilities, the Board of Supervisors may benefit by transferring the maintenance responsibility to an individual or group of individuals residing within the controlled area. These individuals may have the permanent stormwater control facilities adjacent to their lots or otherwise have an interest in the proper maintenance of the facilities. In these instances, the Board of Supervisors and the individual(s) may enter into a formal agreement for the maintenance of the facilities whereby Warminster Township shall maintain ownership of the facilities and be responsible for periodic inspections.

3. Individual Lot Ownership. Where any stormwater management facility is located on an individual lot, and maintenance thereof is the responsibility of that landowner, a description of the facility or systems and the terms of the required maintenance shall be incorporated as a part of the deed to the property. The deed shall be recorded with the County Recorder of Deeds within ninety (90) days following the Board of Supervisors'

approval. In addition, the Board of Supervisors may require as a condition of approval that a deed conveying any interest in such lot contain language indicating that the conveyance is subject to an express covenant by the grantee that the grantee will maintain the stormwater management facility.

4. Multi-Entity Ownership. In cases where property is in multiple owner (i.e. many individual ownership of various portions of the property on which stormwater facilities are located) the developer(s) shall enter into an agreement with the Township to determine the maintenance of the permanent stormwater facilities. If maintenance is prescribed for each individual lot owner, the requirements of §453.2.A (3) shall apply.
- B. The failure of any person, individual lot owner or private entity to properly maintain any stormwater management facility shall be construed to be a violation of this Part and is declared to be a public nuisance, subject to §456, "Penalties."
3. **Liability Insurance**. If, in the opinion of the Board of Supervisors based upon a report of the Township Solicitor, the nature of the work is such that it may create a hazard to human life or endanger adjoining property or streets, the Board of Supervisors shall, before issuing the stormwater management permit, require that the applicant file a certificate of insurance showing that there exists insurance against claims for damages for personal injury, bodily injury, and property damage, including damage to Warminster Township by surface water flow which has been altered on the site. The liability insurance shall be to the amount prescribed by the Township in accordance with the nature of risks involved and include the Township as an additional insured. Such insurance shall be written by a company licensed to do business in the Commonwealth. Neither issuance of the stormwater management permit nor compliance with the provisions hereto or any conditions imposed by the Township shall relieve any person from any responsibility for damage otherwise imposed by law, nor impose any liability upon Warminster Township or its officers and employees for damages to persons or property.

§454. Right of Entry.

1. Upon presentation of proper credentials, duly authorized representatives of Warminster Township may enter at reasonable times upon any property within Warminster Township to investigate or ascertain the condition of the subject property in regard to any aspect regulated by this Part.
2. Stormwater control and BMP owners and operators shall allow persons working on behalf of the municipality ready access to all parts of the premises for the purposes of determining compliance with this Part.
3. Persons working on behalf of the municipality shall have the right to temporarily locate on any stormwater control or BMP in the municipality such devices as are necessary to conduct monitoring and/or sampling of the discharges from such stormwater control or BMP.
4. Unreasonable delays in allowing the municipality access to a stormwater control or BMP is a violation of this Part.

§455. Notification.

1. In the event that an owner, subdivider, developer or his agent fails to comply with the requirements of this Part or fails to conform to the requirements of any permit issued hereunder, Warminster Township shall provide written notification of violation. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of the violation(s). Such notice may require, without limitation:
 - A. The performance of monitoring, analyses and reporting.
 - B. The elimination of prohibited discharges.
 - C. Cessation of any violating discharges, practices or operations.
 - D. The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property.
 - E. Payment of a fine to cover administrative and remediation costs.
 - F. The implementation of stormwater BMPs.
 - G. Operation and maintenance of stormwater BMPs.
2. Upon failure to comply within the time specified, the owner, subdivider, developer or his agent shall be subject to the penalty provisions of this Part §456 or other penalty provisions contained in the Subdivision and Land Development Ordinance [Chapter 22], where applicable.

§456. Enforcement Generally.

1. Whenever the municipality finds that a person has violated a prohibition or failed to meet a requirement of this Part, the municipality may order compliance by written notice to the responsible person. Such notice may, without limitation, require the following remedies:
 - A. Performance of monitoring, analyses and reporting;
 - B. Elimination of prohibited connections or discharges;
 - C. Cessation of any violating discharges, practices or operations;
 - D. Abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property;
 - E. Payment of a fine to cover administrative and remediation costs;
 - F. Implementation of stormwater controls and BMPs; and
 - G. Operation and maintenance of stormwater controls and BMPs.
2. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of these violations(s). Said notice may further advise that, if applicable, should the violator fail to take the required action within the established deadline, the work will be done by the municipality or designee and the expense thereof shall be charged to the violator.
3. Failure to comply within the time specified shall also subject such person to the penalty provisions of this Part. All such penalties shall be deemed cumulative and shall not

prevent the municipality from pursuing any and all other remedies available in law or equity.

§457. Penalties.

1. Any person, firm or corporation who shall violate any provision of this Part or who shall fail to comply with any written notice from Warminster Township which describes a condition of noncompliance, upon conviction thereof in an action brought before a district justice in the manner provided for the enforcement of summary offenses under the Pennsylvania Rules of Criminal Procedure, shall be sentenced to pay a fine of not more than \$1,000 plus costs and, in default of payment of said fine and costs, to a term of imprisonment not to exceed 90 days. Each day that a violation of this Part continues or each Section of this Part which shall be found to have been violated shall constitute a separate offense.
2. The Bucks County Court of Common Pleas, upon petition, may grant an order to stay, upon cause shown, tolling the per diem fine pending a final adjudication of the violation and judgment.
3. Nothing contained in the Section shall be construed or interpreted to grant to any person or entity other than Warminster Township the right to commence any action for enforcement pursuant to this Section.

§458. Appeals.

1. An appeal from any action or decision of the Board of Supervisors concerning regulated activities specified in §405 shall be made to the Bucks County Court of Common Pleas pursuant to Article X-A of the Pennsylvania Municipalities Planning Code.
2. The Board of Supervisors may hear and decide appeals pursuant to the Pennsylvania Municipalities Planning Code, §909.1(b)(6), where it is alleged that the Building Permit/Zoning Officer has failed to follow prescribed procedures or has misinterpreted or misapplied any provision of this Part concerning regulated activities specified in §405.
3. The Warminster Township Zoning Hearing Board may hear and decide pursuant to the Pennsylvania Municipalities Planning Code, §909.1(a)(9), where it is alleged that the Building Permit/Zoning Officer has failed to follow prescribed procedures or has misinterpreted or misapplied any provision of this Part concerning regulated activities specified in §405.
4. Nothing in §§457.2 and .3 shall be construed to deny the appellant the right to proceed directly to the Bucks County Court of Common Pleas pursuant to the Pennsylvania Municipalities Planning Code, §910.1.
5. The approval of an appeal shall not have the effect of making null and void the intent and purpose of this Part.

ARTICLE G. PROHIBITIONS.

§461. Prohibited Discharges.

1. No person in the municipality shall allow, or cause to allow, stormwater discharges into the municipality's separate storm sewer system which are not composed entirely of

stormwater, except (i) as provided in subsection 2 below, and (ii) discharges allowed under a state or federal permit.

2. Discharges that may be allowed, based on a finding by the municipality that the discharge(s) do not significantly contribute to pollution to surface waters of the Commonwealth, are:
 - A. Discharges from firefighting activities,
 - B. Potable water sources including dechlorinated water line and fire hydrant flushings.
 - C. Irrigation drainage.
 - D. Routine external building washdown (which does not use detergents or other compounds).
 - E. Air conditioning condensate.
 - F. Water from individual residential car washing.
 - G. Spring water from crawl space pumps.
 - H. Uncontaminated water from foundation or from footing drains.
 - I. Flows from riparian habitats and wetlands.
 - J. Lawn watering.
 - K. Pavement washwaters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used.
 - L. Dechlorinated swimming pool discharges.
 - M. Uncontaminated groundwater.
3. In the event that the municipality determines that any of the discharges identified in §461.2. significantly contribute to pollution of waters of the Commonwealth, or is so notified by DEP, the municipality will notify the responsible person to cease the discharge.
4. Upon notice provided by the municipality under §461.3, the discharger will have a reasonable time, as determined by the municipality, to cease the discharge consistent with the degree of pollution caused by the discharge.
5. Nothing in this Section shall affect a discharger's responsibilities under state law.

§462. Prohibited Connections.

1. The following connections are prohibited, except as provided in §461.2 above:
 - A. Any drain or conveyance, whether on the surface or subsurface, which allows any non-stormwater discharge including sewage, process wastewater, and wash water to enter the separate storm sewer system, and any connections to the storm drain system from indoor drains and sinks; and

- B. Any drain or conveyance connected from a commercial or industrial land use to the separate storm sewer system, which has not been documented in plans, maps, or equivalent records, and approved by the municipality.

§463. Roof Drains.

1. Roof drains shall not be connected to streets, sanitary or storm sewers or roadside ditches in order to promote overland flow and infiltration/percolation of stormwater where advantageous to do so.
2. When it is more advantageous to connect directly to streets or storm sewers, connections of roof drains to streets or roadside ditches may be permitted on a case by case basis as determined by the municipality.
3. Roof drains shall discharge to infiltration areas or vegetative BMPs to the maximum extent practicable.

§464. Alteration of BMPs.

1. No person shall modify, remove, fill, landscape or alter any existing stormwater control or BMP, unless it is part of an approved maintenance program, without the written approval of the municipality.
2. No person shall place any structure, fill, landscaping or vegetation into a stormwater control or BMP or within a drainage easement, which would limit or alter the functioning of the stormwater control or BMP, without the written approval of the municipality.

APPENDIX A

Stormwater Figures & Tables

Table A-1
Design Storm Rainfall Amount (Inches)

The design storm rainfall amount chosen for design should be obtained from the Penn-DOT region for which the site is located according to Figure A-2.

Region 5							
Precipitation Depth (in)							
Duration	1 Yr	2 Yr	5 Yr	10 Yr	25 Yr	50 Yr	100 Yr
5 min	0.33	0.38	0.45	0.50	0.56	0.63	0.68
15 min	0.64	0.75	0.90	1.00	1.15	1.35	1.50
1 hr	1.10	1.35	1.61	1.85	2.15	2.60	2.98
2 hrs	1.34	1.66	2.00	2.34	2.70	3.26	3.76
3 hrs	1.50	1.86	2.28	2.67	3.09	3.69	4.29
6 hrs	1.86	2.28	2.82	3.36	3.90	4.62	5.40
12 hrs	2.28	2.76	3.48	4.20	4.92	5.76	6.72
24 hrs	2.64	3.36	4.32	5.28	6.24	7.20	8.40

Source: Field Manual of Pennsylvania Department of Transportation
STORM INTENSITY-DURATION-FREQUENCY CHARTS PDT – IDF May 1986.

FIGURE A-2 PENNDOT DELINEATED REGIONS

Source: Field Manual of Pennsylvania Department of Transportation, May 1986

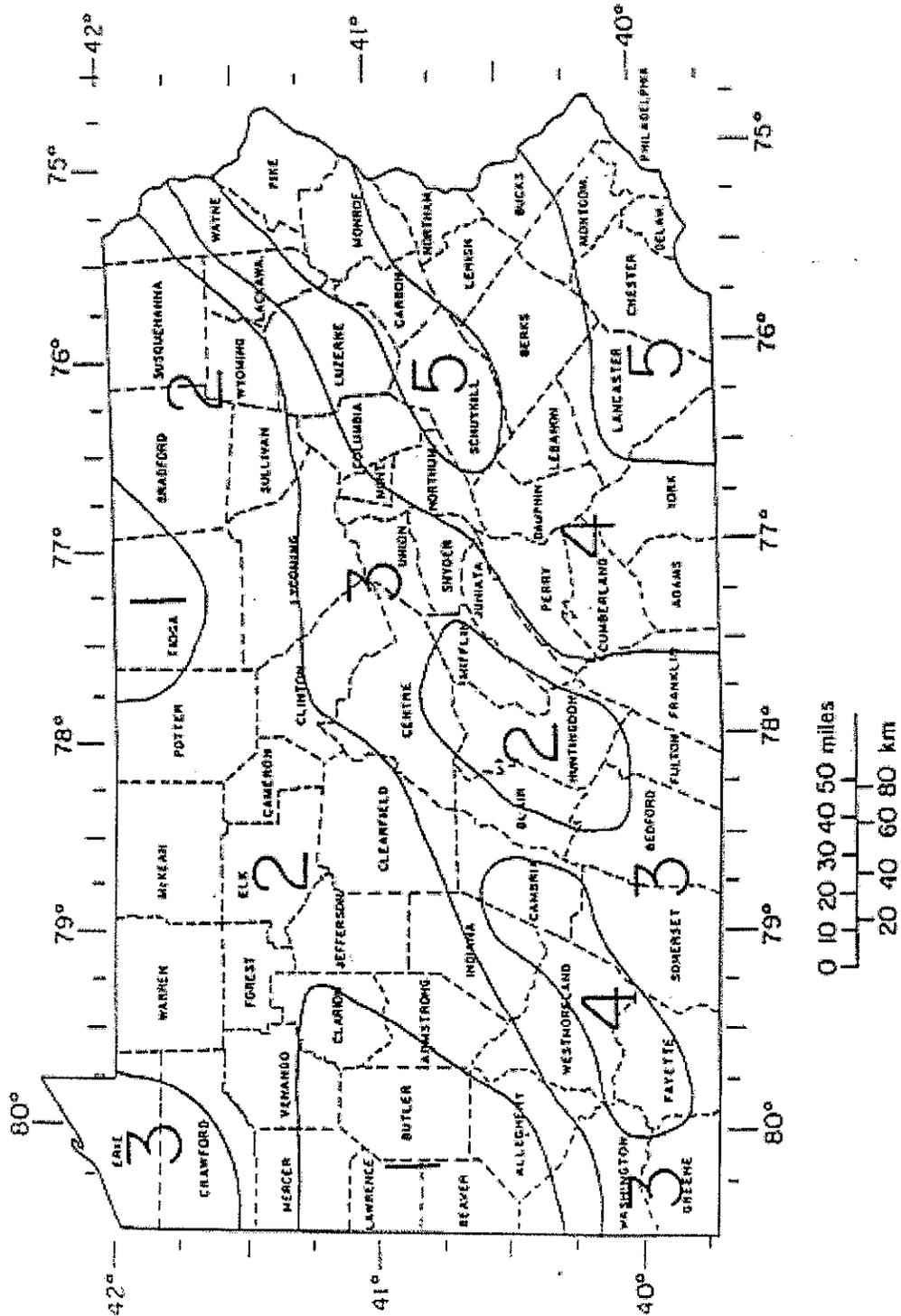


FIGURE A-3

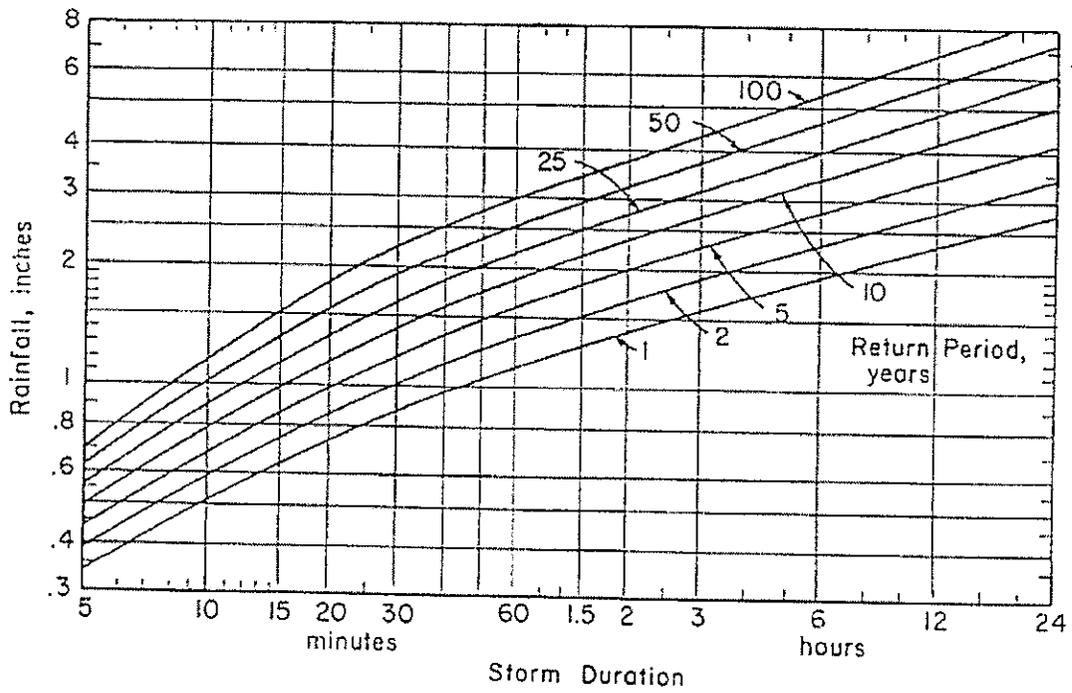
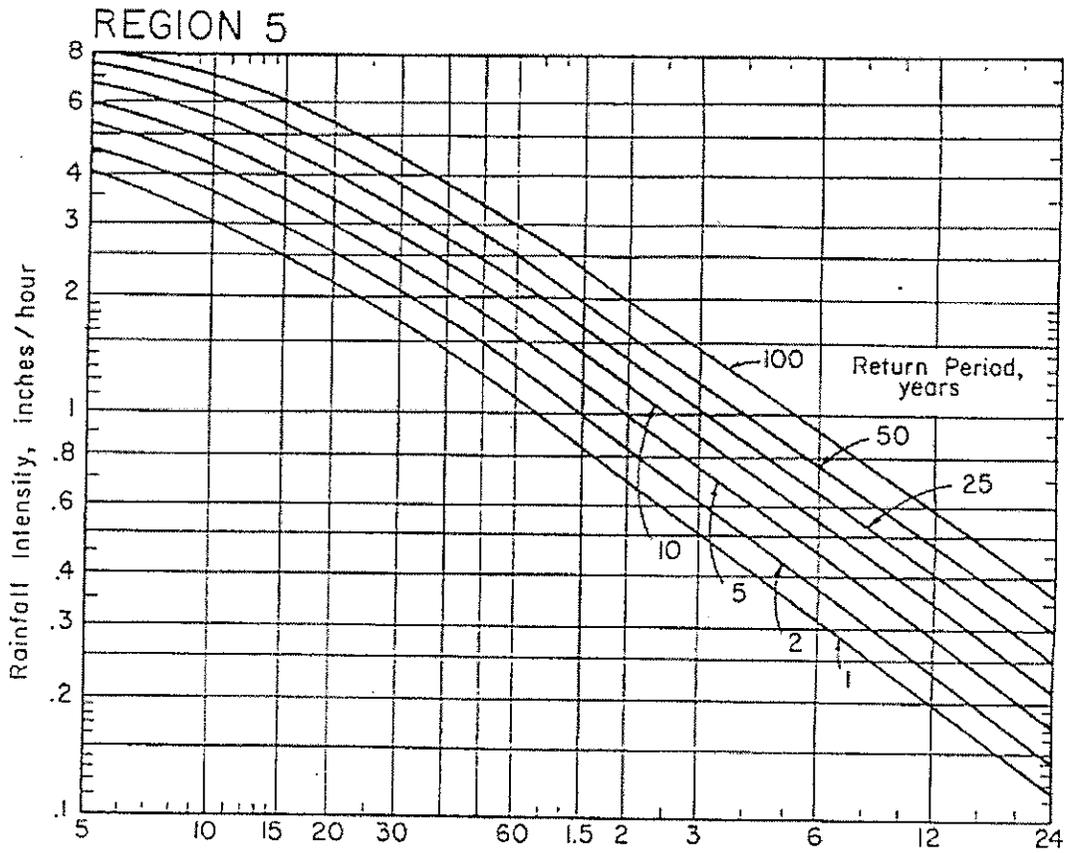


Table A-4. Roughness Coefficients (Manning's "n") For Overland Flow
 Source: U.S. Army Corps of Engineers, HEC-1 Users Manual

Surface Description	n
Dense Growth	0.4 - 0.5
Pasture	0.3 - 0.4
Lawns	0.2 - 0.3
Bluegrass Sod	0.2 - 0.5
Short Grass Prairie	0.1 - 0.2
Sparse Vegetation	0.05 - 0.13
Bare Clay-Loam Soil (eroded)	0.01 - 0.03
Concrete/Asphalt - very shallow depths (less than 1/4 inch)	0.10 - 0.15
- small depths (1/4 inch to several inches)	0.05 - 0.10

Roughness Coefficients (Manning's "n") For Channel Flow

Reach Description	n
Natural stream, clean, straight, no rifts or pools	0.03
Natural stream, clean, winding, some pools or shoals	0.04
Natural stream, winding, pools, shoals, stony with some weeds	0.05
Natural stream, sluggish deep pools and weeds	0.07
Natural stream or swale, very weedy or with timber underbrush	0.10
Concrete pipe, culvert or channel	0.012
Corrugated metal pipe	0.012 - 0.027 ⁽¹⁾
High Density Polyethylene (HDPE) Pipe	
Corrugated	0.021 - 0.029 ⁽²⁾
Smooth Lined	0.012 - 0.020 ⁽²⁾

⁽¹⁾ Depending upon type, coating and diameter

⁽²⁾ Values recommended by the American Concrete Pipe Association, check Manufacturer's recommended value.

Table A-5. Rational Runoff Coefficients

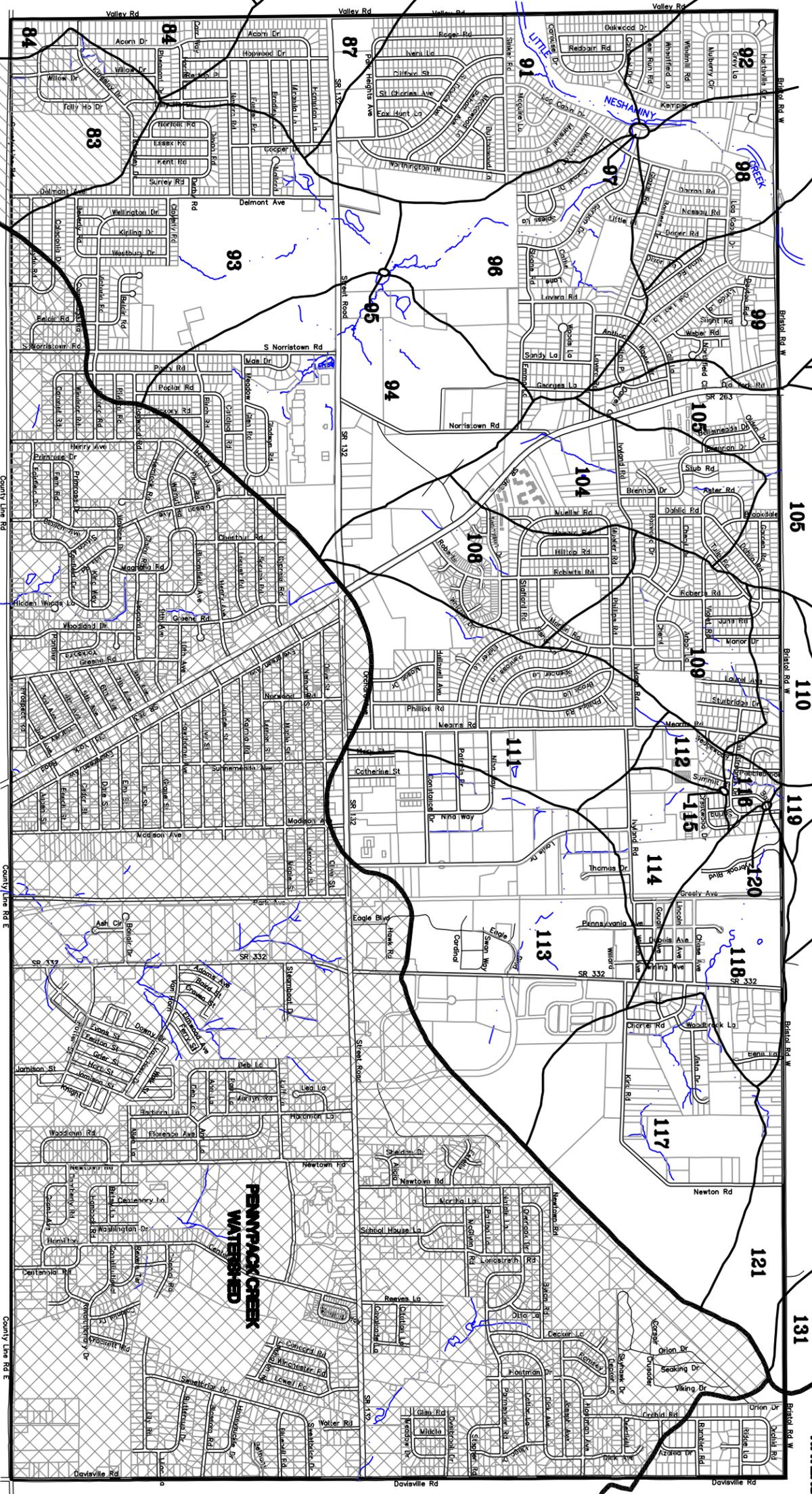
Storms less than 25-year Land Use	Soil Type 'A'			Soil Type 'B'			Soil Type 'C'			Soil Type 'D'		
	0-2%	2-6%	6% +	0-2%	2-6%	6% +	0-2%	2-6%	6% +	0-2%	2-6%	6% +
Cultivated Land	0.08	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
Pasture	0.12	0.20	0.30	0.18	0.28	0.37	0.24	0.34	0.44	0.30	0.40	0.50
Meadow	0.10	0.16	0.25	0.14	0.22	0.30	0.20	0.28	0.36	0.24	0.30	0.40
Forest	0.05	0.08	0.11	0.08	0.11	0.14	0.10	0.13	0.16	0.12	0.16	0.20
Open space, lawns	0.05	0.10	0.14	0.08	0.13	0.19	0.12	0.17	0.24	0.16	0.21	0.28
Parking, impervious	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
Storms 25-year & over Land Use	Soil Type 'A'			Soil Type 'B'			Soil Type 'C'			Soil Type 'D'		
	0-2%	2-6%	6% +	0-2%	2-6%	6% +	0-2%	2-6%	6% +	0-2%	2-6%	6% +
Cultivated Land	0.14	0.18	0.22	0.16	0.21	0.28	0.20	0.25	0.34	0.24	0.29	0.41
Pasture	0.15	0.25	0.37	0.23	0.34	0.45	0.30	0.42	0.52	0.37	0.50	0.62
Meadow	0.14	0.22	0.30	0.20	0.28	0.37	0.26	0.35	0.44	0.30	0.40	0.50
Forest	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25
Open space, lawns	0.11	0.18	0.20	0.14	0.19	0.26	0.18	0.23	0.32	0.22	0.27	0.39
Parking, impervious	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97

Table A-5. Rational Runoff Coefficients

Storms less than 25-year Land Use	Soil Type 'A'			Soil Type 'B'			Soil Type 'C'			Soil Type 'D'		
	0-2%	2-6%	6% +	0-2%	2-6%	6% +	0-2%	2-6%	6% +	0-2%	2-6%	6% +
Residential												
1/8 acre lots	0.25	0.28	0.31	0.27	0.30	0.35	0.30	0.33	0.38	0.33	0.36	0.42
1/4 acre lots	0.22	0.26	0.29	0.24	0.29	0.33	0.27	0.31	0.36	0.30	0.34	0.40
1/3 acre lots	0.19	0.23	0.26	0.22	0.26	0.30	0.25	0.29	0.34	0.28	0.32	0.39
1/2 acre lots	0.16	0.20	0.24	0.19	0.23	0.28	0.22	0.27	0.32	0.26	0.30	0.37
1 acre lots	0.14	0.19	0.22	0.17	0.21	0.26	0.20	0.25	0.31	0.24	0.29	0.35
Industrial	0.67	0.68	0.68	0.68	0.68	0.69	0.68	0.69	0.69	0.69	0.69	0.70
Commercial	0.71	0.71	0.72	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Streets	0.70	0.71	0.72	0.71	0.72	0.74	0.72	0.73	0.76	0.73	0.75	0.78
Storms 25-year & over												
Land Use	0-2%	2-6%	6% +	0-2%	2-6%	6% +	0-2%	2-6%	6% +	0-2%	2-6%	6% +
Residential												
1/8 acre lots	0.33	0.37	0.40	0.35	0.39	0.44	0.38	0.42	0.49	0.41	0.45	0.54
1/4 acre lots	0.30	0.34	0.37	0.33	0.37	0.42	0.36	0.40	0.47	0.38	0.42	0.52
1/3 acre lots	0.28	0.32	0.35	0.30	0.35	0.39	0.33	0.38	0.45	0.36	0.40	0.50
1/2 acre lots	0.25	0.29	0.32	0.28	0.32	0.36	0.31	0.35	0.42	0.34	0.38	0.40
1 acre lots	0.22	0.26	0.29	0.24	0.28	0.34	0.28	0.32	0.40	0.31	0.35	0.46
Industrial	0.85	0.85	0.86	0.85	0.86	0.86	0.86	0.86	0.87	0.86	0.86	0.88
Commercial	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.90	0.89	0.89	0.90
Streets	0.76	0.77	0.79	0.80	0.82	0.84	0.84	0.85	0.89	0.89	0.91	0.95

LITTLE NESHAMINY CREEK
WATERSHED

NESHAMINY CREEK
WATERSHED



100% RELEASE
RATE DISTRICT

75% RELEASE
RATE DISTRICT

2yr Postdevelopment released
at 1yr Predevelopment

5yr Postdevelopment released
at 2yr Predevelopment

All other storms:
100% Release Rate

STORMWATER MANAGEMENT ORDINANCE

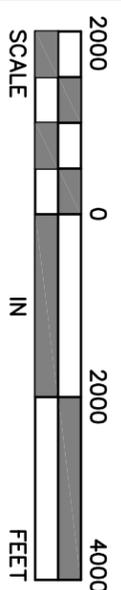
WATERSHED &

SUBWATERSHED BOUNDARIES

WARMINSTER TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA



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			2009-01096
			DATE:
			SCALE:
			1" = 2000'

APPENDIX B

Soil Testing Requirements

Site Evaluation and Soil Infiltration Testing Protocol

Purpose of this Protocol

The purpose of the *Site Evaluation and Soil Infiltration Testing Protocol* is to describe soil evaluation and field testing procedures to:

- Determine if infiltration BMPs are suitable at a site, and at what locations.
- Obtain the required data for infiltration BMP design.

When to Conduct Testing

The Site Development process outlined in Chapters 4 and 5 of the Pennsylvania Stormwater Best Management Practices Manual, December 2006, as amended (“Manual”), describe a process for site development and BMPs. The soil evaluation and infiltration testing investigation should be conducted early in the preliminary design of the project so that information developed in the testing process can be incorporated into the design. The site investigation shall be conducted prior to the development of the Preliminary Plan. The Designer should possess a preliminary understanding of potential BMP locations prior to testing. Prescreening tests may be carried out in advance of siting potential BMP locations.

Who Should Conduct Testing

Qualified professionals who can substantiate, by qualifications and/or experience, their ability to carry out the site evaluation should conduct the test pit soil evaluations. A professional experienced in observing and evaluating soil conditions is necessary to ascertain conditions that might affect BMP performance, which cannot alone be thoroughly assessed with the testing procedures. Such professionals must conduct these evaluations in risk areas, and areas indicated in the Manual as non-preferred locations for testing or BMP implementation.

Importance of Stormwater BMP Areas

Sites are often defined as unsuitable for infiltration BMPs and soil based BMPs due to proposed grade changes (excessive cut or fill) or lack of suitable areas. Many sites will be constrained and unsuitable for infiltration BMPs. However, if suitable areas exist, these areas should be identified early in the design process and should not be subject to a building program that precludes infiltration BMPs. An exemption will not be permitted for development of suitable soils when they can be used for infiltration BMPs.

Safety

As with all field work and testing, attention should be given to all applicable OSHA regulations related to earthwork and excavation. Digging and excavation should never be conducted without adequate notification through the Pennsylvania One Call system (PA OneCall1-800-242-1776 or www.paonecall.org). Excavations shall not be left unsecured and unmarked, and all applicable authorities must be notified prior to any work.

Township Involvement

Onsite soil evaluations and infiltration testing must be witnessed by a representative from the Township Engineer’s office. Notification of testing shall be made 48 hours in advance.

INFILTRATION TESTING: A MULTI-STEP PROCESS

Infiltration testing is a four-step process to obtain the necessary data for the design of site stormwater management facilities. The four steps include:

1. Background Evaluation
 - Prior to field work (desktop)
 - Based on available published and site specific data
 - Includes consideration of proposed development plan
 - Used to identify potential BMP locations and testing locations
2. Test Pit (Deep Hole) Observation
 - Includes multiple testing locations
 - Provides an understanding of sub-surface conditions
 - Identifies soil limiting zones
3. Infiltration Testing
 - Must be conducted on-site
 - Different testing methods permitted
 - Includes multiple testing locations
4. Design Considerations (Chapter 26)
 - Determination of a suitable infiltration rate for design calculations
 - Consideration of BMP drawdown
 - Consideration of peak rate attenuation
 - Method for slowing fast infiltration rates down

Step 1. Background Evaluation

Prior to performing site testing and developing a detailed site plan, existing conditions at the site should be inventoried and mapped including, but not limited to:

- Existing mapped individual soils and USDA Hydrologic Soil Group classifications.
- Existing geology, including the location of any dikes, faults, fracture traces, solution cavities, landslide prone strata, or other features of note.
- Existing streams (perennial and intermittent, including intermittent swales), water bodies, wetlands, hydric soils, floodplains, alluvial soils, stream classifications, headwaters, high quality and exceptional value streams.
- Existing topography, slope, and drainage patterns.
- Existing and previous land uses.
- Other natural or man-made features or conditions that may impact design, such as past uses of the site, existing nearby structures (buildings, walls), etc.

A sketch plan or preliminary layout plan for development should be evaluated, including:

- The preliminary grading plan and areas of cut and fill.
- The location and water surface elevation of all existing water sources and location(s) of proposed water supply sources and wells.
- The location of all existing and proposed on-site sewage disposal systems.
- The location of other features, such as utility rights-of-way, water and sewer lines, etc.
- Existing data such as structural borings, drillings, and geophysical testing.

- The proposed location of development features (buildings, roads, utilities, walls, etc.). In Step 1, the Designer should determine the potential location of infiltration BMPs. The approximate location of these BMPs should be located on the proposed development plan and should serve as the basis for the location and number of tests to be performed on-site.

Important: If the proposed development program is located on areas that may otherwise be suitable for BMP location, or if the proposed grading plan is such that potential BMP locations are eliminated, the designer must revisit the proposed layout and grading plan and adjust the development plan as necessary. Full build-out of areas suitable for infiltration BMPs may not preclude the use of BMPs for volume reduction and groundwater recharge.

Step 2. Test Pits (Deep Holes)

A test pit (deep hole) allows visual observation of the soil horizons and overall soil conditions both horizontally and vertically in that portion of the site. The use of soil borings as a substitute for test pits is not permitted, as visual observation is narrowly limited in a soil boring and the soil horizons cannot be observed in-situ. Borings and other procedures, however, might be suitable for initial screening to develop a preliminary plan for testing, or verification testing.

A test pit consists of a backhoe-excavated trench, 2-1/2 to 3 feet wide, to a depth of 144 inches or less, or until bedrock or fully saturated conditions are encountered. The trench should be benched at a depth of 2-3 feet for access and/or infiltration testing.

At each test pit, the following conditions shall be noted and described. Depth measurements should be described as depth below the ground surface:

- _____ Soil Horizons (upper and lower boundary)
- _____ Soil Texture and Color for each horizon
- _____ Color Patterns (mottling) and observed depth
- _____ Soil Structure
- _____ Soil Consistence
- _____ Estimated Type and Percent Coarse Fragments
- _____ Hardpan or Limiting Layers
- _____ Depth to Water Table
- _____ Depth to Bedrock
- _____ Additional comments or observations

At the designer's discretion, soil samples may be collected at various horizons for additional analysis. Following testing, the test pits should be backfilled with the original soil and the surface replaced with the original topsoil. A test pit should never be accessed if soil conditions are unsuitable for safe entry, or if site constraints preclude entry. OSHA regulations should always be observed.

It is important that the test pit provide information related to conditions at the bottom of the proposed infiltration BMP. Proposed BMP depths of ten (10) feet or greater are discouraged, especially in Karst topography. Except for surface discharge BMPs (filter strips, etc.), the designer is cautioned regarding the proposal of systems that are significantly lower than the existing topography. The suitability for infiltration may decrease, and risk factors are likely to

increase. Locations that are not preferred for site testing and subsurface infiltration BMPs include: existing swales, toe slopes, and soil mantels of less than three feet in Karst topography.

The designer and contractor shall limit grading and earthwork to reduce site disturbance and compaction, so that a greater opportunity exists for testing and stormwater management.

The number of test pits varies depending on site conditions and the proposed development plan. General guidelines are as follows:

- For single-family residential subdivisions with on-lot BMPs, one test pit per lot is recommended, preferably within 25 feet of the proposed BMP area. Verification testing should take place when BMPs are sited at greater distances.
- For multi-family and high density residential developments, one test pit per BMP area or acre is recommended.
- For large infiltration areas (basins, commercial, institutional, industrial, and other proposed land uses), multiple test pits should be evenly distributed at the rate of four (4) to six (6) tests per acre of BMP area.

The recommendations above are guidelines. Additional tests should be conducted if local conditions indicate significant variability in soil types, geology, water table levels, bedrock, topography, etc. Similarly, uniform site conditions may indicate that fewer test pits are necessary. Excessive testing and disturbance of the site prior to construction is not recommended.

Step 3. Infiltration Tests/Permeability Tests

A variety of field tests exist for determining the infiltration capacity of a soil. Laboratory tests are not permitted, as a homogeneous laboratory sample does not represent field conditions. Infiltration tests must be conducted in the field. Tests should not be conducted in the rain or within 24 hours of significant rainfall events (>0.5 inches), or when the temperature is below freezing. However, the preferred testing is during the wet season of January to June. This is the period when infiltration is likely to be diminished by saturated conditions. Percolation tests carried out between June 1 and December 31 should use a 24 hour presoaking before the testing. Presoaking is not required for infiltrometer or permeometer testing

At least one test shall be conducted at the proposed bottom elevation of an infiltration BMP, and a minimum of two tests per test pit is recommended. More tests may be warranted if the results for the first two tests are substantially different. The highest rate (inches/hour) for test results should be discarded when more than two are employed for design purposes. The geometric mean should be used to determine the average rate following multiple tests.

Based on observed field conditions, the proposed bottom elevation of a BMP may be revised. Infiltration testing locations and depths should be modified in the field depending upon observed field conditions.

Methodologies discussed in this protocol include:

- Double-ring infiltrometer tests.
- Percolation tests (as described in PA Code Chapter 73).

There are differences between the two referenced methods. A double-ring infiltrometer test estimates the vertical movement of water through the bottom of the test area. The outer ring helps to reduce the lateral movement of water in the soil. A percolation test allows water

movement through both the bottom and sides of the test area. For this reason, the measured rate of water level drop in a percolation test must be adjusted to represent the discharge that is occurring on both the bottom and sides of the percolation test hole.

For infiltration basins, an infiltration test should be carried out with an infiltrometer (not percolation test) to determine the saturated hydraulic conductivity rate. This precaution is taken to account for the fact that only the surface of the basin functions to infiltrate, as measured by the test. Alternatively, permeability test procedures that yield a saturated hydraulic conductivity rate can be used (see formulas developed by Elrick and Reynolds (1992), or others for computation of hydraulic conductivity and saturated hydraulic conductivity).

Other testing methodologies and standards that are available, but not discussed herein, include but are not limited to:

- Testing as described in the Maryland Stormwater Manual Appendix D.1 using 4-inch diameter casing.
- ASTM 2003 Volume 4.08, Soil and Rock (I): Designation D 3385-03, Standard Test Method for Infiltration Rate of Soils in Field Using a Double-Ring Infiltrometer.
- ASTM 2002 Volume 4.09, Soil and Rock (II): Designation D 5093-90, Standard Test Method for Field Measurement of Infiltration Rate Using a Double-Ring Infiltrometer with a Sealed-Inner Ring.
- Guelph Permeameter
- Constant Head Permeameter (Amoozemeter)

A. Methodology for Double-Ring Infiltrometer Test

A double-ring infiltrometer consists of two concentric metal rings. The rings are driven into the ground and filled with water. The outer ring helps to prevent divergent flow. The drop in water level or volume in the inner ring is used to calculate an infiltration rate. The infiltration rate is determined as the amount of water per surface area and time unit that penetrates the soils. The diameter of the inner ring should be approximately 50% to 70% of the diameter of the outer ring, with a minimum inner ring size of 4-inches, preferably much larger. (Bouwer, 1986).

B. Methodology for Percolation Test

This percolation test methodology is based largely on the Pennsylvania Department of Environmental Protection (PADEP) criteria for on-site sewage investigation of soils (as described in Chapter 73 of the Pennsylvania Code). This should include the 24-hour presoak procedure between June 1 and December 31. The presoak is done primarily to simulate saturated conditions in the environment and to minimize the influence of unsaturated flow. If a presoak procedure is not employed between June 1 and December 31, then the rate reduction formula described by Elrick and Reynolds (1992), or Fritton, et.,al. (1986) must be used to account for the influence of unsaturated conditions in the test.

Infiltration Rate = (Percolation Rate) / (Reduction Factor)

Where the Reduction Factor is given by**:

$$R_f = \frac{2d_I - \Delta d}{DIA} + 1$$

where

d_1	=	Initial Water Depth (in.)
Δd	=	Average/Final Water Level Drop (in.)
DIA	=	Diameter of the Percolation Hole (in.)

The percolation rate is simply divided by the reduction factor as calculated above. In most cases, the reduction factor varies from about 2 to 4 depending on the percolation hole dimensions and water level drop. Wider and shallower tests have lower reduction factors because proportionately less water exfiltrates through the sides.

The Reduction Factor accounts for the exfiltration occurring through the sides of percolation hole. It assumes that the percolation rate is affected by the depth of water in the hole and that the percolating surface of the hole is in uniform soil. If there are significant problems with either of these assumptions then other adjustments may be necessary.

Source: Pennsylvania Stormwater Best Management Practices Manual, December 2006

Step 4. Design Considerations

Refer to Chapter 26, Part 4 for BMP design considerations and parameters.

APPENDIX C

Pervious Hardscaping Credit Criteria

**Pervious Hardscaping System Design and
Impervious Surface Area Credit Criteria**

Applicants for Erosion and Sediment Control and Grading Permit, Subdivision, and Land Development may request approval of an impervious surface area credit for construction of pervious hardscaping systems provided they comply with the design guidelines herein and approval is received from Warminster Township. An impervious surface credit shall only be considered by the Township for driveways, parking areas, and other hardscaping surfaces that are constructed at a slope greater than 1%, but less than 5%.

Numbers shown in the following table are the ratio of hardscaping surface area (proposed) that must be considered "IMPERVIOUS" based on factors such as paver block open void area and the material installed in the voids/openings of these surfaces.

**TABLE 1.0
HARDSCAPING SURFACE AREA THAT MUST BE CONSIDERED IMPERVIOUS SURFACE:**

FILL MATERIAL IN PAVER BLOCK VOIDS	HARDSCAPING MATERIAL				
	PAVER/ OR	→	→	CLEAN STONE STRUCTURAL "GEOWEB" *	
	SURFACE OPEN AREA PERCENTAGE (%)				
	50- 59.99	60- 69.99	70- 79.99	80- 89.99	90-100
SOIL/GRASS	0.67	0.60	0.54	0.45	NOT PERMITTED
CLEAN STONE (no fines) or other CLEAN, NON-ERODIBLE FILL	0.52	0.43	0.33	0.29	0.14

* Driveways and parking areas must either be bituminous paving, stone (residential driveways, only), or some other combination of load bearing paver block backfilled with stone or soil. Geoweb, alone, with earth backfill may not be used for driveways and parking areas; therefore, is not eligible for an impervious surface area credit.

NOTES:

1. An impervious surface area credit, if approved by the Township, will only be valid if a proper sub-base is used and when filter fabric is installed to separate all soil/stone interfaces and clean stone/sand leveling bed surfaces, as more particularly shown on the attached conceptual installation detail.
2. Pervious hardscaping systems with less than 50% open surface void percentage is not eligible for an impervious surface credit and the entire surface of such hardscaping will be considered 100% impervious for the purpose of calculating on-site impervious surface area and stormwater runoff. However, such systems may be considered a "Best Management Practice" if constructed in compliance with the criteria herein.
 - a. Porous bituminous pavement or porous concrete pavement will be considered 90% impervious for the purpose of calculating on-site impervious surface area and stormwater runoff. Porous pavement system(s) will only be considered for credit if a proper sub-base is used and when filter fabric is installed at all soil/stone interfaces.
3. The hardscaping surface area which is intended and approved for impervious credit must be fully protected (by super silt fence) during the entire construction process to prevent compaction of the underlying soils. A note must be added to the plan indicating this requirement.

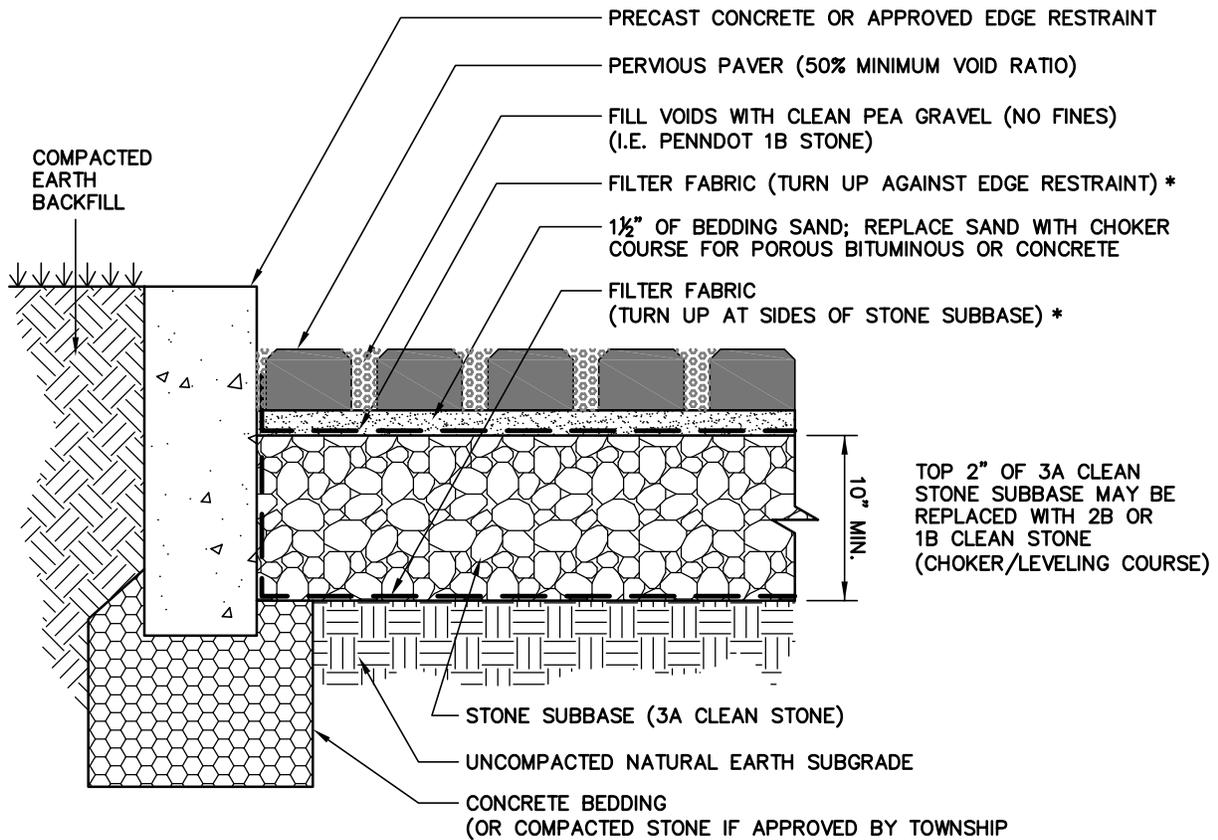
4. The sequence of construction must specify the area of pervious hardscaping may only be constructed upon stabilization of the remainder of the site to prevent sediment from contaminating the surface.
5. General design and construction of these surfaces must conform to the attached construction detail and installation and maintenance procedures for the designated pervious hardscaping system must be identified on the plan.
6. Each request for impervious credit must include the manufacturer, style/product number, surface open area percentage (as identified by the manufacturer), and product data sheets. This information must also be shown on the plan including a notation that hardscaping system may only be modified with the written approval of the Township. No other "paver" block or stone may be substituted for that approved.
7. If the impervious surface credit is approved by the Township, the resulting ("net") total of impervious surface area from the "paver" must be included in the impervious surface tabulation which must also identify the total area of "paver" block and percentage of hardscaping area that must be considered impervious (refer Table 1.0). The calculation of impervious surface area (refer sample herein) must be shown on the plan.
8. All applications for impervious surface area credit shall be reviewed by the Township Engineer for completeness and technical content to satisfy the above requirements and any other applicable Ordinance requirements. Design and installation must be permanent and will be evaluated based on criteria herein, feasibility, effectiveness, and longevity. The Township retains the right to require infiltration testing at pervious paver locations, as well as the right to deny any application due to unforeseen circumstances unique to the site or application. Finally, Construction of the pervious hardscaping system must be inspected by the Township Engineer with advance notice of 48-hours to schedule required inspections.

CALCULATON OF HARDSCAPING SURFACE THAT MUST BE CONSIDERED IMPERVIOUS SURFACE AREA:

Proposed Pervious Hardscaping Surface Area = PHSA
 Ratio of (Hardscaping) surface that must be considered Impervious (from Table 1.0)= RI
 Total of Hardscaping Surface Area that must be considered Impervious = TIHSA = PHSA x RI

Sample calculations:

1. If 1,250 SF of lot area is covered with "Hastings Checkerblock" (70% open area) with voids backfilled with clean stone, the quantity of hardscaping area that must be considered impervious surface area is:
 $1,250 \text{ SF} \times 0.33 \text{ (from Table 1.0)} = 413 \text{ SF} = \text{TIHSA}$
 therefore the "impervious surface credit" would be: $1,250 \text{ SF} - 413 \text{ SF} = 837 \text{ SF}$
2. If 1,436 SF of lot area is covered with "Presto Geoweb" and backfilled with clean stone, the quantity of hardscaping area that must be considered impervious surface is:
 $1,436 \text{ SF} \times (0.14) \text{ (from Table 1.0)} = 201 \text{ SF} = \text{TIHSA}$
 therefore the "impervious surface credit" would be: $1,436 \text{ SF} - 201 \text{ SF} = 1,235 \text{ SF}$
3. If 3,200 SF of lot area is covered by porous bituminous paving, the quantity of hardscaping area that must be considered impervious surface is:
 $3,200 \text{ SF} \times 90\% = 2,880 \text{ SF} = \text{TIHSA}$
 therefore the "impervious surface credit" would be $3,200 \text{ SF} - 2,880 \text{ SF} = 320 \text{ SF}$



NOTES:

1. EDGE RESTRAINT SHOULD BE MINIMUM 6 IN. WIDE FOR STREET APPLICATIONS.
 2. EDGE RESTRAINT MAY BE EVEN WITH TOP OF PAVERS.
 3. SOIL PERCOLATION TESTING, IN ACCORDANCE WITH STORMWATER MANAGEMENT ORDINANCE [CHAPTER 26, PART 4], MAY BE REQUIRED BY TOWNSHIP IF DEEMED NECESSARY.
 4. DEPTH OF STONE SUBBASE SHALL BE DESIGNED BY QUALIFIED PROFESSIONAL ENGINEER IN ACCORDANCE WITH STORMWATER MANAGEMENT ORDINANCE [CHAPTER 26, PART 4].
- * FILTER FABRIC IS REQUIRED AT ALL SOIL/STONE/SAND INTERFACES AND SHALL BE PENNDOT TYPE 1 GEOTEXTILE FABRIC.

DETAIL FOR PERVIOUS PAVEMENT SYSTEM



GILMORE & ASSOCIATES, INC.
ENGINEERING & CONSULTING SERVICES

65 EAST BUTLER AVENUE, SUITE 100
 NEW BRITAIN, PA 18901-5106 • (215) 345-4330
 www.gilmore-assoc.com

TOWNSHIP OF WARMINSTER

SPECIFICATIONS AND DESIGN STANDARDS
 401 GIBSON AVENUE, WARMINSTER, PA 18974

DATE: 07/29/2009

NOT TO SCALE

DETAIL: 012R

APPENDIX D

Low Impact Development

LOW IMPACT DEVELOPMENT PRACTICES

ALTERNATIVE APPROACH FOR MANAGING STORMWATER RUNOFF

Natural hydrologic conditions may be altered radically by poorly planned development practices. Deleterious activities include introducing unneeded impervious surfaces, destroying existing drainage swales, constructing unnecessary storm sewers, and changing local topography. A traditional drainage approach of development has been to remove runoff from a site as quickly as possible and capture it in a detention basin in accordance with the local regulations. This approach leads ultimately to the expenditure of additional resources for detaining and managing concentrated runoff at some downstream locations.

The recommended alternative approach is to promote practices that will minimize postdevelopment runoff rates and volumes, which will minimize needs for artificial conveyance and storage facilities. To simulate predevelopment hydrologic conditions, forced infiltration is often necessary to offset the loss of infiltration by creation of impervious surfaces. The ability of the ground to infiltrate depends upon the soil types and its conditions.

Preserving natural hydrologic conditions requires careful alternative site design considerations. Site design practices include preserving natural drainage features, minimizing impervious surface area, reducing the hydraulic connectivity of impervious surfaces, and protecting natural depression storage. A well designed site will contain a mix of all those features. The following describes various techniques to implement for the alternative approach:

- **Preserving Natural Drainage Features.** Protecting natural drainage features, particularly vegetated drainage swales and channels, is desirable because of their ability to infiltrate and attenuate flows and to filter pollutants, however, this objective is often not accomplished in modern developments. In fact, commonly held drainage philosophy encourages just the opposite pattern. Streets and adjacent storm sewers typically are located in the natural headwater valleys and swales, thereby replacing natural drainage functions with a completely impervious system. Runoff and pollutants generated from impervious surfaces flow directly into storm sewers with no opportunity for attenuation, infiltration or filtration. Developments designed to fit site topography also minimizes the amount of grading onsite.
- **Protecting Natural Depression Storage Areas.** Depression storage areas have no surface outlet or drain very slowly following a storm event. They can be commonly seen as ponded areas in farm fields during the wet season or after large runoff events. Traditional development practices eliminate these depressions by filling or draining, thereby obliterating their ability to reduce the surface runoff volumes and trap pollutants. The volume and release rate characteristics of depressions should be protected in the design of the development site. The depressions can be protected by simply avoiding the depression or by incorporating its storage as additional capacity in required detention facilities.
- **Avoiding Introduction of Impervious Areas.** A careful site planning should consider reducing impervious coverage to the maximum extent possible. Building footprints, sidewalks, driveways, and other features producing impervious surfaces should be evaluated to minimize impacts on runoff.
- **Reducing the Hydraulic Connectivity of Impervious Surfaces.** Impervious surfaces are significantly less of a problem if they are not directly connected to an impervious conveyance system (such as storm sewer). Two basic ways to reduce hydraulic

connectivity are routing of roof runoff over lawns and reducing the use of storm sewers. Site grading should promote increasing travel time of stormwater runoff, and should help reduce concentration of runoff to a single point in the development.

- **Routing Roof Runoff Over Lawns.** Roof runoff can be easily routed over lawns in most site designs. The practice discourages direct connections of downspouts to storm sewers or parking lots. The practice also discourages sloping driveways and parking lots to the street. By routing roof drains and crowning the driveway to run off to the lawn, the lawn is essentially used as a filter strip.
- **Reducing the Use of Storm Sewers.** By reducing use of storm sewers for draining streets, parking lots, and backyards, the potential for accelerating runoff from the development can be greatly reduced. The practice requires greater use of swales and may not be practical for some development sites, especially if there are concerns for areas that do not drain in a "reasonable" time. The practice requires educating local citizens and public works officials, who expect runoff to disappear shortly after a rainfall event.
- **Reducing Street Widths.** Street widths can be reduced by either eliminating on-street parking or by reducing roadway widths. Municipal planners and traffic designers should encourage narrower neighborhood streets which ultimately could lower maintenance.
- **Limiting Sidewalks to One Side of the Street.** A sidewalk on one side of the street may suffice in low-traffic neighborhoods. The lost sidewalk could be replaced with bicycle/recreational trails that follow back-of-lot lines. Where appropriate, backyard trails should be constructed using pervious materials.
- **Using Permeable Paving Materials.** These materials include permeable interlocking concrete paving blocks or porous bituminous concrete. Such materials should be considered as alternatives to conventional pavement surfaces, especially for low use surfaces such as driveways, overflow parking lots, and emergency access roads.
- **Reducing Building Setbacks.** Reducing building setbacks reduces driveway and entry walks and is most readily accomplished along low traffic streets where traffic noise is not a problem.
- **Constructing Cluster Development.** Cluster developments can also reduce the amount of impervious area for a given number of lots. The biggest savings is in street length, which also will reduce costs of the development. Cluster development clusters the construction activity onto less-sensitive areas without substantially affecting the gross density of development.

In summary, a careful consideration of the existing topography and implementation of a combination of the above mentioned techniques may avoid construction of costly stormwater control measures. Other benefits included reduced potential of downstream flooding, water quality degradation of receiving streams/water bodies, and enhancement of aesthetics and reduction of development costs. Beneficial results include more stable base flows in receiving streams, improved groundwater recharge, reduced flood flows, reduced pollutant loads, and reduced costs for conveyance and storage.

(Reference: *Pennsylvania Storm water Best Management Practices Manual, December 2006*)

APPENDIX E

**Stormwater Management Operation
& Maintenance Agreement**

pits, filter strips, bioretention, wet ponds, permeable paving, rain gardens, grassed swales, forested buffers, sand filters and detention basins.

- Infiltration Trench – a BMP surface structure designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer,
- Seepage Pit – an underground BMP structure designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer,
- Rain Garden – a BMP overlain with appropriate mulch and suitable vegetation designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer, and

WHEREAS, the Municipality requires, through the implementation of the Plan, that stormwater management BMPs as required by said Plan and the Municipal Stormwater Management Ordinance be constructed and adequately operated and maintained by the Owner, his successors and assigns, and

NOW, THEREFORE, in consideration of the foregoing promises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The BMPs shall be constructed by the Owner in accordance with the plans and specifications identified in the Plan.
2. The Owner shall operate and maintain the BMPs as shown on the Plan in good working order acceptable to the Municipality and in accordance with the specific maintenance requirements noted on the Plan.
3. The Owner hereby grants permission to the Municipality, its authorized agents and employees, to enter upon the Property, at reasonable times and upon presentation of

proper identification, to inspect the BMPs whenever it deems necessary. Whenever possible, the Municipality shall notify the Owner prior to entering the Property.

4. In the event the Owner fails to operate and maintain the BMPs as shown on the Plan in good working order acceptable to the Municipality, the Municipality or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMPs. This provision shall not be construed to allow the Municipality to erect any permanent structure on the land of the Owner. It is expressly understood and agreed that the Municipality is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the Municipality.
5. In the event the Municipality, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Owner shall reimburse the Municipality for all expenses (direct and indirect) incurred within 10 days of receipt of invoice from the Municipality.
6. The intent and purpose of this Agreement is to ensure the proper maintenance of the onsite BMPs by the Owner: provided, however, that this Agreement shall not be deemed to create or effect any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.
7. The Owner, its executors, administrators, assigns, and other successors in interests, shall release the Municipality's employees and designated representatives from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against said employees and representatives from the construction, presence, existence, or maintenance of the BMPs by the Owner or Municipality. In the event that a claim is asserted against the Municipality, its designated representatives or employees, the Municipality shall promptly notify the Owner and the Owner shall defend, at his own expense, any suit based on the claim. If any judgment or claims against the Municipality's employees or designated representatives shall be allowed, the Owner shall pay all costs and expenses regarding said judgment or claim.

8. The Municipality shall inspect the BMPs at a minimum of once every three years to ensure their continued functioning.

THIS AGREEMENT shall be recorded at the Office of the Recorder of Deeds of Bucks County, Pennsylvania, and shall constitute a covenant running with the Property and/or equitable servitude, and shall be binding on the Owner, his administrators, executors, assigns, heirs and any other successors in interests, in perpetuity.

ATTEST:

WITNESS the following signatures and seals:

For the Municipality:

(SEAL)

By: _____

For the Owner:

(SEAL)

By: _____

ATTEST:

_____ (City, Borough, Township)

County of _____, Pennsylvania

I, _____, a Notary Public in and for the County and State aforesaid, whose commission expires on the _____ day of _____, 20____, do hereby certify that _____ whose name(s) is/are signed to the foregoing Agreement bearing the date of the _____ day of _____, 20____, has acknowledged the same before me in my said County and State.

GIVEN UNDER MY HAND THIS _____ day of _____, 20____.

Notary Public

(seal)

STORMWATER MANAGEMENT SYSTEM
OPERATION AND MAINTENANCE AGREEMENT

SITE NAME

TAX MAP PARCEL NO.

THIS AGREEMENT, made and entered into this day of , by and between owner (hereinafter referred to as “Owner”), and Warminster Township, Bucks County, Pennsylvania (hereinafter referred to as “Municipality”);

WITNESSETH:

WHEREAS, Owner is the owner of record and developer of a certain tract of land containing Bucks County Tax Map Parcel No. (hereinafter referred to as “Property”) in Warminster Township, Bucks County, Pennsylvania; and

WHEREAS, Owner is proceeding to build and develop the Property, and

WHEREAS, the Stormwater Controls and BMP Operations and Maintenance Plan approved by the Municipality (hereinafter referred to as the “Plan”) for the property identified herein, which is attached hereto as Appendix A and made part hereof, as approved by the Municipality, provides for management of stormwater within the confines of the Property through the use of Best Management Practices (BMPs); and

WHEREAS, the Municipality, and the Owner, his successors and assigns, agree that the health, safety, and welfare of the residents of the Municipality and the protection and maintenance of water quality require that on-site stormwater Best Management Practices be constructed and maintained on the Property; and

WHEREAS, for the purposes of this agreement, the following definitions shall apply:

BMP – “Best Management Practice” activities, facilities, designs, measures or procedures used to manage stormwater impacts from land development, to protect and maintain water quality and groundwater recharge and to otherwise meet the purposes of the Municipal Stormwater Management Ordinance, including but not limited to infiltration trenches, seepage

APPENDIX F

**Stormwater Management
Plan Application**

STORMWATER MANAGEMENT PLAN APPLICATION

Application is hereby made for review of the stormwater management and erosion and sediment control plan and related data as submitted herewith in accordance with the Warminster Stormwater Management Ordinance.

Sketch Plan Preliminary Plan Final Plan Grading Plan

Date of Submission _____ Submission No. _____

1. Name of subdivision or development: _____

Location: _____

2. Name of applicant _____ Telephone No. _____ - _____ - _____

(if corporation, list the corporation's name and the names of two officers of the corporation)

Address _____

City _____, State _____ Zip Code _____

Applicant's interest in subdivision or development _____

(If other than property owner, provide owner's name and address)

3. Name of Property Owner _____ Telephone No. _____ - _____ - _____

Address _____

City _____, State _____ Zip Code _____

4. Name of Engineer or Surveyor _____ Telephone No. _____ - _____ - _____

Address _____

City _____, State _____ Zip Code _____

5. Type of subdivision or development proposed:

Single family lots

Townhouses

Commercial (multi-lot)

Two family lots

Garden Apartments

Commercial (one lot)

Cluster lots

Campground

Industrial (one lot)

Planned Residential

Other

If other, describe type of development _____

6. Lineal feet of new road proposed: _____ L.F.

7. Area of proposed and existing impervious area on entire tract:

a. Existing to remain _____ S.F. _____% of property

b. Proposed _____ S.F. _____% of property

8. Stormwater
- a. Does the peak rate of runoff from proposed conditions exceed that flow which occurred for predevelopment conditions for the designated design storm?

 - b. Design storm utilized (on-site conveyance systems) (24 hr.) (check one)
 - No. of Subarea _____
 - Watershed Name _____
 - Other, explain: _____
 - c. Does the submission meet the release rate and/or district criteria for the applicable subarea?

 - d. Number of subareas from the _____ *Watershed Stormwater Management Plan*.
 - e. Type of proposed runoff control _____
 - f. Does the proposed stormwater control criteria meet the requirement/guidelines of the stormwater ordinance? Yes No N/A
If not, what variances/waivers are requested? _____
Reasons _____
 - g. Does the plan meet the requirements of the stormwater ordinance?
 Yes No N/A
If not, what variances/waivers are requested? _____
Reasons _____
 - h. Was SCS Segmental Approach utilized in determining the time of concentration?
 Yes No N/A
If not, explain _____
 - i. What hydrologic method was used in the stormwater computations? _____
 - j. Is a hydraulic routing through the stormwater control structure submitted?

 - k. Is a construction schedule or staging attached? Yes No
 - l. Is a recommended maintenance program attached? Yes No
9. Has an erosion and sediment pollution control (E&S) been submitted to the Bucks County Conservation District? Yes No
Total area of earth disturbance: _____ S.F. (_____ Acres)
10. Wetlands:
- a. Have the wetlands been delineated by someone trained in wetland delineation?
 Yes No N/A
 - b. Have the wetland lines been verified by a state or federal permitting authority?
 Yes No N/A

- c. Have the wetland lines been surveyed? Yes No N/A
- d. Total acreage of wetland within the property: _____
- e. Total acreage of wetland to be disturbed: _____
- f. Supporting documentation: _____

11. Filing:

- a. Has the required fee been submitted? Yes No N/A
amount \$_____
- b. Has the proposed schedule of construction inspection to be performed by the applicant's engineer been submitted? Yes No N/A
- c. Name of individual who will be making the inspections: _____
- d. General comments about stormwater management at development site: _____

The undersigned hereby certifies that, to the best of his knowledge and belief, the information and statements given above and on the stormwater management plan herewith submitted are true and correct.

SIGNATURE OF APPLICANT _____

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**This Information to be completed by the Municipality**

\_\_\_\_\_ Township official submission receipt

Date complete application received: \_\_\_\_\_ Plan Number \_\_\_\_\_

Fees \_\_\_\_\_ Date fees paid \_\_\_\_\_ received by \_\_\_\_\_

Official submission receipt date \_\_\_\_\_

Received by \_\_\_\_\_