Chapter 23

Stormwater Management

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Part 1

Schuylkill River Watershed Stormwater Management Ordinance

A. General Provisions

§23-101. Short Title.

This Part shall be known and may be cited as the “Schuylkill River Watershed Stormwater Management Ordinance, Township of Douglass, Berks County.”

(Ord. 2008-1, 4/1/2008, §101)


The Board of Supervisors of the Township of Douglass finds that:

A. Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of existing streams and storm sewers, greatly increases the cost of public facilities to convey and manage stormwater, undermines floodplain management and flood reduction efforts in upstream and 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 streambeds 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, is fundamental to the public health, safety, welfare, and the protection of the people of the Township of Douglass and all the people of the Commonwealth, their resources, and the environment.

D. Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed poses a threat to surface and groundwater quality.

E. Stormwater can be an important water resource by providing groundwater recharge for water supplies and baseflow of streams, which also protects and maintains surface water quality.

F. 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, minimizing impervious surfaces and sprawl, avoiding sensitive areas (i.e., stream buffers, floodplains, steep slopes), and
designing to topography and soils to maintain the natural hydrologic regime.

G. Public education on the control of pollution from stormwater is an essential component in successfully addressing stormwater.

H. Federal and State regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).

I. Nonstormwater discharges to Township separate storm sewer systems can contribute to pollution of waters of the Commonwealth by the Township of Douglass.

(Ord. 2008-1, 4/1/2008, §102)

§23-103. Purpose.

The purpose of this Part is to promote the public health, safety, and welfare within the Schuylkill River Watershed by maintaining the natural hydrologic regime by minimizing the impacts described in §23-102 of this Part through provisions designed to:

A. Promote alternative project designs and layout that minimizes impacts to surface and groundwater.

B. Promote nonstructural best management practices (BMPs).

C. Minimize increases in stormwater volume.

D. Minimize impervious surfaces.

E. Manage accelerated runoff and erosion and sedimentation problems 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 the existing natural drainage systems.

H. Manage stormwater impacts close to the runoff source, which requires a minimum of structures and relies 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, where possible.

K. Meet legal water quality requirements under State law, including regulations at 25 Pa.Code §93.4a to protect and maintain “existing uses” and maintain the level of water quality to support those uses in all streams, and to protect and maintain water quality in “special protection” streams.

L. Address the quality and quantity of stormwater discharges from the development site.

M. Provide a mechanism to identify controls necessary to meet the NPDES permit requirements.

N. Implement an illegal discharge detection and elimination program to
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address nonstormwater discharges into the Township of Douglass’s separate storm sewer system.

O. Preserve and restore the flood-carrying capacity of streams.

P. Prevent scour and erosion of streambanks 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 Township of Douglass.

S. NPDS Requirements. Federal regulations approved October 1999 require operators of small municipal separate storm sewer systems (MS4s) to obtain NPDES Phase II permits from DEP by March 2003. (NPDES II is an acronym for the National Pollutant Discharge Elimination System Phase II Stormwater Permitting Regulations.) This program affects all municipalities in “urbanized areas” of the State. This definition applies to all Schuylkill River watershed municipalities identified in Table III-1 of the Schuylkill River Stormwater Management Plan Volume II as NPDES Phase II municipalities. Therefore, these identified municipalities will be subject to the NPDES Phase II requirements mandated by the Federal Clean Water Act as administered by DEP. For more information on NPDES II requirements, contact the DEP Regional Office.

(Ord. 2008-1, 4/1/2008, §103)

§23-104 Statutory Authority.

1. Primary Authority. The Township of Douglass is empowered to regulate these activities by the authority of the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. §680.1 et seq., as amended, the “Storm Water Management Act.”

2. Secondary Authority. The Township of Douglass also is empowered to regulate land use activities that affect runoff by the authority of the Act of July 31, 1968, P.L. 805, No. 247, the Pennsylvania Municipalities Planning Code, 53 P.S. §10101 et seq., as amended.

(Ord. 2008-1, 4/1/2008, §104)

§23-105 Applicability/Regulated Activities.

1. This Part shall apply to all areas of the Township of Douglass within the Schuylkill River watershed. All regulated activities and all activities that may affect stormwater runoff, including land development and earth disturbance activity, are subject to regulation by this Part.

2. A portion of the Township of Douglass is located within the Swamp Creek watershed. A separate Township ordinance has been prepared for regulated activities within the Swamp Creek watershed.

3. Act 167 watershed mapping and stormwater management districts identified herein have been developed specifically for the portions of the Township of Douglass draining to tributaries to the Schuylkill River in Berks County (see Appendix 23-1-D). This Part also applies to unclassified watersheds of the Township of Douglass, which are also tributaries of the Schuylkill River, but do not join the Schuylkill River within
the Berks County limits, shown as “white,” or unmapped on the map in Appendix 23-1- D. At such time that additional Act 167 plans are developed for these non-Berks County tributaries, ordinances adopted wider those plans shall take precedence over this Part for the unclassified areas.

(Ord. 2008-1, 4/1/2008, §105)

§23-106. Compatibility with Other Ordinance Requirements.

Approvals issued and actions taken under this Part do not relieve the applicant of the responsibility to secure required permits or approvals for activities by any other code, law, regulation or ordinance.

(Ord. 2008-1, 4/1/2008, §108)
B. Definitions

§23-111. Interpretation.

For the purposes of this Part, certain terms and words used herein shall be interpreted as follows:

A. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.

B. The word “includes” or “including” shall not limit the term to the specific example, but is intended to extend its meaning to all other instances of like kind and character.

C. The word “person” includes an individual, firm, association, organization, partnership, trust, company, corporation, unit of government, or any other similar entity.

D. The words “shall” and “must” are mandatory; the words “may” and “should” are permissive.

E. The words “used or occupied” include the words “intended, designed, maintained, or arranged to be used, occupied or maintained.”

(Ord. 2008-1, 4/1/2008, §201)


Accelerated erosion—the removal of the surface of the land through the combined action of man’s activity and the natural processes of a rate greater than would occur because of the natural process alone.

Agricultural activities—the work of producing crops and raising livestock including tillage, plowing, disking, harrowing, pasturing and installation of conservation measures. For purposes of regulation by this Part, construction of new buildings or impervious area is not considered an agricultural activity.

Alteration—as applied to land, a change in topography as a result of the moving of soil and rock from one location or position to another; also, the changing of surface conditions by causing the surface to be more or less impervious; land disturbance.

As-built drawings—those maintained by the contractor as he constructs the project and upon which he documents the actual locations of the building components and changes to the original contract documents. These, or a copy of same, are turned over to the Engineer at the completion of the project.

Applicant—a person who has filed an application for approval to engage in any regulated activities as defined in §23-105 of this Part.

Bankfull—the channel at the top-of-bank or point where water begins to overflow onto a floodplain.

Base flow—portion of stream discharge derived from groundwater; the sustained discharge that does not result from direct runoff or from water diversions, reservoir releases, piped discharges, or other human activities.

Bioretention—a stormwater retention area which utilizes woody and herbaceous
plants and soils to remove pollutants before infiltration occurs.

BMP (best management practice)—methods, measures or practices to prevent or reduce surface runoff and/or water pollution including, but not limited to, structural and non-structural stormwater management practices and operation and maintenance procedures. See also “non-structural best management practice (BMP).”

Board of Supervisors—the Board of Supervisors of the Township of Douglass, Berks County, Pennsylvania.

Buffer—the area of land immediately adjacent to any stream, measured perpendicular to and horizontally from the top-of-bank on both sides of a stream. (See “top-of-bank.”)

Channel—a drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and man-made drainage ways, swales, streams, ditches, canals, and pipes flowing partly full.

Channel erosion—the widening, deepening, and headward cutting of small channels and waterways, caused by stormwater runoff or bankfull flows.

Cistern—an underground reservoir or tank for storing rainwater.

Conservation District—the Berks County Conservation District.

Culvert—a structure with appurtenant works, which carries water under or through an embankment or fill.

Dam—an artificial barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water or another fluid or semifluid, or a refuse bank, fill or structure for highway, railroad or other purposes which does or may impound water or another fluid or semifluid.

Department—the Pennsylvania Department of Environmental Protection.

Designee—the agent of the Berks County Planning Commission, Berks County Conservation District and/or agent of the Board of Supervisors involved with the administration, review or enforcement of any provisions of this Part by contract or memorandum of understanding.

Design professional (qualified)—any person licensed by the Pennsylvania Department of State or otherwise qualified by law to perform the work required by this Part.

Design storm—the magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g., a 5-year storm) and duration (e.g., 24-hours), used in the design and evaluation of stormwater management systems.


Detention basin—an impoundment designed to collect and retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. Detention basins are designed to drain completely shortly after any given rainfall event and are dry until the next rainfall event.
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Developer—A person that seeks to undertake any regulated activities at a project site in the Township of Douglass.

Development—Any human-induced change to improved or unimproved real estate, whether public or private including, but not limited to, land development, construction, installation, or expansion of a building or other structure, land division, street construction, drilling, and site alteration such as embankments, dredging, grubbing, grading, paving, parking or storage facilities, excavation, filling, stockpiling, or clearing. As used in this Part, development encompasses both new development and redevelopment.

Development site—the specific tract of land where any regulated activities in the Township of Douglass are planned, conducted or maintained.

Diffused drainage discharge—Drainage discharge not confined to a single point location or channel, such as sheet flow or shallow concentrated flow.

Discharge—(1) (verb) To release water from a project, site, aquifer, drainage basin or other point of interest. (2) (noun) The rate and volume of flow of water such as in a stream, generally expressed in cubic feet per second (volume per unit of time). See also “peak discharge.”

Discharge point—the point of discharge for a stormwater facility.

Disturbed areas—Unstabilized land area where an earth disturbance activity is occurring or has occurred.

Ditch—an artificial waterway for irrigation or stormwater conveyance.

Downslope property line—that portion of the property line of the lot, tract, or parcels of land being developed located such that overland or pipe flow from the site would be directed towards it.

Drainage conveyance facility—a stormwater management facility designed to transmit stormwater runoff and shall include channels, swales, pipes, conduits, culverts, storm sewers, etc.

Drainage easement—a right granted by a landowner to a grantee, allowing the use of private land for stormwater management purposes.

Drainage permit—a permit issued by the Board of Supervisors after the drainage plan has been approved.

Drainage plan—the documentation of the stormwater management system, if any, to be used for a given development site, the contents of which are established in §23-403.

Earth disturbance activity—a construction or other human activity which disturbance the surface of land including, but not limited to, clearing and grubbing, grading, excavations, embankments, land development, agricultural plowing or tilling, timber harvesting activities, road maintenance activities, mineral extraction, and the moving, depositing, stockpiling, or storing of soil, rock or earth materials.

Emergency spillway—a conveyance area that is used to pass peak discharge greater than the maximum design storm controlled by the stormwater facility.

Encroachment—a structure or activity that changes, expands or diminishes the course, current or cross-section of a watercourse, floodway or body of water.

Erosion—the process by which the surface of the land, including channels, is worn
away by water, wind, or chemical action.

*Erosion and sediment control plan*—a plan for a project site which identifies BMPs to minimize accelerated erosion and sedimentation.

*Exceptional value waters*—surface waters of high quality which satisfy 25 Pa.Code, Chapter 93, “Water Quality Standards,” §93.4b(b) (relating to antidegradation).

*Existing conditions*—the initial condition of a project site prior to the proposed alteration. If the initial condition of the site is undeveloped land, the land use shall be considered as “meadow” unless the natural land cover is proven to generate lower curve numbers or Rational “C” value, such as forested lands.

*Flood*—a temporary condition of partial or complete inundation of land areas from the overflow of streams, rivers, and other waters of this Commonwealth.

*Floodplain*—any land area susceptible to inundation by water from any natural source or delineated by applicable Department of Housing and Urban Development, Federal Insurance Administration Flood Hazard Boundary—Mapped as being a special flood hazard area.

*Floodway*—the channel of the watercourse and those portions of the adjoining floodplains, which are reasonably required to carry and discharge the 100-year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the 100-year frequency floodway, it is assumed—absent evidence to the contrary—that the floodway extends from the stream to 50 feet from the top-of-bank.

*Fluvial geomorphology*—the study of landforms associated with river channels and the processes that form them.

*Forest management/timber operations*—planning and activities necessary for the management of forest land with no change of land use proposed. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting and reforestation.

*Freeboard*—a vertical distance between the elevation of the design high-water and the top of a dam, levee, tank, basin, swale, or diversion berm. The space is required as a safety margin in a pond or basin.

*Grade*—a slope, usually of a road, channel or natural ground specified in percent and shown on plans as specified herein. *(To) Grade*—to finish the surface of a roadbed, top of embankment or bottom of excavation.

*Grassed waterway*—a natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to convey surface water.

*Groundwater*—water beneath the earth’s surface, often between saturated soil and rock that supplies wells and springs.

*Groundwater recharge*—replenishment of existing natural underground water supplies without degrading groundwater quality.

*HEC-HMS*—the U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC)-Hydrologic Modeling System (HMS). This model was used to model the Schuylkill River watershed during the Act 167 plan development and was the basis for the standards and criteria of this Part.
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High quality waters—surface waters having quality which exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water by satisfying Pennsylvania Code, Title 25, “Environmental Protection,” Chapter 93, “Water Quality Standards,” §93.4b(a).

Hotspots—areas where land use or activities generate highly contaminated runoff, with concentrations of pollutants in excess of those typically found in stormwater.

Hydrograph—a graph of discharge versus time for a selected point in the drainage system.

Hydrologic regime (natural)—the hydrologic cycle or balance that sustains quality and quantity of stormwater, baseflow, storage, and groundwater supplies under natural conditions.

Hydrologic soil group—a classification of soils by the Natural Resources Conservation Service, formerly the Soil Conservation Service, into four runoff potential groups. The groups range from A soils, which are very permeable and produce little runoff, to D soils, which are not very permeable and produce much more runoff.

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 gravel or crushed stone shall be assumed to be impervious surfaces.

Impoundment—a retention or detention basin designed to retain stormwater runoff and release it at a controlled rate.

Infill—development that occurs on smaller parcels that remain undeveloped but are within or very close proximity to urban areas. The development relies on existing infrastructure and does not require an extension of water, sewer or other public utilities.

Infiltration—movement of surface water into the soil, where it is absorbed by plant roots, evaporated into the atmosphere, or percolates downward to recharge groundwater.

Infiltration structures—a structure designed to direct runoff into the underground water (e.g., french drains, seepage pits, seepage trench).

Inlet—the upstream end of any structure through which water may flow.

Intermittent stream—a stream that flows only part of the time. Flow generally occurs for several weeks or months in response to seasonal precipitation, due to groundwater discharge.

Land development—any of the following activities:

A. The improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving:

   (1) A group of two 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.

   (2) The division or allocation of land or space, whether initially or cumulatively, between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups, or other features.
(3) A subdivision of land.

(4) Development in accordance with §503(1.1) of the Pennsylvania Municipalities Planning Code, 53 P.S. §10503(1.1).

**Limiting zone**—a soil horizon or condition in the soil profile or underlying strata which includes one of the following:

A. A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil mottling.

B. A rock with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments.

C. A rock formation, other stratum or soil condition which is so slowly permeable that it effectively limits downward passage of water.

**Lot**—a designated parcel, tract or area of land established by a plat or otherwise as permitted by law and to be used, developed or built upon as a unit.

**Main stem (main channel)**—any stream segment or other runoff conveyance facility used as a reach in the Schuylkill River hydrologic model.

**Manning equation (Manning formula)**—a method for calculation of velocity of flow (e.g., feet per second) and flow rate (e.g., cubic feet per second) in open channels based upon channel shape, roughness, depth of flow and slope. “Open channels” may include closed conduits so long as the flow is not under pressure.

**Natural condition**—existing conditions.

**Natural hydrologic regime**—see “hydrologic regime.”

**Natural recharge area**—undisturbed surface area or depression where stormwater collects, and a portion of which infiltrates and replenishes the underground and groundwater.

**Nonpoint source pollution**—pollution that enters a water body from diffuse origins in the watershed and does not result from discernible, confined, or discrete conveyances.

**Nonstormwater discharges**—water flowing in stormwater collection facilities, such as pipes or swales, which is not the result of a rainfall event or snowmelt.

**Nonstructural best management practice (BMPs)**—methods of controlling stormwater runoff quantity and quality, such as innovative site planning, impervious area and grading reduction, protection of natural depression areas, temporary ponding on site and other techniques.

**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.

**NRCS**—Natural Resource Conservation Service (previously SCS).

**Outfall**—“point source” as described in 40 CFR §122.2 at the point where the Township of Douglass’s storm sewer system discharges to surface waters of the Commonwealth.

**Outlet**—points of water disposal to a stream, river, lake, tidewater or artificial drain.

**Parent tract**—the parcel of land from which a land development or subdivision originates, determined from the date of Township adoption of this Part.
Parking lot storage—Involves the use of parking areas as temporary impoundments with controlled release rates during rainstorms.

Peak discharge—the maximum rate of stormwater runoff from a specific storm event.

Penn State runoff model—the computer-based hydrologic model developed at the Pennsylvania State University.

Pipe—a culvert, closed conduit, or similar structure (including appurtenances) that conveys stormwater.

Planning Commission—the Planning Commission of the Township of Douglass.

Point source—any discernible, 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.

Post construction—Period after construction where disturbed areas are stabilized, stormwater controls are in place and functioning and all proposed improvements in the approved land development plan are completed.

Pretreatment—Techniques employed in stormwater BMPs to provide storage or filtering to trap coarse materials and other pollutants before they enter the system, but not necessarily meet the water quality volume requirements of §23-126.

Project site—the specific area of land where any regulated earth disturbance activities in the Township of Douglass are planned, conducted or maintained.

Rational formula—a rainfall-runoff relation used to estimate peak flow.

Recharge—the replenishment of groundwater through the infiltration of rainfall, other surface waters, or land application of water or treated wastewater.

Reconstruction—Demolition of, and subsequent rebuilding of impervious surface.

Record drawings—Original documents revised to suit the as-built conditions and subsequently provided by the engineer to the client. The engineer takes the contractor’s as-builts, reviews them in detail with his/her own records for completeness, then either turns these over to the client or transfers the information to a set of reproducibles, in both cases for the client’s permanent records.

Redevelopment—the demolition, construction, reconstruction, alteration, or improvement exceeding 2,000 square feet of land disturbance performed on sites where existing land use is commercial, industrial, institutional, or multi-family residential. Maintenance activities such as top-layer grinding and re-paving are not considered to be redevelopment. Interior remodeling projects and tenant improvements are also not considered to be redevelopment. Utility trenches in streets are not considered redevelopment unless more than 50 percent of the street width is removed and repaved.

Regulated activities—Any actions or proposed actions that involve the alteration or development of land in a manner that may affect stormwater runoff.

Regulated earth disturbance activity—Activity involving earth disturbance subject to regulation under 25 Pa.Code, Chapter 92, Chapter 102, or the Clean Streams Law.

Release rate—the percentage of existing conditions peak rate of runoff from a site or subarea to which the proposed conditions peak rate of runoff must be reduced to protect downstream areas.
Re-paving—replacement of the impervious surface that does not involve reconstruction of an existing paved (impervious) surface.

Replacement paving—reconstruction of and full replacement of an existing paved (impervious) surface.

Retention basin—a structure in which stormwater is stored and not released during the storm event. Retention basins do not typically have an outlet to other downstream conveyance features such as channels, storm sewer, or other surface waters. Generally, these features empty via recharge and must infiltrate stored water in no more than 4 days. These features may have an emergency spillway or other overflow device for large events.

Return period—the average interval, in years, within which a storm event of a given magnitude can be expected to recur. For example, the 25-year return period rainfall would be expected to recur on the average of once every 25 years.

Riser—a vertical pipe extending from the bottom of a pond that is used to control the discharge rate from the pond for a specified design storm.

Road maintenance—earth disturbance activities within the existing road cross-section, such as grading and repairing existing unpaved road surfaces, cutting road banks, cleaning or clearing drainage ditches and other similar activities.

Roof drains—a drainage conduit or pipe that collects water runoff from a roof and leads it away from the structure.

Roof top detention—temporary ponding and gradual release of stormwater falling directly onto flat roof surfaces by incorporating controlled-flow roof drains into building designs.

Runoff—any part of precipitation that flows over the land surface.

SALDO—Subdivision and Land Development Ordinance [Chapter 22].

Sediment basin—a barrier, dam, retention or detention basin located and designed to retain rock, sand, gravel, silt, or other material transported by water during construction.

Sediment pollution—the placement, discharge or any other introduction of sediment into the waters of the Commonwealth.

Sedimentation—the process by which mineral or organic matter is accumulated or deposited by the movement of water or air.

Seepage pit/seepage trench—an area of excavated earth filled with loose stone or similar coarse material, into which surface water is directed for infiltration into the underground water.

Separate storm sewer system—a conveyance or system of conveyances (including roads with drainage systems, Township streets, catch basins, curbs, gutters, ditches, man-made channels or storm drains) primarily used for collecting and conveying stormwater runoff.

Shallow concentrated flow—stormwater runoff flowing in shallow, defined ruts prior to entering a defined channel or waterway.

Sheet flow—a flow process associated with broad, shallow water movement on sloping ground surfaces that is not channelized or concentrated.

Soil-cover complex method—a method of runoff computation developed by the NRCS
that is based on relating soil type and land use/cover to a runoff parameter called “curve number” (CN).

Source water protection areas (SWPA)—the zone through which contaminants, if present, are likely to migrate and reach a drinking water well or surface water intake.

Special geologic features—carbonate bedrock features including, but not limited to, closed depressions, existing sinkholes, fracture traces, lineaments, joints, faults, caves and pinnacles, which may exist and must be identified on a site when stormwater management BMPs are being considered.

Special protection subwatersheds—watersheds for which the receiving waters are exceptional value (EV) or high quality (HQ) waters.

Spillway—a conveyance that is used to pass the peak discharge of the maximum design storm controlled by the stormwater facility.

State water quality requirements—the regulatory requirements to protect, maintain, reclaim, and restore water quality under Pennsylvania Code, Title 25, and the Clean Streams Law.

Storage indication method—a reservoir routing procedure based on solution of the continuity equation (inflow minus outflow equals the change in storage) with outflow defined as a function of storage volume and depth.

Storm frequency—the number of times that a given storm “event” occurs or is exceeded on the average in a stated period of years. See “return period.”

Storm sewer—a system of pipes and/or open channels that convey intercepted runoff and stormwater from other sources, but excludes domestic sewage and industrial wastes.

Stormwater—the surface runoff generated by precipitation reaching the ground surface.

Stormwater management district—those subareas in which some type of detention is required to meet the plan requirements and the goals of Act 167.

Stormwater management facility—any structure, natural or man-made, that, due to its condition, design, or construction, conveys, stores, or otherwise affects stormwater runoff quality, rate or quantity. Typical stormwater management facilities include, but are not limited to, detention and retention basins, open channels, storm sewers, pipes, and infiltration structures.

Stormwater Management Plan—the plan for managing those land use activities that will influence stormwater runoff quality and quantity and that would impact the tributaries to the Schuylkill River Watershed adopted by Berks County as required by the Act of October 4, 1978, P.L. 864, (Act 167), and known as the “Tributaries to the Schuylkill River in Berks County Act 167 Stormwater Management Plan.”

Stormwater management site plan—the plan prepared by the applicant or his representative indicating how stormwater runoff will be managed at the particular site of interest according to this Part.

Stream—a natural watercourse.

Stream buffer—the land area adjacent to each side of a stream, essential to maintaining water quality. (See “buffer.”)

Stream enclosure—a bridge, culvert or other structure in excess of 100 feet in length
upstream to downstream which encloses a regulated water of this Commonwealth.

Subarea (subwatershed)—the smallest drainage unit of a watershed for which stormwater management criteria have been established in the Stormwater Management Plan.

Subdivision—the division or redivision of a lot, tract, or parcel of land by any means into two 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, partition by the court for distribution to heirs or devisees, transfer of ownership, or building or lot development: Provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than 10 acres, not involving any new street or easement of access or any residential dwelling, shall be exempted.

Surface waters of the Commonwealth—any and all rivers, streams, creeks, rivulets, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.

Swale—a low lying stretch of land which gathers or carries surface water runoff.

Timber operations—see “forest management.”

Time of concentration (Tc)—the time for surface runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. This time is the combined total of overland flow time and flow time in pipes or channels, if any.

Top-of-bank—highest point of elevation in a stream channel cross section at which a rising water level just begins to flow out of the channel and over the floodplain.

Township—the Township of Douglass, Berks County, Pennsylvania.

Township Engineer—a professional engineer licensed as such in the Commonwealth of Pennsylvania, duly appointed as the Engineer for the Township of Douglass, planning agency or joint planning commission.

Vernal pond—seasonal depressional wetlands that are covered by shallow water for variable periods from winter to spring, but may be completely dry for most of the summer and fall.

Watercourse—a channel or conveyance of surface water having defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

Waters of the Commonwealth—any and all rivers, streams, creeks, rivulets, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.

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

Wellhead—(1) a structure built over a well; (2) the source of water for a well.

Wellhead protection area—the surface and subsurface area surrounding a water supply well, well field, spring or infiltration gallery supplying a public water system, through which contaminants are reasonably likely to move toward and reach the water source.
Wet basin—pond for urban runoff management that is designed to detain urban runoff and always contains water.

Wetland—those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, fens, and similar areas.

(Ord. 2008-1, 4/1/2008, §202)
C. Stormwater Management

§23-121. General Requirements.

1. Applicants proposing regulated activities in Schuylkill River Watershed which do not fall under the exemption criteria shown in §23-142 shall submit a drainage plan consistent with the Schuylkill River Watershed Stormwater Management Plan to the Township of Douglass for review. These criteria shall apply to the total proposed development even if development is to take place in stages.

2. The applicant is required to evaluate practicable alternatives to the surface discharge of stormwater, the creation of impervious surfaces and the degradation of waters of the Commonwealth, and must maintain as much as possible the natural hydrologic regime.

3. The drainage plan must be designed consistent with the sequencing provisions of §23-124 to ensure maintenance of the natural hydrologic regime and to promote groundwater recharge and protect groundwater and surface water quality and quantity. The drainage plan designer must proceed sequentially in accordance with this Part 1C.

4. Existing points of concentrated drainage that discharge onto adjacent property shall not be altered in any manner which could cause property damage without permission of the affected property owner(s) and shall be subject to any applicable discharge criteria specified in this Part.

5. Areas of existing diffused drainage discharge shall be subject to any applicable discharge criteria in the general direction of existing discharge, whether proposed to be concentrated or maintained as diffused drainage areas, except as otherwise provided by this Part. If diffused drainage discharge is proposed to be concentrated and discharged onto adjacent property, the applicant must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge, or otherwise prove that no erosion, sedimentation, flooding or other impacts will result from the concentrated discharge.

6. Where a development site is traversed by existing watercourses, drainage easements shall be provided conforming to the line of such watercourses. The terms of the easement shall conform to the stream buffer requirements contained in §23-126.D.

7. Any stormwater management facilities regulated by this Part that would be located in or adjacent to waters of the Commonwealth or wetlands shall be subject to approval by Pennsylvania DEP through the joint permit application process, or, where deemed appropriate by Pennsylvania DEP, the general permit process. When there is a question whether wetlands may be involved, it is the responsibility of the applicant or his agent to show that the land in question cannot be classified as wetlands, otherwise approval to work in the area must be obtained from Pennsylvania DEP.

8. Any alteration that affects stormwater flow directly or indirectly toward a PennDOT facility shall be subject to PennDOT regulations.

9. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc., are encouraged, where soil conditions permit, to reduce the size or eliminate the need for detention facilities or other structural BMPs.

10. Roof drains shall not be connected to impervious surfaces in order to promote overland flow and infiltration/percolation of stormwater where advantageous to do so.
§23-121. Township of Douglass

When site conditions preclude infiltration/percolation, then it shall be permitted on a case by case basis by the Township of Douglass.

11. All stormwater runoff shall be treated for water quality.

12. Transference of runoff to or from an EV/HQ watershed is prohibited unless otherwise authorized by DEP, DRBC or SRBC.

(Ord. 2008-1, 4/1/2008, §301)

§23-122. Permit Requirements by Other Government Entities.

Permits must be obtained for all relevant regulated activities, in compliance with any and all applicable local, County, State and Federal regulations.

(Ord. 2008-1, 4/1/2008, §302)

§23-123. Erosion and Sediment Control During Regulated Earth Disturbance Activities.

1. No regulated earth disturbance activities within the Township of Douglass shall commence until the Township of Douglass receives an approval from the Berks County Conservation District of an erosion and sediment control plan for construction activities.

2. 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).

3. In addition, under 25 Pa.Code, Chapter 92, a DEP “NPDES construction activities” permit is required for regulated earth disturbance activities. Evidence of any necessary permit(s) for regulated earth disturbance activities from the appropriate DEP regional office or Berks County Conservation District must be provided to the Township of Douglass. The issuance of an NPDES construction permit (or permit coverage under the Statewide General Permit (PAG-2) satisfies the requirements subsection .1.

4. A copy of the erosion and sediment control plan and any required permit, as required by DEP regulations, shall be available at the project site at all times.

5. Additional erosion and sediment control design standards and criteria are recommended to be applied where infiltration BMPs are proposed 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.

   B. Infiltration BMPs shall not be constructed nor receive runoff until the entire contributory drainage area to the infiltration BMP has achieved final stabilization.

(Ord. 2008-1, 4/1/2008, §303)


1. For projects disturbing 1 acre or more, the design of all regulated activities shall include evaluation of practicable alternatives to the surface discharge of stormwater, the creation of impervious surfaces, and the degradation of waters of the
Commonwealth, and must maintain as much as possible the natural hydrologic regime of the site.

A. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology and logistics in light of overall project purposes, and other Township requirements.

B. All practicable alternatives to the discharge of stormwater are presumed to have less adverse impact on quantity and quality of waters of the Commonwealth unless otherwise demonstrated.

2. The applicant shall demonstrate that they designed the regulated activities that disturb 1 acre or more included consideration of the following issues:

A. Prepare an existing resource and site analysis map (ERSAM), showing environmentally sensitive areas including, but not limited to, steep slopes, ponds, lakes, streams, wetlands, hydric soils, vernal pools, floodplains, stream buffer zones, hydrologic soil groups A and B (areas conducive to infiltration), special geologic features, any existing recharge areas and any other requirements outlined in the Township Subdivision and Land Development Ordinance [Chapter 22].

B. Establish appropriate buffers for each of the delineated environmentally sensitive areas per the Township Zoning Ordinance [Chapter 27] (See §23-126.D for stream buffers and §23-125.2.K for special geologic feature buffers).

C. Prepare a draft project layout avoiding sensitive areas identified in subsection .2.A.

D. Identify site specific existing conditions drainage areas, discharge points, recharge areas and hydrologic soil groups A and B.

E. Evaluate nonstructural stormwater management alternatives.

   (1) Minimize earth disturbance.

   (2) Minimize impervious surfaces.

   (3) Break up large impervious surfaces.

F. Satisfy infiltration objective (§23-125) and provide for stormwater pretreatment prior to infiltration. Pretreatment may not be necessary for rooftop runoff which enters the infiltration facility directly from a roof leader.

G. Satisfy water quality (§23-126) and stream bank erosion protection objective (§23-127).

H. Determine what management district the site falls into (Appendix 23-1-D) and conduct an existing conditions runoff analysis.

I. Prepare final project design to maintain existing conditions drainage areas and discharge points, to minimize earth disturbance and impervious surfaces, and to the maximum extent possible, to ensure the remaining site development has no surface or point discharge.

J. Conduct a proposed conditions runoff analysis based on the final design and to meet the release rate and in turn the overbank flow and extreme event requirements (§23-128).

K. Manage any remaining runoff through treatment prior to discharge, as part of detention, bioretention, direct discharge or other structural control.

1. Maximizing the ground water recharge capacity of the area being developed is required. Design of the infiltration stormwater management facilities shall give consideration to providing ground water recharge to compensate for the reduction in the percolation that occurs when the ground surface is disturbed or impervious surface is created. It is recommended that roof runoff be directed to infiltration BMPs which can be over-designed to compensate for the infiltration losses due to parking areas. It is recommended that roof runoff be directed to infiltration BMPs which may be designed to compensate for the runoff from parking areas. These measures are required to be consistent with §23-103, and take advantage of utilizing any existing recharge areas.

2. Infiltration may not be feasible on every site due to site-specific limitations such as soil type. If it cannot be physically accomplished, due to seasonal high water table, soil permeability rate, soil depth or setback distances from special geologic features, then the design professional shall be responsible to show that this cannot be physically accomplished. If it can be physically accomplished, then the volume of runoff to be infiltrated shall be determined from paragraph .A.3 depending on demonstrated site conditions and shall be the greater of the two volumes.

A. Infiltration BMPs shall meet the following minimum requirements:

   (1) Infiltration Requirements. Regulated activities will be required to infiltrate, where site conditions permit, a portion of the runoff created by the development as part of an overall stormwater management plan designed for the site. The volume of runoff to be infiltrated shall be determined from subparagraphs (3)(a) or (3)(b) depending upon demonstrated site conditions.

   (2) Infiltration BMPs intended to receive runoff from developed areas shall be selected based on suitability of soils and site conditions and shall be constructed on soils that have the following characteristics:

      (a) A minimum depth of 24 inches between the bottom of the BMP and the limiting zone.

      (b) An infiltration and/or percolation rate sufficient to accept the additional stormwater load and drain completely as determined by field tests conducted by the applicant’s design professional.

      (c) The infiltration facility shall be capable of completely infiltrating the required retention (infiltration) volume within 4 days (96 hours).

      (d) Pretreatment shall be provided prior to infiltration.

   (3) The size of the infiltration facility shall be based upon the following volume criteria:

      (a) NRCS Curve Number Equation.

      The NRCS runoff equation shall be utilized to calculate infiltration requirements (I) in inches.

      \[
      I \text{ (Infiltration requirement, in inches)} = \left( \frac{200}{\text{CN}} \right) - 2 \quad \text{Eqn: 23 – 125}
      \]

      Where:
CN = SCS (NRCS) curve number of existing conditions contributing to the infiltration facility.

This equation is displayed graphically in, and the infiltration requirement can be determined from Figure 23-125.

It has been determined that infiltrating 0.46 inches of runoff from the impervious areas will aid in maintaining the hydrologic regime of the watershed. However, the rounded number 0.5 inches will be used.

![Required Infiltration (I) in inches by NRCS CN](image)

**Figure 23-125. Infiltration requirement based upon NRCS Curve Number.**

The retention (infiltration) volume (Re,) required to meet the infiltration requirement would therefore be computed as:

\[ Re_v = (0.5 \text{ or } I, \text{ whichever is greater}) \times \text{impervious area (square feet)} / (12 \text{ in } / \text{ ft}) = \]

Cubic Feet Eqn: 23-125

Where:

I = infiltration requirements (in inches).

(b) Annual Recharge–Water Budget Approach. If the goals of subparagraph (3)(a) cannot be achieved, then 0.5 inches of rainfall shall be infiltrated from all impervious areas, up to an existing site conditions curve number of 81. Above a curve number of 81, Equation 23-125 or the curve in Figure 23-125 should be used to determine the infiltration requirement.
requirement.

The retention (infiltration) volume \((Re_v)\) required again would therefore be computed as:

\[
Re_v = \left(0.5 \text{ or } I, \text{ whichever is greater}\right) \times \text{impervious area (square feet) / (12 in / ft)} = \text{Cubic Feet}
\]

B. Soils. A detailed soils evaluation of the project site shall be required where practicable to determine the suitability of infiltration facilities. The evaluation shall be performed by a qualified design professional, and at a minimum, address soil permeability, depth to bedrock and subgrade stability. The general process for designing the infiltration BMP shall be:

1. Analyze hydrologic soil groups as well as natural and man-made features within the site to determine general areas of suitability for infiltration practices. In areas where development on fill material is under consideration, conduct geo-technical investigations of sub-grade stability; infiltration is not permitted to be ruled out without conducting these tests.

2. Provide field tests such as double ring infiltrometer or hydraulic conductivity tests (at the level of the proposed infiltration surface) to determine the appropriate hydraulic conductivity rate. Percolation tests are not recommended for design purposes.

3. Design the infiltration structure for the required retention \((Re_v)\) volume based on field determined capacity at the level of the proposed infiltration surface.

4. If on-lot infiltration structures are proposed by the applicant’s design professional, it must be demonstrated to the Township of Douglass that the soils are conducive to infiltrate on the lots identified.

C. Carbonate Areas. The applicant is required to investigate the ability of all areas on the site which are not underlain by carbonate rock to meet the infiltration requirements of subsection .2.A. If this investigation proves infeasible, infiltration can occur on areas underlain by carbonate rock by following the recommended procedure below in conjunction with Figure 23-B-1 in Appendix 23-1-B. However, the applicant is not required to use infiltration in carbonate areas even if the site falls into the “recommended” range on Figure 23-B-1 in Appendix 23-1-B. If infiltration is not proposed, the calculated infiltration volume (subsection .2.A) shall be treated by an acceptable BMP.

Infiltration BMP loading rate percentages in Figure 23-B-1 in Appendix 23-1-B shall be calculated as follows:

\[
\left( \frac{\text{Area Tributary to the Infiltration BMP}}{\text{Base Area of the Infiltration BMP}} \right) \times 100\%
\]

The area tributary to the infiltration BMP shall be weighted as follows:
All disturbed area to be made impervious 100%
All disturbed areas to be made pervious 50%
All undisturbed impervious areas 100%
All undisturbed pervious areas 0%

Soil thickness is to be measured from the bottom of any proposed infiltration BMP. The effective soil thickness in Figure 23-B-1 in Appendix 23-1-B is the measured soil thickness multiplied by the thickness factor based on soil permeability, as follows:

<table>
<thead>
<tr>
<th>Permeability Range</th>
<th>Thickness Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0 to 12.0 inches/hr</td>
<td>0.8</td>
</tr>
<tr>
<td>2.0 to 6.0 inches/hr</td>
<td>1.0</td>
</tr>
<tr>
<td>1.0 to 2.0 inches/hr</td>
<td>1.4</td>
</tr>
<tr>
<td>0.75 to 1.0 inches/hr</td>
<td>1.2</td>
</tr>
<tr>
<td>0.5 to 0.75 inches/hr</td>
<td>1.0</td>
</tr>
</tbody>
</table>

The design of all facilities over Karst shall include an evaluation of measures to minimize adverse effects.

D. Stormwater Hotspots.

(1) Following is a list of examples of designated hotspots. If a site is designated as a hotspot, it has important implications for how stormwater is managed. First and foremost, untreated stormwater runoff from hotspots shall not be allowed to recharge into groundwater where it may contaminate water supplies. Therefore, the Re_ requirement shall not be applied to development sites that fit into the hotspot category (the entire WQ_ must still be treated). Second, a greater level of stormwater treatment shall be considered at hotspot sites to prevent pollutant wash-off after construction. EPA’s NPDES stormwater program requires some industrial sites to prepare and implement a stormwater pollution prevention plan.

(a) Examples of Hotspots:

1) Vehicle salvage yards and recycling facilities.
2) Vehicle fueling stations.
3) Vehicle service and maintenance facilities.
4) Vehicle and equipment cleaning facilities.
5) Fleet storage areas (bus, truck, etc.).
6) Industrial sites (based on Standard Industrial Codes).
7) Marinas (service and maintenance).
8) Outdoor liquid container storage.
9) Outdoor loading/unloading facilities.
10) Public works storage areas.
11) Facilities that generate or store hazardous materials.
12) Commercial container nursery.
13) Other land uses and activities as designated by an appropriate review authority.

(b) The following land uses and activities are not normally considered hotspots:

1) Residential streets and rural highways.
2) Residential development.
3) Institutional development.
4) Office developments.
5) Nonindustrial rooftops.
6) Pervious areas, except golf courses and nurseries (which may need an integrated pest management (IPM) plan).

(2) While large highways (average daily traffic volume (ADT) greater than 30,000) are not designated as a stormwater hotspot, it is important to ensure that highway stormwater management plans adequately protect groundwater.

E. Caution shall be exercised where infiltration is proposed in source water protection areas as defined by the Township of Douglass or water authority.

F. Infiltration facilities shall be used in conjunction with other innovative or traditional stormwater control facilities that are found within the Pennsylvania DEP State BMP manual.

G. Caution shall be exercised where salt or chloride (Township salt storage) would be a pollutant since soils do little to filter this pollutant and it may contaminate the groundwater. The qualified design professional shall evaluate the possibility of groundwater contamination from the proposed infiltration facility and perform a hydrogeologic justification study if necessary.

H. The infiltration requirement in high quality or exceptional value waters shall be subject to the Department’s Chapter 93 antidegradation regulations.

I. Dependant upon certain land use or hotspots an impermeable liner will be required in detention basins where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation may be required by the Township of Douglass.

J. The Township of Douglass shall require the applicant to provide safeguards against groundwater contamination for land uses that may cause groundwater contamination should there be a mishap or spill.

K. For projects that disturb 1 acre or more, unless otherwise specified in the Zoning Ordinance [Chapter 27], the following setbacks for infiltration facilities shall apply.

(1) One hundred feet from water supply wells.
(2) Ten feet downslope or 100 feet upslope from building foundations.
(3) Fifty feet from septic system drainfields.
§23-125 Stormwater Management

(4) Fifty feet from a geologic contact with carbonate bedrock, unless a preliminary site investigation is done in the carbonate bedrock to show the absence of special geologic features within 50 feet of the proposed infiltration area.

(5) One hundred feet from the property line unless documentation is provided to show all setbacks from wells, foundations and drainfields on the neighboring property will be met.

(Ord. 2008-1, 4/1/2008, §305)

§23-126. Water Quality Requirements.

The applicant shall comply with the following water quality requirements of this Part 1A:

A. Developed areas shall provide adequate storage and treatment facilities necessary to capture and treat stormwater runoff. The infiltration volume computed under §23-125 may be a component of the water quality volume if the applicant chooses to manage both components in a single facility. If the infiltration volume is less than the water quality volume, the remaining water quality volume may be captured and treated by methods other than infiltration BMPs. The required water quality volume ($WQ_v$) is the storage capacity needed to capture and treat a portion of stormwater runoff from the developed areas of the site.

The following calculation formula is to be used to determine the water quality storage volume, ($WQ_v$), in acre-feet of storage for the Schuylkill River watershed:

$$WQ_v = \left( \frac{P}{R_v} \right) \left( \frac{A}{12} \right)$$

Eqn: 23 - 126

This volume requirement can be accomplished by the permanent volume of a wet basin or the detained volume from other BMPs. Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility). The design of the facility shall provide for protection from clogging and unwanted sedimentation.

B. For areas within defined special protection subwatersheds which include Exceptional Value (EV) and High Quality (HQ) waters, Cold Water Fishery (CWF) the temperature and quality of water and streams shall be maintained.

C. To accomplish the above, the applicant shall use innovative or traditional stormwater control facilities that are found within the Pennsylvania DEP State BMP manual.

D. If a perennial or intermittent stream passes through the site, the applicant
§23-126. Township of Douglass

shall create a stream buffer extending a minimum of 50 feet to either side of the

top-of-bank of the channel. The buffer area shall be maintained with appropriate

native vegetation (Reference to Appendix H of Pennsylvania Handbook of Best

Management Practices for Developing Areas for plant lists). If the applicable rear

or side yard setback is less than 50 feet, the buffer width may be reduced to 25

percent of the setback to a minimum of 10 feet. If an existing buffer is legally

prescribed (i.e., deed, covenant, easement, etc.) and it exceeds the requirements of

this Part, the existing buffer shall be maintained.

E. Evidence of any necessary permit(s) for regulated earth disturbance

activities from the appropriate DEP regional office must be provided to the

Township of Douglass. The issuance of an NPDES construction permit (or permit

coverage under the Statewide general permit) satisfies the requirements of

paragraph .A.

(Ord. 2008-1, 4/1/2008, §306)


1. In addition to control of the water quality volume, in order to minimize the

impact of stormwater runoff on downstream stream bank erosion, the primary

requirement is to design a BMP to detain the proposed conditions 2-year, 24-hour

design storm to the existing conditions 1-year peak flow using the SCS Type II

distribution. Additionally, provisions shall be made (such as adding a small orifice at

the bottom of the outlet structure) so that the proposed conditions 1-year storm takes

a minimum of 24 hours to drain from the facility from a point where the maximum

volume of water from the 1-year storm is captured. (i.e., the maximum water surface

elevation is achieved in the facility). Release of water can begin at the start of the storm

(i.e., the invert of the water quality orifice is at the invert of the facility).

2. The minimum orifice size in the outlet structure to the BMP shall be a 3-inch

diameter orifice and a trash rack shall be installed to prevent clogging. On sites with

small contributing drainage areas to this BMP that do not provide enough runoff

volume to allow a 24-hour attenuation with the 3-inch orifice, the calculations shall be

submitted showing this condition. Orifice sizes less than 3 inches can be utilized

provided that the design will prevent clogging of the intake.

(Ord. 2008-1, 4/1/2008, §307)


1. The Schuylkill River Watershed has been divided into stormwater manage-

dment districts as shown on the Management District Map in Appendix 23-1-D.

In addition to the requirements specified in Table 128-1 below, the groundwater

recharge (§23-125), water quality (§23-126), and stream bank erosion control (§23-127),

requirements shall be implemented.

Standards for managing runoff from each subarea in the Schuylkill River

Watershed for the 2-year through 100-year design storms are shown in Table 128-1.

Development sites located in each of the Districts must control proposed conditions

runoff rates to existing conditions runoff rates for the design storms in accord with

Table 128-1.

Table 128-1–Water Quantity Requirements
<table>
<thead>
<tr>
<th>Management District</th>
<th>Proposed Condition Design Storm</th>
<th>Existing Condition Design Storm</th>
<th>Equivalent Release Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>2-year</td>
<td>1-year</td>
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<tr>
<td></td>
<td>5-year</td>
<td>5-year</td>
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<td>50-year</td>
<td>100%</td>
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<tr>
<td>C*</td>
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<td>1-year</td>
<td>100%</td>
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<tr>
<td>Unclassified</td>
<td>Proposed Condition Design Storm</td>
<td>Existing Condition Design Storm</td>
<td>Equivalent Release Rate</td>
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<td>Township, ex-</td>
<td>10-year</td>
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<td>cluding areas</td>
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<td>within the Swamp</td>
<td>50-year</td>
<td>50-year</td>
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<tr>
<td>Creek Watershed</td>
<td>100-year</td>
<td>100-year</td>
<td></td>
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</tbody>
</table>

*The minimum performance standard for development sites in District C is that stormwater management controls must be provided to limit the post-development peak rate of stormwater runoff to a rate that is equal to or less than the existing peak rate of stormwater runoff. This minimum performance criteria was set through a policy directive of the Pennsylvania Department of Environmental Protection. However, in the previous development of the Act 167 Plan, this district was originally established as a conditional no-detention district such that development sites which could discharge directly to the main channel of the Schuylkill River and its major...
§23-128 Township of Douglass §23-129

tributaries, or indirectly to the main channel through an existing stormwater drainage system (i.e., storm sewer or open channel) could do so without control of the post-development peak rate of runoff.

**The Unclassified Management District includes all areas of the Township of Douglass shown as unmapped, in “white,” on the Watershed Map in Appendix 23-1-D, excluding the Swamp Creek Watershed which is located in the extreme northeast corner of the Township, and is covered by a separately available ordinance for the Swamp Creek Act 167 Plan [Part 2].

All areas, regardless of the release rate, must still meet the requirements of the groundwater recharge criteria (§23-125), water quality criteria (§23-126), and streambank erosion criteria (§23-127).

2. **General.** Proposed condition rates of runoff from any regulated activity shall not exceed the peak release rates of runoff prior to development for the design storms specified on the Stormwater Management District Watershed Map (Appendix 23-1-D) and §23-128, of this Part.

3. **District Boundaries.** The boundaries of the Stormwater Management Districts are shown on an official map that is available for inspection at the Township office. A copy of the official map at a reduced scale is included in the Appendix 23-1-D. The exact location of the Stormwater Management District boundaries as they apply to a given development site shall be determined by mapping the boundaries using the 2-foot topographic contours (or most accurate data required) provided as part of the drainage plan.

4. **Sites Located in More than One District.** For a proposed development site located within two or more stormwater management district category subareas, the peak discharge rate from any subarea shall meet the management district criteria for which the discharge is located, as indicated in §23-128. The calculated peak discharges shall apply regardless of whether the grading plan changes the drainage area by subarea. An exception to the above may be granted if discharges from multiple subareas recombine in proximity to the discharge site. In this case, peak discharge in any direction shall follow Management District A criteria provided that the overall site discharge meets the management district criteria for which the discharge is located.

5. **Off-Site Areas.** Off-site areas that drain through a proposed development site are not subject to release rate criteria when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the development site.

6. **Site Areas.** Where the site area to be impacted by a proposed development activity differs significantly from the total site area, only the proposed impact area utilizing stormwater management measures shall be subject to the management district criteria. In other words, unimpacted areas bypassing the stormwater management facilities would not be subject to the management district criteria.

(Ord. 2008-1, 4/1/2008, §308)

§23-129. **Design Criteria for Stormwater Management and Conveyance BMPs.**

1. Applicants may select a combination of runoff control techniques that are most suitable to control stormwater runoff from the site. All controls shall be subject to approval of the Township of Douglass. The Township Engineer may request specific information on design and/or operating features of the proposed stormwater controls

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in order to determine their suitability and adequacy in terms of the standards of this Section.

2. The applicant shall consider the effect of the proposed stormwater management techniques on any special soil conditions or geological hazards that may exist on the development site. In the event such conditions are identified on the site, the Township Engineer may require in-depth studies by a geo-technical engineer.

3. **Basins and Impoundments.** Any BMP that is a dam, as defined in 25 Pa.Code, Chapter 105, shall be designed according to the requirements in those regulations. Any stormwater BMP that does not constitute a dam under 25 Pa.Code, Chapter 105, but is designed to store runoff and requires a berm or earthen embankment (i.e., detention basin), shall be designed to comply with the following:

   A. Basins with earthen embankments shall be designed with an emergency spillway that has capacity and stability to accommodate the 100-year post-development hydrograph, in a manner that will not damage the integrity of the facility and will not create a downstream hazard emergency spillway design shall assume that all other basin outlets are nonfunctional. Where practical, the emergency spillway shall be constructed in undisturbed ground, and locations in fill should be avoided. Regardless of location, appropriate stabilization measures shall be provided.

   B. The height of the embankment shall be designed to provide a minimum 1.0 foot of freeboard above the maximum elevation computed when the 100-year peak post-development flow passes through the emergency spillway. Embankment heights shall not exceed 15 feet, unless approved by the Township of Douglass.

   C. The minimum top width of earthen embankments shall be equal to three-fourths of the embankment height, but in no case shall the top width be less than 8 feet.

   D. Interior and exterior embankment side slopes shall not be greater than 3 horizontal to 1 vertical.

   E. All pipes, conduits, etc. passing through basin embankments shall have properly spaced concrete anti-seep collars. Minimum collar projection beyond the pipe shall be 2 feet, and maximum collar spacing is 14 times the projection. The joint between collar and pipe shall be watertight.

   F. A key trench of relatively impervious material shall be provided within all basin embankments. The key trench shall be at least 2 feet deep, or extend down to stable subgrade, whichever is deeper. Minimum bottom width for key trench shall be 4 feet. Maximum side slopes for the key trench shall be 1 horizontal to 1 vertical. A compacted impervious core at least 3 feet wide at the top, having maximum side slopes of 1 horizontal to 1 vertical shall extend for the full length of the embankment, and the top elevation shall be set at the 10-year design water surface elevation.

   G. All basins shall be structurally sound and shall be constructed of durable materials. The completed structure and the foundation of all basins shall be stable under all probable conditions of operation. Embankments shall be placed in maximum 8 inch lifts to a minimum of 95 percent of maximum dry density, as established by ASTM D-1557. Compaction test results shall be provided to the Township of Douglass upon request. Embankments shall be constructed 6 inches
above design elevations to allow for settlement.

H. All basins not including groundwater recharge and/or water quality storage shall include an outlet structure to permit draining the basin to a completely dry condition within 24 hours following the end of the design rainfall.

I. All discharge control devices with appurtenances (except discharge pipes) shall be made of reinforced concrete and stainless or hot dip galvanized steel. Bolts/fasteners and any orifice plates are to be stainless or galvanized steel. Outlet barrels/pipes shall have a minimum diameter of 15 inches and shall be made of reinforced concrete pipe with watertight joints, or approved equivalent. Where installation conditions merit, structural calculations that address the actual design requirements will be required.

J. All basins employing small orifices (i.e., less than 6 inches diameter or equivalent area), shall be provided with an apron of concrete or similar durable material which abuts the orifice invert and extends a minimum of 18 inches in all directions from the orifice, to prevent potential blockage by vegetative growth or debris, and to allow for easy cleaning of the area approaching the orifice. Appropriate trash racks are required for all orifice openings.

K. Low flow channels shall be provided from each water carrying facility to the outlet structure for all basins that do not include groundwater recharge and/or water quality storage. Low flow channels shall be 1 percent minimum slope and shall be designed to enable ease of maintenance. All basins that do include groundwater recharge and/or water quality storage shall not be required to have a low flow channel.

L. Minimum slope within a basin that does not include groundwater recharge and/or water quality storage shall be 2 percent positive grade to the low flow channel.

M. Design storms for the computation of retention basin volumes shall be based upon a 24-hour storm with 100-year return period (SCS Type II storm).

N. The effect on downstream areas if the basin embankment fails shall be considered in the design of all basins. The basin shall be designed to minimize the potential damage caused by such failure of the embankment.

O. All structures (detention basins, cisterns, etc.), other than those used for groundwater recharge volume and water quality volume, must completely drain within 24 hours after the end of the design storm.

P. Soils used for the construction of basins shall have lower erodibility factors (“K” factors).

Q. Minimum floor elevations for all structures that would be affected by a basin, other temporary impoundments, or open conveyance systems where ponding may occur shall be 2 feet above the 100-year water surface. If basement or underground facilities are proposed, detailed calculations addressing the effects of stormwater ponding on the structure and water-proofing and/or flood-proofing design information shall be submitted for approval.

4. Stormwater Collection and Conveyance Systems. Gutters, inlets, pipes, conduits, swales, ditches and any other means for collecting and/or conveying stormwater shall be designed to comply with the following:
A. All storm sewer pipes, culverts and bridges (excluding detention and retention basin outfall structures), gutters and swales conveying water originating only from within the boundaries of the development site shall be designed for a 25-year storm event. All storm sewer pipes, culverts and bridges (excluding detention and retention basin outfall structures) conveying water originating from off site shall be designed for a 50-year storm event. Facilities that convey runoff to stormwater management facilities (e.g., detention basins, etc.) shall be designed for the 100-year storm event, unless adequate alternate means for conveying 100-year flow to the facilities are provided. Drainage easements having widths no less than 20 feet shall be provided to contain and convey the 100-year frequency flood throughout the development site. Easements shall begin at the furthest upstream property line of the proposed development site in a watershed.

B. Water obstructions shall convey runoff from the 25-year design storm with a minimum of 2.0 feet of freeboard measured below the lowest point along the top of the roadway, without damage to the drainage structure or the roadway, unless more restrictive local, State and/or Federal regulations apply. A concentrated discharge of stormwater to an adjacent property shall be within an existing watercourse or otherwise an easement and appropriate agreements shall be required.

C. Storm sewer pipes other than those used as roof drains, detention basin underdrains, and street subbase underdrains, shall have a minimum diameter of 15 inches and be either Class III reinforced concrete pipe (RCP) or smooth-lined corrugated high-density polyethylene pipe (HDPE). Corrugated metal pipe is not permitted. HDPE pipe joints shall be silt-tight at a minimum (e.g., ADS N-12 ST/IB, or equal), and RCP joints shall have pre-lubed O-ring gaskets. Watertight specification is required in areas of carbonate geology and elsewhere as may be specified by the Township of Douglass. Where installation conditions merit (e.g., deep fills) structural calculations that address the actual design requirements will be required.

D. Storm sewer pipes and culverts shall be installed on sufficient slopes to provide a minimum velocity of 3 feet per second when flowing full.

E. Storm sewers shall be placed within in the cartway of curbed streets and parallel to the road shoulders of streets without curbs. At curbed street intersections, inlets shall be placed on the tangent and not on the curved portion of the curbing. Storm sewer crossings of streets shall be perpendicular to the street centerline to the maximum extent practicable.

F. Storm facilities not located within a public right-of-way shall be contained in and centered within an easement not less than 20 feet wide. Easements shall follow property boundaries where possible.

G. Manning “n” values used for design of pipes and culverts shall be in accordance with generally accepted engineering practice. Adequate documentation shall be provided in support of the chosen values.

H. All storm sewer pipe and culverts shall have a minimum cover of 18 inches. Embedment for all storm sewer pipe and culverts shall consist of AASHTO No. 8 (1B) aggregate from a minimum of 6 inches of bedding beneath the pipe, to a minimum of 12 inches over the pipe. Aggregate requirements for street
construction shall take precedence over the 1B specification, but in no case shall total aggregate cover over the pipe be less than 12 inches. Compaction shall be in conformance with manufacturer's specifications. Select backfill shall complete the trench to pavement subgrade or topsoil layer in grassed areas.

I. Curves, tees, elbows and wyes are not permitted in pipes other than those used as roof drains, detention basin underdrains, and street subbase underdrains. Manholes or inlets are required to facilitate such configurations.

J. Manholes and inlets shall not be spaced more than 400 feet apart for pipes with diameters of 24 inches and less, and not more than 500 feet apart for pipes of greater diameter. Ladder rungs shall be placed in manholes and inlets with depths exceeding 5 feet.

K. When there is a change in the pipe size in a manhole or inlet, the elevations of the top of the pipes shall be the same, or the smaller pipe(s) higher. A minimum drop of 0.1 foot shall be provided from the inlet invert elevation(s) to the outlet invert elevation.

L. Manholes, inlets, headwalls, endwalls and end sections proposed for dedication or located along streets or subject to vehicular traffic, shall conform to the requirements of PennDOT, or to specifications as otherwise modified by the Township of Douglass. Manhole covers shall have the word “STORM” cast clearly on the lid.

M. Inlets along curbed streets shall be spaced to limit depth along the curb to a maximum of 3 inches during a 10-year storm. Inlet capacities and by-pass calculations shall be determined by PennDOT design techniques.

N. Pipe underdrains and/or pavement base drains shall be provided in areas known or otherwise documented to have a seasonal high water table, and as directed by the Township of Douglass Engineer.

O. Appropriate headwalls, endwalls or end sections shall be used where stormwater runoff enters or leaves the storm sewer horizontally from a natural or man-made channel. Such facilities shall conform to the requirements of PennDOT, or to specifications as otherwise modified by the Township of Douglass.

P. Adequate erosion and sediment control protection shall be provided along all open channels, and at all points of discharge.

Q. Stormwater roof drains, sump pumps, and pipes shall not directly discharge water into a street right-of-way or discharge into a sanitary sewer or storm sewer.

R. All existing and natural watercourses, channels, drainage systems, wetlands and areas of surface water concentration shall be maintained in their existing condition unless an alteration is approved by the Township of Douglass and any other necessary approving body.

S. Flow velocities from any storm sewer may not result in erosion of the receiving channel.

T. Energy dissipaters shall be placed at the outlets of all storm sewer pipes, culverts, and bridges where flow velocities exceed maximum permitted channel velocities as specified in the Pennsylvania DEP *Erosion and Sediment Pollution Control Manual*, as amended.
U. The following conditions shall be met for all swales:

(1) Capacities and velocities shall be computed using the Manning equation Stabilization (i.e., linings, etc.) shall be as specified in the Pennsylvania DEP Erosion and Sediment Pollution Control Manual, as amended.

(2) All vegetated swales shall have a minimum slope of 1 percent unless approved by the Township of Douglass.

(3) “N” factors shall be based upon accepted engineering design practices as approved by the Township of Douglass.

(4) All swales shall be designed to concentrate low flows to minimize siltation and meandering.

(Ord. 2008-1, 4/1/2008, §309)

§23-130. Calculation Methodology.

1. Stormwater runoff from all development sites with a drainage area of greater than 200 acres shall be calculated using a generally accepted calculation technique that is based on the NRCS Soil Cover Complex Method. Table 23-130 summarizes acceptable computation methods and the method selected by the design professional shall be based on the individual limitations and suitability of each method for a particular site. The Township of Douglass may allow the use of the Rational Method to estimate peak discharges from drainage areas that contain less than 200 acres. The Soil Cover Complex Method shall be used for drainage areas greater than 200 acres.

Table 23-130
Acceptable Computation Methodologies for Stormwater Management Plans

<table>
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<tr>
<th>Method</th>
<th>Method Developed by</th>
<th>Applicability</th>
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</thead>
<tbody>
<tr>
<td>TR-20 (or commercial computer package based on TR-20)</td>
<td>USDA NRCS</td>
<td>Applicable where use of full hydrology computer model is desirable or necessary.</td>
</tr>
<tr>
<td>TR-55 (or commercial computer package based on TR-55)</td>
<td>USDA NRCS</td>
<td>Applicable for land development plans within limitations described in TR-55.</td>
</tr>
<tr>
<td>HEC-1/HEC-HMS</td>
<td>US Army Corps of Engineers</td>
<td>Applicable where use of full hydrologic computer model is desirable or necessary.</td>
</tr>
<tr>
<td>PSRM</td>
<td>Penn State University</td>
<td>Applicable where use of a hydrologic computer model is desirable or necessary; simpler than TR-20 or HEC-1.</td>
</tr>
<tr>
<td>Rational Method (or commercial computer package based on Rational Method)</td>
<td>Emil Kuichling (1889)</td>
<td>For sites less than 200 acres and with time of concentration less than 60 minutes (tc&lt;60min), or as approved by the Township of Douglass.</td>
</tr>
<tr>
<td>Method</td>
<td>Method Developed by</td>
<td>Applicability</td>
</tr>
<tr>
<td>--------</td>
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</tr>
<tr>
<td>Other Methods</td>
<td>Varies</td>
<td>Other computation methodologies approved by the Township of Douglass.</td>
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*Note: Successors to the above methods are also acceptable. These successors include WINNTR55 for TR55 and WINTR20 for TR20 and SWMM.*

2. All calculations consistent with this Part using the Soil Cover Complex Method shall use the appropriate design rainfall depths for the various return period storms according to NOAA’s National Weather Service Precipitation Frequency Data Server (PFDS), or NOAA Atlas 14. If a hydrologic computer model such as PSRM or HEC-1/HEC-HMS is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours.

3. For the purposes of existing conditions flow rate determination, undeveloped land shall be considered as “meadow” in good condition, unless the natural ground cover generates a lower curve number or Rational “C” value (i.e., forest), as listed in Tables 23-1-B-1 or 23-1-B-2 in Appendix 23-1-B of this Part.

4. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times-of-concentration for overland flow and return periods from NOAA’s National Weather Service Precipitation Frequency Data Server (PFDS), or NOAA Atlas 14.

5. Times of concentration shall be calculated using the methodology presented in Chapter 3 of *Urban Hydrology for Small Watersheds*, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times of concentration for channel and pipe flow shall be computed using Manning’s equation.

6. Runoff curve numbers (CN) for both existing and proposed conditions to be used in the Soil Cover Complex Method shall be obtained from Table 23-1-B-1 in Appendix 23-1-B of this Part.

7. Runoff coefficients (C) for both existing and proposed conditions for use in the Rational Method shall be obtained from Table 23-1-B-2 in Appendix 23-1-B of this Part.

8. Where uniform flow is anticipated, the Manning equation shall be used for hydraulic computations, and to determine the capacity of open channels, pipes, and storm sewers. Values for Manning’s roughness coefficient (n) shall be consistent with Table 23-1-B-3 in Appendix 23-1-B of the Part. Full flow shall be assumed for closed conduits.

9. Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this Part using any generally accepted hydraulic analysis technique or method.

10. The design of any stormwater detention facilities intended to meet the performance standards of this Part shall be verified by routing the design storm hydrograph through these facilities using the Storage-Indication Method. For drainage areas greater than 200 acres in size, the design storm hydrograph shall be computed using a calculation method that produces a full hydrograph (i.e., TR-20, TR-55, HEC-1, PSRM). The Township of Douglass may approve the use of any generally accepted full hydrograph approximation technique that shall use a total runoff volume that is...
consistent with the volume from a method that produces a full hydrograph.

(Ord. 2008-1, 4/1/2008, §310)

§23-131. Other Requirements.

1. All wet basin designs shall incorporate biologic minimization controls consistent with the West Nile guidance found in Appendix 23-1-F.

2. Any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures), water encroachments, and any work involving wetlands governed by Pennsylvania DEP 25 Pa.Code, Chapter 105, regulations (as amended or replaced from time to time by Pennsylvania DEP), are subject to Pennsylvania DEP 25 Pa.Code, Chapter 105, regulations.

3. Adequate erosion protection shall be provided along all open channels, and at all points of discharge (DEP Erosion and Erosion, Sediment and Pollution Control Manual).

4. The Township of Douglass reserves the right to disapprove any design that would result in the construction in or continuation of a stormwater problem area.

5. No stormwater detention facility shall be placed within 50 feet of a special geologic feature. No stormwater conveyance facility shall be constructed within 50 feet of a special geologic feature, unless it is constructed of durable pipe utilizing watertight joints.

6. Stormwater controls, conveyance facilities and BMPs are subject to additional design and construction criteria as may be included in a separate stormwater specifications document.

(Ord. 2008-1, 4/1/2008, §311)
D. Drainage Plan Requirements


For any of the activities regulated by this Part, the preliminary or final approval of subdivision and/or land development plans, the issuance of any building or occupancy permit, or the commencement of any earth disturbance activity may not proceed until the property owner or applicant or his/her agent has received written approval of a drainage plan from the Township of Douglass unless the project qualifies for an exemption from the requirements to submit a drainage plan.

(Ord. 2008-1, 4/1/2008, §401)

§23-142. Exemptions.

1. General Exemptions. The following land use activities are exempt from the drainage plan submission requirements of this Part:

   A. Use of land for gardening for home consumption.

   B. Agricultural plowing and tilling are exempt from the rate control and stormwater management site plan preparation requirements of this Part provided the activities are performed according to the requirements of 25 Pa.Code, Chapter 102.

   C. Forest management and timber operations are exempt from the rate control and stormwater management site plan preparation requirements of this Part provided the activities are performed according to the requirements of 25 Pa.Code, Chapter 102.

2. Stormwater Quantity Control Exemption.

   A. Any regulated activity that meets the impervious area exemption criteria in Table 23-142 shall not be required to implement the stormwater quantity controls, specified in §23-128 of this Part. These criteria shall apply to the total development even if development is to take place in phases. The date of the Township ordinance adoption shall be the starting point from which to consider tracts as “parent tracts” in which future subdivisions and respective impervious area computations shall be cumulatively considered. Impervious areas existing on the “parent tract” prior to adoption of this Part shall not be considered in cumulative impervious area calculations for exemption purposes.

Table 23-142
Impervious Area Exemption Criteria

<table>
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<tr>
<th>Total Parcel Size</th>
<th>Impervious Area Exemption (sq. ft.)</th>
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<tbody>
<tr>
<td>0 to &lt; 0.125 ac</td>
<td>1,000 sq. ft.</td>
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<tr>
<td>0.125 to &lt; 0.5 ac</td>
<td>2,500 sq. ft.</td>
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<tr>
<td>0.5 to &lt; 1 ac</td>
<td>5,000 sq. ft.</td>
</tr>
<tr>
<td>1 to &lt; 2 ac</td>
<td>7,500 sq. ft.</td>
</tr>
<tr>
<td>2 to &lt; 3 ac</td>
<td>10,000 sq. ft.</td>
</tr>
<tr>
<td>3 to &lt; 4 ac</td>
<td>12,500 sq. ft.</td>
</tr>
</tbody>
</table>
B. Submissions for projects that utilize the exemption under this subsection shall still be required to meet the groundwater recharge (§23-125), water quality (§23-126), and stream bank erosion (§23-127) controls of this Part. Drainage plans in accordance with §§23-143.A(2), 23-143.B(7), (8), (11), (15), and (22) and 23-143.D(2) must still be submitted. Any exemption must first be approved by the Township of Douglass.

3. Additional Exemption Requirement.

A. Exemption Responsibilities. An exemption shall not relieve the applicant from implementing such measures as are necessary to protect the public health, safety, and property. An exemption shall not relieve the applicant from providing adequate stormwater management for regulated activities to meet the requirements of this Part.

B. HQ and EV Streams. This exemption shall not relieve the applicant from meeting the special requirements for watersheds draining to high quality (HQ) or exceptional value (EV) waters, identified and source water protection areas (SWPA) and requirements for nonstructural project design sequencing (§23-124), groundwater recharge (§23-125), water quality (§23-126), and stream bank erosion (§23-127).

C. Drainage Problems.

(1) If a drainage problem is documented or known to exist downstream of, or expected from the proposed activity, then the Township of Douglass may require a drainage plan submittal.

(2) All regulated activities occurring in drainage areas tributary to waters designated HQ/EV pursuant to 25 Pa.Code, Chapter 93, shall not change any biological, chemical, or physical characteristics, including volume, rate, velocity, course, current, cross-section, or temperature of the waters, unless the activity is specifically permitted in accordance with the environmental laws of the Commonwealth.

(Ord. 2008-1, 4/1/2008, §402)

§23-143. Drainage Plan Contents.

The drainage plan shall consist of a general description of the project including sequencing items described in §23-124, calculations, maps and plans. A note on the maps shall refer to the associated computations and erosion and sediment control plan by title and date. The cover sheet of the computations and erosion and sediment control plan shall refer to the associated maps by title and date. All drainage plan materials shall be submitted to the Township of Douglass in a format that is clear, concise, legible, neat, and well organized; otherwise, the drainage plan shall not be accepted for review and shall be returned to the applicant. The following items shall be included in the drainage plan:

A. General.
§23-143 Stormwater Management

(1) General description of the project including those areas described in §23-124.

(2) General description of permanent stormwater management techniques, including construction specifications of the materials to be used for stormwater management facilities.

(3) Complete hydrologic, hydraulic, and structural computations for all stormwater management facilities.

(4) An erosion and sediment control plan, including all reviews and approvals by the Berks County Conservation District.

(5) A general description of nonpoint source pollution controls.

B. Maps. Map(s) of the project area shall be submitted on 24-inch by 36-inch sheets and/or shall be prepared in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Berks County. If the Subdivision and Land Development Ordinance (SALDO) [Chapter 22] has more stringent criteria, then the more stringent criteria shall apply. The contents of the map(s) shall include, but not be limited to:

(1) The location of the project relative to highways, municipalities or other identifiable landmarks.

(2) Existing contours at intervals of 2 feet. In areas of steep slopes (greater than 15 percent), 5-foot contour intervals may be used.

(3) Existing streams, lakes, ponds or other waters of the Commonwealth within the project area.

(4) Other physical features including flood hazard boundaries, stream buffers, existing drainage courses, areas of natural vegetation to be preserved, and the total extent of the upstream area draining through the site.

(5) The locations of all existing and proposed utilities, sanitary sewers, and water lines within 50 feet of property lines.

(6) An overlay showing soil names and boundaries.

(7) Limits of earth disturbance, including the type and amount of impervious area that would be added.

(8) Proposed structures, roads, paved areas, and buildings.

(9) Final contours at intervals of 2 feet. In areas of steep slopes (greater than 15 percent), 5-foot contour intervals may be used.

(10) The name of the development, the name and address of the owner of the property, and the name of the individual or firm preparing the plan.

(11) The date of submission.

(12) A graphic and written scale of 1 inch equals no more than 50 feet; for tracts of 20 acres or more, the scale shall be 1 inch equals no more than 100 feet.

(13) A north arrow.

(14) The total tract boundary and size with distances marked to the nearest foot and bearings to the nearest degree.
§23-143 Township of Douglass

(15) Existing and proposed land use(s).

(16) A key map showing all off site existing man-made features which may be affected by stormwater runoff or stormwater management controls for the project.

(17) Location of all open channels.

(18) Overland drainage patterns and swales.

(19) A 20-foot wide access easement around all stormwater management facilities that would provide ingress to and egress from a public right-of-way.

(20) The location of all erosion and sediment control facilities.

(21) A note on the plan indicating the location and responsibility for maintenance of stormwater management facilities that would be located on/off-site. All on/off-site facilities shall meet the performance standards and design criteria specified in this Part.

(22) A statement, signed by the landowner, acknowledging that any revision to the approved drainage plan must be approved by the Township of Douglass and the Berks County Conservation District.

(23) The following signature block for the design engineer:

“I, (Design Engineer), on this date (date of signature), hereby certify that the drainage plan meets all design standards and criteria of the Schuylkill River Watershed Act 167 Stormwater Management Ordinance.”

C. Supplemental Information.

(1) A written description of the following information shall be submitted.

(a) The overall stormwater management concept for the project designed in accordance with §23-124.

(b) Stormwater runoff computations as specified in this Part.

(c) Stormwater management techniques to be applied both during and after development.

(d) Expected project time schedule.

(e) Development stages (project phases) if so proposed.

(f) An operation and maintenance plan in accordance with §23-172 of this Part.

(2) An erosion and sediment control plan.

(3) The effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any existing Township stormwater collection system that may receive runoff from the project site.

D. Stormwater Management Facilities.

(1) All stormwater management facilities must be located on a plan and described in detail.

(2) When infiltration facilities such as seepage pits, beds or trenches are used, the locations of existing and proposed septic tank infiltration areas and wells must be shown.
(3) All calculations, assumptions, and criteria used in the design of the stormwater management facilities must be shown.

E. Responsibilities for Operations and Maintenance of Stormwater Controls and BMPs.

(1) No regulated earth disturbance activities within the Township of Douglass shall commence until approval by the Township of Douglass of a stormwater control and BMP operations and maintenance plan which describes how the permanent (e.g., post-construction) stormwater controls and BMPs will be properly operated and maintained.

(2) The following items shall be included in the stormwater control and BMP operations and maintenance plan:

(a) Map(s) of the project area, in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Berks County, and shall be submitted on 24-inch by 36-inch sheets. The contents of the maps(s) shall include, but not be limited to:

1) Clear identification of the location and nature of permanent stormwater controls and BMPs.

2) The location of the project site relative to highways, Township boundaries or other identifiable landmarks.

3) Existing and final contours at intervals of 2 feet, or others as appropriate.

4) Existing streams, lakes, ponds, or other bodies of water within the project site area.

5) Other physical features including flood hazard boundaries, sinkholes, streams, existing drainage courses, and areas of natural vegetation to be preserved.

6) The locations of all existing and proposed utilities, sanitary sewers, and water lines within 50 feet of property lines of the project site.

7) Proposed final changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added.

8) Proposed final structures, roads, paved areas, and buildings.

9) A 20-foot wide access easement around all stormwater controls and BMPs that would provide ingress to and egress from a public right-of-way.

(b) A description of how each permanent stormwater control and BMP will be operated and maintained, and the identity of the person(s) responsible for operations and maintenance.

(c) The name of the project site, the name and address of the owner of the property, and the name of the individual or firm preparing the plan.

(d) A statement, signed by the landowner, acknowledging that the stormwater controls and BMPs are fixtures that can be altered or removed only after approval by the Township of Douglass.
(3) 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:

   (a) 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 Township of Douglass, stormwater controls and BMPs may also be dedicated to and maintained by the Township of Douglass.

   (b) 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.

(4) The Township of Douglass shall make the final determination on the continuing operations and maintenance responsibilities. The Township of Douglass reserves the right to accept or reject the operations and maintenance responsibility for any or all of the stormwater controls and BMPs.


   (1) The Township of Douglass 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.

   (2) The Township of Douglass shall notify the applicant in writing whether the stormwater control and BMP operations and maintenance plan is approved.

   (3) The Township of Douglass may require a “record drawing” of all stormwater controls and BMPs, and an explanation of any discrepancies with the operations and maintenance plan.

(Ord. 2008-1, 4/1/2008, §403)

§23-144. Plan Submission.

1. The Township of Douglass shall require receipt of a complete plan, as specified in this Part.

2. For any activities that require an NPDES permit for stormwater discharges from construction activities, a Pennsylvania DEP joint permit application, a PennDOT highway occupancy permit, or any other permit under applicable State or Federal regulations or are regulated under 25 Pa.Code, Chapter 105 (Dam Safety and Waterway Management), or 25 Pa.Code, Chapter 106 (Floodplain Management), of Pennsylvania DEP’s rules and regulations, the proof of application for said permits) or approvals shall be part of the plan. The plan shall be coordinated with the State and Federal permit process and the Township SALDO review process.

   A. For projects which require SALDO approval, the drainage plan shall be submitted by the applicant as part of the preliminary plan submission where applicable for the regulated activity.

   B. For these regulated activities that do not require SALDO approval, see §23-141, “General Requirements.”
C. Six copies of the drainage plan shall be submitted and distributed as follows:

1. Two copies to the Township of Douglass accompanied by the requisite Township review fee, in accordance with this Part.
2. Two copies to the Berks County Conservation District.
3. One copy to the Township Engineer.
4. One copy to the County Planning Commission/Department.

(Ord. 2008-1, 4/1/2008, §404)

§23-145. Drainage Plan Review.

1. The Township of Douglass shall review the drainage plan with the standards set forth in this Part for consistency with the adopted Schuylkill River Watershed Act 167 Stormwater Management Plan. Any found incomplete shall not be accepted for review and shall be returned to the applicant.

2. For activities regulated by this Part, the Township of Douglass shall notify the applicant in writing, within (recommend 90) calendar days, whether the drainage plan is consistent with the Stormwater Management Plan.

A. Should the drainage plan be determined to be consistent with the Stormwater Management Plan, the Township Engineer shall forward an approval letter to the Township Secretary who will then forward a copy to the applicant.

B. Should the drainage plan be determined to be inconsistent with the Stormwater Management Plan, the Township Engineer shall forward a disapproval letter to the Township Secretary who will then forward a copy to the applicant. The disapproval letter shall cite the reason(s) and specific Sections of this Part for the disapproval. Disapproval may be due to inadequate information to make a reasonable judgment as to compliance with the stormwater management plan. Any disapproved drainage plans may be revised by the applicant and resubmitted consistent with this Part.

3. For regulated activities specified in §23-105 of this Part, which require a building permit, the Township Engineer shall notify the Township Building Permit Officer in writing, within a time frame consistent with the Township Building Code [Chapter 5, Part 1] and/or this Part, whether the drainage plan is consistent with the Stormwater Management Plan and forward a copy of the approval/disapproval letter to the applicant. Any disapproved drainage plan may be revised by the applicant and resubmitted consistent with this Part.

4. For regulated activities under this Part that require an NPDES permit application, the applicant shall forward a copy of the Township Engineer’s letter stating that the drainage plan is consistent with the stormwater management plan to the Berks County Conservation District. Pennsylvania DEP and the Conservation District may consider the Township Engineer’s review comments in determining whether to issue a permit.

5. The Township of Douglass shall not grant approval or grant preliminary approval to any subdivision or land development for regulated activities specified in §23-105 of this Part if the drainage plan has been found to be inconsistent with the Stormwater Management Plan, as determined by the Township of Douglass. All
required permits from Pennsylvania DEP must be obtained prior to approval of any subdivision or land development.

6. The applicant shall be responsible for completing record drawings of all stormwater management facilities included in the approved drainage plan. The record drawings and an explanation of any discrepancies with the design plans shall be submitted to the Township of Douglass for final approval. The Township of Douglass may withhold approval of the record drawings until the Township of Douglass receives a copy of an approved highway occupancy permit from the PennDOT district office, NPDES permit, and any other applicable permits or approvals, from Pennsylvania DEP or the Berks County Conservation District. The above permits and approvals must be based on the record drawings.

7. The Township of Douglass’s approval of a drainage plan shall be valid for a period not to exceed 5 years, commencing on the date that the Township of Douglass signs the approved drainage plan. If stormwater management facilities included in the approved drainage plan have not been constructed, or if constructed, and record drawings of these facilities have not been approved within this 5-year time period, then the Township of Douglass may consider the drainage plan disapproved and may revoke any and all permits. Drainage plans that are considered disapproved by the Township of Douglass shall be resubmitted in accordance with §23-147 of this Part.

(Ord. 2008-1, 4/1/2008, §405)

§23-146. Modifications of Plans.

1. A modification to a drainage plan under review by the Township of Douglass for a development site that involves a change in stormwater management facilities or techniques, or that involves the relocation or re-design of stormwater management facilities, or that is necessary because soil or other conditions are not as stated on the drainage plan as determined by the Township of Douglass, shall require a resubmission of the modified drainage plan consistent with §23-144 of this Part and be subject to review as specified in §23-145 of this Part.

2. A modification to an already approved or disapproved drainage plan shall be submitted to the Township of Douglass, accompanied by the applicable Township review and inspection fee. A modification to a drainage plan for which a formal action has not been taken by the Township of Douglass shall be submitted to the Township of Douglass, accompanied by the applicable Township review and inspection fee.

(Ord. 2008-1, 4/1/2008, §406)


A disapproved drainage plan may be resubmitted, with the revisions addressing the Township of Douglass’s concerns documented in writing and addressed to the Township Secretary in accordance with §23-144 of this Part and distributed accordingly and be subject to review as specified in §23-145 of this Part. The applicable Township review and inspection fee must accompany a resubmission of a disapproved drainage plan.

(Ord. 2008-1, 4/1/2008, §407)
E. Inspections

§23-151. Schedule of Inspections.

1. The Township of Douglass or their designee shall inspect all phases of the installation of the permanent stormwater management facilities as deemed appropriate by the Township of Douglass.

2. During any stage of the work, if the Township of Douglass or their designee determines that the permanent stormwater management facilities are not being installed in accordance with the approved stormwater management plan, the Township of Douglass shall revoke any existing building permits and issue a cease and desist order until a revised stormwater management plan is submitted and approved, except as directed by the Township of Douglass or Berks County Conservation District as specified in this Part.

3. A final inspection of all stormwater management facilities shall be conducted by the Township of Douglass or their designee and to confirm compliance with the approved stormwater management plan prior to the issuance of any occupancy permit. (Ord. 2008-1, 4/1/2008, §501)
F. Fees and Expenses

§23-161. Drainage Plan Review and Inspection Fee.

Fees shall be established by the Township of Douglass to defray plan review and construction inspection costs incurred by the Township of Douglass. All fees shall be paid by the applicant at the time of drainage plan submission. Review and inspection fee schedule shall be established by resolution of the Board of Supervisors based on the size of the regulated activity and based on the Township of Douglass’s costs for reviewing drainage plans and conducting inspections pursuant to §23-151. The Township of Douglass shall periodically update the review and inspection fee schedule to ensure that review costs are adequately reimbursed.

(Ord. 2008-1, 4/1/2008, §601)

§23-162. Expenses Covered by Fees.

The fees required by this Part shall at a minimum cover:

A. Administrative costs.
B. The review of the drainage plan by the Township of Douglass.
C. The site inspections.
D. The inspection of stormwater management facilities and drainage improvements during construction.
E. The final inspection upon completion of the stormwater management facilities and drainage improvements presented in the drainage plan.
F. Any additional work required to enforce any permit provisions regulated by this Part, correct violations, and assure proper completion of stipulated remedial actions.

(Ord. 2008-1, 4/1/2008, §602)

1. For subdivisions and land developments the applicant shall provide a financial guarantee to the Township of Douglass for the timely installation and proper construction of all stormwater management controls as: (A) required by the approved drainage plan equal to or greater than the full construction cost of the required controls or (B) in the amount and method of payment provided for in the Subdivision and Land Development Ordinance [Chapter 22].

2. For other regulated activities, the Township of Douglass may require a financial guarantee from the applicant.

3. At the completion of the project, and as a prerequisite for the release of the performance guarantee, the applicant or his representatives shall:
   A. Provide a certification of completion from an engineer, architect, surveyor or other qualified person verifying that all permanent facilities have been constructed according to the plans and specifications and approved revisions thereto.
   B. Provide a set of record drawings.

4. After the Township of Douglass receives the certification, a final inspection shall be conducted by the Township of Douglass or designee to certify compliance with this Part.

(Ord. 2008-1, 4/1/2008, §701)


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.

(Ord. 2008-1, 4/1/2008, §702)

§23-173. Operations and Maintenance Agreement for Privately Owned Stormwater Controls and BMPs.

1. The property owner shall sign an operations and maintenance agreement with the Township of Douglass covering all stormwater controls and BMPs that are to be privately owned. The agreement shall be substantially the same as the agreement in Appendix 23-1-A of this Part.

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 Township of Douglass.

(Ord. 2008-1, 4/1/2008, §703)

§23-174 Township of Douglass §23-176

1. Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the Township of Douglass.

2. Stormwater management easements shall be provided by the property owner if necessary for (A) access for inspections and maintenance, or (B) 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 §23-173.

(Ord. 2008-1, 4/1/2008, §704)

§23-175. 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 Berks County, within 15 days of approval of the stormwater control and BMP operations plan by the Township of Douglass:
   A. The operations and maintenance plan, or a summary thereof.
   B. Operations and maintenance agreements under §23-173.
   C. Easements under §23-174.

2. The Township of Douglass may suspend or revoke any approvals granted for the project site upon discovery of the failure of the owner to comply with this Section.

(Ord. 2008-1, 4/1/2008, §705)

§23-176. Township Stormwater Control and BMP Operation and Maintenance Fund.

1. Persons installing stormwater controls or BMPs shall be required to pay a specified amount to the Township Stormwater Control and BMP Operation and Maintenance Fund to help defray costs of periodic inspections and maintenance expenses. The amount of the deposit shall be determined as follows:
   A. If the stormwater control or BMP is to be privately owned and maintained, the deposit shall cover the cost of periodic inspections performed by the Township of Douglass for a period of 10 years, as estimated by the Township Engineer. After that period of time, inspections will be performed at the expense of the Township of Douglass.
   B. If the stormwater control or BMP is to be owned and maintained by the Township of Douglass, the deposit shall cover the estimated costs for maintenance and inspections for 10 years. The Township Engineer will establish the estimated costs utilizing information submitted by the applicant.
   C. The amount of the deposit to the fund shall be converted to present worth of the annual series values. The Township Engineer shall determine the present worth equivalents, which shall be subject to the approval of the Board of Supervisors.

2. If a stormwater control or BMP is proposed that also serves as a recreation facility (e.g., ballfield, lake), the Township of Douglass may reduce or waive the amount of the maintenance find deposit based upon the value of the land for public recreation.
§23-176 Stormwater Management

3. If at some future time a stormwater control or BMP (whether publicly or privately owned) is eliminated due to the installation of storm sewers or other storage facility, the unused portion of the maintenance fund deposit will be applied to the cost of abandoning the facility and connecting to the storm sewer system or other facility. Any amount of the deposit remaining after the costs of abandonment are paid will be returned to the depositor.

4. If stormwater controls or BMPs are accepted by the Township of Douglass for dedication, the Township of Douglass may require persons installing stormwater controls or BMPs to pay a specified amount to the Township Stormwater Control and BMP operation and maintenance fund, to help defray costs of operations and maintenance activities. The amount may be determined as follows:
   
   A. If the stormwater control or BMP is to be owned and maintained by the Township of Douglass, the amount shall cover the estimated costs for operations and maintenance for 10 years, as determined by the Township of Douglass.
   
   B. The amount shall then be converted to present worth of the annual series values.

5. **Long-Term Maintenance.** The Township of Douglass shall require applicants to pay a fee to the Township Stormwater Maintenance Fund to cover long term maintenance of stormwater control and best management practices.

6. **Stormwater Related Problems.** The Township of Douglass may require applicants to pay a fee to the Township Stormwater Maintenance Fund to cover stormwater related problems which may arise from the land development and earth disturbance. The Township Engineer will establish the estimated cost of utilizing information submitted by the applicant.

(Ord. 2008-1, 4/1/2008, §706)
H. Prohibitions


1. Any drain or conveyance, whether on the surface or subsurface, which allows any nonstormwater discharge including sewage, process wastewater, and wash water to enter the waters of this Commonwealth is prohibited.

2. No person shall allow, or cause to allow, discharges into surface waters of this Commonwealth which are not composed entirely of stormwater, except (A) as provided in subsection .3 below, and (B) discharges allowed under a State or Federal permit.

3. The following discharges are authorized unless they are determined to be significant contributors to pollution to the waters of this Commonwealth:
   A. Discharges from firefighting activities.
   B. Potable water sources including water line flushing.
   C. Irrigation drainage.
   D. Air conditioning condensate.
   E. Springs.
   F. Water from crawl space pumps.
   G. Pavement wash waters 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.
   H. Flows from riparian habitats and wetlands.
   I. Uncontaminated water from foundations or from footing drains.
   J. Lawn watering.
   K. Dechlorinated swimming pool discharges.
   L. Uncontaminated groundwater.
   M. Water from individual residential car washing.
   N. Routine external building wash down (which does not use detergents or other compounds).

4. In the event that the Township of Douglass or DEP determines that any of the discharges identified in subsection .3 significantly contribute to pollution of the waters of this Commonwealth, the Township of Douglass or DEP will notify the responsible person(s) to cease the discharge.

(Ord. 2008-1, 4/1/2008, §801)

§23-182. Roof Drains.

Roof drains and sump pumps shall discharge to infiltration or vegetative BMPs and to the maximum extent practicable satisfy the criteria for disconnected impervious areas.

(Ord. 2008-1, 4/1/2008, §802)

§23-183. Alteration of Stormwater Management BMPs.

No person shall modify, remove, fill, landscape, or alter any stormwater manage-
ment BMPs, facilities, areas, or structures, without the written approval of the Township of Douglass.

(Ord. 2008-1, 4/1/2008, §803)
I. Enforcement and Penalties

§23-191. Right of Entry.

1. Upon presentation of proper credentials, duly authorized representatives of the Township of Douglass may enter at reasonable times upon any property within the Township of Douglass to inspect the implementation, condition, or operation and maintenance of the stormwater controls or BMPs in regard to any aspect governed by this Part.

2. Stormwater control and BMP owners and operators shall allow persons working on behalf of the Township of Douglass ready access to all parts of the premises for the purposes of determining compliance with this Part.

3. Persons working on behalf of the Township of Douglass shall have the right to temporarily locate on any stormwater control or BMP in the Township of Douglass such devices as are necessary to conduct monitoring and/or sampling of the discharges from such stormwater control or BMP.

4. Unreasonable delays (>24 hrs.) in allowing the Township of Douglass access to a stormwater control or BMP is a violation of this Part.

(Ord. 2008-1, 4/1/2008, §901)


1. The violation of any provision of this Part is hereby deemed a public nuisance.

2. Each day that a violation continues shall constitute a separate violation.

(Ord. 2008-1, 4/1/2008, §902)


1. Whenever the Township of Douglass finds that a person has violated a prohibition or failed to meet a requirement of this Part, the Township of Douglass may order compliance by written notice to the responsible person. Such notice may require, without limitation:

   A. The performance of monitoring, analyses, and reporting.
   B. The elimination of prohibited connections or 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 controls and BMPs.
   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 Township of Douglass 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 Township of Douglass from pursuing any and all other remedies available in law or equity.

(Ord. 2008-1, 4/1/2008, §903)

§23-194. Suspension and Revocation of Permits and Approvals.

1. Any building, land development or other permit or approval issued by the Township of Douglass may be suspended or revoked, in whole or in part, by the Township of Douglass for:
   A. Noncompliance with or failure to implement any provision of the permit.
   B. A violation of any provision of this Part.
   C. The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or nuisance, pollution or which endangers the life or property of others.

2. A suspended permit or approval may be reinstated by the Township of Douglass, in whole or in part, when:
   A. The Township of Douglass or designee has inspected and approved the corrections to the stormwater controls and BMPs, or the elimination of the hazard or nuisance.
   B. The Township of Douglass is satisfied that the violation of the ordinance, law, or rule and regulation has been corrected.

3. A permit or approval which has been revoked, in whole or in part, by the Township of Douglass cannot be reinstated. The applicant may apply for a new permit under the procedures outlined in this Part.

(Ord. 2008-1, 4/1/2008, §904)


1. Any violation of the provisions of this Part shall be enforced by action brought before a magisterial district judge in the same manner provided for the enforcement of summary offenses under the Pennsylvania Rules of Criminal Procedure. The Township Solicitor may assume charge of the prosecution without the consent of the District Attorney as required by Pa.R.Crimes.P. 454 (relating to trial in summary cases). Upon conviction, the person shall be subject to a fine of not more than $1,000.00 for each violation, recoverable with costs, or imprisonment to the extent allowed by law for the punishment of summary offenses, or both. Each day that the violation continues shall be a separate offense.

2. In addition, the Township of Douglass, through its Solicitor, may institute injunctive, mandamus or any other appropriate action or proceeding at law or in equity for the enforcement of this Part. Any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent injunctions, mandamus or other appropriate forms of remedy or relief. The imposition of a fine or penalty for any violation of, or noncompliance with, this Part shall not excuse the violation or noncompliance, or permit it to continue, and all such persons shall be required to correct or remedy such violations and noncompliances.


In the event that a person fails to comply with the requirements of this Part, or fails to conform to the requirements of any permit issued hereunder, the Township of Douglass will provide notification of the violation. After notice is provided, failure to correct violations in a timely manner may result in additional violations.

(Ord. 2008-1, 4/1/2008, §906)

§23-197. Enforcement.

The Board of Supervisors is hereby authorized and directed to enforce all of the provisions of this Part. All inspections regarding compliance with the drainage plan shall be the responsibility of the Township Engineer or other qualified persons designated by the Township of Douglass.

A. No person shall modify, remove, fill, landscape or alter any stormwater management BMPs, facilities, areas, or structures, without the written approval of the Township of Douglass.

B. Upon presentation of proper credentials, the Township of Douglass may enter at reasonable times upon any property within the Township of Douglass to inspect the condition of the stormwater structures and facilities in regard to any aspect regulated by this Part.

C. It shall be unlawful for a person to undertake any regulated activity except as provided in an approved stormwater management site plan, unless specifically exempted from the requirement to submit a stormwater management site plan by this Part.

D. The developer shall be responsible for providing as-built plan of all stormwater management BMPs included in the approved stormwater management site plan. The as-built plans and an explanation of any discrepancies with the construction plans shall be submitted by the developer to the Township of Douglass.

E. The as-built submission shall include a certification of completion signed by a qualified professional verifying that all permanent stormwater management BMPs have been constructed according to the approved plans and specifications. If any licensed qualified professionals contributed to the construction plans, then a licensed qualified professional must sign the completion certificate.

F. After receipt of the completion certificate by the Township of Douglass, the Township of Douglass may conduct a final inspection.

G. Inspections regarding compliance with the stormwater management site plan are a responsibility of the Township of Douglass.

H. The Township of Douglass may withhold an occupancy permit until a certificate of completion has been provided by the developer.

(Ord. 2008-1, 4/1/2008, §907)

§23-198. Appeals.

1. Any person aggrieved by any action of the Township of Douglass or its designee may appeal to the Township of Douglass's Board of Supervisors within 30 days of that
2. Any person aggrieved by any decision of the Township of Douglass's Board of Supervisors may appeal to the County Court of Common Pleas in the County where the activity has taken place within 30 days of the Township decision.

(Ord. 2008-1, 4/1/2008, §908)
Stormwater Controls and Best Management Practices
Operation and Maintenance Agreement

THIS AGREEMENT, made and entered into this _________ day of __________, 20____, by and between _____________________, (hereinafter the “Landowner”), and the Township of Douglass, Berks County, Pennsylvania, (hereinafter “Township”);

WITNESSETH

WHEREAS, the Landowner is the owner of certain real property as recorded by deed in the land records of _________________ County, Pennsylvania, Deed Book __________ at Page ___________, (hereinafter “Property”).

WHEREAS, the Landowner is proceeding to build and develop the Property; and

WHEREAS, the Stormwater Controls and BMP operations and maintenance plan approved by the Township (hereinafter referred to as the “Plan”) for the property identified herein, which is attached hereto as Appendix 23-1-A and made part hereof, as approved by the Township, provides for management of stormwater within the confines of the Property through the use of best management practices (BMPs); and

WHEREAS, the Township, and the Landowner, his successors and assigns, agree that the health, safety, and welfare of the residents of the Township 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 Township Stormwater Management Ordinance, including but not limited to infiltration trenches, seepage 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 underground aquifer, and

WHEREAS, the Township requires, through the implementation of the Plan, that stormwater management BMPs as required by said Plan and the Township Stormwater
Management Ordinance be constructed and adequately operated and maintained by the Landowner, 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 Landowner in accordance with the plans and specifications identified in the Plan.

2. The Landowner shall operate and maintain the BMP(s) as shown on the Plan in good working order acceptable to the Township and in accordance with the specific maintenance requirements noted on the Plan.

3. The Landowner hereby grants permission to the Township, its authorized agents and employees, to enter upon the property, at reasonable times and upon presentation of proper identification, to inspect the BMP(s) whenever it deems necessary. Whenever possible, the Township shall notify the Landowner prior to entering the property.

4. In the event the Landowner fails to operate and maintain the BMP(s) as shown on the Plan in good working order acceptable to the Township, the Township or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMP(s). This provision shall not be construed to allow the Township to erect any permanent structure on the land of the Landowner. It is expressly understood and agreed that the Township 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 Township.

5. In the event the Township, 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 Landowner shall reimburse the Township for all expenses (direct and indirect) incurred within 10 days of receipt of invoice from the Township.

6. The intent and purpose of this Agreement is to ensure the proper maintenance of the onsite BMP(s) by the Landowner; 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 Landowner, its executors, administrators, assigns, and other successors in interests, shall release the Township’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 BMP(s) by the Landowner or Township. In the event that a claim is asserted against the Township, its designated representatives or employees, the Township shall promptly notify the Landowner and the Landowner shall defend, at his own expense, any suit based on the claim. If any judgment or claims against the Township’s employees or designated representatives shall be allowed, the Landowner shall pay all costs and expenses regarding said judgment or claim.

8. The Township shall inspect the BMP(s) at a minimum of once every 3 years to ensure their continued functioning.

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

ATTEST:

WITNESS the following signatures and seals:

(SEAL) For the Township of Douglass:

__________________________________________

(SEAL) For the Landowner:

__________________________________________

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 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)
Appendix 23-1-B

Stormwater Management Design Criteria

Table 23-1-B-1
Runoff Curve Numbers
Source: NRCS (SCS) TR-55

Table 23-1-B-2
Rational Runoff Coefficients

Table 23-1-B-3
Manning Roughness Coefficients

Figure 23-1-B-1
PennDOT Region 4
Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Areas
Table 23-1-B-1
Runoff Curve Numbers
(From NRCS (SCS) TR-55)

<table>
<thead>
<tr>
<th>Land Use Description</th>
<th>Hydrologic Soil Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Open space</td>
<td>44</td>
</tr>
<tr>
<td>Meadow/Orchard</td>
<td>30</td>
</tr>
<tr>
<td>Agricultural</td>
<td>59</td>
</tr>
<tr>
<td>Forest</td>
<td>36</td>
</tr>
<tr>
<td>Commercial (85% impervious)</td>
<td>89</td>
</tr>
<tr>
<td>Industrial (72% impervious)</td>
<td>81</td>
</tr>
<tr>
<td>Institutional (50% impervious)</td>
<td>71</td>
</tr>
<tr>
<td>Residential</td>
<td></td>
</tr>
<tr>
<td>Average lot size % impervious</td>
<td></td>
</tr>
<tr>
<td>½ acre or less*</td>
<td>65</td>
</tr>
<tr>
<td>½ - 1/3 acre</td>
<td>34</td>
</tr>
<tr>
<td>½ - 1 acre</td>
<td>23</td>
</tr>
<tr>
<td>1 - 4 acres</td>
<td>12</td>
</tr>
<tr>
<td>Farmstead</td>
<td>59</td>
</tr>
<tr>
<td>Smooth surfaces (concrete, asphalt, gravel or bare compacted soil)</td>
<td>98</td>
</tr>
<tr>
<td>Water</td>
<td>98</td>
</tr>
<tr>
<td>Mining/newly graded areas (previous areas only)</td>
<td>77</td>
</tr>
</tbody>
</table>

* Includes multi-family housing unless justified lower density can be provided.

Note: Existing site conditions of bare earth or fallow ground shall be considered as meadow when choosing a CN value.
Table 23-1-B-2

Rational Runoff Coefficients
By Hydrologic Soils Group and Overland Slope (%)

<table>
<thead>
<tr>
<th>Land Use</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-2%</td>
<td>2-6%</td>
<td>6%+</td>
<td>0-2%</td>
</tr>
<tr>
<td>Cultivated Land</td>
<td>0.08</td>
<td>0.13</td>
<td>0.16</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>0.14</td>
<td>0.18</td>
<td>0.22</td>
<td>0.16</td>
</tr>
<tr>
<td>Pasture</td>
<td>0.12</td>
<td>0.20</td>
<td>0.30</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>0.15</td>
<td>0.25</td>
<td>0.37</td>
<td>0.23</td>
</tr>
<tr>
<td>Meadow</td>
<td>0.10</td>
<td>0.16</td>
<td>0.25</td>
<td>0.14</td>
</tr>
<tr>
<td></td>
<td>0.14</td>
<td>0.22</td>
<td>0.30</td>
<td>0.20</td>
</tr>
<tr>
<td>Forest</td>
<td>0.05</td>
<td>0.08</td>
<td>0.11</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>0.08</td>
<td>0.11</td>
<td>0.14</td>
<td>0.10</td>
</tr>
<tr>
<td>Residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lot Size ½ Acre</td>
<td>0.25</td>
<td>0.28</td>
<td>0.31</td>
<td>0.27</td>
</tr>
<tr>
<td></td>
<td>0.33</td>
<td>0.37</td>
<td>0.40</td>
<td>0.35</td>
</tr>
<tr>
<td>Lot Size ¼ Acre</td>
<td>0.22</td>
<td>0.26</td>
<td>0.29</td>
<td>0.24</td>
</tr>
<tr>
<td></td>
<td>0.30</td>
<td>0.34</td>
<td>0.37</td>
<td>0.33</td>
</tr>
<tr>
<td>Lot Size ½ Acre</td>
<td>0.19</td>
<td>0.23</td>
<td>0.26</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>0.28</td>
<td>0.32</td>
<td>0.35</td>
<td>0.30</td>
</tr>
<tr>
<td>Lot Size ¾ Acre</td>
<td>0.16</td>
<td>0.20</td>
<td>0.24</td>
<td>0.19</td>
</tr>
<tr>
<td></td>
<td>0.25</td>
<td>0.29</td>
<td>0.32</td>
<td>0.28</td>
</tr>
<tr>
<td>Lot Size 1 Acre</td>
<td>0.14</td>
<td>0.19</td>
<td>0.22</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>0.22</td>
<td>0.26</td>
<td>0.29</td>
<td>0.24</td>
</tr>
<tr>
<td>Industrial</td>
<td>0.67</td>
<td>0.68</td>
<td>0.68</td>
<td>0.68</td>
</tr>
<tr>
<td></td>
<td>0.85</td>
<td>0.85</td>
<td>0.86</td>
<td>0.85</td>
</tr>
<tr>
<td>Commercial</td>
<td>0.71</td>
<td>0.71</td>
<td>0.72</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td>0.88</td>
<td>0.88</td>
<td>0.89</td>
<td>0.89</td>
</tr>
<tr>
<td>Streets</td>
<td>0.70</td>
<td>0.71</td>
<td>0.71</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td>0.76</td>
<td>0.77</td>
<td>0.79</td>
<td>0.80</td>
</tr>
<tr>
<td>Open Space</td>
<td>0.05</td>
<td>0.10</td>
<td>0.14</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>0.11</td>
<td>0.16</td>
<td>0.20</td>
<td>0.14</td>
</tr>
<tr>
<td>Parking</td>
<td>0.85</td>
<td>0.86</td>
<td>0.87</td>
<td>0.85</td>
</tr>
<tr>
<td></td>
<td>0.95</td>
<td>0.96</td>
<td>0.97</td>
<td>0.95</td>
</tr>
</tbody>
</table>

A Runoff coefficients for storm recurrence intervals less than 25 years.
B Runoff coefficients for storm recurrence intervals of 25 years or more.

### Table 23-1-B-3

**Roughness Coefficients (Manning’s “n”) for Overland Flow**  
(U.S. Army Corps of Engineers, HEC-1 Users Manual)

<table>
<thead>
<tr>
<th>Surface Description</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dense Growth</td>
<td>0.4 - 0.5</td>
</tr>
<tr>
<td>Pasture</td>
<td>0.3 - 0.4</td>
</tr>
<tr>
<td>Lawns</td>
<td>0.2 - 0.3</td>
</tr>
<tr>
<td>Bluegrass Sod</td>
<td>0.2 - 0.5</td>
</tr>
<tr>
<td>Short Grass Prairie</td>
<td>0.1 - 0.2</td>
</tr>
<tr>
<td>Sparse Vegetation</td>
<td>0.05 - 0.13</td>
</tr>
<tr>
<td>Bare Clay-Loam Soil (eroded)</td>
<td>0.01 - 0.03</td>
</tr>
<tr>
<td>Concrete/Asphalt</td>
<td></td>
</tr>
<tr>
<td>- very shallow depths (less than ¼ inch)</td>
<td>0.10 - 0.15</td>
</tr>
<tr>
<td>- small depths (¼ inch to several inches)</td>
<td>0.05 - 0.10</td>
</tr>
</tbody>
</table>

**Roughness Coefficients (Manning’s “n”) for Channel Flow**

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

(1) Depending upon type, coating, and diameter  
(2) Values recommended by the American Concrete Pipe Association, check Manufacturer’s recommended value.
### FIGURE 23-1-B-1
Recommendation Chart for Infiltration Stormwater Management BMP’s in Carbonate Bedrock

<table>
<thead>
<tr>
<th>Site Risk Factors</th>
<th>Geology Type</th>
<th>Carbonate Bedrock</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Effective Soil Thickness</td>
<td>Less Than 2 Feet</td>
</tr>
<tr>
<td></td>
<td>Special Geologic Features*</td>
<td>Low Buffer</td>
</tr>
<tr>
<td>Site Investigation Recommended</td>
<td>(Unacceptable)</td>
<td>Preliminary</td>
</tr>
<tr>
<td>Design Factors</td>
<td>Infiltration Loading Rates (% increase)**</td>
<td>0-100%</td>
</tr>
</tbody>
</table>

| Program Summary Ordinance*** | 1 | 1 | ✓ | ✓ | 1 | 2 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

✓ Recommended
☐ Not Recommended

* Special Geologic Feature Buffer widths are as follows
  - Low buffer is less than 50 feet
  - Medium buffer is 50 feet to 100 feet
  - High buffer is greater than 100 feet

** Rates greater than 500% not recommended

*** Assumes adequately permeable soils and lack of natural constrains as required for all infiltration systems

1 Infiltration systems may be allowed at the determination of the Engineer and/or Geologist, provided that a detailed site investigation is undertaken which confirms nature of rock, location of special geologic features, and adequacy of the buffer between the SGF and the proposed stormwater system(s).

2 In these special geologic features lower buffer situations, infiltration systems may be allowed at the determination of the Engineer and/or Geologist, provided that a detailed site investigation is undertaken and a 25 foot buffer from SGFs is maintained.

Source: Little Lehigh Creek Watershed ACT 167 - Stormwater Management Ordinance, May 2004
Appendix 23-1-C

Drainage Plan Application

(To be attached to the “land subdivision plan or development plan review application” or “minor land subdivision plan review application.”)

Application is hereby made for review of the Stormwater Management and Erosion and Sedimentation Control Plan and related data as submitted herewith in accordance with the Township of Douglass Stormwater Management and Earth Disturbance Ordinance.

___________ Final Plan _____________ Preliminary Plan _____________ Sketch Plan

Date of Submission ____________________ Submission No.____________________

1. Name of subdivision or development ________________________________________

2. Name of applicant ______________________ Telephone No. ________________

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

___________________________________________ Officer 1
___________________________________________ Officer 2

Address ____________________________ Zip ______
Applicants interest in subdivision or development
(if other than property owner give owners name and address)

3. Name of property owner ________________ Telephone No. ________________

Address ____________________________ Zip ______

4. Name of engineer or surveyor ________________ Telephone No. ________________

Address ____________________________ Zip ______

5. Type of subdivision or development proposed:
   ___ Single-family lots ___ Townhouses ___ Commercial(multi-lot)
   ___ Two-family lots ___ Garden Apartments ___ Commercial(one-lot)
   ___ Multi-family lots ___ Mobile home park ___ Industrial(multi-lot)
   ___ Cluster type lots ___ Campground ___ Industrial(one-lot)
   ___ Planned Residential Development ___ Other (_______________________)

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
8. Stormwater

A. Does the peak rate of runoff from proposed conditions exceed that flow which occurred for existing conditions for the designated design storm? 

B. Design storm utilized (onsite conveyance systems) (24 hr.) 
   No. of Subarea 
   Watershed Name 
   Explain: 

C. Does the submission and/or district meet the release rate criteria for the applicable subarea? 

D. Number of subarea(s) from Appendix 23-1-D of the Schuylkill River Watershed Stormwater Management Plan. 

E. Type of proposed runoff control. 

F. Does the proposed stormwater control criteria meet the requirement/guidelines of the Stormwater Ordinances? 
   If not, what variances/waivers are requested? 
   Reasons 

G. Does the plan meet the requirements of Part 3 of the Stormwater Ordinances? 
   If not, what variances/waivers are requested? 
   Reasons why 

H. Was TR-55, June 1986 utilized in determining the time of concentration? 

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? 

L. Is a recommended maintenance program attached? 

9. Erosion and Sediment Pollution Control (E&S):
A. Has the stormwater management and E&S plan, supporting documentation and narrative been submitted to the Berks County Conservation District?

B. Total area of earth disturbance __________________________ S.F.

10. Wetlands

A. Have the wetlands been delineated by someone trained in wetland delineation?

B. Have the wetland lines been verified by a State or Federal permitting authority?

C. Have the wetland lines been surveyed?

D. Total acreage of wetland within the property__________________________

E. Total acreage of wetland disturbed__________________________

F. Supporting documentation__________________________

11. Filing

A. Has the required fee been submitted?__________________________
   Amount__________________________

B. Has the proposed schedule of construction inspection to be performed by the applicant’s engineer been submitted?

C. Name of individual who will be making the inspections__________________________

D. General comments about stormwater management at the development__________________________
CERTIFICATE OWNERSHIP AND ACKNOWLEDGMENT OF APPLICATION:

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF [County Name]

On this the ___ day of ____________, 20__, before me, the undersigned officer, personally appeared __________________ who being duly sworn, according to law, deposes and says that __________________ owners of the property described in this application and that the application was made with __________________ knowledge and/or direction and does hereby agree with the said application and to the submission of the same.

__________________________________________________________ Property Owner

My Commission Expires ____________________________ 20 _________

Notary Public

THE UNDERSIGNED HEREBY CERTIFIES THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF THE INFORMATION AND STATEMENTS GIVEN ABOVE ARE TRUE AND CORRECT.

SIGNATURE OF APPLICANT__________________________________________

//___________________________________________________________________

(Information Below This Line To Be completed By The Township)

_________________________ (Name of) Township official submission receipt:

Date complete application received ____________ Plan Number ______________

Fees ___________ date fees paid ____________ received by ________________

Official submission receipt date __________________________________________

Received by __________________________________________

__________________________________________ Township
Appendix 23-1-D

Stormwater Management District Watershed Map
Appendix 23-1-E

Low Impact Development (LID) Practices

Alternative Approach for Managing Stormwater Runoff

Natural hydrologic conditions may be altered radically by poorly planned development practices, such as 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. This approach leads ultimately to the degradation of water quality as well as expenditure of additional resources for detaining and managing concentrated runoff at some downstream location.

The recommended alternative approach is to promote practices that will minimize proposed conditions runoff rates and volumes, which will minimize needs for artificial conveyance and storage facilities. To simulate pre-development hydrologic conditions, 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 achieve 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 land development. 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. As a result, 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 on site.

• **Protecting Natural Depression Storage Areas.** Depressional 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 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.** 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 back yards, 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. Township 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 Developments.** 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 include 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
baseflows in receiving streams, improved groundwater recharge, reduced flood flows, reduced pollutant loads, and reduced costs for conveyance and storage.
Appendix 23-1-F

West Nile Virus Guidance

(This source is from the Monroe County, Pennsylvania Conservation District who researched the potential of West Nile Virus problems from BMPs due to a number of calls they were receiving)

Monroe County Conservation District Guidance:
Stormwater Management and West Nile Virus
Source: Brodhead McMichaels Creeks Watershed Act 167 Stormwater Management Ordinance 2/23/04

The Monroe County Conservation District recognizes the need to address the problem of non-point source pollution impacts caused by runoff from impervious surfaces. The new stormwater policy being integrated into Act 167 Stormwater Management regulations by the Pennsylvania Department of Environmental Protection (DEP) will make non-point pollution controls an important component of all future plans and updates to existing plans. In addition, to meet post-construction anti-degradation standards under the state National Pollution Discharge Elimination System (NPDES) permitting program, applicants will be required to employ best management practices (BMPs) to address non-point pollution concerns.

Studies conducted throughout the United States have shown that wet basins and in particular constructed wetlands are effective in traditional stormwater management areas such as channel stability and flood control, and are one of the most effective ways to remove stormwater pollutants (United States Environmental Protection Agency, 1991, Center for Watershed Protection, 2000). From Maryland to Oregon, studies have shown that as urbanization and impervious surface increase in a watershed, the streams in those watersheds become degraded (CWP 2000). Although there is debate over the threshold of impervious cover when degradation becomes apparent (some studies show as little as 6 percent while others show closer to 20 percent), there is agreement that impervious surfaces cause nonpoint pollution in urban and urbanizing watersheds, and that degradation is ensured if stormwater BMPs are not implemented.

Although constructed wetlands and ponds are desirable from a water quality perspective there may be concerns about the possibility of these stormwater management structures becoming breeding grounds for mosquitoes. The Conservation District feels that although it may be a valid concern, municipalities should not adopt ordinance provisions prohibiting wet basins for stormwater management.

Mosquitoes

The questions surrounding mosquito production in wetlands and ponds have intensified in recent years by the outbreak of the mosquito-borne West Nile Virus. As is the case with all vector-borne maladies, the life cycle of West Nile Virus is complicated, traveling from mosquito to bird, back to mosquito and then to other animals including humans. *Culex pipiens* was identified as the vector species in the first documented cases from New York in 1999. This species is still considered the primary transmitter of the disease across its range. Today there are some 60 species of mosquitoes that inhabit Pennsylvania. Along with *C. pipiens*, three other species have been identified as vectors of West Nile Virus while four more have been identified as potential vectors.
The four known vectors in Northeast Pennsylvania are *Culex pipiens*, *C. restuans*, *C. salinarius*, and *Ochlerotatus japonicus*. All four of these species prefer, and almost exclusively use, artificial containers (old tires, rain gutters, birdbaths, etc.) as larval habitats. In the case of *C. pipiens*, the most notorious of the vector mosquitoes, the dirtier the water the better they like it. The important factor is that these species do not thrive in functioning wetlands where competition for resources and predation by larger aquatic and terrestrial organisms is high.

The remaining four species, *Aedes vexans*, *Ochlerotatus Canadensis*, *O. triseriatus*, and *O. trivittatus* are currently considered potential vectors due to laboratory tests (except the *O. trivittatus*, which did have one confirmed vector pool for West Nile Virus in Pennsylvania during 2002). All four of these species prefer venial habitats and ponded woodland areas following heavy summer rains. These species may be the greatest threat of disease transmission around stormwater basins that pond water for more than four days. This can be mitigated however by establishing ecologically functioning wetlands.

**Stormwater Facilities**

If a stormwater wetland or pond is constructed properly and a diverse ecological community develops, mosquitoes should not become a problem. Wet basins and wetlands constructed as stormwater management facilities, should be designed to attract a diverse wildlife community. If a wetland is planned, proper hydrologic soil conditions and the establishment of hydrophytic vegetation will promote the population of the wetland by amphibians and other mosquito predators. In natural wetlands, predatory insects and amphibians are effective at keeping mosquito populations in check during the larval stage of development while birds and bats prey on adult mosquitoes.

The design of a stormwater wetland must include the selection of hydrophytic plant species for their pollutant uptake capabilities and for not contributing to the potential for vector mosquito breeding. In particular, species of emergent vegetation with little submerged growth are preferable. By limiting the vegetation growing below the water surface, larvae lose protective cover and there is less chance of anaerobic conditions occurring in the water.

Stormwater ponds can be designed for multiple purposes. When incorporated into an open space design a pond can serve as a stormwater management facility and a community amenity. Aeration fountains and stocked fish should be added to keep larval mosquito populations in check.

Publications from the Pennsylvania Department of Health and the Penn State Cooperative Extension concerning West Nile Virus identify aggressive public education about the risks posed by standing water in artificial containers (tires, trash cans, rain gutters, bird baths) as the most effective method to control vector mosquitoes.

**Conclusion**

The Conservation District understands the pressure faced by municipalities when dealing with multifaceted issues such as stormwater management and encourages the incorporation of water quality management techniques into stormwater designs. As Monroe County continues to grow, conservation design, groundwater recharge and constructed wetlands and ponds should be among the preferred design options to reduce the impacts of increases in impervious surfaces. When designed and constructed appropriately, the runoff mitigation benefits to the community from these design options will far out weigh their potential to become breeding grounds for mosquitoes.
Appendix 23-1-G

References

BMP Manuals

California

Georgia

Maryland
2000 Maryland Stormwater Design Manual—
http://www.mde.state.md.us/Programs/Waterprograms/SedimentandStormwater/stormwater_design/index.asp

Massachusetts

Minnesota

New Jersey
Revised Manual for New Jersey: Best Management Practices for Control of Non-point Source Pollution from Stormwater (Fifth Draft May 2000)—
http://www.state.nj.us/dep/watershedmgt/bmpmanual.htm

New York
http://www.dec.state.ny.us/website/dow/swmanual/swmanual.html

Pennsylvania

http://www.depweb.state.pa.us/watershedmgmt/cwp/view.asp?a=1437&q=518682

Washington
Stormwater Management Manual for Western Washington (August 2001)—
Federal

USEPA Infiltration Trench Fact Sheet (September 1999)–http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

Precipitation Frequency Data Reference

Precipitation Frequency Data Server (NOAA Atlas 14), National Oceanic and Atmospheric Administration (NOAH), Hydrometeorological Design Studies Center–http://hdsc.nws.noaa.gov/hdsc/pfds/

Riparian Buffer References

Alliance for the Chesapeake Bay, Pennsylvania Department of Environmental Protection, September 2000. Forest Buffer Toolkit, Stream ReLeaf Program.


Part 2

Swamp Creek Watershed Stormwater Management Ordinance

A. General Provisions

§23-201. Short Title.

This Part shall be known as the “Douglass Township Stormwater Management Ordinance for the Swamp Creek Watershed.”

(Ord. 2007-6, 6/5/2007, §101)


The Board of Supervisors of Douglass Township, Berks County, finds that:

A. Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of existing streams and storm sewers, greatly increases the cost of public facilities to convey and manage stormwater, undermines floodplain management and flood reduction efforts in upstream and downstream communities, reduces groundwater recharge, and threatens public health and safety.

B. Inadequate planning and management of stormwater runoff resulting from land development 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, 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 Township and all of 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 baseflow 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 stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).

H. Nonstormwater discharges to Township separate storm sewer systems can contribute to pollution of waters of the Commonwealth by the Township.

(Ord. 2007-6, 6/5/2007, §102)

§23-203. 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 minimizing the impacts described in §23-202 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 runoff 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 baseflows and quality of streams and watercourses, where possible.

K. Meet legal water quality requirements under State law, including regulations at 25 Pa.Code §93.4.a requiring protection and maintenance of “existing uses” and maintenance of the level of water quality to support those uses in all streams, and the protection and maintenance of water quality in “special protection” streams.

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 nonstormwater discharges into the Township's separate storm sewer system.
§23-203 Stormwater Management

O. Preserve the flood-carrying capacity of streams.

P. Prevent scour and erosion of stream banks and stream beds.

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 Township.

(Ord. 2007-6, 6/5/2007, §103)

§23-204 Statutory Authority.

The Township is empowered to regulate land use activities that affect runoff and surface and groundwater quality and quantity by the authority of:

A. Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. §680.1 et seq., as amended, the “Stormwater Management Act” (hereinafter referred to as “the Act”).


C. First Class Township Code, 53 P.S. §55101 et seq., Second Class Township Code, 53 P.S. §§66501 et seq., 66601 et seq., and the Borough Code, 53 P.S. §46201 et seq.


(Ord. 2007-6, 6/5/2007, §104)

§23-205 Applicability/Regulated Activities.

1. This Part shall apply to all areas of the Township within the Swamp Creek watershed.

2. This Part contains only the stormwater management performance standards and design criteria that are necessary or desirable from a watershed-wide perspective. Local stormwater management design criteria (e.g., inlet spacing, inlet type, collection system design and details, outlet structure design, etc.) shall continue to be regulated by the applicable Township ordinances and applicable State regulations.

3. The following activities are defined as “regulated activities” and shall be regulated by this Part unless exempted by §23-206:

A. Land development.

B. Subdivisions.

C. Alteration of the natural hydrologic regime.

D. Construction or reconstruction of or addition of new impervious or semi-pervious surfaces (i.e., driveways, parking lots, roads, etc.).

E. Construction of new buildings or additions to existing buildings.

F. Redevelopment.

G. Diversion piping or encroachments in any natural or man-made channel.

H. Nonstructural and structural stormwater management BMPs or appurtenances thereto.

I. Earth disturbance activities of greater than 5,000 square feet.
§23-205 Township of Douglass §23-205

J. Any of the above regulated activities that were approved more than 5 years prior to the effective date of this Part and resubmitted for Township approval.

K. Prohibited or polluted discharges.

L. Any other activities that may affect stormwater runoff.

4. Table 23-205 summarizes the applicability requirements of this Part. “Proposed Impervious Surface” in Table 23-205 includes new, additional, or replacement impervious surface/cover. Repaving existing surfaces without reconstruction does not constitute “replacement.”
## Table 23-205
Ordinance Applicability

<table>
<thead>
<tr>
<th>Subpart or Section</th>
<th>Type of Project</th>
<th>Proposed Impervious Surface</th>
<th>Earth Disturbance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>0–1,000 sq. ft.</td>
<td>1,000–5,000 sq. ft.</td>
</tr>
<tr>
<td>Part 2C</td>
<td>Development</td>
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<td>Modified</td>
</tr>
<tr>
<td>Drainage Plan Requirements</td>
<td>Redevelopment</td>
<td>N/A</td>
<td>Modified</td>
</tr>
<tr>
<td>§23-234</td>
<td>Development</td>
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<td>Yes</td>
</tr>
<tr>
<td>Non-structural Project Design</td>
<td>Redevelopment</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>§23-235</td>
<td>Development</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>Groundwater Recharge</td>
<td>Redevelopment</td>
<td>N/A</td>
<td>Yes</td>
</tr>
<tr>
<td>§23-236</td>
<td>Development</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Water Quality Requirements</td>
<td>Redevelopment</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>§23-237</td>
<td>Development</td>
<td>N/A</td>
<td>Exempt</td>
</tr>
<tr>
<td>Stream Bank Erosion Requirements</td>
<td>Redevelopment</td>
<td>N/A</td>
<td>Exempt</td>
</tr>
<tr>
<td>§23-238</td>
<td>Development</td>
<td>N/A</td>
<td>Exempt</td>
</tr>
<tr>
<td>Stormwater Peak Rate Control and Management Districts</td>
<td>Redevelopment</td>
<td>N/A</td>
<td>Exempt</td>
</tr>
<tr>
<td>Erosion and Sediment Pollution Control Plan Submission to the Conservation District</td>
<td>Earth Disturbance</td>
<td>See Earth Disturbance Requirements</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Refer to Township earth disturbance requirements, as applicable

**Legend:**
- Yes - Drainage plan required with associated Section provision.
- N/A - Not applicable–exempt from drainage plan submission.
- Exempt - Exempt from required Section provision–Drainage plan submission may still be required if other Section provisions are applicable (yes in box).
- Modified - Modified drainage plan required:
  - Sites with less than 1,000 square feet of impervious surface, but between 5,000 square feet and 1 acre of earth disturbance must submit a drainage plan to the Township which need only consist of the items in §§23-222.A.2 and A.4; 23-222.B.7., B.8, B.11, and B.22; and 23-222.D.1 and .D.3 and related supportive material needed to determine compliance with §§23-234 and 23-238.
  - Sites with more than 1,000 square feet, but less than 5,000 square feet of impervious surface must submit a drainage plan; however, it need not consist of the items in §§23-234 and 23-238.

This Part applies to any earth disturbance activity greater than or equal to 5,000 square feet that is associated with a development or redevelopment project. Earth disturbance activities of less than 1 acre that are associated with redevelopment projects are exempt from the §23-237 stream bank erosion requirements. Earth disturbance activities and associated stormwater management controls are also regulated under existing State law and implementing regulations. This Part shall operate in coordination with those parallel requirements; the requirements of this Part shall be no less restrictive in meeting the purposes of this Part than State law.

*(Ord. 2007-6, 6/5/2007, §105)*

1. Exemptions for Land Use Activities. The following land use activities are exempt from the drainage plan submission 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 sedimentation control plan approved by the 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 that result in a net increase in earth disturbance of greater than 5,000 square feet shall be subject to the provisions of this Part.

   C. Forest management operations that are following the Department of Environmental Protection’s (DEP) management practices contained in its publication “Soil Erosion and Sedimentation Control Guidelines for Forestry” and are operating under an approved erosion and sedimentation plan and must comply with the stream buffer requirements in §23-236.G.

   D. Road replacement, development, or redevelopment that has less than 1,000 square feet of new, additional, or replaced impervious surface/cover, or in the case of earth disturbance only, less than 5,000 square feet of disturbance, is exempt from this Part.

2. Exemptions for Land Development Activities.

   A. The following land development and earthmoving activities are exempt from the drainage plan submission requirements of this Part:

      (1) A maximum of 1,000 square feet of new, additional, or replacement proposed impervious surface. Or in the case of earth disturbance resulting in less than 1,000 square feet of impervious cover (as noted above).

      (2) Up to a maximum of 5,000 square feet of disturbed earth. These criteria shall apply to the total development even if the development is to take place in phases. The date of the Township ordinance adoption shall be the starting point from which to consider tracts as “parent tracts” upon which future subdivisions and respective earth disturbance computations shall be cumulatively considered.

   B. The activities exempted above are still encouraged to implement the voluntary stormwater management practices as indicated in Appendix 23-2-B.

3. Additional Exemption Criteria:

   A. Exemption Responsibilities. An exemption shall not relieve the applicant from implementing such measures as are necessary to protect public health, safety, and property.

   B. HQ and EV Streams. An exemption shall not relieve the applicant from meeting the special requirements for watersheds draining to identified high quality (HQ) or exceptional value (EV) waters and source water protection areas (SWPA) and requirements for nonstructural project design sequencing (§23-234).

   C. Drainage Problems. If a drainage problem is documented or known to exist downstream of or is expected from the proposed activity, then the Township may
require the applicant to comply with this Part.

D. **Emergency Exemption.** Emergency maintenance work performed for the protection of public health, safety, and welfare. A written description of the scope and extent of any emergency work performed shall be submitted to Douglass Township within 2 calendar days of the commencement of the activity. If Douglass Township finds that the work is not an emergency, then the work shall cease immediately, and the requirements of this Part shall be addressed as applicable.

E. **Maintenance Exemption.** Any maintenance to an existing stormwater management system made in accordance with plans and specifications approved by the Township Engineer or Douglass Township.

F. Even though the developer is exempt, he is not relieved from complying with other regulations.


§23-207. **Compatibility with Other Ordinances or Legal Requirements.**

1. 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.

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

3. Nothing in this Part shall be construed to affect any of the Township’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 Township ordinances or regulations shall be construed to retain the requirements of this Part addressing State water quality requirements.

§23-211. Interpretation.

For the purposes of this Part, certain terms and words used herein shall be interpreted as follows:

A. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.

B. The word “includes” or “including” shall not limit the term to the specific example, but is intended to extend its meaning to all other instances of like kind and character.

C. The word “person” includes an individual, firm, association, organization, partnership, trust, company, corporation, unit of government, or any other similar entity.

D. The words “shall” and “must” are mandatory; the words “may” and “should” are permissive.

E. The words “used” or “occupied” include the words “intended, designed, maintained, or arranged to be used, occupied, or maintained.”

(Ord. 2007-6, 6/5/2007, §201)

§23-212. Definitions.

Accelerated erosion—the removal of the surface of the land through the combined action of man’s activity and the natural processes of a rate greater than would occur because of the natural process alone.

Agricultural activities—the work of producing crops and raising livestock including tillage, plowing, disking, harrowing, pasturing, mushroom growing, nursery, and sod operations and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

Alteration—as applied to land, a change in topography as a result of the moving of soil and rock from one location or position to another; also, the changing of surface conditions by causing the surface to be more or less impervious; land disturbance.

Applicant—a person who has filed an application for approval to engage in any regulated activity defined in §23-205 of this Part.

As-built drawings—engineering or site drawings maintained by the contractor as he constructs the project and upon which he documents the actual locations of the building components and changes to the original contract documents. These documents, or a copy of same, are turned over to the Township Engineer at the completion of the project.

Bankfull—the channel at the top-of-bank or point from where water begins to overflow onto a floodplain.

Baseflow—portion of stream discharge derived from groundwater; the sustained discharge that does not result from direct runoff or from water diversions, reservoir releases, piped discharges, or other human activities.
§23-212 Township of Douglass §23-212

*Bioretention*–a stormwater retention area that utilizes woody and herbaceous plants and soils to remove pollutants before infiltration occurs.

*BMP (best management practice)*–methods, measures, or practices used to prevent or reduce surface runoff and/or water pollution including, but not limited to, structural and nonstructural stormwater management practices and operation and maintenance procedures. See also “nonstructural best management practice (BMP).”

*Buffer*–the area of land immediately adjacent to any stream, measured perpendicular to and horizontally from the top-of-bank on both sides of a stream (see “top-of-bank”).

*Channel*–an open drainage feature through which stormwater flows. Channels include, but shall not be limited to, natural and man-made drainageways, swales, streams, ditches, canals, and pipes flowing partly full.

*Channel erosion*–the widening, deepening, or headward cutting of channels and waterways caused by stormwater runoff or bankfull flows.

*Cistern*–an underground reservoir or tank for storing rainwater.

*Conservation District*–the Berks County Conservation District.

*Conveyance*–a facility or structure used for the transportation or transmission of something from one place to another.

*Culvert*–a structure with its appurtenant works that carries water under or through an embankment or fill.

*Dam*–a man-made barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water or another fluid or semifluid. A dam may include a refuse bank, fill, or structure for highway, railroad, or other purposes which impounds or may impound water or another fluid or semifluid.

*Department*–the Pennsylvania Department of Environmental Protection.

*Designee*–the agent of the Berks County Planning Commission, Berks County Conservation District, and/or agent of the Board of Supervisors involved with the administration, review, or enforcement of any provisions of this Part by contract or memorandum of understanding.

*Design professional (qualified)*–a Pennsylvania registered professional engineer, registered landscape architect, or registered professional land surveyor trained to develop stormwater management plans.

*Design storm*–the magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g., a 5-year storm) and duration (e.g., 24 hours), used in the design and evaluation of stormwater management systems.

*Detention basin*–an impoundment designed to collect and retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. Detention basins are designed to drain completely soon after a rainfall event and become dry until the next rainfall event.

*Developer*–a person who seeks to undertake any regulated earth disturbance activities at a project site in the Township.

*Development*–any human-induced change to improved or unimproved real estate, whether public or private including, but not limited to, land development, construction, installation, or expansion of a building or other structure, land division, street
construction, drilling, and site alteration such as embankments, dredging, grubbing, grading, paving, parking or storage facilities, excavation, filling, stockpiling, or clearing. As used in this Part, development encompasses both new development and redevelopment.

**Development site**—the specific tract or parcel of land where any regulated activity set forth in §23-205 is planned, conducted, or maintained.

**Diameter at breast height (DBH)**—the outside bark diameter at breast height which is defined as 4½ feet (1.37m) above the forest floor on the uphill side of the tree.

**Diffused drainage discharge**—drainage discharge that is not confined to a single point location or channel, including sheet flow or shallow concentrated flow.

**Discharge**—(A) (verb) to release water from a project, site, aquifer, drainage basin, or other point of interest; (B) (noun) the rate and volume of flow of water such as in a stream, generally expressed in cubic feet per second. (See “peak discharge.”)

**Discharge point**—the point of discharge for a stormwater facility.

**Disturbed areas**—unstabilized land area where an earth disturbance activity is occurring or has occurred.

**Ditch**—a man-made waterway constructed for irrigation or stormwater conveyance purposes.

**Downslope property line**—that portion of the property line of the lot, tract, or parcels of land being developed, located such that overland or pipe flow from the project site would be directed towards it by gravity.

**Drainage conveyance facility**—a stormwater management facility designed to transport stormwater runoff that includes channels, swales, pipes, conduits, culverts, and storm sewers.

**Drainage easement**—a right granted by a landowner to a grantee allowing the use of private land for stormwater management purposes.

**Drainage permit**—a permit issued by the Township after the drainage plan has been approved.

**Drainage plan**—the documentation of the stormwater management system, if any, to be used for a given development site, the contents of which are established in §23-222.

**Earth disturbance activity**—a construction or other human activity which disturbs the surface of land including, but not limited to, clearing and grubbing, grading, excavations, embankments, land development, agricultural plowing or tilling, timber harvesting activities, road maintenance activities, mineral extraction, and the moving, depositing, stockpiling, or storing of soil, rock, or earth materials.

**Emergency spillway**—a conveyance area that is used to pass peak discharge greater than the maximum design storm controlled by the stormwater facility.

**Encroachment**—a structure or activity that changes, expands, or diminishes the course, current, or cross-section of a watercourse, floodway, or body of water.

**Erosion**—the process by which the surface of the land, including water/stream channels, is worn away by water, wind, or chemical action.

**Erosion and sediment control plan**—a plan that is designed to minimize accelerated erosion and sedimentation. Said plan must be submitted to and approved by the
appropriate Conservation District before construction can begin.

Exceptional value waters—surface waters of high quality that satisfy Pennsylvania Code, Title 25, “Environmental Protection,” Chapter 93, “Water Quality Standards,” §93.4b(b) (relating to antidegradation).

Existing conditions—the initial condition of a project site prior to the proposed alteration. If the initial condition of the site is undeveloped land, the land use shall be considered as “meadow” unless the natural land cover is proven to generate a lower curve number or Rational “c” value, such as forested lands.

Flood—a temporary condition of partial or complete inundation of land areas from the overflow of streams, rivers, and other waters of this Commonwealth.

Floodplain—any land area susceptible to inundation by water from any natural source or as delineated by the applicable Department of Housing and Urban Development, Federal Insurance Administration Flood Hazard Boundary Map as being a special flood hazard area.

Floodway—the channel of a watercourse and those portions of the adjoining floodplains that are reasonably required to carry and discharge the 100-year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by the Federal Emergency Management Agency (FEMA). In an area where no FEMA maps or studies have defined the boundary of the 100-year frequency floodway, it is assumed, absent evidence to the contrary, that the floodway extends from the stream to 50 feet from the top-of-bank.

Fluvial geomorphology—the study of landforms associated with river channels and the processes that form them.

Forest management/timber operations—planning and associated activities necessary for the management of forest lands. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, and reforestation.

Freeboard—a vertical distance between the elevation of the design high-water and the top of a dam, levee, tank, basin, swale, or diversion berm. The space is required as a safety margin in a pond or basin.

Grade—(A) (noun) a slope, usually of a road, channel, or natural ground specified in percent and shown on plans as specified herein. (B) (verb) to finish the surface of a roadbed, the top of an embankment, or the bottom of an excavation.

Grassed waterway—a natural or man-made waterway, usually broad and shallow, covered with erosion-resistant grasses used to convey surface water.

Groundwater—water beneath the Earth’s surface that supplies wells and springs and is often between saturated soil and rock.

Groundwater recharge—the replenishment of existing natural underground water supplies from rain or overland flow.

High quality waters—surface waters having quality which exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water by satisfying Pennsylvania Code, Title 25, “Environmental Protection,” Chapter 93, “Water Quality Standards,” §93.4b(a).

Hotspots—areas where land use or activities generate highly contaminated runoff,
with concentrations of pollutants in excess of those typically found in stormwater.

Hydrograph—a graph representing the discharge of water versus time for a selected point in the drainage system.

Hydrologic regime—the hydrologic cycle or balance that sustains quality and quantity of stormwater, baseflow, storage, and groundwater supplies under natural conditions.

Hydrologic soil group—a classification of soils by the Natural Resources Conservation Service (NRCS), formerly the Soil Conservation Service (SCS), into four runoff potential groups. The groups range from A soils, which are very permeable and produce little runoff, to D soils, which are not very permeable and produce much more runoff.

Impervious surface—a surface that prevents the infiltration of water into the ground. Impervious surfaces include, but are not limited to, streets, sidewalks, pavements, driveway areas, or roofs. Any surface areas designed to be gravel or crushed stone shall be regarded as impervious surfaces.

Impoundment—a retention or detention basin designed to retain stormwater runoff and release it at a controlled rate.

Infill—development that occurs on smaller parcels that remain undeveloped but are within or in very close proximity to urban or densely developed areas. Infill development usually relies on existing infrastructure and does not require an extension of water, sewer, or other public utilities.

Infiltration—movement of surface water into the soil, where it is absorbed by plant roots, evaporated into the atmosphere, or percolated downward to recharge groundwater.

Infiltration structures—a structure designed to direct runoff into the underground water (e.g., french drains, seepage pits, or seepage trenches).

Inflow—the flow entering the stormwater management facility and/or BMP.

Inlet—the upstream end of any structure through which water may flow.

Intermittent stream—a stream that flows only part of the time. Flow generally occurs for several weeks or months in response to seasonal precipitation or groundwater discharge.

Invert—the lowest surface, the floor or bottom of a culvert, drain, sewer, channel, basin, BMP, or orifice.

Land development—any of the following activities:

A. The improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving:
   (1) A group of two 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.
   (2) The division or allocation of land or space, whether initially or cumulatively, between or among two 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.
C. Development in accordance with §503(1.1) of the Pennsylvania Municipalities Planning Code, 53 P.S. §10503(1.1).

**Limiting zone**—a soil horizon or condition in the soil profile or underlying strata that includes one of the following:

A. A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil mottling.

B. A rock with open joints, fracture or solution channels, or masses of loose rock fragments, including gravel, with insufficient fine soil to fill the voids between the fragments.

C. A rock formation, other stratum, or soil condition that is so slowly permeable that it effectively limits downward passage of water.

**Lot**—a designated parcel, tract, or area of land established by a plat or otherwise as permitted by law and to be used, developed, or built upon as a unit.

**Main stem (main channel)**—any stream segment or other runoff conveyance used as a reach in watershed-specific hydrologic models.

**Manning equation (Manning formula)**—a method for calculation of velocity of flow (e.g., feet per second) and flow rate (e.g., cubic feet per second) in open channels based upon channel shape, roughness, depth of flow, and slope. “Open channels” may include closed conduits so long as the flow is not under pressure.

**Maximum design storm**—the maximum (largest) design storm that is controlled by the stormwater facility.

**Natural condition**—pre-development condition.

**Natural hydrologic regime**—see “hydrologic regime.”

**Natural recharge area**—undisturbed surface area or depression where stormwater collects and a portion of which infiltrates and replenishes the underground and groundwater.

**Nonpoint source pollution**—pollution that enters a waterbody from diffuse origins in the watershed and does not result from discernible, confined, or discrete conveyances.

**Nonstormwater discharges**—water flowing in stormwater collection facilities, such as pipes or swales, which is not the result of a rainfall event or snowmelt.

**Nonstructural best management practice (BMPs)**—methods of controlling stormwater runoff quantity and quality, such as innovative site planning, impervious area and grading reduction, protection of natural depression areas, temporary ponding on site, and other techniques.

**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.

**NRCS**—Natural Resource Conservation Service (previously SCS).

**Open channel**—a conveyance channel that is not enclosed.

**Outfall**—“point source” as described in 40 CFR §122.2 at the point where the Township’s storm sewer system discharges to surface waters of the Commonwealth.

**Outflow**—the flow exiting the stormwater management facility and/or BMP.

**Outlet**—points of water disposal to a stream, river, lake, tidewater, or artificial
drain.

*Parent tract*—the parcel of land from which a land development or subdivision originates, determined from the date of Township adoption of this Part.

*Parking lot storage*—involves the use of parking areas as temporary impoundments with controlled release rates during rainstorms.

*Peak discharge*—the maximum rate of stormwater runoff from a specific storm event.

*Penn State runoff model*—the computer-based hydrologic model developed at Pennsylvania State University.

*Pipe*—a culvert, closed conduit, or similar structure (including appurtenances) that conveys stormwater.

*Planning Commission*—the Planning Commission of Douglass Township, Berks County.

*Point source*—any discernible, 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.

*Post-construction*—period after construction during which disturbed areas are stabilized, stormwater controls are in place and functioning, and all proposed improvements in the approved land development plan are completed.

*Pre-construction*—prior to commencing construction activities.

*Pre-development Condition*—undeveloped/natural condition.

*Pretreatment*—techniques employed in stormwater BMPs to provide storage or filtering to trap coarse materials and other pollutants before they enter the system, but not necessarily designed to meet the water quality volume requirements of §23-236.

*Project site*—the specific area of land where any regulated activities in the Township are planned, conducted, or maintained.

*Rational formula*—a rainfall-runoff relation used to estimate peak flow.

*Reach*—any stream segment or other runoff conveyance used in the watershed-specific hydrologic models.

*Recharge*—the replenishment of groundwater through the infiltration of rainfall, other surface waters, or land application of water or treated wastewater.

*Reconstruction*—demolition and subsequent rebuilding of impervious surface.

*Record Drawings*—original documents revised to suit the as-built conditions and subsequently provided by the Engineer to the client. The Engineer reviews the contractor's as-builts against his/her own records for completeness, then either turns these over to the client or transfers the information to a set of reproducibles, in both cases for the client’s permanent records.

*Redevelopment*—any development that requires demolition or removal of existing structures or impervious surfaces at a site and replacement with new impervious surfaces. Maintenance activities such as top-layer grinding and re-paving are not considered to be redevelopment. Interior remodeling projects and tenant improvements are also not considered to be redevelopment.

*Regulated activities*—actions or proposed actions that have an impact on stormwater
runoff quality or quantity and that are specified in §23-205 of this Part.

Regulated earth disturbance activity—defined under NPDES Phase II regulations as earth disturbance activity of 1 acre or more with a point source discharge to surface waters or the Township’s storm sewer system or 5 acres or more regardless of the planned runoff. This includes earth disturbance on any portion of, part, or during any stage of a larger common plan of development.

Release rate—the percentage of existing conditions peak rate of runoff from a site or subarea to which the proposed conditions peak rate of runoff must be reduced to protect downstream areas.

Repaving—replacement of the impervious surface that does not involve reconstruction of an existing paved (impervious) surface.

Replacement paving—reconstruction of and full replacement of an existing paved (impervious) surface.

Retention basin—a structure in which stormwater is stored and not released during the storm event. Retention basins are designed for infiltration purposes and do not have an outlet. The retention basin must infiltrate stored water in 4 days or less.

Return period—the average interval, in years, within which a storm event of a given magnitude can be expected to recur. For example, the 25-year return period rainfall would be expected to recur on the average of once every 25 years.

Riser—a vertical pipe extending from the bottom of a pond that is used to control the discharge rate from the pond for a specified design storm.

Road maintenance—earth disturbance activities within the existing road cross-section, such as grading and repairing existing unpaved road surfaces, cutting road banks, cleaning or clearing drainage ditches, and other similar activities.

Roof drains—a drainage conduit or pipe that collects water runoff from a roof and leads it away from the structure.

Rooftop detention—the temporary ponding and gradual release of stormwater falling directly onto flat roof surfaces using controlled-flow roof drains in building designs.

Runoff—any part of precipitation that flows over the land surface.

SALDO—Subdivision and Land Development Ordinance [Chapter 22].

Sediment basin—a barrier, dam, or retention or detention basin located and designed in such a way as to retain rock, sand, gravel, silt, or other material transported by water during construction.

Sediment pollution—the placement, discharge, or any other introduction of sediment into the waters of the Commonwealth.

Sedimentation—the process by which mineral or organic matter is accumulated or deposited by the movement of water or air.

Seepage pit/seeage trench—an area of excavated earth filled with loose stone or similar coarse material into which surface water is directed for infiltration into the underground water.

Separate storm sewer system—a conveyance or system of conveyances (including roads with drainage systems, Township streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) primarily used for collecting and conveying
stormwater runoff.

Shallow concentrated flow—stormwater runoff flowing in shallow, defined ruts prior to entering a defined channel or waterway.

Sheet flow—a flow process associated with broad, shallow water movement on sloping ground surfaces that is not channelized or concentrated.

Soil Cover Complex Method—a method of runoff computation developed by NRCS that is based on relating soil type and land use/cover to a runoff parameter called curve number (CN).

Source water protection areas (SWPA)—the zone through which contaminants, if present, are likely to migrate and reach a drinking water well or surface water intake.

Special protection subwatersheds—watersheds that have been designated by DEP as EV or HQ waters.

Spillway—a conveyance that is used to pass the peak discharge of the maximum design storm that is controlled by the stormwater facility.

State water quality requirements—the regulatory requirements to protect, maintain, reclaim, and restore water quality under Pa.Code, Title 25, and the Clean Streams law.

Storage indication method—a reservoir routing procedure based on solution of the continuity equation (inflow minus outflow equals the change in storage) with outflow defined as a function of storage volume and depth.

Storm frequency—the number of times that a given storm “event” occurs or is exceeded on the average in a stated period of years. (See “return period.”)

Storm sewer—a system of pipes and/or open channels that conveys intercepted runoff and stormwater from other sources but excludes domestic sewage and industrial wastes.

Stormwater—the surface runoff generated by precipitation reaching the ground surface.

Stormwater management district—those subareas of a watershed in which some type of detention is required to meet the plan requirements and the goals of Act 167.

Stormwater management facility—any structure, natural or man-made, that, due to its condition, design, or construction, conveys, stores, or otherwise affects stormwater runoff quality, rate, or quantity. Typical stormwater management facilities include, but are not limited to, detention and retention basins, open channels, storm sewers, pipes, and infiltration structures.

Stormwater Management Plan—the watershed plan, known as the “Swamp Creek Watershed Act 167 Stormwater Management Plan,” for managing those land use activities that will influence stormwater runoff quality and quantity and that would impact the Swamp Creek watershed adopted by Berks County and Montgomery County as required by the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. §680.1 et seq.

Stormwater management site plan—the plan prepared by the applicant or his representative indicating how stormwater runoff will be managed at the particular site of interest according to this Part.

Stream—a natural watercourse.

Stream buffer—the land area adjacent to each side of a stream essential to
maintaining water quality. (See “buffer.”)

**Stream enclosure**—a bridge, culvert, or other structure in excess of 100 feet in length upstream to downstream which encloses a regulated water of the Commonwealth.

**Subarea (subwatershed)**—the smallest drainage unit of a watershed for which stormwater management criteria have been established in the stormwater management plan.

**Subdivision**—the division or redission of a lot, tract, or parcel of land by any means into two 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, partition by the court for distribution to heirs or devisees, transfer of ownership, or building or lot development; provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than 10 acres not involving any new street or easement of access or any residential dwelling shall be exempted.

**Surface waters of the Commonwealth**—any and all rivers, streams, creeks, rivulets, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface waters, or parts thereof, whether natural or artificial, within or on the boundaries of the Commonwealth.

**Swale**—a low-lying stretch of land that gathers or carries surface water runoff.

**Timber operations**—see “forest management.”

**Time of concentration (Tc)**—the time required for surface runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. This time is the combined total of overland flow time and flow time in pipes or channels, if any.

**Top-of-bank**—highest point of elevation in a stream channel cross-section at which a rising water level just begins to flow out of the channel and over the floodplain.

**Township**—Douglass Township, Berks County, Pennsylvania.

**Township Engineer**—a professional engineer licensed as such in the Commonwealth of Pennsylvania, duly appointed as the Engineer for a Township, planning agency, or joint planning commission.

**Undeveloped condition**—natural condition. (See also “pre-development condition.”)

**Vernal pond**—seasonal depressional wetlands that are covered by shallow water for variable periods from winter to spring but may be completely dry for most of the summer and fall.

**Watercourse**—a channel or conveyance of surface water having a defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

**Waters of the Commonwealth**—any and all rivers, streams, creeks, rivulets, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of the Commonwealth.

**Watershed**—region or area drained by a river, watercourse, or other body of water, whether natural or artificial.

**Wellhead**—(A) a structure built over a well, (B) the source of water for a well.

**Wellhead protection area**—the surface and subsurface area surrounding a water
supply well, well field, or spring supplying a public water system through which contaminants are reasonably likely to move toward and reach the water source.

Wet basin—pond for urban runoff management that is designed to detain urban runoff and always contains water.

Wetland—those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, fens, and similar areas.

Woods—a natural groundcover with more than one viable tree of a DBH of 6 inches or greater per 1,500 square feet which existed within 3 years of application; a cover condition for which SCS curve numbers have been assigned or to which equivalent Rational Method runoff coefficients have been assigned.

(Ord. 2007-6, 6/5/2007, §202)
C. Drainage Plan Requirements

§23-221. General Requirements.

For any of the activities regulated by this Part, the preliminary or final approval of subdivision and/or land development plans, the issuance of any building or occupancy permit, or the commencement of any earth disturbance activity may not proceed until the property owner or applicant or his/her agent has received written approval of a drainage plan from the Township, obtained an NPDES permit for stormwater discharges associated with construction activities, if greater than 1 acre of land disturbance, from the local Conservation District and/or DEP, and an adequate erosion and sediment control plan review by the Conservation District.

(Ord. 2007-6, 6/5/2007, §301)

§23-222. Drainage Plan Contents.

The drainage plan shall consist of a general description of the project including sequencing items described in §23-234, calculations, maps, and plans. A note on the maps shall refer to the associated computations and erosion and sediment control plan by title and date. The cover sheet of the computations, erosion and sediment control plan, and post-construction stormwater management (PCSWM) plan shall refer to the associated maps by title and date. All drainage plan materials shall be submitted to the Township in a format that is clear, concise, legible, neat, and well organized; otherwise, the drainage plan shall not be accepted for review and shall be returned to the applicant. The following items shall be included in the drainage plan:

A. General.

   (1) General description of the project including those areas described in §23-234.2.
   (2) General description of proposed permanent stormwater management techniques, including construction specifications of the materials to be used for stormwater management facilities.
   (3) Complete hydrologic, hydraulic, and structural computations for all stormwater management facilities.
   (4) An erosion and sediment control plan, including all reviews and letters of adequacy from the Conservation District.
   (5) A general description of proposed nonpoint source pollution controls.
   (6) The drainage plan application and completed fee schedule form and associated fee (Appendix 23-2-C-1).
   (7) The drainage plan checklist (Appendix 23-2-C-2).

B. Maps. Map(s) of the project area shall be submitted on 24-inch by 36-inch sheets and/or shall be prepared in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Berks County. If the SALDO [Chapter 22] has more stringent criteria than this Part, then the more stringent criteria shall apply. The contents of the map(s) shall include, but not be limited to:

   (1) The location of the project relative to highways, Township boundaries, or other identifiable landmarks.
(2) Existing contours at intervals of 2 feet. In areas of slopes greater than 15 percent, 5-foot contour intervals may be used.

(3) Existing streams, lakes, ponds, or other waters of the Commonwealth within the project area.

(4) Other physical features including flood hazard boundaries, stream buffers, existing drainage courses, areas of natural vegetation to be preserved, and the total extent of the upstream area draining through the site.

(5) The locations of all existing and proposed utilities, sanitary sewers, and water lines within 50 feet of property lines.

(6) An overlay showing soil names, boundaries and limitations (in tabular format).

(7) Limits of earth disturbance, including the type and amount of impervious area that would be added.

(8) Proposed structures, roads, paved areas, and buildings.

(9) Final contours at intervals of 2 feet. In areas of steep slopes (greater than 15 percent), 5-foot contour intervals may be used.

(10) The name of the development, the name and address of the owner of the property, and the name of the individual or firm preparing the plan.

(11) The date of submission.

(12) A graphic and written scale of 1 inch equals no more than 50 feet; for tracts of 20 acres or more, the scale shall be 1 inch equals no more than 100 feet.

(13) A north arrow.

(14) The total tract boundary and size with distances marked to the nearest foot and bearings to the nearest degree.

(15) Existing and proposed land use(s).

(16) A key map showing all existing man-made features beyond the property boundary that would be affected by the project.

(17) Location of all open channels, as well as indicating where they are draining after they leave the site (storm sewer, defined drainage swale, stream channel, waters of the Commonwealth, etc.).

(18) Overland drainage patterns and swales.

(19) A 15-foot wide access easement around all stormwater management facilities that would provide ingress to and egress from a public right-of-way.

(20) The location of all erosion and sediment control facilities and all post-construction stormwater management facilities, BMPs, systems, etc.

(21) A note on the plan indicating the location and responsibility for maintenance of stormwater management facilities that would be located off site. All off-site facilities shall meet the performance standards and design criteria specified in this Part.

(22) A statement, signed by the applicant, acknowledging that any revision to the approved post-construction stormwater management plan must be approved by the Township and the Conservation District and/or DEP (if
greater than 1 acre of land disturbance), and that a revised erosion and sediment control plan must be submitted to the Conservation District for a determination of adequacy.

(23) The following signature block for the design engineer:

"I, (Design Engineer), on this date (date of signature), hereby certify that the drainage plan meets all design standards and criteria of Douglass Township Stormwater Management Ordinance."

C. Supplemental Information to Be Submitted to the Township.

(1) A written description of the following information shall be submitted by the applicant and shall include:

(a) The overall stormwater management concept for the project designed in accordance with §23-234.

(b) Stormwater runoff computations as specified in this Part.

(c) Stormwater management techniques to be applied both during and after development.

(d) Expected project time schedule.

(e) Development stages or project phases, if so proposed.

(f) An operations and maintenance plan in accordance with §23-262 of this Part.

(2) An erosion and sediment control plan.

(3) A description of the effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any existing Township stormwater collection system that may receive runoff from the project site.

(4) A declaration of adequacy and highway occupancy permit from the Pennsylvania Department of Transportation (PennDOT) District office when utilization of a PennDOT storm drainage system is proposed.

D. Stormwater Management Facilities.

(1) All PCSWM BMP facilities must be located on a plan and described in detail. The PCSWM plan package should include at a minimum pre- and post-drainage area plans, an overall PCSWM plan, PCSWM details sheets, landscaping or conservation plans, etc.

(2) When infiltration measures such as seepage pits, beds, or trenches are used, the locations of existing and proposed septic tank, infiltration areas and wells must be shown. Minimum setback distances should be identified from water supply wells, septic areas, and any adjacent or down gradient buildings and/ or structures with below grade floors or inhabitable space.

(3) All calculations, assumptions, and criteria used in the design of the stormwater management facilities must be shown.

(Ord. 2007-6, 6/5/2007, §302)


The Township shall require receipt of a complete drainage plan, as specified in this Part.
A. Proof of application or documentation of required permit(s) or approvals for the programs listed below shall be part of the plan:
   (1) NPDES permit for stormwater discharges from construction activities.
   (2) DEP joint permit application.
   (3) PennDOT highway occupancy permit.
   (6) Any other permit under applicable State or Federal regulations.
B. The plan shall be coordinated with the State and Federal permit process and the Township SALDO review process.
C. For projects that require SALDO approval, the drainage plan shall be submitted by the applicant as part of the preliminary plan submission where applicable for the regulated activity.
D. For regulated activities that do not require SALDO approval, see §23-221, “General Requirements.”
E. Six copies of the drainage plan shall be submitted and distributed as follows:
   (1) Two copies to the Township accompanied by the requisite Township review fee, as specified in this Part.
   (2) Two copies to the County Conservation District.
   (3) One copy to the Township Engineer.
   (4) One copy to the County Planning Commission/Department.
F. Any submissions to the agencies listed above that are found to be incomplete shall not be accepted for review and shall be returned to the applicant with a notification in writing of the specific manner in which the submission is incomplete.

(Ord. 2007-6, 6/5/2007, §303)

§23-224. Drainage Plan Review.

1. The Township Engineer shall review the drainage plan for consistency with this Part and the respective Act 167 Stormwater Management Plan. Any found incomplete shall not be accepted for review and shall be returned to the applicant.
2. The Township Engineer shall review the drainage plan for any subdivision or land development against the Township SALDO provisions not otherwise superseded by this Part.
3. The Conservation District, in accordance with established criteria and procedures, shall review the drainage plan for consistency with stormwater management and erosion and sediment pollution control requirements and provide comments to the Township. Such comments shall be considered by the Township prior to final approval of the drainage plan.
4. For activities regulated by this Part, the Township Engineer shall notify the applicant and the Township in writing, within 30 calendar days, whether the drainage
plan is consistent with the Act 167 Stormwater Management Plan.

A. If the Township Engineer determines that the drainage plan is consistent with the Act 167 Stormwater Management Plan, the Township Engineer shall forward a letter of consistency to the Township Secretary who will then forward a copy to the applicant.

B. If the Township Engineer determines that the drainage plan is inconsistent or noncompliant with the Act 167 Stormwater Management Plan, the Township Engineer shall forward a letter to the Township Secretary with a copy to the applicant citing the reason(s) and specific Sections of this Part for the inconsistency or noncompliance. Inconsistency or noncompliance may be due to inadequate information to make a reasonable judgment as to compliance with the Act 167 Stormwater Management Plan. Any drainage plans that are inconsistent or noncompliant may be revised by the applicant and resubmitted when consistent with this Part. The Township Secretary shall then notify the applicant of the Township Engineer's findings. Any inconsistent or noncompliant drainage plans may be revised by the applicant and resubmitted consistent with this Part.

5. For regulated activities specified in §23-205 of this Part that require a building permit, the Township Engineer shall notify the Township Building Permit Officer in writing, within a time frame consistent with the Township Building Code [Chapter 5, Part 1] and/or Township SALDO [Chapter 22], whether the drainage plan is consistent with the Act 167 Stormwater Management Plan. The Township Building Permit Officer shall forward a copy of the consistency/inconsistency letter to the applicant. Any drainage plan deemed inconsistent may be revised by the applicant and resubmitted consistent with this Part.

6. For regulated activities under this Part that require an NPDES permit application, the applicant shall forward a copy of the Township Engineer's letter stating that the drainage plan is consistent with the Act 167 Stormwater Management Plan to the Conservation District and/or DEP. In addition, a short summary of the proposed post-construction stormwater management design and proposed BMPs should also be forwarded to the Conservation District and/or DEP. DEP and the Conservation District may consider the Township Engineer's review comments in determining whether to issue a permit.

7. The Township shall not grant preliminary or final approval to any subdivision or land development for regulated activities specified in §23-205 of this Part if the drainage plan has been found by the Township Engineer to be inconsistent with the Act 167 Stormwater Management Plan. All required permits from DEP must be obtained prior to approval of any subdivision or land development.

8. No building permits for any regulated activity specified in §23-205 of this Part shall be approved by the Township if the drainage plan has been found to be inconsistent with the Act 167 Stormwater Management Plan, as determined by the Township Engineer and Conservation District, or without considering the comments of the Township Engineer and Conservation District. All required permits from DEP must be obtained prior to issuance of a building permit.

9. The applicant shall be responsible for completing record drawings of all stormwater management facilities included in the approved drainage plan. The record drawings and an explanation of any discrepancies with the design plans shall be
submitted to the Township Engineer for final approval. In no case shall the Township approve the record drawings until the Township receives a copy of an approved declaration of adequacy and/or highway occupancy permit from the PennDOT District office, NPDES permit, and any other applicable permits or approvals from DEP or the Conservation District. The above permits and approvals must be based on the record drawings.

10. The Township’s approval of a drainage plan shall be valid for a period not to exceed 5 years commencing on the date that the Township signs the approved drainage plan. If stormwater management facilities included in the approved drainage plan have not been constructed, or if constructed, record drawings of these facilities have not been approved within this 5-year time period, then the Township may consider the drainage plan inconsistent or noncompliant and may revoke any and all permits. Drainage plans that are determined to be inconsistent or noncompliant by the Township shall be resubmitted in accordance with §23-226 of this Part.

(Ord. 2007-6, 6/5/2007, §304)


1. A modification to a submitted drainage plan under review by the Township for a development site that involves the following shall require a resubmission to the Township of a modified drainage plan consistent with §23-223 of this Part and be subject to review as specified in §23-224 of this Part:

   A. Change in stormwater management facilities or techniques.
   B. Relocation or redesign of stormwater management facilities.
   C. Is necessary because soil or other conditions are not as stated on the drainage plan as determined by the Township Engineer.

2. A modification to an already approved or inconsistent or noncompliant drainage plan shall be submitted to the Township, accompanied by the applicable Township review and inspection fee. A modification to a drainage plan for which a formal action has not been taken by the Township shall be submitted to the Township accompanied by the applicable Township review and inspection fee.

(Ord. 2007-6, 6/5/2007, §305)


An inconsistent or noncompliant drainage plan may be resubmitted with the revisions addressing the Township Engineer’s concerns documented in writing. It must be addressed to the Township Secretary in accordance with §23-223 of this Part, distributed accordingly, and be subject to review as specified in §23-224 of this Part. The applicable Township review and inspection fee must accompany a resubmission of an inconsistent or noncompliant drainage plan.

(Ord. 2007-6, 6/5/2007, §306)
D. Stormwater Management


1. Applicants proposing regulated activities in the Township that do not fall under the exemption criteria shown in §23-206 shall submit a drainage plan consistent with this Part and the respective Act 167 Stormwater Management Plan to the Township for review. The stormwater management criteria of this Part shall apply to the total proposed development even if development is to take place in stages.

2. The applicant is required to find practicable alternatives to the surface discharge of stormwater, the creation of impervious surfaces, and the degradation of waters of the Commonwealth and must maintain as much as possible the natural hydrologic regime.

3. The drainage plan must be designed consistent with the sequencing provisions of §23-234 to ensure maintenance of the natural hydrologic regime, to promote groundwater recharge, and to protect groundwater and surface water quality and quantity. The drainage plan designer must proceed sequentially in accordance with Part 2D.

4. Stormwater drainage systems shall be designed in order to permit unimpeded flow along natural watercourses, except as modified by stormwater management facilities or open channels consistent with this Part.

5. Existing points of concentrated drainage that discharge onto adjacent property shall not be altered in any manner which could cause property damage without permission of the affected property owner(s) and shall be subject to any applicable discharge criteria specified in this Part.

6. Areas of existing diffused drainage discharge, whether proposed to be concentrated or maintained as diffused drainage areas, shall be subject to any applicable discharge criteria in the general direction of existing discharge, except as otherwise provided by this Part. If diffused drainage discharge is proposed to be concentrated and discharged onto adjacent property, the applicant must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge or otherwise prove that no erosion, sedimentation, flooding, or other impacts will result from the concentrated discharge.

7. Where a development site is traversed by existing streams, drainage easements shall be provided conforming to the line of such streams. The terms of the easement shall conform to the stream buffer requirements contained in §23-236.G of this Part.

8. Any stormwater management facilities regulated by this Part that would be located in or adjacent to waters of the Commonwealth or delineated wetlands shall be subject to approval by DEP through the joint permit application or the environmental assessment approval process, or where deemed appropriate, by the DEP general permit process. When there is a question as to whether wetlands may be involved, it is the responsibility of the applicant or his agent to show that the land in question cannot be classified as wetlands; otherwise, approval to work in the area must be obtained from DEP.

9. Any proposed stormwater management facilities regulated by this Part that would be located on State highway rights-of-way shall be subject to approval by
PennDOT.

10. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc., is encouraged where soil conditions permit in order to reduce the size or eliminate the need for detention facilities or other structural BMPs.

11. All stormwater runoff shall be pre-treated for water quality prior to discharge to surface or groundwater.

12. All regulated activities within the Township shall be designed, implemented, operated, and maintained to meet the purposes of this Part, through these two elements:
   A. Erosion and sediment control during earth disturbance activities (e.g., during construction).
   B. Water quality protection measures after completion of earth disturbance activities (i.e., after construction), including operations and maintenance.

13. No regulated earth disturbance activities within the Township shall commence until the requirements of this Part are met.

14. Post-construction water quality protection shall be addressed as required by §23-236.

15. Operations and maintenance of permanent stormwater BMPs shall be addressed as required by Part 1G.

16. All BMPs used to meet the requirements of this Part shall conform to the State water quality requirements and any more stringent requirements as set forth by the Township.

17. Techniques described in Appendix 23-2-D (Low Impact Development) of this Part shall be considered because they reduce the costs of complying with the requirements of this Part and the State water quality requirements.

18. In selecting the appropriate BMPs or combinations thereof, the applicant shall consider the following:
   A. Total contributing area.
   B. Permeability and infiltration rate of the site’s soils.
   C. Slope and depth to bedrock.
   D. Seasonal high water table.
   E. Proximity to building foundations and wellheads.
   F. Erodibility of soils.
   G. Land availability and configuration of the topography.
   H. Peak discharge and required volume control.
   I. Stream bank erosion.
   J. Effectiveness of the BMPs to mitigate potential water quality problems.
   K. The volume of runoff that will be effectively treated.
   L. The nature of the pollutant being removed.
   M. Maintenance requirements.
   N. Creation/protection of aquatic and wildlife habitat.
O. Recreational value.

19. The applicant may meet the stormwater management criteria through off-site stormwater management measures as long as the proposed measures are in the same subwatershed as shown in Appendix 23-2-A.

(Ord. 2007-6, 6/5/2007, §401)

§23-232. Permit Requirements by Other Governmental 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 drainageways 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 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.

(Ord. 2007-6, 6/5/2007, §402)


1. No regulated earth disturbance activities within the Township shall commence until the Township receives an approval from the Conservation District of an erosion and sediment control plan for construction activities.

2. 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).

3. In addition, under 25 Pa.Code, Chapter 92, a DEP permit for stormwater discharges associated with construction activities is required for land disturbances greater than 1 acre.

4. 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 Township.

5. A copy of the erosion and sediment control plan and any required permit, as required by DEP regulations, shall be available on the project site at all times.

6. 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 sedimenta-
tion and compaction during the construction phase to maintain maximum infiltration capacity. Additional measures, such as placement of orange construction fencing around proposed infiltration BMPs during construction to minimize or eliminate traffic overtop of these areas, and temporary sealing off of pipes and inlet connections to infiltration BMPs to prevent sediment clogging should be given consideration.

B. Infiltration BMPs shall not be constructed nor receive runoff until the entire drainage area contributory to the infiltration BMP has achieved final stabilization.

(Ord. 2007-6, 6/5/2007, §403)

§23-234. **Nonstructural Project Design (Sequencing to Minimize Stormwater Impacts)**

1. The design of all regulated activities shall include the following to minimize stormwater impacts:

   A. The applicant shall find practicable alternatives to the surface discharge of stormwater, such as those listed in Appendix 23-2-E, Table 23-2-E-4, the creation of impervious surfaces, and the degradation of waters of the Commonwealth and must maintain as much as possible the natural hydrologic regime of the site.

   B. An alternative is practicable if it is available and capable of implementation after taking into consideration existing technology and logistics in light of overall project purposes and other Township requirements.

   C. All practicable alternatives to the discharge of stormwater are presumed to have less adverse impact on quantity and quality of waters of the Commonwealth unless otherwise demonstrated.

2. The applicant shall demonstrate that the regulated activities were designed in the following sequence. The goal of the sequence is to minimize the increases in stormwater runoff and impacts to water quality resulting from the proposed regulated activity:

   A. Prepare an existing resource and site analysis map (ERSAM) showing environmentally sensitive areas including, but not limited to, steep slopes, ponds, lakes, streams, wetlands, hydric soils, vernal pools, stream buffers, hydrologic soil groups, wooded areas, and potential infiltration areas. Land development, any existing recharge areas, and other requirements outlined in the Township SALDO [Chapter 22] shall also be included.

   B. Establish a stream buffer according to §23-236.G.

   C. Prepare a draft project layout avoiding sensitive areas identified in paragraph .A.

   D. Identify site-specific existing conditions, drainage areas, discharge points, recharge areas, and hydrologic soil groups A and B (areas conducive to infiltration). Infiltration should still be considered in well draining soils listed as hydrologic soil group C, but additional soils testing should be performed to verify on-site conditions and placement of these BMPs.

   E. Evaluate nonstructural stormwater management alternatives:
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(1) Minimize earth disturbance.
(2) Minimize impervious surfaces.
(3) Break up large impervious surfaces.

F. Satisfy the groundwater recharge (infiltration) objective (§23-235) and provide for stormwater pretreatment prior to infiltration.

G. Provide for water quality protection in accordance with §23-236 water quality requirements.

H. Provide stream bank erosion protection in accordance with §23-237 stream bank erosion requirements.

I. Determine into what management district the site falls (Appendix 23-2-A) and conduct an existing conditions runoff analysis.

J. Prepare final project design to maintain existing conditions drainage areas and discharge points, to minimize earth disturbance and impervious surfaces, and, to the maximum extent possible, to ensure that the remaining site development has no surface or point discharge.

K. Conduct a proposed conditions runoff analysis based on the final design that meets the management district requirements (§23-238).

L. Manage any remaining runoff prior to discharge through detention, bioretention, direct discharge, or other structural control.

(Ord. 2007-6, 6/5/2007, §404)


Maximizing the groundwater recharge capacity of the area being developed is required. Design of the infiltration facilities shall consider groundwater recharge to compensate for the reduction in the recharge that occurs when the ground surface is disturbed or impervious surface is created. It is recommended that roof runoff be directed to infiltration BMPs that may be designed to compensate for the runoff from parking areas. These measures are required to be consistent with §23-203 and to take advantage of utilizing any existing recharge areas. Infiltration may not be feasible on every site due to site-specific limitations such as soil type. If it cannot be physically accomplished, then the design professional shall be responsible to show that this cannot be physically accomplished. Appropriate soils testing and/or geotechnical evaluation should be included as part of any documentation for infiltration BMPs. If it can be physically accomplished, then the volume of runoff to be infiltrated shall be determined from paragraph A(2).

A. Infiltration BMPs shall meet the following minimum requirements:

(1) Infiltration BMPs intended to receive runoff from developed areas shall be selected based on suitability of soils and site conditions and shall be constructed on soils that have the following characteristics:

   (a) A minimum depth of 24 inches, preferably 36 inches, between the bottom of the BMP and the top of the limiting zone (e.g., SHWT, groundwater, bedrock, etc.).

   (b) An infiltration rate sufficient to accept the additional stormwater load and dewater completely as determined by field tests conducted by the
applicant’s design professional.

(c) The infiltration facility shall be capable of completely infiltrating the recharge (infiltration) volume ($Re_v$) within 3 days (72 hours) or less.

(d) Pretreatment shall be provided prior to infiltration.

(2) The size of the infiltration facility shall be based upon the net 2-year volume approach, where the recharge (infiltration) volume ($Re_v$) to be captured and infiltrated shall be the volume difference between the pre-development 2-year, 24-hour storm event and post-development 2-year, 24-hour storm event.

(3) The recharge volume calculated using this Section is the minimum volume the applicant must control through an infiltration BMP facility. However, if a site has areas of soils where additional volume of recharge can be achieved, the applicant is encouraged to infiltrate as much of the stormwater runoff from the site as possible.

B. Soils. A detailed soils evaluation of the project site shall be required to determine the suitability of infiltration facilities. The evaluation shall be performed by a qualified design professional and at a minimum address soil permeability, depth to bedrock, and subgrade stability. The general process for designing the infiltration BMP shall be:

(1) Analyze hydrologic soil groups as well as natural and man-made features within the site to determine general areas of suitability for infiltration practices. In areas where development on fill material is under consideration, conduct geotechnical investigations of sub-grade stability; infiltration may not be ruled out without conducting these tests.

(2) Provide field tests such as double ring infiltrometer or hydraulic conductivity tests (at the level of the proposed infiltration surface) to determine the appropriate hydraulic conductivity rate. Percolation tests are not recommended for design purposes.

(3) Design the infiltration structure for the required recharge ($Re_v$) volume based on field determined capacity at the level of the proposed infiltration surface.

(4) If on-lot infiltration structures are proposed by the applicant’s design professional, it must be demonstrated to the Township that the soils are conducive to infiltrate on the lots identified.

C. Stormwater Hotspots.

(1) Below is a list of examples of designated hotspots. If a site is designated as a hotspot, it has important implications for how stormwater is managed. First and foremost, untreated stormwater runoff from hotspots shall not be allowed to recharge into groundwater where it may contaminate water supplies. Therefore, the $Re_v$ requirement shall NOT be applied to development sites that fit into the hotspot category (the entire WQ$_v$ must still be treated). Second, a greater level of stormwater treatment shall be considered at hotspot sites to prevent pollutant wash off after construction. The Environmental Protection Agency’s (EPA) NPDES stormwater program requires some industrial sites to prepare and implement a stormwater pollution prevention plan. Examples of hotspots:
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(a) Vehicle salvage yards and recycling facilities.
(b) Vehicle fueling stations.
(c) Vehicle service and maintenance facilities.
(d) Vehicle and equipment cleaning facilities.
(e) Fleet storage areas (bus, truck, etc.).
(f) Industrial sites based on Standard Industrial Codes.
(g) Marinas (service and maintenance).
(h) Outdoor liquid container storage.
(i) Outdoor loading/unloading facilities.
(j) Public works storage areas.
(k) Facilities that generate or store hazardous materials.
(l) Commercial container nursery.
(m) Other land uses and activities as designated by an appropriate review authority.

(2) The following land uses and activities are not normally considered hotspots:
   (a) Residential streets and rural highways.
   (b) Residential development.
   (c) Institutional development.
   (d) Office developments.
   (e) Nonindustrial rooftops.
   (f) Pervious areas, except golf courses and nurseries (which may need an integrated pest management (IPM) plan).

(3) While large highways (average daily traffic volume (ADT) greater than 30,000 are not designated as stormwater hotspots, it is important to ensure that highway stormwater management plans adequately protect groundwater.

D. Extreme caution shall be exercised where infiltration is proposed in SWPAs as defined by the local Township or water authority.

E. Infiltration facilities shall be used in conjunction with other innovative or traditional BMPs, stormwater control facilities, and nonstructural stormwater management alternatives.

F. Extreme caution shall be exercised where salt or chloride (municipal salt storage) would be a pollutant since soils do little to filter this pollutant, and it may contaminate the groundwater. The qualified design professional shall evaluate the possibility of groundwater contamination from the proposed infiltration facility and perform a hydrogeologic justification study if necessary. Specific consideration should be given to the particular type of salt or deicing material to be used within this watershed in regards to its potential long-term effects on the soils, especially in areas that contain clay soil.

G. The infiltration requirement in HQ or EV waters shall be subject to the Department’s Chapter 93 antidegradation regulations.
H. An impermeable liner will be required in detention basins where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation may be required by the Township.

I. The Township shall require the applicant to provide safeguards against groundwater contamination for land uses that may cause groundwater contamination should there be a mishap or spill.

(Ord. 2007-6, 6/5/2007, §405)

§23-236. Water Quality Requirements.

The applicant shall comply with the following water quality requirements of this Part:

A. No regulated earth disturbance activities within the Township shall commence until approval by the Township of a plan that demonstrates compliance with post-construction State water quality requirements.

B. The BMPs shall be designed, implemented, and maintained to meet state water quality requirements and any other more stringent requirements as determined by the Township.

C. To control post-construction stormwater impacts from regulated earth disturbance activities, State water quality requirements can be met by BMPs, including site design, which provide for replication of pre-construction 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 pre-construction stormwater infiltration conditions.

(2) **Treatment.** Use of water quality treatment BMPs to ensure filtering out of the chemical and physical pollutants from the stormwater runoff.

(3) **Stream Bank and Stream Bed Protection.** Management of volume and rate of post-construction stormwater discharges to prevent physical degradation of receiving waters (e.g., from scouring).

D. Developed areas shall provide adequate storage and treatment facilities necessary to capture and treat stormwater runoff. If site conditions allow for infiltration, the water quality volume and the recharge volume are the same volume and may be managed in a single facility. If infiltration can not be physically accomplished, the water quality volume should be calculated using the net 2-year volume approach described in §23-235.A(2). In this case, the water quality volume may be captured and treated by methods other than infiltration BMPs.

This volume requirement can be accomplished by the permanent volume of a wet basin or the detained volume from other BMPs. Where appropriate, wet basins shall be utilized for water quality control and shall follow the guidelines of the BMP manuals referenced in Appendix 23-2-F.

The water quality volume shall take a minimum of 24 hours to be discharged from a BMP facility. Release of the water quality volume can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility).
The design of the facility shall provide for protection from clogging and unwanted sedimentation.

E. For areas within defined special protection subwatersheds that include EV and HQ waters, the temperature and quality of water and streams shall be maintained through the use of temperature sensitive BMPs and stormwater conveyance systems.

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

G. If a perennial or intermittent stream passes through the site, the applicant shall create a stream buffer extending a minimum of 50 feet to either side of the top-of-bank of the channel. The buffer area shall be maintained with and encouraged to use appropriate native vegetation (refer to Appendix B of the Pennsylvania Stormwater Best Management Practices Manual, latest version, for plant lists). If the applicable rear or side yard setback is less than 50 feet or a stream traverses the site, the buffer width may be reduced to 25 percent of the setback and/or to a minimum of 10 feet. If an existing buffer is legally prescribed (i.e., deed, covenant, easement, etc.) and it exceeds the requirements of this Part, the existing buffer shall be maintained. This does not include lakes or wetlands.

H. Evidence of any necessary permit(s) for regulated earth disturbance activities from the appropriate DEP regional office 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 paragraph .A.

(Ord. 2007-6, 6/5/2007, §406)


1. In addition to the control of water quality volume (in order to minimize the impact of stormwater runoff on downstream stream bank erosion), the primary requirement is to design a BMP to detain the proposed conditions 2-year, 24-hour design storm to the existing conditions 1-year flow using the SCS Type II distribution. Additionally, provisions shall be made (such as adding a small orifice at the bottom of the outlet structure) so that the proposed conditions 1-year storm takes a minimum of 24 hours to drain from the facility from a point where the maximum volume of water from the 1-year storm is captured (i.e., the maximum water surface elevation is achieved in the facility). Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility).

2. The minimum orifice size in the outlet structure to the BMP shall be 3 inches in diameter where possible, and a trash rack shall be installed to prevent clogging. On sites with small drainage areas contributing to this BMP that do not provide enough runoff volume to allow a 24-hour attenuation with the 3-inch orifice, the calculations shall be submitted showing this condition. Orifice sizes less than 3 inches can be utilized, provided that the design will prevent clogging of the intake.

(Ord. 2007-6, 6/5/2007, §407)

§23-238. Stormwater Peak Rate Control.
1. Within the Swamp Creek watershed, the criteria for peak runoff control are designed to reduce the post-development peak flow to 50 percent of the pre-development peak flow. Development sites must control proposed conditions runoff rates to 50 percent of the existing conditions runoff rates for the 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year storm events.

2. The calculated peak discharges shall apply regardless of whether the grading plan changes the drainage area by subarea. An exception to the above may be granted if discharges from multiple subareas recombine in proximity to the site. In this case, peak discharge in any direction may be a 100 percent release rate provided that the overall site discharge meets the weighted average release rate.

3. Off-Site Areas. Off-site areas that drain through a proposed development site are not subject to release rate criteria when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the development site.

4. Site Areas. Where the site area to be impacted by a proposed development activity differs significantly from the total site area, only the proposed impact area utilizing stormwater management measures shall be subject to the peak rate control standards noted above. In other words, unimpacted areas bypassing the stormwater management facilities would not be subject to the peak rate control standards.

5. Alternate Criteria for Redevelopment Sites. For redevelopment sites, one of the following minimum design parameters shall be accomplished, whichever is most appropriate for the given site conditions as determined by Douglass Township:
   A. Meet the full requirements specified by subsections .1 through .4.
   B. Reduce the total impervious surface on the site by at least 20 percent, based upon a comparison of existing impervious surface to proposed impervious surface.

(Ord. 2007-6, 6/5/2007, §408)

§23-239. Calculation Methodology.

1. Stormwater runoff from all development sites with a drainage area of greater than 200 acres shall be calculated using a generally accepted calculation technique that is based on the NRCS Soil Cover Complex Method. Table 23-239 summarizes acceptable computation methods, and the method selected by the design professional shall be based on the individual limitations and suitability of each method for a particular site. Note that successors to the methods listed in Table 23-239 are also acceptable, such as WinTR55 for TR-55 and WinTR20 for TR-20. The Township may allow the use of the Rational Method to estimate peak discharges from drainage areas that contain less than 200 acres. The Soil Cover Complex Method shall be used for drainage areas greater than 200 acres.

Table 23-239
Acceptable Computation Methodologies for Stormwater Management Plans
2. All calculations consistent with this Part using the Soil Cover Complex Method shall use the appropriate design rainfall depths for the various return period storms according to the region in which they are located as presented in Table 23-2-E-1 in Appendix 23-2-E of this Part. If a hydrologic computer model such as PSRM or HEC-1/HEC-HMS is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours.

3. The following criteria shall be used for runoff calculations:

   A. For development sites not considered redevelopment, the ground cover used in determining the existing conditions flow rates shall be as follows:

      (1) Wooded sites shall use a ground cover of “woods in good condition.” A site shall be considered to be a wooded site where a biological community dominated by trees and other woody plants exists that covers an area of 10,000 square feet or more, and contains at least 100 trees with at least 50 percent of those trees having a dbh of 2 inches or greater.1

      (2) The undeveloped portion of the site including agriculture, bare earth, and fallow ground shall be considered as “meadow in good condition,” unless the natural ground cover generates a lower curve (CN) number or Rational “c” value (i.e., woods) as listed in Tables 23-2-E-2 or 23-2-E-3 in Appendix 23-2-E of this Part.

      (3) Off-site land use conditions used to determine storm flows for designing storm facilities shall be based on existing land uses assuming winter

or poor land cover conditions.

B. For development considered redevelopment sites, the ground cover used in determining the existing conditions flow rates for the developed portion of the site shall be based upon actual land cover conditions.

4. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration for overland flow and return periods presented in the appropriate curves from the PennDOT Storm-Duration-Frequency Chart (Region 4 is included in Figure 23-2-E-3. The user should refer to the Atlas 14, Volume 2, Storm-Duration-Frequency Chart). Times of concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of Urban Hydrology for Small Watersheds, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times of concentration for channel and pipe flow shall be computed using Manning’s equation.

5. Runoff curve numbers (CN) for both existing and proposed conditions to be used in the Soil Cover Complex Method shall be obtained from Table 23-2-E-2 in Appendix 23-2-E of this Part.

6. Runoff coefficients (c) for both existing and proposed conditions for use in the Rational Method shall be obtained from Table 23-2-E-3 in Appendix 23-2-E of this Part.

7. Where uniform flow is anticipated, the Manning equation shall be used for hydraulic computations and to determine the capacity of open channels, pipes, and storm sewers. Values for Manning’s roughness coefficient (n) shall be consistent with accepted published values.

8. Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this Part using any generally accepted hydraulic analysis technique or method.

9. The design of any stormwater detention facilities intended to meet the performance standards of this Part shall be verified by routing the design storm hydrograph through these facilities using the storage indication method. The design storm hydrograph shall be computed using a calculation method that produces a full hydrograph. The Township may approve the use of any generally accepted full hydrograph approximation technique that shall use a total runoff volume that is consistent with the volume from a method that produces a full hydrograph.

(Ord. 2007-6, 6/5/2007, §409)

§23-240. Other Requirements.

1. All wet basin designs shall incorporate biologic controls consistent with the West Nile Guidance found in Appendix 23-2-G.

2. Any stormwater management facility (i.e., detention basin) required or regulated by this Part designed to store runoff and requiring a berm or earthen embankment shall be designed to provide an emergency spillway to handle flow up to and including the 100-year proposed conditions. The height of embankment must provide a minimum 1 foot of freeboard above the maximum pool elevation computed when the facility functions for the 100-year proposed conditions inflow. Should any stormwater management facility require a dam safety permit under DEP 25 Pa.Code, Chapter 105, the facility shall be designed in accordance with 25 Pa.Code, Chapter 105,
and meet the regulations of Chapter 105 concerning dam safety. Chapter 105 may be required to pass storms larger than the 100-year event.

3. Any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures) and any work involving wetlands governed by DEP 25 Pa.Code, Chapter 105, regulations (as amended or replaced from time to time by DEP) shall be designed in accordance with Chapter 105 and will require a permit from DEP.

4. Any other drainage conveyance facility that does not fall under 25 Pa.Code, Chapter 105, regulations must be able to convey, without damage to the drainage structure or roadway, runoff from the 25-year design storm with a minimum 1 foot of freeboard measured below the lowest point along the top of the roadway. Any facility that constitutes a dam as defined in DEP Chapter 105 regulations may require a permit under dam safety regulations. Any facility located within a PennDOT right-of-way must meet PennDOT minimum design standards and permit submission requirements.

5. Any drainage conveyance facility and/or channel not governed by 25 Pa.Code, Chapter 105, regulations must be able to convey, without damage to the drainage structure or roadway, runoff from the 25-year design storm. Conveyance facilities to or exiting from stormwater management facilities (i.e., detention basins) shall be designed to convey the design flow to or from that structure. Roadway crossings located within designated floodplain areas must be able to convey runoff from a 100-year design storm. Any facility located within a PennDOT right-of-way must meet PennDOT minimum design standards and permit submission requirements.

6. Storm sewers must be able to convey proposed conditions runoff from a 25-year design storm without surcharging inlets, where appropriate.

7. Adequate erosion protection shall be provided along all open channels and at all points of discharge.

8. The design of all stormwater management facilities shall incorporate sound engineering principles and practices. The Township reserves the right to disapprove any design that would result in construction in or continuation of a stormwater problem area.

9. Any stormwater management facility (i.e., detention basin) required or regulated by this Part designed to store runoff and requiring a berm or earthen embankment shall be designed to provide the following (at a minimum):

   A. The maximum water depth shall not exceed 6 feet.
   B. The minimum top width of all dams/embankments/berms shall be 8 feet.
   C. The interior side slopes shall not be greater than 3 horizontal to 1 vertical.
   D. All basins shall be structurally sound and shall be constructed of sound and durable materials. The completed structure and the foundation of all basins shall be stable under all probable conditions of operation. An emergency spillway shall be provided for the basin and shall be capable of discharging the 100-year peak rate of runoff that enters the basin after development, in a manner that will not damage the integrity of the facility and will not create a downstream hazard. Where practical, the emergency spillway shall be constructed in undisturbed ground. An easement for inspection and repair shall be provided when the conveyance structure crosses property boundaries.
   E. All basins not including groundwater recharge and/or water quality
storage shall include an outlet structure to permit draining the basin to a completely dry position within 24 hours following the end of the design rainfall. All basins that do include groundwater recharge and/or water quality storage shall include an outlet structure to permit draining the basin to the level of the groundwater recharge and/or water quality storage within 24 hours following the end of the design rainfall.

F. A cutoff trench and core of relatively impervious material shall be provided within all basin embankments.

G. All structures passing through detention basin embankments shall have properly spaced concrete cutoff collars and all piping must be watertight. All structures passing through dam embankments shall have seepage diaphragms and drains.

H. All discharge control devices with appurtenances shall be made of reinforced concrete and stainless or hot dip galvanized steel. Bolts/fasteners are to be stainless or galvanized steel.

I. Low flow channels shall be provided from each water carrying facility to the outlet structure for all basins that do not include groundwater recharge and/or water quality storage. Low flow channels shall be 1 percent minimum slope and shall be designed to enable ease of maintenance. All basins that do include groundwater recharge and/or water quality storage shall not be required to have a low flow channel.

J. Minimum slope within a basin that does not include groundwater recharge and/or water quality storage shall be 2 percent positive grade to the low flow channel.

K. Design storms for the computation of retention basins (where approved) volumes shall be based upon a 24-hour storm with 100-year return period (a storm with a 1 percent chance of occurrence each year).

L. The effect on downstream areas if the basin embankment fails shall be considered in the design of all basins. Where possible, the basin shall be designed to minimize the potential damage caused by such failure of the embankment.

M. All structures (detention basins, cisterns, etc.), other than those used for groundwater recharge volume and water quality volume, must completely drain within 24 hours after the end of the design storm.

N. Soils used for the construction of basins shall have lower erodibility factors ("K" factors).

10. Minimum floor elevations for all structures that would be affected by a basin, other temporary impoundments, or open conveyance systems where ponding may occur shall be 2 feet above the 100-year water surface. If basement or underground facilities are proposed, detailed calculations addressing the effects of stormwater ponding on the structure and waterproofing and/or flood-proofing design information shall be submitted for approval.

11. All storm sewer pipes, culverts and bridges (excluding detention and retention basin outfall structures), gutters and swales conveying water originating only from within the boundaries of the development site shall be designed for a 25-year storm event as a minimum. All storm sewer pipes, culverts and bridges (excluding detention
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and retention basin outfall structures) conveying water originating from off-site shall be designed for a 50-year storm event. Drainage easements shall be provided to contain and convey the 100-year frequency flood throughout the development site. Easements shall begin at the furthest upstream property line of the proposed development site in a watershed.

12. A concentrated discharge of stormwater to an adjacent property shall be within an existing natural drainageway or watercourse or otherwise an easement shall be required.

13. Storm sewer pipes other than those used as roof drains, detention basin underdrains, and street subbase underdrains, shall have a minimum diameter of 15 inches and be made of reinforced concrete pipe, corrugated galvanized metal pipe, smooth lined corrugated polyethylene pipe, or approved equivalent. Where installation conditions merit, structural calculations that address the actual design requirements will be required.

14. Storm sewer pipes and culverts shall be installed on sufficient slopes to provide a minimum velocity of 3 feet per second when flowing full.

15. All storm sewer pipe and culverts shall be laid to a minimum depth of 1 foot from finished subgrade to the crown of pipe in paved areas and 1 foot from finished grade to the crown of pipe in grassed areas.

16. Curves in pipes or box culverts without an inlet or manhole are prohibited. Tee joints, elbows and wyes are also prohibited.

17. Manholes, inlets, headwalls and endwalls proposed for dedication or located along streets or subject to vehicular traffic, shall conform to the requirements of the PennDOT, Bureau of Design, Standards for Roadway Construction, in effect at the time the design is submitted, or as otherwise modified by the Township.

18. Headwalls and endwalls shall be used where stormwater runoff enters or leaves the storm sewer horizontally from a natural or manmade channel. PennDOT Type “DW” headwalls and endwalls shall be utilized.

19. Stormwater roof drains, sump pumps, and pipes, shall not directly discharge water into a street right-of-way or discharge into a sanitary sewer or storm sewer.

20. All existing and natural watercourses, channels, drainage systems, wetlands and areas of surface water concentration shall be maintained in their existing condition unless an alteration is approved by the Township and any other necessary approving body.

21. Flow velocities from any storm sewer may not result in erosion of the receiving channel.

22. Energy dissipators shall be placed at the outlets of all storm sewer pipes, culverts, and bridges where flow velocities exceed maximum permitted channel velocities as specified below:

   A. Three feet per second where only sparse vegetation can be established and maintained because of shade or soil condition.

   B. Four feet per second where normal growing conditions exist and vegetation is to be established by seeding.

   C. Five feet per second where a dense, vigorous sod can be quickly established
or where water can be temporarily diverted during establishment of vegetation. Netting and mulch or the equivalent methods for establishing vegetation shall be used.

D. Six feet per second where there exists a well-established sod of good quality.

23. The following conditions shall be met for all swales:
   A. Capacities and velocities shall be computed using the Manning equation. The design parameters shall be as follows:
      (1) All vegetated swales shall have a minimum slope of 1 percent unless approved by the Township Engineer.
      (2) The “n” factors to be used for swales or gutters shall be based upon accepted engineering design practices as approved by the Township.
   B. All swales shall be designed to concentrate low flows to minimize siltation and meandering.

24. Manning “n” values used for design of pipes and culverts shall be in accordance with accepted published values.

25. Storm facilities not located within a public right-of-way shall be contained in and centered within an easement. Easements shall follow property boundaries where possible.

26. Adequate erosion protection shall be provided along all open channels, and at all points of discharge.

27. All groundwater recharge facilities shall be designed to empty within 3 days (72 hours) or less subsequent to any storm event. All water quality facilities shall be designed so that water is released slowly for a minimum of 24 hours subsequent to any storm event. All infiltration, detention or retention facilities the volume of which will be used for stormwater management (pre-development vs. post-development) shall be designed to empty within 24 hours subsequent to any storm event. Volumes that will not be available within 24 hours subsequent to any storm event shall not be used for stormwater management (pre-development vs. post-development).

(Ord. 2007-6, 6/5/2007, §410)
§23-241. Inspections.

1. The Township Engineer or his municipal designee shall inspect all phases of the installation of the permanent BMPs and/or stormwater management facilities as deemed appropriate by the Township Engineer.

2. During any stage of the work, if the Township Engineer or his municipal designee determines that the permanent BMPs and/or stormwater management facilities are not being installed in accordance with the approved stormwater management plan, the Township shall revoke any existing permits or other approvals and issue a cease and desist order until a revised drainage plan is submitted and approved, as specified in this Part, and until the deficiencies are corrected.

3. A final inspection of all BMPs and/or stormwater management facilities shall be conducted by the Township Engineer or his municipal designee to confirm compliance with the approved drainage plan prior to the issuance of any occupancy permit.

(Ord. 2007-6, 6/5/2007, §501)
F. Fees and Expenses

§23-251. Township Drainage Plan Review and Inspection Fee.

Fees shall be established by the Township to defray plan review and construction inspection costs incurred by the Township. All fees shall be paid by the applicant at the time of drainage plan submission. A review and inspection fee schedule shall be established by resolution of the Township Board of Supervisors based on the size of the regulated activity and based on the Township's costs for reviewing drainage plans and conducting inspections pursuant to §23-241. The Township shall periodically update the review and inspection fee schedule to ensure that review costs are adequately reimbursed.

(Ord. 2007-6, 6/5/2007, §601)

§23-252. Expenses Covered by Fees.

The fees required by this Part shall at a minimum cover:

A. Administrative costs.

B. The review of the drainage plan by the Township and the Township Engineer.

C. The site inspections.

D. The inspection of stormwater management facilities and drainage improvements during construction.

E. The final inspection upon completion of the stormwater management facilities and drainage improvements presented in the drainage plan.

F. Any additional work required to enforce any permit provisions regulated by this Part, correct violations, and assure proper completion of stipulated remedial actions.

(Ord. 2007-6, 6/5/2007, §602)
G. Maintenance Responsibilities

1. For subdivisions and land developments, the applicant shall provide a financial guarantee to the Township for the timely installation and proper construction of all stormwater management controls as:
   A. Required by the approved drainage plan equal to or greater than the full construction cost of the required controls.
   B. The amount and method of payment provided for in the SALDO [Chapter 22].
2. For other regulated activities, the Township may require a financial guarantee from the applicant.

(Ord. 2007-6, 6/5/2007, §701)

§23-262. Responsibilities for Operations and Maintenance of Stormwater Controls and BMPs.
1. No regulated earth disturbance activities within the Township shall commence until approval by the Township of a stormwater control and BMP operations and maintenance plan that describes how the permanent (e.g., post-construction) stormwater controls and BMPs will be properly operated and maintained.
2. The following items shall be included in the stormwater control and BMP operations and maintenance plan:
   A. Map(s) of the project area, in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Berks County, shall be submitted on 24-inch by 36-inch sheets. The contents of the maps(s) shall include, but not be limited to:
      (1) Clear identification of the location and nature of permanent stormwater controls and BMPs.
      (2) The location of the project site relative to highways, Township boundaries, or other identifiable landmarks.
      (3) Existing and final contours at intervals of 2 feet, or others as appropriate.
      (4) Existing streams, lakes, ponds, or other bodies of water within the project site area.
      (5) Other physical features including flood hazard boundaries, sinkholes, streams, existing drainage courses, and areas of natural vegetation to be preserved.
      (6) The locations of all existing and proposed utilities, sanitary sewers, and water lines within 50 feet of property lines of the project site.
      (7) Proposed final changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added.
      (8) Proposed final structures, roads, paved areas, and buildings.
      (9) A 15-foot wide access easement around all stormwater controls and...
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BMPs that would provide ingress to and egress from a public right-of-way.

B. A description of how each permanent stormwater control and BMP will be operated and maintained, and the identity and contact information associated with the person(s) responsible for operations and maintenance.

C. The name of the project site, the name and address of the owner of the property, and the name of the individual or firm preparing the plan.

D. A statement, signed by the landowner, acknowledging that the stormwater controls and BMPs are fixtures that can be altered or removed only after approval by the Township.

3. 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:

A. If a plan includes structures or lots that are to be separately owned and in which streets, sewers, and other public improvements are to be dedicated to the Township, stormwater controls and BMPs may also be dedicated to and maintained by the Township.

B. 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.

4. The Township shall make the final determination on the continuing operations and maintenance responsibilities. The Township reserves the right to accept or reject the operations and maintenance responsibility for any or all of the stormwater controls and BMPs.

(Ord. 2007-6, 6/5/2007, §702)


1. The Township 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.

2. The Township shall notify the applicant in writing whether or not the stormwater control and BMP operations and maintenance plan is approved.

3. The Township may require a “record drawing” of all stormwater controls and BMPs and an explanation of any discrepancies with the operations and maintenance plan.

(Ord. 2007-6, 6/5/2007, §703)


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.
§23-265. Operations and Maintenance Agreement for Privately Owned Stormwater Controls and BMPs.

1. The applicant shall sign an operations and maintenance agreement with the Township 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 23-2-H of this Part.

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 Township.

§23-266. Stormwater Management Easements.

1. Stormwater management easements are required for all areas used for off-site stormwater control.

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 §23-267.


1. Prior to final approval of the site’s drainage plan, the applicant shall sign and record the maintenance agreement contained in Appendix 23-2-H which is attached and made part hereof covering all stormwater control facilities that are to be privately owned.

2. Other items may be included in the agreement where determined necessary to guarantee the satisfactory maintenance of all facilities. The maintenance agreement shall be subject to the review and approval of the Township Solicitor and the Board of Supervisors.


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 Berks County, within 15 days of approval of the stormwater control and BMP operations and maintenance plan by the Township:

   A. The operations and maintenance plan, or a summary thereof.
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B. Operations and maintenance agreements under §23-265.
C. Easements under §23-266.

2. The Township 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.

(Ord. 2007-6, 6/5/2007, §708)
§23-271. Prohibited Discharges.²

1. No person in the Township shall allow, or cause to allow, stormwater discharges into the Township’s separate storm sewer system which are not composed entirely of stormwater, except (A) as provided in subsection .2 below, and (B) discharges allowed under a State or Federal permit.

2. Discharges that may be allowed based on a finding by the Township 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 Township determines that any of the discharges identified in subsection .2 significantly contribute to pollution of waters of the Commonwealth, or is so notified by DEP, the Township will notify the responsible person to cease the discharge.

4. Upon notice provided by the Township under subsection .3, the discharger will have a reasonable time, as determined by the Township, 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.

(Ord. 2007-6, 6/5/2007, §801)


²Note: The following language taken from DEP’s NPDES program and model NPDES ordinance is required to be incorporated into this Part.
The following connections are prohibited, except as provided in §23-271.2 above:

A. Any drain or conveyance, whether on the surface or subsurface, which allows any nonstormwater 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.

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

(Ord. 2007-6, 6/5/2007, §802)


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 Township.

3. Roof drains shall discharge to infiltration areas or vegetative BMPs to the maximum extent practicable.

(Ord. 2007-6, 6/5/2007, §803)

§23-274. 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 Township.

2. No person shall place any structure, fill, landscaping, or vegetation into a stormwater control or BMP or within a drainage easement that would limit or alter the functioning of the stormwater control or BMP without the written approval of the Township.

(Ord. 2007-6, 6/5/2007, §804)

1. Upon presentation of proper credentials, duly authorized representatives of the Township may enter at reasonable times upon any property within the Township to inspect the implementation, condition, or operation and maintenance of the stormwater controls or BMPs in regard to any aspect governed by this Part.

2. Stormwater control and BMP owners and operators shall allow persons working on behalf of the Township ready access to all parts of the premises for the purposes of determining compliance with this Part.

3. Persons working on behalf of the Township shall have the right to temporarily locate on any stormwater control or BMP in the Township 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 Township access to a stormwater control or BMP is a violation of this Part.

(Ord. 2007-6, 6/5/2007, §901)


1. The violation of any provision of this Part is hereby deemed a public nuisance.

2. Each day that a violation continues shall constitute a separate violation.

(Ord. 2007-6, 6/5/2007, §902)


1. Whenever the Township finds that a person has violated a prohibition or failed to meet a requirement of this Part, the Township 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.
   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 Township 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 Township from pursuing any and all other remedies available in law or equity.

(Ord. 2007-6, 6/5/2007, §903)

§23-284. Suspension and Revocation of Permits and Approvals.

1. Any building, land development, or other permit or approval issued by the Township may be suspended or revoked by the Township for:
   A. Noncompliance with or failure to implement any provision of the permit.
   B. A violation of any provision of this Part.
   C. The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or nuisance, pollution, or which endangers the life, health, or property of others.
2. A suspended permit or approval shall be reinstated by the Township when:
   A. The Township Engineer or designee has inspected and approved the corrections to the stormwater controls and BMPs or the elimination of the hazard or nuisance.
   B. The Township is satisfied that the violation of the Part, law, or rule and regulation has been corrected.
3. A permit or approval that has been revoked by the Township cannot be reinstated. The applicant may apply for a new permit under the procedures outlined in this Part.

(Ord. 2007-6, 6/5/2007, §904)


1. Any person, firm or corporation violating the provisions of this Part, upon conviction thereof in an action brought before a magisterial district judge in the manner provided for the enforcement of summary offenses under the Pennsylvania Rules of Criminal Procedure, shall be subject to 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, and the applicable fines are cumulative. [Ord. 2009-3]

2. In addition, the Township, through its Solicitor, may institute injunctive, mandamus, or any other appropriate action or proceeding at law or in equity for the enforcement of this Part. Any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent injunctions, mandamus, or other appropriate forms of remedy or relief.

(Ord. 2007-6, 6/5/2007, §905; as amended by Ord. 2009-3, 8/31/2009)


In the event that a person fails to comply with the requirements of this Part or fails to conform to the requirements of any permit issued hereunder, the Township shall provide written notification of the violation. Such notification shall state the nature of the violation(s) and establish a time limit for correction of these violation(s).
Failure to comply within the time specified shall subject such person to the penalty provisions of this Part. All such penalties shall be deemed cumulative and shall not prevent the Township from pursuing any and all remedies. It shall be the responsibility of the owner of the real property on which any regulated activity is proposed to occur, is occurring, or has occurred to comply with the terms and conditions of this Part.

(Ord. 2007-6, 6/5/2007, §906)

§23-287. Enforcement.

The Township Board of Supervisors is hereby authorized and directed to enforce all of the provisions of this Part. All inspections regarding compliance with the drainage plan shall be the responsibility of the Township Engineer or other qualified persons designated by the Township.

A. A set of design plans approved by the Township shall be on file at the site throughout the duration of the construction activity. Periodic inspections may be made by the Township or designee during construction.

B. It shall be unlawful for any person, firm, or corporation to undertake any regulated activity under §23-204 on any property except as provided for in the approved drainage plan and pursuant to the requirements of this Part. It shall be unlawful to alter or remove any control structure required by the drainage plan pursuant to this Part or to allow the property to remain in a condition that does not conform to the approved drainage plan.

C. At the completion of the project and as a prerequisite for the release of the performance guarantee, the owner or his representatives shall:

   (1) Provide a certification of completion from an engineer, architect, surveyor, or other qualified person verifying that all permanent facilities have been constructed according to the plans and specifications and approved revisions thereto.

   (2) Provide a set of as-built (record) drawings.

D. After receipt of the certification by the Township, a final inspection shall be conducted by the Township Engineer or designated representative to certify compliance with this Part.

E. Prior to revocation or suspension of a permit and at the request of the applicant, the Board of Supervisors will schedule a hearing to discuss the noncompliance if there is no immediate danger to life, public health, or property. The expense of a hearing shall be the applicant’s responsibility.

F. Occupancy Permit. An occupancy permit shall not be issued unless the certification of completion pursuant to §23-287.C(1) has been secured. The occupancy permit shall be required for each lot owner and/or applicant for all subdivisions and land developments in the Township.

(Ord. 2007-6, 6/5/2007, §907)


1. Any person aggrieved by any action of Douglass Township or its designee may appeal to the Board of Supervisors of Douglass Township within 30 days of that action.

2. Any person aggrieved by any decision of Board of Supervisors of Douglass
Township may appeal to the County Court of Common Pleas in the County where the activity has taken place within 30 days of the Township decision.

(Ord. 2007-6, 6/5/2007, §908)
Appendices

Appendix 23-2-A
Swamp Creek Stormwater Management District Watershed Map
Appendix 23-2-B

Voluntary Stormwater Management Procedures for Projects with less than 1,000 Square Feet of Proposed Impervious Area or less than 5,000 Square Feet of Earth Disturbance

Voluntary Stormwater Management Procedures for Projects Meeting the Land Cover Exemption Criteria

What Are the Act 167 Stormwater Management Requirements?
Pennsylvania Act 167 was authorized on October 4, 1978 (P.L. 864), 32 P.S. §680.1 et seq. and gave Pennsylvania Municipalities the power to regulate activities that affect stormwater runoff and surface and groundwater quantity and quality.

Who Is Affected by These Requirements?
The Act 167 stormwater management requirements affect all NEW development in the Township. Individual home construction projects on single-family lots that result in less than 1,000 square feet of impervious area (including the building footprint driveway, sidewalks, and parking areas) or less than 5,000 square feet of earth disturbance are not required to submit formal drainage plans to the Township or County; however, they are still encouraged to address water quality and groundwater recharge criteria specified in this Part (§§23-235 and 23-236).

Do I Require Professional Services to Meet These Requirements?
This brochure has been developed to assist the individual homeowner in meeting the voluntary water quality and groundwater recharge goals of this Part. If the guidelines presented in this brochure are followed, the individual homeowner will not require professional services to comply with these water quality and groundwater recharge goals.

What Do I Need to Send to the Municipality?
Even though a formal drainage plan is not required for individual lot owners, a brief description of the proposed infiltration facilities, including types of material to be used, total impervious areas and volume calculations as shown above, and a simple sketch plan showing the following information shall be submitted to the contractor prior to construction:

A. Location of proposed structures, driveways, or other paved areas with approximate size in square feet.
B. Location of any existing or proposed on-site septic system and/or potable water wells showing rough proximity to infiltration facilities.

Determination of Recharge Volume.
The amount of recharge volume that should be provided can be determined using §23-235.

Example Recharge Volume:
**STEP 1**–Determine total impervious surfaces.

**STEP 2**–Determine required recharge (infiltration) volume ($R_{e}$) using §23-235.

**STEP 3**–Sizing of select infiltration method.

The following pages show several methods of infiltrating stormwater runoff from residential areas. Their appropriateness depends on the amount of infiltration volume required and the amount of land available. More than one method can be implemented on a site, depending on site constraints. Dry wells should be used only for receiving runoff from roof drains. Infiltration trenches are appropriate for receiving runoff from driveways, sidewalk, or parking areas. Other methods may be appropriate, but these should be discussed with the Township Engineer prior to installation.

**Dry Wells.**

Dry wells are effective methods of infiltrating runoff from roof leaders. These facilities should be located a minimum of 10 feet from the building foundation to avoid seepage problems. A dry well can be either a structural prefabricated chamber or an excavated pit filled with aggregate. Construction of a dry well should be performed after all other areas of the site are stabilized to avoid clogging. During construction, compaction of the subgrade soil should be avoided, and construction should be performed with only light machinery. Depth of dry wells in excess of 3½ feet should be avoided. Gravel fill should be an average 1½ to 3 inches in diameter. Dry wells should be inspected at least four times annually as well as after large storm events.

**Figure 23-2-B-1**

**Typical Dry Well Configuration**

Source: Maryland Stormwater Design Manual
Example Sizing:

**STEP 1**–Determine total impervious surfaces.

**STEP 2**–Determine required recharge (infiltration) volume \((Re_v)\) using §23-235.

**STEP 3**–Sizing of select infiltration method.

Volume of facility = depth x width x length
Volume of facility must account for assumed 40 percent void ratio in gravel bed.

Example

**STEP 1**: Suppose proposed impervious surface = 500 square feet; provide stormwater management under voluntary stormwater management procedures.

**STEP 2**: Required Recharge (Infiltration) Volume \((Re_v)\) is determined using §23-235. Suppose \(Re_v = 90\) cubic feet.

**STEP 3**: Facility volume = \(Re_v/0.40\) (accounting for void ratio in bed). Therefore, the proposed facility volume = \(90/0.40 = 225\) cubic feet.

Infiltration Trenches

An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. Runoff is stored in the void space between the stones and infiltrates through the bottom and into the soil matrix. Infiltration trenches perform well for removal of fine sediment and associated pollutants. Pretreatment using buffer strips, swales, or detention basins is important for limiting amounts of coarse sediment entering the trench which can clog and render the trench ineffective.

**Figure 23-2-B-2**
Typical Infiltration Trench Configuration

Source: Maryland Stormwater Design Manual

23-147
Example Sizing:

**STEP 1**—Suppose proposed impervious surface = 500 square feet; provide stormwater management under voluntary stormwater management procedures.

**STEP 2**—Required recharge (infiltration) volume ($Re_v$) is determined using §23-235. Suppose $Re_v = 90$ cubic feet.

**STEP 3**—Sizing of select infiltration method.

Volume of facility = depth x width x length

Required facility volume = $Re_v/0.40$ (accounting for void ratio in bed). Therefore, the proposed facility volume = $90/0.40 = 225$ cubic feet.

Set $D = 3$ ft; determined required surface area of trench

225 cu. ft. / 3 = 75 sq. ft.

The width of the trench should be greater than 2 times its depth (2 x D); therefore, in this example a trench width of 7 feet is selected.

Determine trench length: $L = 75$ sq. ft. / 7 ft. = 10.8 ft.

Final trench dimensions: 3 ft. (D) x 7 ft. (W) x 10.8 ft. (L)

**Figure 23-2-B-3**
Sample Site Sketch Plan

Source: Maryland Stormwater Design Manual
Appendix 23-2-C-1

Sample Drainage Plan Application

(To be attached to the “land subdivision plan or development plan review application” or “minor land subdivision plan review application.”)

Application is hereby made for review of the Stormwater Management and related data as submitted herewith in accordance with the Stormwater Management Ordinance.

_________ Final Plan __________ Preliminary Plan __________ Sketch Plan

Date of Submission ________________ Submission No. ________________

1. Name of subdivision or development ________________________________

2. Name of applicant __________________________ Telephone No. ________________
   (if corporation, list the corporation’s name and the names of two officers of the corporation)
   __________________________________________________ Officer 1
   __________________________________________________ Officer 2

   Address __________________________ Zip ______

Applicants interest in subdivision or development
(if other than property owner give owners name and address)

3. Name of property owner ________________ Telephone No. ________________

   Address __________________________ Zip ______

4. Name of engineer or surveyor ________________ Telephone No. ________________

   Address __________________________ Zip ______

5. Type of subdivision or development proposed:

   ___ Single-family lots  ___ Townhouses  ___ Commercial(multi-lot)
   ___ Two-family lots  ___ Garden apartments  ___ Commercial(one-lot)
   ___ Multi-family lots  ___ Mobile home park  ___ Industrial(multi-lot)
   ___ Cluster type lots  ___ Campground  ___ Industrial(one-lot)
   ___ Planned Residential  ___ Other (__________________________)
   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 existing conditions for the designated design storm? _________

B. Design storm utilized (onsite conveyance systems) (24 hr.) _________
   No. of Subarea ______________
   Watershed Name _______________________
   Explain: __________________________________________________________
   __________________________________________________________
   __________________________________________________________

C. Does the submission and/or district meet the criteria for the applicable management district? ________________________

D. Number of subarea(s) from Appendix 23-2-D of the _________________________
   Stormwater Management Plan or other subareas identified in other watershed stormwater management plans. _________________________

E. Type of proposed runoff control. _________________________

F. Does the proposed stormwater control criteria meet the requirement/guidelines of the Stormwater Ordinance? _________________________
   If not, what variances/waivers are requested? _________________________
   Reasons _________________________

G. Does the plan meet the requirements of Part 3 of the Stormwater Ordinance? _________________________
   If not, what variances/waivers are requested? _________________________
   Reasons why _________________________

H. Was TR-55, June 1986 utilized in determining the time of concentration? _________________________

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? _________________________

L. Is a recommended maintenance program attached? _________________________

9. Erosion and Sediment Pollution Control (E&S):
A. Has the stormwater management and E&S plan, supporting documentation, and narrative been submitted to the _____________ County Conservation District? _____________

B. Total area of earth disturbance __________________________ S.F.

10. Wetlands

A. Have the wetlands been delineated by someone trained in wetland delineation? ______

B. Have the wetland lines been verified by a State or Federal permitting authority? ______

C. Have the wetland lines been surveyed? ________________________________

D. Total acreage of wetland within the property ____________________________

E. Total acreage of wetland disturbed _________________________________

F. Supporting documentation________________________________________

11. Filing

A. Has the required fee been submitted? _________________________________
   Amount ___________________________________________________________

B. Has the proposed schedule of construction inspection to be performed by the applicant’s engineer been submitted? ________________________________

C. Name of individual who will be making the inspections _______________

D. General comments about stormwater management at the development____
   __________________________________________________________________
CERTIFICATE OWNERSHIP AND ACKNOWLEDGMENT OF APPLICATION:

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF BERKS

On this the _____ day of ____________, 20__, before me, the undersigned officer, personally appeared ______________________ who, being duly sworn, according to law, deposes and says that _____________ are owners of the property described in this application and that the application was made with __________ knowledge and/or direction and does hereby agree with the said application and to the submission of the same.

__________________________________________________________________ Property Owner

My Commission Expires ___________________________ 20__

Notary Public

THE UNDERSIGNED HEREBY CERTIFIES THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF THE INFORMATION AND STATEMENTS GIVEN ABOVE ARE TRUE AND CORRECT.

SIGNATURE OF APPLICANT

___________________________________________________________________________

(Information Below This Line To Be completed By The Township)

_________________________ (Name of) Township official submission receipt:

Date complete application received ____________ Plan Number ____________

Fees ____________ date fees paid ____________ received by ____________

Official submission receipt date ________________________________

Received by ________________________________

____________________________________

Township
Appendix 23-2-C-2

Drainage Plan Checklist

Project: _____________________________________________
Municipality: _______________________________________
Engineer: __________________________________________
Submittal No.: _______________________________________
Date: ____________________________

ARTICLE I: GENERAL PROVISIONS

Reference: §23-205 Applicability/Regulated Activities

1. Is the proposed project within the Swamp Creek Watershed?  Yes No
2. Does the proposed project meet the definition of “regulated activity”? Yes No

Stop—If you have checked NO for either of the above questions, you are not required to submit a Stormwater Management Plan under the Swamp Creek Stormwater Management Ordinance.

ARTICLE I: GENERAL PROVISIONS

Reference: §23-206 Exemptions

Note: Parent tract refers to the total parcel configuration on the date of the Municipal Stormwater Management Ordinance and includes any subdivision of lands which may have occurred after than date.

Parent Tract Area: __________________________ acres

Total Existing Impervious Area (as of the date of the Municipal Stormwater Management Ordinance): ______ acres

Total New Impervious Area (all Phases): ______ acres

Parcel IS Exempt Yes No Parcel IS NOT Exempt

ARTICLE IV: STORMWATER MANAGEMENT

Reference: §23-234 Nonstructural Project Design

1. Has an existing resource and site analysis map (ERSAM) been prepared?
   Yes No, Explain __________________________

2. Are any of the following environmentally sensitive areas identified on site?

   Steep slopes Yes No Unknown
   Ponds/lakes/vernal pools Yes No Unknown
   Streams Yes No Unknown
   Wetlands Yes No Unknown
   Hydric soils Yes No Unknown
   Floodplains Yes No Unknown
<table>
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<th>Yes</th>
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<td>Recharge areas</td>
<td>Yes</td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Others:</td>
<td>Yes</td>
<td>No</td>
<td>Unknown</td>
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</table>

3. Does the site layout plan avoid environmentally sensitive areas identified on site?

☐ Yes  ☐ No, Explain

4. Has a stream buffer been established per §23-236.G?

☐ Yes  ☐ No, Explain

---

**ARTICLE IV: STORMWATER MANAGEMENT**

Reference: §23-235 Groundwater Recharge

1. Is the proposed activity considered a “stormwater hotspot”?  ☐ Yes  ☐ No

2. Have provisions been installed to promote groundwater recharge on site?

☐ Yes  ☐ No, Explain

3. Total recharge volume required: __________ cubic feet

4. How is the required recharge volume being addressed?

☐ Infiltration Trench  ☐ Dry Swales

☐ Infiltration Basin  ☐ Other: ________________

☐ Bioretention

---

**ARTICLE IV: STORMWATER MANAGEMENT**

Reference: §23-236 Water Quality Requirements

1. Have provisions been installed to address stormwater runoff water quality on site?

☐ Yes  ☐ No, Explain

2. Total water quality volume required: __________ acre feet

3. Is the site in a special protection watershed which includes exceptional value (EV) of high quality (HQ) waters?

☐ Yes  ☐ No

4. How is the required recharge volume being addressed?

☐ Wet Detention Basin  ☐ Sand Filter

☐ Extended Dry Detention Basin  ☐ Constructed Wetlands

☐ Bioretention  ☐ Other: ________________
ARTICLE IV: STORMWATER MANAGEMENT
Reference: §23-237 Streambank Erosion Requirements

1. Has the 2-year proposed conditions flow been reduced to the 1-year existing conditions flow?
   [ ] Yes   [ ] No, Explain ________________________________

2. Does the proposed conditions 1-year storm drain over a minimum 24-hour period?
   [ ] Yes   [ ] No, Explain ________________________________

ARTICLE IV: STORMWATER MANAGEMENT
Reference: §23-238 Stormwater Peak Rate Control and Management Districts

1. Does the proposed conditions runoff meet the criteria established in §23-238.1?
   [ ] Yes   [ ] No, if you answered Yes proceed to Section V.

ARTICLE IV: STORMWATER MANAGEMENT
Reference: §23-239 Calculation Methodology

1. Which method(s) are utilized in the site stormwater management plan for computing stormwater runoff rates and volumes?
   [ ] TR-20   [ ] PSRM
   [ ] TR-55   [ ] Rational Method
   [ ] HEC-1/HEC-HMS   [ ] Other: ___________________ 

2. Were Table 23-2-E-1 or Figure 23-2-E-3 in Appendix 23-2-E utilized in rainfall determination?
   [ ] Yes   [ ] No, Explain ________________________________

3. Were Table 23-2-E-2 (Runoff Curve Numbers) or Table 23-2-E-3 in the Appendix 23-2-E (Rational Runoff Coefficients) utilized in calculations for runoff?
   [ ] Yes   [ ] No, Explain ________________________________

4. For any proposed stormwater detention facility, were the appropriate design storms rooted through the facility using the storage-indication method?
   [ ] Yes   [ ] No, Explain ________________________________

ARTICLE IV: STORMWATER MANAGEMENT
Reference: §23-240 Other Requirements

1. Is this project subject to PennDOT approval?
   [ ] Yes   [ ] No
   a. If “Yes” have these plans been forwarded to PennDOT for review?
ARTICLE VII: MAINTENANCE RESPONSIBILITIES

Reference: §23-262 Responsibilities for operations and maintenance of stormwater controls/BMPs

1. Has a stormwater control and BMP operations and maintenance plan been approved by the Municipality?
   - Yes
   - No
   - Explain

2. Who shall assume responsibility for implementing the stormwater control and BMP operations and maintenance plan?
   - Municipality
   - Homeowner Association
   - Private Owner
   - Other:___________________________

2. Have proposed wet detention basins incorporated biologic control consistent with the West Nile Guidelines presented in Appendix 23-2-G?
   - Yes
   - No
   - Not Applicable

3. Are any proposed stormwater facilities subject to Pennsylvania DEP Chapter 105 permitting?
   - Yes
   - No
   a. If “Yes” have these plans been forwarded to Pennsylvania DEP for review?
      - Yes
      - No
      - Explain

Appendix 23-2-D

Low Impact Development (LID) Practices

Alternative Approach for Managing Stormwater Runoff

Natural hydrologic conditions can be altered radically by poorly planned development practices such as introducing unnecessary 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. This approach leads ultimately to the degradation of water quality as well as expenditure of additional resources for detaining and managing concentrated runoff at some downstream location.

The recommended alternative approach is to promote practices that will minimize proposed conditions runoff rates and volumes, which will minimize needs for artificial conveyance and storage facilities. To simulate pre-development hydrologic conditions, 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 of those features. The following describes various techniques to achieve 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 land development. In fact, commonly held drainage philosophy encourages just the opposite pattern—streets and adjacent storm sewers are typically located in the natural headwater valleys and swales, thereby replacing natural drainage functions with a completely impervious system. As a result, 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 minimize the amount of grading on site.

**Protecting Natural Depression Storage Areas.** Depressional storage areas either 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 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
Avoiding Introduction of Impervious Areas. 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 a 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 connection 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 back yards, 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. Township planners and traffic designers should encourage narrower neighborhood streets that 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 impervious cover associated with driveway and entry walks and is most readily accomplished along low traffic streets where traffic noise is not a problem.

Constructing Cluster Developments. Cluster developments can also reduce the amount of impervious area for a given number of lots. The biggest savings occurs with street length, which also will reduce costs of the development. Cluster development groups the construction activity in 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. Benefits include reduced potential for downstream
flooding and water quality degradation of receiving streams/water bodies, enhancement of aesthetics, and reduction of development costs. Other benefits include more stable baseflows in receiving streams, improved groundwater recharge, reduced flood flows, reduced pollutant loads, and reduced costs for conveyance and storage.
Appendix 23-2-E

Stormwater Management Design Criteria

Table 23-E-1
Precipitation-Frequency Atlas of the United States

Table 23-E-2
Runoff Curve Numbers

Table 23-E-3
Rational Runoff Coefficients

Table 23-E-4
Nonstructural Stormwater Management Measures
Table 23-2-E-1
Precipitation-Frequency Atlas of the United States

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<td>Pasture, grassland, or range--continuous forage for grazing</td>
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*Includes multi-family housing unless justified lower density can be provided.

Note: Existing site conditions of bare earth or fallow ground shall be considered as meadow when choosing a CN value.

Source: NRCS (SCS) TR-55
## Table 23-2-E-3
### Rational Runoff Coefficients

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</tr>
<tr>
<td>Good conditions</td>
<td>.08</td>
<td>.13</td>
<td>.16</td>
<td>.11</td>
</tr>
<tr>
<td>Forest/Woodland</td>
<td>.08</td>
<td>.11</td>
<td>.14</td>
<td>.10</td>
</tr>
<tr>
<td>Grass Areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average conditions</td>
<td>.12</td>
<td>.18</td>
<td>.22</td>
<td>.16</td>
</tr>
<tr>
<td>Poor conditions</td>
<td>.14</td>
<td>.21</td>
<td>.30</td>
<td>.18</td>
</tr>
<tr>
<td>Impervious Areas</td>
<td>.90</td>
<td>.91</td>
<td>.92</td>
<td>.91</td>
</tr>
<tr>
<td>Weighted Residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lot size ½ acre</td>
<td>.29</td>
<td>.33</td>
<td>.36</td>
<td>.31</td>
</tr>
<tr>
<td>Lot size ¼ acre</td>
<td>.26</td>
<td>.30</td>
<td>.34</td>
<td>.29</td>
</tr>
<tr>
<td>Lot size ¼ acre</td>
<td>.24</td>
<td>.28</td>
<td>.31</td>
<td>.26</td>
</tr>
<tr>
<td>Lot size ½ acre</td>
<td>.21</td>
<td>.25</td>
<td>.28</td>
<td>.24</td>
</tr>
<tr>
<td>Lot size 1 acre</td>
<td>.18</td>
<td>.23</td>
<td>.26</td>
<td>.21</td>
</tr>
</tbody>
</table>
Table 23-2-E-4
Nonstructural Stormwater Management Measures

<table>
<thead>
<tr>
<th>Nonstructural Stormwater Measure</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Area Conservation</td>
<td>Conservation of natural areas such as forest, wetlands, or other sensitive areas in a protected easement, thereby retaining their existing hydrologic and water quality characteristics.</td>
</tr>
<tr>
<td>Disconnection of Rooftop Runoff</td>
<td>Rooftop runoff is disconnected and then directed over a pervious area where it may either infiltrate into the soil or filter over it. This is typically obtained by grading the site to promote overland flow or by providing bioretention on single-family residential lots.</td>
</tr>
<tr>
<td>Disconnection of Nonrooftop Runoff</td>
<td>Disconnect surface impervious cover by directing it to pervious areas where it is either infiltrated or filtered through the soil.</td>
</tr>
<tr>
<td>Buffers</td>
<td>Buffers effectively treat stormwater runoff. Effective treatment constitutes capturing runoff from pervious and impervious areas adjacent to the buffer and treating the runoff through overland flow across a grassy or forested area.</td>
</tr>
<tr>
<td>Grass Channel (Open Section Roads)</td>
<td>Open grass channels are used to reduce the volume of runoff and pollutants during smaller storms.</td>
</tr>
<tr>
<td>Environmentally Sensitive Rural Development</td>
<td>Environmental site design techniques are applied to low-density or rural residential development.</td>
</tr>
</tbody>
</table>

Appendix 23-2-F

References

BMP Manuals

**California**

**Georgia**

**Maryland**

**Massachusetts**

**Minnesota**

**New Jersey**

**New York**

**Pennsylvania**

**Washington**

**Federal**

USEPA Infiltration Trench Fact Sheet (September 1999)–http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm

**Riparian Buffer References**

Alliance for the Chesapeake Bay, Pennsylvania Department of Environmental Protection, September 2000. *Forest Buffer Toolkit*, Stream ReLeaf Program.


Appendix 23-2-G

Stormwater Controls and Best Management Practices
Operations and Maintenance Agreement

THIS AGREEMENT, made and entered into this ___ day of __________, 20 ___,
by and between __________________________, (hereinafter the “Landowner”), and
________________________, _______ County, Pennsylvania, (hereinafter “Township”);

WITNESSETH

WHEREAS, the landowner is the owner of certain real property as recorded by
deed in the land records of ________ County, Pennsylvania, Deed Book __________
at Page __________, (hereinafter “Property”).

WHEREAS, the Landowner is proceeding to build and develop the Property; and

WHEREAS, the Stormwater Controls and BMP operations and maintenance plan
approved by the Township (hereinafter referred to as the “Plan”) for the property
identified herein, which is attached hereto as Appendix 23-2-A and made part hereof,
provides for management of stormwater within the confines of the Property through the
use of best management practices (BMPs); and

WHEREAS, the Township, and the Landowner, his successors and assigns, agree
that the health, safety, and welfare of the residents of the Township and the protection
and maintenance of water quality require that on-site stormwater BMPs 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 Township Stormwater Management Ordinance including, but not
limited to, infiltration trenches, seepage 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 underground aquifer, and
WHEREAS, the Township requires, through the implementation of the Plan, that stormwater management BMPs as required by said Plan and the Township Stormwater Management Ordinance be constructed and adequately operated and maintained by the Landowner, 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 Landowner in accordance with the plans and specifications identified in the Plan.

2. The Landowner shall operate and maintain the BMP(s) as shown on the Plan in good working order acceptable to the Township and in accordance with the specific maintenance requirements noted on the Plan.

3. The Landowner hereby grants permission to the Township, its authorized agents and employees, to enter upon the property, at reasonable times and upon presentation of proper identification, to inspect the BMP(s) whenever it deems necessary. Whenever possible, the Township shall notify the Landowner prior to entering the property.

4. In the event the Landowner fails to operate and maintain the BMP(s) as shown on the Plan in good working order acceptable to the Township, the Township or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMP(s). This provision shall not be construed to allow the Township to erect any permanent structure on the land of the Landowner. It is expressly understood and agreed that the Township 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 Township.

5. In the event the Township, 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 Landowner shall reimburse the Township for all expenses (direct and indirect) incurred within 10 days of receipt of invoice from the Township.

6. The intent and purpose of this Agreement is to ensure the proper maintenance of the onsite BMP(s) by the Landowner; 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 Landowner, its executors, administrators, assigns, and other successors in interest shall release the Township’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 BMP(s) by the Landowner or Township. In the event that a claim is asserted against the Township, its designated representatives, or employees, the Township shall promptly notify the Landowner, and the Landowner shall defend, at his own expense, any suit based on the claim. If any judgment or claims against the Township’s employees or designated representatives shall be allowed, the Landowner shall pay all costs and expenses regarding said judgment or claim.

8. The Township shall inspect the BMP(s) at a minimum of once every 3 years to ensure their continued functioning.
This Agreement shall be recorded at the Office of the Recorder of Deeds of _____ County, Pennsylvania, and shall constitute a covenant running with the Property and/or equitable servitude, and shall be binding on the Landowner, his administrators, executors, assigns, heirs and any other successors in interests, in perpetuity.

ATTEST:

WITNESS the following signatures and seals:

(SEAL) For the Township:

__________________________________________

(SEAL) For the Landowner:

__________________________________________

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 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)