ORDINANCE NO: 2022 - 1041

**AN ORDINANCE OF THE BOROUGH OF MORRISVILLE,
BUCKS COUNTY, PENNSYLVANIA,
AMENDING CHAPTER 370 (STORMWATER MANAGEMENT ORDINANCE)
TO BE CONSISTENT WITH UPDATES TO MS4 GUIDELINES**

WHEREAS, the Council of the Borough of Morrisville is empowered to adopt Ordinances of the Borough; and

WHEREAS, the Council of the Borough of Morrisville believes amendments to the Provisions contained in Chapter 370 (Stormwater Management) are necessary to protect the health, safety, morals and general welfare of the residents of the Borough.

NOW, THEREFORE, the Council of Morrisville Borough, Bucks County, Pennsylvania does hereby ordain and enact the following:

SECTION 1. Chapter 370, Stormwater Management, shall be repealed in its entirety and replaced as follows:

DELAWARE RIVER SOUTH WATERSHED STORMWATER MANAGEMENT

Article I. General Provisions

This Ordinance shall be known and may be cited as the "Morrisville Borough Stormwater Management Ordinance."

§370-1. Statement of Findings.

The governing body of the Municipality finds that:

A. Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases runoff volumes, flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines flood plain managemend flood control efforts in downstream communities, reduces groundwater recharge, threatens public health and safety, and increases nonpoint source pollution of water resources.

B. Inadequate planning and management of stormwater runoff resulting from land development and redevelopment throughout a watershed can also harm surface water resources by changing the natural hydrologic patterns, accelerating stream flows (which increase scour and erosion of stream-beds and stream-banks thereby elevating sedimentation), destroying aquatic habitat and elevating aquatic pollutant concentrations and loadings such as sediments, nutrients, heavy metals and pathogens. Groundwater resources are also impacted through loss of recharge.

C. A comprehensive program of stormwater management (SWM), including reasonable regulation of development and activities causing accelerated runoff , is fundamental to the public health, safety, welfare, and the protection of the people of the Commonwealth, their resources, and the environment.

D. Through project design, impacts from stormwater runoff can be minimized to 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.

E. Stormwater is an important water resource, which provides groundwater recharge for water supplies and base flow of streams, which also protects and maintains surface water quality.

F. 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).

G. The use of green infrastructure and low impact development (LID) are intended to address the root cause of water quality impairment by using systems and practices which use or mimic natural processes to: 1) infiltrate and recharge, 2) evapotranspire, and/or 3) harvest and use precipitation near where it falls to earth. Green infrastructure practices and LID contribute to the restoration or maintenance of pre-development hydrology.

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

I. Non-stormwater discharges to municipal separate storm sewer systems can contribute to pollution of waters of the Commonwealth by the Municipality.

§370-2. Purpose.

The purpose of this ordinance is to promote health, safety, and welfare within the Delaware River South watershed by minimizing the damages described in § 370-1 of this Part through provisions designed to:

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

B. Promote nonstructural best management practices.

C. Minimize increases in stormwater volume.

D. Minimize impervious surfaces.

E. Manage stormwater runoff and erosion and sedimentation problems close to the source, reduce runoff volumes and mimic predevelopment hydrology.

F. Utilize and preserve the existing natural drainage systems.

G. Encourage infiltration of stormwater to maintain groundwater recharge, to prevent degradation of surface and groundwater quality, and to otherwise protect water resources.

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

I. Maintain existing flows and quality of streams and watercourses in the municipality and the Commonwealth.

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

K. Provide performance standards, design criteria, and review procedures for watershed-wide stormwater management and planning.

L. Meet legal water quality requirements under State law, including regulations at 25 Pa.Code, Chapter 93 to protect, maintain, reclaim and restore the existing and designated uses of the waters of the Commonwealth.

M. Prevent scour and erosion of stream banks and streambeds.

N. Provide proper operations and maintenance of all stormwater best management practices (BMPs) that are implemented within the Municipality.

O. Implement an illegal discharge detection and elimination program to address non-stormwater discharges into the Municipality's Separate Storm Sewer System.

P. Provide standards to meet NPDES Permit requirements.

§370-3. Statutory Authority.

The Borough 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, as amended, and/or the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. Section 680.1, et seq., as amended, The Stormwater Management Act.

§370-4. Applicability

A. All regulated activities and all activities that may affect stormwater runoff, including land development and earth disturbance activity, are subject to regulation by this Ordinance.

B. All discharges entering into the Municipality's separate storm sewer system are subject to regulation by this Part.

C. The following activities are defined as "Regulated Activities" and shall be regulated by this Ordinance:

1. Land development.
2. Subdivision.
3. Redevelopment.
4. Earth disturbance activities.
5. Construction of new or additional impervious or semi-pervious surfaces (roads, driveways, parking lots, patios, tennis courts, etc.).
6. Construction of new buildings or additions to existing buildings.
7. Diversion or piping of any natural or man-made stream channel.
8. Installation of BMPs and/or stormwater management facilities or appurtenances thereto.

D. Article VIII, regarding prohibitions, is applicable to all discharges entering into the Municipality's separate storm sewer system regardless of project type or proposed impervious surface area or the area of earth disturbance. These prohibitions apply to proposed or new discharges as well as existing discharges.

E. 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.

§370-5. Repealer.

Any ordinance or ordinance provision(s) or regulation of the Municipality inconsistent with any of the provisions of this ordinance is hereby repealed to the extent of the inconsistency only.

§370-6. Severability.

Should any section or provision of this ordinance be declared invalid by a court of competent jurisdiction, such decision shall not affect the validity of any of the remaining provisions of this Ordinance.

§370-7. Compatibility With Other Ordinance Requirements.

A. Approvals issued and actions taken under this ordinance do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, or ordinance. To the extent that this Ordinance imposes more rigorous or stringent requirements for stormwater management, the specific requirements contained in this Ordiance shall be followed.

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

§370-8. Erroneous Permit.

Any permit or authorization issued or approved based on false, misleading or erroneous information provided by an applicant is void without the necessity of any proceedings for revocation. Any work undertaken or use established pursuant to such permit or other authorization is unlawful. No action may be taken by a board, agency or employee of the Municipality purporting to validate such a violation.

§370-9. Waivers

A. If the Municipality determines that any requirement under this Ordinance cannot be achieved for a particular regulated activity, the Municipality may, after an evaluation of alternatives, approve measures other than those in this Ordinance.

B. Waivers or modifications of the requirements of this Ordinance may be approved by the Municipality if enforcement will exact undue hardship because of peculiar conditions pertaining to the land in question, provided that the modifications will not be contrary to the public interest and that the purpose of the Ordinance is preserved. Cost or financial burden shall not be considered a hardship. Modification may be considered if an alternative standard or approach will provide equal or better achievement of the purpose of the Ordinance. A request for modifications shall be in writing and accompany the Stormwater Management Site Plan submission. The request shall provide the facts on which the request is based, the provision(s) of the Ordinance involved and the proposed modification.

C. No waiver or modification of any regulated stormwater activity involving earth disturbance greater than or equal to one acre may be granted by the Municipality unless that action is approved in advance by the Department of Environmental Protection (DEP) or the delegated county conservation district.

Article II. Definitions

§370-10. Definitions.

For the purposes of this chapter, 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, or any other similar entity.

D. The words "shall" and "must" refers to items which are mandatory; the words "may" and "should" refer to items which are permissive.

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

These definitions do not necessarily reflect the definitions contained in pertinent regulations or statutes and are intended for this Ordinance only.

Accelerated Erosion - The removal of the surface of the land through the combined action of man's activity and the natural processes at a rate greater than would occur because of the natural process alone.

Agricultural Activities - Activities associated with agriculture such as agricultural cultivation, agricultural operation, and animal heavy use areas. This includes the work of producing crops including tillage, land clearing, plowing, disking, harrowing, planting, harvesting crops or pasturing and raising of livestock 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 landowner , developer, or other person who has filed an application to the municipality for approval to engage in any regulated activities at a project site in the municipality as defined in §370-4 of this ordinance.

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 the same, are turned over to the Engineer at the completion of the

project.

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

Base Flow – The portion of stream flow that is sustained by groundwater discharge.

Bioretention - A stormwater management facility which utilizes woody and herbaceous plants and soils to remove pollutants before infiltration occurs.

Best Management Practice (BMP) – Activities, facilities, designs, measures, or procedures used to manage stormwater impacts from regulated activities, to meet state water quality requirements, to promote groundwater recharge, and to otherwise meet the purposes of this Ordinance. Stormwater BMPs are commonly grouped into one of two broad categories or measures: "structural" or "non-structural." In this Ordinance, non-structural BMPs or measures refer to operational and/or behavior-related practices that attempt to minimize the contact of pollutants with stormwater runoff, whereas structural BMPs or measures are those that consist of a physical device or practice that is installed to capture and treat stormwater runoff. Structural BMPs include, but are not limited to, a wide variety of practices and devices, from large-scale retention ponds and constructed wetlands, to small-scale underground treatment systems, infiltration facilities, filter strips, low impact design, bioretention, wet ponds, permeable paving, grassed swales, riparian or forested buffers, sand filters, detention basins, and manufactured devices. Structural stormwater BMPs are permanent appurtenances to the project site.

Channel Erosion – The widening, deepening, and headward cutting of small channels and waterways caused by moderate to large floods.

Cistern – An underground reservoir or tank for storing rainwater.

Conservation District – A conservation district, as defined in Section 3(c) of the Conservation District Law (3 P. S. § 851(c)) that has the authority under a delegation agreement executed with DEP to administer and enforce all or a portion of the regulations promulgated under 25 Pa. Code 102.

Culvert – A structure with appurtenant works which carries a stream 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 that does or may impound water or another fluid or semifluid.

DEP – The Pennsylvania Department of Environmental Protection.

Department – Pennsylvania Department of Environmental Protection.

Designee – The agent of the Morrisville Borough Planning Commission and/or agent of the governing body involved with the administration, review, or enforcement of any provisions of this ordinance by contract or memorandum of understanding.

Design Professional (Qualified) - A Pennsylvania Registered Professional Engineer, Registered Landscape Architect, or a 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. Also, see Return Period.

Detention Basin - An impoundment structure designed to manage stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate.

Detention District - Those subareas in which some type of detention is required to meet the plan requirements and the goals of Act 167.

Detention Volume – The volume of runoff that is captured and released into the waters of the Commonwealth at a controlled rate.

Development Site (Site) – See Project Site.

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

Disturbed Areas – An unstabilized land area where an earth disturbance activity is occurring or has occurred.

Downslope Property Line – That portion of the property line of the lot, tract, or parcels of land being developed located such that all 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 streams, 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 Municipal governing body after the drainage plan has been approved. Said permit is issued prior to or with the final Municipal approval.

Drainage Plan - The documentation of the stormwater management system, to be used for a given development site, the contents of which are established in §370-26.

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; road maintenance; building construction; 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 natural process by which the surface of the land is worn away by water, wind, or chemical action.

Erosion and Sediment Pollution Control Plan - A plan that is designed to minimize accelerated erosion and sedimentation.

ERSAM - Existing Resource and Site Analysis Map.

Exceptional Value Waters - Surface waters of high quality which satisfy Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards, §93.4b(b) (relating to antidegradation).

Existing Condition – The dominant land cover during the 5 year period immediately preceding a proposed regulated activity.

FEMA – Federal Emergency Management Agency.

Flood - A general but temporary condition of partial or complete inundation of normally dry 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 FEMA maps and studies as being a special flood hazard area. Also includes areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania Department of Environmental Protection (DEP) Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by DEP).

Floodway - The channel of the watercourse and those portions of the adjoining floodplains that are reasonably required to carry and discharge the 100-year 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 floodway, it is assumed—absent evidence to the contrary—that the floodway extends from the stream to 50 feet from the top of the bank of the stream.

Forest Management/Timber Operations - Planning and activities necessary for the management of forestland. These include conducting a timber inventory, preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, site preparation, and reforestation.

Freeboard - A vertical distance between the elevation of the design high-water and the top of a dam, levee, tank, basin, or diversion ridge. 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 conduct surface water.

Green Infrastructure – Systems and practices that use or mimic natural processes to infiltrate, evapotranspire, or reuse stormwater on the site where it is generated.

Groundwater Recharge - Replenishment of existing natural underground water supplies.

HEC-HMS - The U.S. Army Corps of Engineers, Hydrologic Engineering Center (HEC) - Hydrologic Modeling System (HMS) adapted to the Delaware River South watershed.

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).

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 (HSG) – Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates. Soils are classified into four HSGs (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged wetting. The NRCS defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of the development site may be identified from a soil survey report that can be obtained from local NRCS offices or conservation district offices. Soils become less pervious as the HSG varies from A to D (NRCS[1,2]).

Hyetograph - A graphical representation of average rainfall, rainfall excess rates, or volumes over specified areas during successive units of time during a storm.

Impervious Surface (Impervious Area) - A surface that prevents the infiltration of water into the ground. Impervious surfaces (or areas) shall include, but not be limited to: roofs; additional indoor living spaces, patios, garages, storage sheds and similar structures; and any new streets or sidewalks. Decks, parking areas, and driveway areas are not counted as impervious areas if they do not prevent infiltration.

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 areas. The development relies on existing infrastructure and does not require an extension of water, sewer, or other public utilities.

Infiltration - The passing of stormwater through the soil from the surface.

Infiltration Structures - A structure designed to direct runoff into the ground (e.g., french drains,

seepage pits, seepage trench).

Inlet - A surface connection to a closed drain. A structure at the diversion end of a conduit. The upstream end of any structure through which water may flow.

Karst – A type of topography or landscape characterized by surface depressions, sinkholes, rock pinnacles/uneven bedrock surface, underground drainage, and caves. Karst is formed on carbonate rocks, such as limestone or dolomite.

Land Development (Development) – Inclusive of any or all of the following meanings: (i) the improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving: (a) a group of two or more buildingsor (ii) the division or allocation of land or space 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; (ii) any subdivision of land; (iii) development in accordance with Section 503(1.1) of the Pennsylvania Municipalities Planning Code.

Land Earth Disturbance - Any activity involving grading, tilling, digging, or filling of ground or stripping of vegetation or any other activity that causes an alteration to the natural condition of the land.

Limiting zone - A soil horizon or condition in the soil profile or underlying strata which includes one of the following:

i. A seasonal high water table, whether perched or regional, determined by direct observation of the water table or indicated by soil mottling.
ii. 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.
iii. A rock formation, other stratum or soil condition which is so slowly permeable that it effectively limits downward passage of effluent.

Low Impact Development (LID) – Site design approaches and small-scale stormwater management practices that promote the use of natural systems for infiltration, evapotranspiration, and reuse of rainwater. LID can be applied to new development, urban retrofits, and revitalization projects. LID utilizes design techniques that infiltrate, filter, evaporate, and store runoff close to its source. Rather than rely on costly large-scale conveyance and treatment systems, LID addresses stormwater through a variety of small, cost-effective landscape features located on-site.

Main Stem (Main Channel) - Any stream segment or other runoff conveyance facility used as a reach in the Delaware River South Creek 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.

Municipality – Borough of Morrisville, Bucks County, Pennsylvania.

Natural Hydrologic Regime (see Hydrologic Regime)

Nonpoint Source Pollution - Pollution that enters a body of water from diffuse origins in the watershed and does not result from confined or discrete conveyances.

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 - USDA Natural Resources Conservation Service (previously SCS).

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

Outfall - Point where water flows from a conduit, stream, or drain.

Outlet – Points of water disposal from a stream, river, lake, tidewater or artificial drain.

Parent Tract - The parcel of land from which a land development or subdivision originates as of the date of the original Delaware River South Creek stormwater ordinance adoption.

Parking Lot Storage - Involves the use of impervious 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 (calibrated) - The computer-based hydrologic modeling technique adapted to the Delaware River South Watershed for the Act 167 plan. The model has been "calibrated" to reflect actual recorded flow values by adjoining key model input parameters.

Pervious Area – Any area not defined as impervious.

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

Planning Commission - The planning commission of [municipal name].

PMF - Probable Maximum Flood - The flood that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in any area. The PMF is derived from the probable maximum precipitation (PMP) as determined based on data obtained from the National Oceanographic and Atmospheric Administration (NOAA).

Point Source - Any discernible, confined and discreet 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.

Predevelopment - Undeveloped/Natural Condition.

Pretreatment - Techniques employed in stormwater BMPs to provide storage or filtering to help trap coarse materials and other pollutants before they enter the system.

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

Qualified Professional – Any person licensed by the Pennsylvania Department of State or otherwise qualified by law to perform the work required by this Ordinance.

Rational Method - A rainfall-runoff relation used to estimate peak flow.

Recharge Area - Undisturbed surface area or depression where stormwater collects, and a portion of which infiltrates and replenishes the underground and groundwater.

Reconstruction - The process by which existing developed area is adaptively reused, rehabilitated, restored, renovated, and/or expanded. The development relies on existing infrastructure and does not require an extension of water, sewer, or other public utilities.

Record Drawings - Original documents revised to suit the as-built conditional 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 construction, alteration, or improvement exceeding 5,000 square feet of land disturbance performed on sites where existing land use is commercial, industrial, institutional, or multifamily residential.

Regulated Activities - Any earth disturbance activities or any activities 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 92, 25 Pa. Code 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.

Retention Basin - An impoundment in which stormwater is stored and not released during the storm event. Stored water may be released from the basin at some time after the end of the storm.

Retention Volume/Removed Runoff – The volume of runoff that is captured and not released directly into the surface waters of this Commonwealth during or after a storm event.

Return Period – The average interval, in years, within which a storm event of a given magnitude can be expected to occur one time. For example, the 25-year return period rainfall would be expected to occur on average of once every 25 years; or stated in another way, the probability of a 25-year storm occurring in any one year is 0.04 (i.e., a 4% chance).

Riparian Buffer – A permanent area of trees and shrubs located adjacent to streams, lakes, ponds and wetlands.

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 cleaning drainage ditches and other similar activities.

Rooftop 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.

SALDO - Subdivision and Land Development Ordinance.

Sediment – Soils or other materials transported by surface water as a product of erosion.

Sediment Basin – A barrier, dam, or retention or detention basin located and designed to retain rock, sand, gravel, silt, or other material transported by water.

Sediment Pollution - The placement, discharge, or any other introduction of sediment into the waters of the Commonwealth occurring from the failure to design, construct, implement or maintain control measures and control facilities in accordance with the requirements of the DEP Erosion and Sediment Pollution Control Program Manual.

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

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 ground.

Sheet Flow - Runoff that flows over the ground surface as a thin, even layer, not concentrated in a channel.

Separate Storm Sewer System - A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels or storm drains) primarily used for collecting and conveying stormwater runoff.

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 are likely to migrate and reach a drinking water well or surface water intake.

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 Title 25 of the Pennsylvania Code 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 - Drainage runoff from the surface of the land resulting from precipitation or snow or ice melt.

Stormwater Management Facility - Any structure, natural or manmade, that, due to its condition, design, or construction, conveys, stores, or otherwise affects stormwater runoff. Typical stormwater management facilities include, but are not limited to, detention and retention basins; open channels; storm sewers; pipes; and infiltration facilities.

Stormwater Management Plan - The plan for managing stormwater runoff in the Delaware River South Watershed adopted by Bucks County as required by the Act of October 4, 1978, P.L. 864, (Act 167), and known as the Delaware River South Watershed Act 167 Stormwater Management Plan.

Stormwater Management Site Plan - The plan prepared by the developer or his representative indicating how stormwater runoff will be managed at the development site in accordance with this Ordinance. **Stormwater Management Site Plan** will be designated as **SWM Site Plan** throughout this Ordinance.

Stream - A natural watercourse.

Stream Buffer - The land area adjacent to each side of a stream, essential to maintaining water quality measured 150 feet from the top of the bank.

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 - The smallest drainage unit of a watershed for which stormwater management criteria have been established in the stormwater management plan.

Subdivision - As defined in The Pennsylvania Municipalities Planning Code, Act of July 31, 1968, P.L. 805, No. 247.

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.

USDA – United States Department of Agriculture.

Watercourse - River, brook, creek, or a channel or ditch for water, whether natural or manmade with perennial or intermittent flow.

Waters of this Commonwealth - Any and all rivers, streams, creeks, rivulets, impoundments, ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface 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 surface water of this Commonwealth.

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 towards and reach the water source.

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, ferns, and similar areas.

Article III. Stormwater Management

§370-11. Requirements Applicable to All Stormwater Management Systems.

A. All regulated activities in Delaware River South watershed that do not fall under the exemption criteria shown in §370-25 shall submit a drainage plan consistent with the *Delaware River South Watershed Stormwater Management Plan* to the municipality for review. These criteria shall apply to the total proposed development even if development is to take place in stages. Impervious cover shall include, but not be limited to, any roof, parking or driveway areas and any new streets and sidewalks. Any areas designed to initially be gravel or crushed stone shall be assumed to be impervious for the exemption criteria. All regulated activities within the municipality shall be designed, implemented, operated and maintained to meet the purposes of this chapter, through these two elements:

1. Erosion and sediment control during the earth disturbance activities (e.g., during construction), and

2. Water quality protection measures after completion of earth disturbance activities (i.e., after construction), including operations and maintenance.

B. No regulated earth disturbance activities within the municipality shall commence until the requirements of this chapter are met.

C. Discharges onto adjacent property shall not be created, increased, decreased, or relocated, or otherwise altered without permission of the adjacent property owner(s). Such discharges shall be subject to the requirements of this Part.

D. All regulated activities shall include such measures as necessary to:

1. Protect health, safety, and property.

2. Meet State water quality requirements as defined in Article II.

3. Meet the water quality goals of this Part by implementing measures to:

   a. Minimize disturbance to floodplains, wetlands, natural slopes over 15 percent, and existing native vegetation.

   b. Preserve and maintain trees and woodlands. Maintain or extend riparian buffers and protect existing forested buffer. Provide trees and woodlands adjacent to impervious areas whenever feasible.

   c. Establish and maintain non-erosive flow conditions in natural flow pathways.

   d. Minimize soil disturbance and soil compaction. Cover disturbed areas with topsoil having a minimum depth of 4 inches. Use tracked equipment for grading when feasible.

   e. Disconnect impervious surfaces by directing runoff to pervious areas.

E. Stormwater drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by stormwater management facilities or open channels consistent with this ordinance.

F. The drainage plan must be designed consistent with the sequencing provisions of §370-13 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 Article III. of this ordinance.

G. The existing points of concentrated drainage that discharge onto adjacent property shall not be altered without permission of the affected property owner(s) and shall be subject to any applicable discharge criteria specified in this ordinance.

H. 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 ordinance. If diffused flow 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 harm will result from the concentrated discharge.

I. Whenever a watercourse is located within a development site, it shall remain open in its natural state and location and should not be piped, impeded, or altered (except for road crossings). It is the responsibility of the developer to stabilize existing eroded stream/channel banks.

J. Where a development site is traversed by watercourses drainage easements shall be provided conforming to the line of such watercourses. The terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations that may adversely affect the flow of stormwater within any portion of the easement.

K. When it can be shown that, due to topographic conditions, natural drainageways on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainageways. Work within natural drainageways shall be subject to approval by the municipality and the DEP through the Joint Permit Application process, or, where deemed appropriate by DEP, through the General Permit process.

L. Any stormwater management facilities regulated by this ordinance that would be located in or adjacent to waters of the Commonwealth or wetlands shall be subject to approval by DEP through the Joint Permit Application process, or, where deemed appropriate by 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 DEP.

M. Any stormwater management facilities regulated by this ordinance that would be located on or discharge into state highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).

N. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc., are required to reduce the size or eliminate the need for detention facilities.

O. Roof drains must not be discharged to streets or roadside ditches or connected to sanitary or storm sewers. Overland flow and infiltration/percolation of stormwater shall be promoted where advantageous to do so. Only when it is more advantageous to connect directly to streets or storm sewers, shall it be permitted on a case-by-case basis by the municipality.

P. All stormwater runoff shall be pretreated for water quality prior to discharge to surface or groundwater as required by § 370-14 of this ordinance.

Q. Post-construction water quality protection shall be addressed as required by § 370-22. Operations and maintenance of permanent stormwater BMPs shall be addressed as required by Article VII.

R. All BMPs used to meet the requirements of this Part shall conform to the State water quality requirements, and any more stringent requirements as determined by the Municipality.

§370-12. Permit Requirements by Other Government Entities.

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

A. All regulated earth disturbance activities subject to permit requirements by DEP under regulations at 25 Pa. Code, Chapter 102.

B. Work within natural drainageways subject to permit requirements 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 requirements by DEP under 25 Pa. Code, Chapter 105.

D. Any stormwater management facility that would be located on a State highway right-of-way, or require access from a State highway, shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).

E. Culverts, bridges, storm sewers or any other facilities which must pass or convey flows from the tributary area and any facility which may constitute a dam subject to permit requirements by DEP under 25 Pa. Code, Chapter 105.

§370-13. Nonstructural Project Design (Sequencing to Minimize Stormwater Impacts).

A. The design of all Regulated Activities shall include the following steps in sequence to minimize stormwater impacts.

1. 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 of the site.

2. 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 municipal requirements.

3. 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.

B. The applicant shall demonstrate that they designed the Regulated Activities in the following sequence to minimize the increases in stormwater runoff and impacts to water quality:

1. 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, flood plains, stream buffer zones, hydrologic soil groups A, B, C, and D, any existing recharge areas and any other requirements outlined in the municipal Subdivision and Land Development ordinance. Establish stream buffer according to recommended criteria or applicable ordinances.

2. Prepare a draft project layout avoiding sensitive areas identified in §370-13.B.1 and minimizing total site earth disturbance as much as possible. The ratio of disturbed area to the entire site area and measures taken to minimize earth disturbance shall be included in the ERSAM.

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

4. Evaluate Nonstructural Stormwater Management Alternatives (See Appendix B, Table B-6).
   a. Minimize earth disturbance
   b. Minimize impervious surfaces
   c. Break up large impervious surfaces.

5. Satisfy water quality objective (§370-14).

6. Satisfy groundwater recharge (infiltration) objective (§370-15) and provide for stormwater treatment prior to infiltration.

7. Satisfy streambank erosion protection objective (§370-16)

8. Determine what Management District the site falls into (Appendix D) and conduct a predevelopment runoff analysis.

9. Prepare final project design to maintain predevelopment drainage areas and discharge points, to minimize earth disturbance and impervious surfaces, and to reduce runoff to the maximum extent possible, the use of surface or point discharges.

10. 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 (§370-17).

11. Satisfy the erosion and sedimentation control objective (§370-21).

12. Satisfy the post-construction runoff control objective (§370-22).

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

§ 370-14. Water Quality.

In addition to the performance standards and design criteria requirements of this Article, the applicant SHALL comply with the following water quality requirements of this Article.

A. Adequate storage and treatment facilities will be provided to capture and treat stormwater runoff from developed or disturbed areas. The Recharge Volume computed under §370-15 may be a component of the Water Quality Volume if the applicant chooses to manage both components in a single facility. If the Recharge Volume is less than the Water Quality Volume, the remaining Water Quality Volume may be captured and treated by methods other than recharge/infiltration BMPs. The required Water Quality Volume (WQv) is the storage capacity needed to capture and to treat a portion of stormwater runoff from the developed areas of the site produced from 90 percent of the average annual rainfall (P).

To achieve this goal, the following criterion is established:

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

WQv = [(P)(Rv)(A)]/12 Equation: 370-14.1

WQv = Water Quality Volume (acre-feet)
P = Rainfall Amount equal to 90% of events producing this rainfall (in)
A = Area of the project contributing to the water quality BMP (acres)
Rv = 0.05 + 0.009(I) where I is the percent of the area that is impervious surface (impervious area/A*100)

The P value for the five PennDOT rainfall regions is shown in Figure B-2 in Appendix B of the Model Ordinance within this plan and as shown in Appendix Table B-5. Since the Delaware River South is in PennDOT Region 5, the P value to be utilized to meet this requirement is 2.04 inches.

B. Design of BMPs used for water quality control shall be in accordance with design specifications outlined in the *Pennsylvania Handbook of Best Management Practices for Developing Areas* or other applicable manuals. The following factors SHALL be considered when evaluating the suitability of BMPs used to control water quality at a given development site:

1. Total contributing drainage area.
2. Permeability and infiltration rate of the site soils.
3. Slope and depth to bedrock.
4. Seasonal high water table.
5. Proximity to building foundations and well heads.
6. Erodibility of soils.
7. Land availability and configuration of the topography.
8. Peak discharge and required volume control.
9. Stream bank erosion.
10. Efficiency of the BMPs to mitigate potential water quality problems.
11. The volume of runoff that will be effectively treated.
12. The nature of the pollutant being removed.
13. Maintenance requirements.
14. Creation/protection of aquatic and wildlife habitat.
15. Recreational value.
16. Enhancement of aesthetic and property value.

C. To accomplish the above, the applicant shall submit original and innovative designs to the municipality for review and approval. Such designs may achieve the water quality objectives through a combination of BMPs (best management practices).

D. The BMPs must be designed, implemented and maintained to meet State water quality requirements, and any other more stringent requirements as determined by the Municipality.

§370-15. Groundwater Recharge (Infiltration).

A. Infiltration BMPs shall meet the following minimum requirements:

Regulated activities will be required to recharge (infiltrate) 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 recharged shall be determined from paragrahps A.2.a. or A.2.b. depending upon demonstrated site conditions.

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 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 recharge facility shall be capable of completely infiltrating the recharge volume within four (4) days (96 hours).

d. Pretreatment shall be provided prior to infiltration.

e. The requirements for recharge are applied to all *disturbed areas*, even if they are ultimately to be an undeveloped land use such as grass, since studies have found that compaction of the soils during disturbance reduces their infiltrative capacity.

2. The recharge volume (Re) shall be computed by first obtaining the infiltration requirement using methods in either subparagraphs a. or b. then multiplying by thc total proposed impervious area. The overall required recharge volume for a site is computed by multiplying total impervious area by the infiltration requirement.

   a. NRCS Curve Number Equation

   The following criteria shall apply.

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

   For zero runoff: P = I (Infiltration) = (200 / CN) - 2 **Equation: 370-15.1**

   where: P = I = infiltration requirement (inches)
   CN = SCS(NRCS) curve number of the existing conditions contributing to the recharge facility

   This equation can be displayed graphically in, and the infiltration requirement can also be determined from Figure 370-15-1.

   The recharge volume (Re_v) required would therefore be computed as:

   Re_v = I * impervious area (SF) / 12 = Cubic Feet (CF) **Equation: 370-15.2**

   b. Annual Recharge Water Budget Approach

   It has been determined that infiltrating 0.5 inches of runoff from the impervious areas will aid in maintaining the hydrologic regime of the watershed. If the goals of §370-15.A.2.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 370-15.1 or the curve in Figure 370-15-1 should be used to determine the Infiltration requirement.

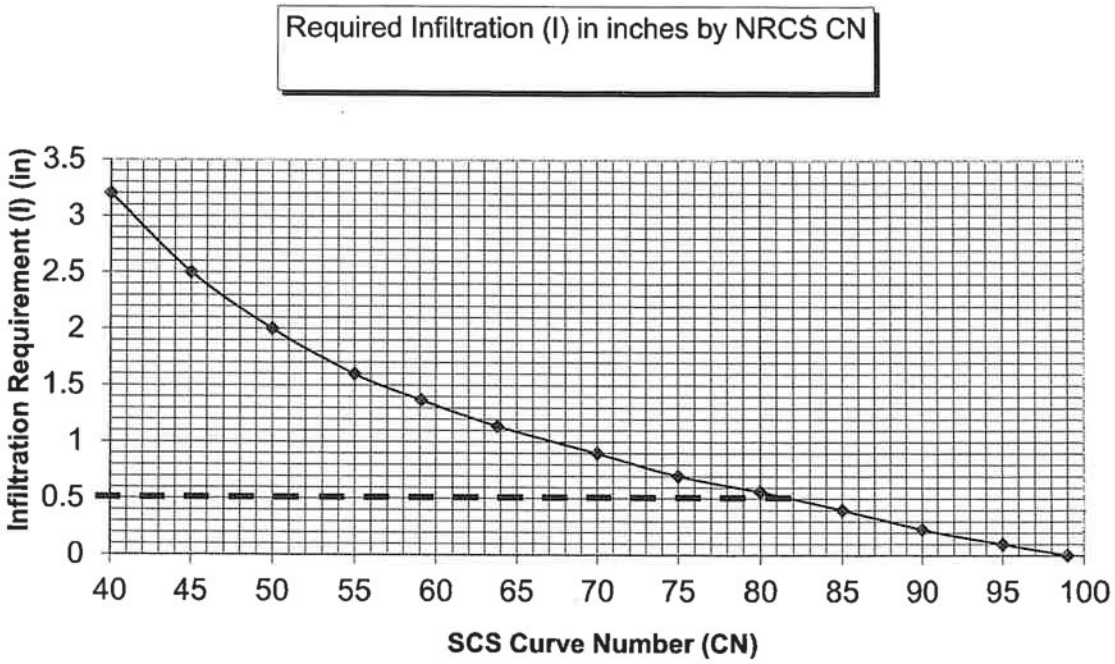
   where: I = 0.5 inches

   The recharge volume (Re_v) required would therefore be computed as:

   Re_v = I * percent impervious area (SF) / 12 = (CF)

The recharge values derived from these methods are the minimum volumes the applicant must control through an infiltration/recharge BMP facility. However, if a site has areas of soils where additional volume of infiltration can be achieved, the applicant is encouraged to recharge as much of the stormwater runoff from the site as possible.

Figure 370-15-1. Infiltration Requirement Based Upon NRCS Curve Number.



B. The general process for designing the infiltration BMP shall be:

A detailed soils evaluation of the project site shall be required to determine the suitability of recharge facilities. The evaluation shall be performed by a qualified applicant and, at a minimum, address soil permeability, depth to bedrock, and subgrade stability.

1. Analyze hydrologic soil groups as well as natural and man-made features within the watershed to determine general areas of suitability for infiltration practices.

2. Provide field tests, such as double ring infiltration tests at the level of the proposed infiltration surface to determine the appropriate hydraulic conductivity rate.

3. Design the infiltration structure for the required storm volume based on field determined capacity at the level of the proposed infiltration surface.

4. Where the recharge volume requirement cannot be physically accomplished due to the results of the field soils testing, supporting documentation and justification shall be supplied to the municipality with the drainage plan.

5. If on-lot infiltration structures are proposed by the applicant's design professional, it must be demonstrated to the municipality that the soils are conducive to infiltration on the lots identified.

C. Extreme caution shall be exercised where infiltration is proposed in geologically susceptible areas such as strip mine or limestone areas. Extreme caution shall also be exercised where salt or chloride would be a pollutant since soils do little to filter this pollutant and it may contaminate the groundwater. Extreme caution shall be exercised where infiltration is proposed in source water protection areas. The qualified design professional shall evaluate the possibility of groundwater contamination from the proposed infiltration/recharge facility and perform a hydrogeologic justification study if necessary. The infiltration requirement in High Quality/Exceptional Value waters shall be subject to the DEP's Title 25: Chapter 93 Antidegradation Regulations. The municipality may require the installation of an impermeable liner in BMP and/or detention basins where the possibility of groundwater contamination exists. A detailed hydrogeologic investigation may be required by the municipality.

D. The municipality shall require the applicant to provide safeguards against groundwater contamination for uses which may cause groundwater contamination, should there be a mishap or spill.

E. Recharge/infiltration facilities shall be used in conjunction with other innovative or traditional BMPs, stormwater control facilities, and nonstructural stormwater management alternatives.

§370-16. Stream Bank Erosion Requirements.

A. In addition to the water quality volume, to minimize the impact of stormwater runoff on downstream streambank erosion, the requirement is to design a the BMP to detain the post-development 2-year, 24-hour design storm to the predevelopment 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 postdevelopment 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.)

B. 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 consider and minimize the chances of clogging and sedimentation. Orifices smaller than 3 inches diameter are not recommended. However, if the design engineer can provide proof that the smaller orifices are protected from clogging by use of trash racks, etc., smaller orifices may be permitted.

C. In "no detention" areas (District C) only, the objective is not to attenuate the larger storms. This can be accomplished by configuration of the outlet structure not to control the larger storms, or by a bypass or channel to divert only the 2-year flood into the basin or divert flows in excess of the 2-year storm away from the basin.

§370-17. Stormwater Management Districts.

A. Delaware River South watershed has been divided into stormwater management districts as shown on the Watershed Map in Appendix D. In addition to the requirements specified below, the water quality (§ 370-14), groundwater recharge (§ 370-15), and streambank erosion (§ 370-16) requirements shall be implemented. For the 2-, 5-, 10-, 25-, 50-, and 100-year storms, the post-development discharge rates will follow the release rate maps in this Part. For any areas not shown on the release rate maps, the post-development discharge rates shall not exceed the predevelopment discharge rates.

Standards for managing runoff from each subarea in the Delaware River South watershed is shown below. Development sites located in each of the A, B, or C Districts must control postdevelopment runoff rates to predevelopment runoff rates for the design storms as follows:

District	Design Storm Postdevelopment	Design Storm Predevelopment
A	2-year	1-year
	5-year	5-year
	10-year	10-year
	25-year	25-year
	50-year	50-year
	100-year	100-year
B	2-year	1-year
	5-year	2-year
	10-year	5-year
	25- year	10-year
	50-year	50-year
	100-year	100-year
C*	2-year	1-year
	5-year	2-year

* In District C, development sites which can discharge directly to the Delaware River South main channel or major tributaries or indirectly to the main channel through an existing stormwater drainage system (i.e., storm sewer or tributary) may do so without control of postdevelopment peak rate of runoff greater than the 5-year storm. Sites in District C will still have to comply with the groundwater recharge criteria, the water quality criteria, and streambank erosion criteria. If the post-development runoff is intended to be conveyed by an existing stormwater drainage system to the main channel, assurance must be provided that such system has adequate capacity to convey the flows greater than the 2-year predevelopment peak flow or will be provided with improvements to furnish the required capacity. When adequate capacity in the downstream system does not exist and will not be provided through improvements, the postdevelopment peak rate of runoff must be controlled to the predevelopment peak rate as required in District A provisions (i.e., 10-year postdevelopment flows to 10-year predevelopment flows) for the specified design storms.

§370-18. Stormwater Management District Implementation Provisions (Performance Standards).

A. *General* – Postdevelopment peak rates of runoff from any regulated activity shall meet the peak release rates of runoff prior to development for the design storms specified on the Stormwater Management District Watershed Map (Ordinance Appendix D) and § 370-13, of the Ordinance.

B. *District Boundaries* – The boundaries of the Stormwater Management Districts are shown on an official stormwater district map that is available for inspections at the municipal

office. A copy of the map at a reduced scale is included in the Ordinance Appendix 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 two-foot topographic contours (or most accurate data required) provided as part of the Drainage Plan.

C. *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 be the predevelopment peak discharge for that subarea as indicated in § 370-13. 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.

D. *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.

E. *Site Areas* – Where the area of a site being 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. Unimpacted or undisturbed areas that do flow into or are bypassing the stormwater management facilities would not be subject to the Management District Criteria.

F. *"No Harm" Option* – For any proposed development site not located in a provisional direct discharge district, the applicant has the option of using a less restrictive runoff control (including no detention) if the applicant can prove that "no harm" would be caused by discharging at a higher runoff rate than that specified by the Plan. The no harm option is used when an applicant can prove that the postdevelopment hydrographs can match predevelopment hydrographs, or if it can be proved that the postdevelopment conditions will not cause increases in peaks at all points downstream. Proof of "no harm" would have to be shown based upon the following Downstream Impact Evaluation which shall include a "downstream hydraulic capacity analysis" consistent with subsection G. to determine if adequate hydraulic capacity exists. The land applicant shall submit to the municipality this evaluation of the impacts due to increased downstream stormwater flows in the watershed.

1. The "Downstream Impact Evaluation" shall include hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications due to the proposed development upon a dam, highway, structure, natural point of restricted streamflow, or any stream channel section, established with the concurrence of the municipality.

2. The evaluation shall continue downstream until the increase in flow diminishes due to additional flow from tributaries and/or stream attenuation.

3. The peak flow values to be used for downstream areas for the design return period storms (2-, 5-, 10-, 25-, 50-, and 100-year) shall be the values from the calibrated model for the Delaware River South watershed. These flow values can be obtained from the watershed plan.

4. Applicant-proposed runoff controls that would generate increased peak flow rates at storm drainage problem areas would, by definition, be precluded from successful attempts to prove "no-harm," except in conjunction with proposed capacity improvements for the problem areas consistent with subsection H.

5. Financial considerations shall not constitute grounds for granting a no-harm exemption.

6. Capacity improvements may be provided as necessary to implement the "no harm" option which proposes specific capacity improvements to provide that a less stringent discharge control would not create any harm downstream.

7. Any "no harm" justifications shall be submitted by the applicant as part of the Drainage Plan submission per Article IV.

G. *"Downstream Hydraulic Capacity Analysis"* – Any downstream capacity hydraulic analysis conducted in accordance with this ordinance shall use the following criteria for determining adequacy for accepting increased peak flow rates:

1. Natural or man-made channels or swales must be able to convey the increased runoff associated with a 1.5-year return period event within their banks at velocities consistent with protection of the channels from erosion. Acceptable velocities shall be based upon criteria included in the Department of Environmental Protection's *Erosion and Sediment Pollution Control Program Manual*.

2. Natural or man-made channels or swales must be able to convey increased 25-year return period runoff without creating any hazard to persons or property.

3. Culverts, bridges, storm sewers or any other facilities which must pass or convey flows from the tributary area must be designed in accordance with the Department of Environmental Protection's Chapter 105 regulations (if applicable) and, at minimum, pass the increased 25-year return period runoff.

H. *Regional Detention Alternatives* – For certain areas within the study area, it may be more cost-effective to provide one control facility for more than one development site than to provide an individual control facility for each development site. The initiative and funding for any regional runoff control alternatives are the responsibility of prospective applicants. The design of any regional control basins must incorporate reasonable development of the entire upstream watershed. The peak outflow of a regional basin would be determined on a case-by-case basis using the hydrologic model of the watershed consistent with protection of the downstream watershed areas. "Hydrologic model" refers to the calibrated model as developed for the stormwater management plan. It is a requirement that, even if regional basins are proposed for the water quantity control, that the water quality, streambank erosion and recharge criteria be accomplished on-site, or as close to the source of the runoff as possible.

§370-19. Design Criteria for Stormwater Management Facilities.

A. Any stormwater facility located on state highway rights-of-way shall be subject to approval by the Pennsylvania DEP of Transportation (PennDOT).

B. Any stormwater management facility (i.e., detention basin) designed to store runoff and requiring a berm or earthen embankment required or regulated by this ordinance shall be designed to provide an emergency spillway to handle flow up to and including the 100-year

postdevelopment conditions. The height of embankment must be set as to provide a minimum 1.0 foot of freeboard above the maximum pool elevation computed when the facility functions for the 100-year postdevelopment inflow. Should any stormwater management facility require a dam safety permit under Title 25, Environmental Protection, Chapter 105, Dam Safety and waterway management, the facility shall be designed in accordance with Chapter 105 and meet the regulations of Chapter 105 concerning dam safety which may be required to pass storms larger than 100-year event.

C. Any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures), and any work involving wetlands as directed in DEP 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. Any other drainage conveyance facility that does not fall under 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 1.0 foot of freeboard measured below the lowest point along the top of the roadway. Roadway crossings located within designated floodplain areas must be able to convey runoff from a 100-year design storm with a minimum 1.0 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.

D. Any drainage conveyance facility and/or channel that does not fall under Chapter 105 Regulations, must be able to convey, without damage to the drainage structure or roadway, runoff from the 10-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.

E. Storm sewers must be able to convey postdevelopment runoff from a _-year design storm without surcharging inlets, where appropriate.

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

G. The design of all stormwater management facilities shall incorporate sound engineering principles and practices. The municipality shall reserve the right to disapprove any design that would result in the creation, exacerbation, or continuation of an adverse hydrologic or hydraulic condition within the watershed.

§370-20. Calculation Methodology.

Stormwater runoff from all development sites shall be calculated using either the rational method or a soil-cover-complex methodology.

A. Any stormwater runoff calculations shall use generally accepted calculation technique that is based on the NRCS soil cover complex method. Table 370-20-1 summarizes acceptable computation methods. It is assumed that all methods will be selected by the applicant based on the individual limitations and suitability of each method for a particular site.

B. The municipality may allow the use of the Rational Method to estimate peak discharges from drainage areas that contain less than 200 acres. The Rational Method is recommended for drainage areas under 100 acres.

C. All calculations consistent with this ordinance using the soil cover complex method shall use the appropriate design rainfall depths for the various return period storms according to the region for which they are located as presented in Table B-1 in Appendix B of this ordinance. If a hydrologic computer model such as HEC-1 or HEC-HMS is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours. The SCS 'S' curve shown in Figure B-1, Appendix B of this ordinance shall be used for the rainfall distribution.

D. For the purposes of predevelopment 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 Table B-2 or B-3 in Appendix B of this document. For areas of prior mining disturbance (i.e. strip mining, mine spoil areas, etc.), the designer must first identify in which mining affect area the site is located, using the Management District Map is Appendix D. The appropriate curve number or Rational "C" value from Table B-2 or Table B-3 should then be used.

E. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times-of-concentration for overland flow and return periods from the Design Storm Curves from PA DEP of Transportation Design Rainfall Curves (1986) (Figures B-2 to B-3). 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.

F. Runoff Curve Numbers (CN) for both existing and proposed conditions to be used in the soil cover complex method shall be obtained from Table B-2 in Appendix B of this ordinance.

G. Runoff coefficients (c) for both existing and proposed conditions for use in the Rational method shall be obtained from Table B-3 in Appendix B of this ordinance.

H. 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 B-4 in Appendix B of the ordinance.

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

J. The design of any stormwater detention facilities intended to meet the performance standards of this ordinance 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. The municipality 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.

Table 370-20-1
Acceptable Computation Methodologies For Stormwater Management Plans

Method	Method Developed By	Applicability
TR-20 (or commercial computer package based on TR-20)	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary.
TR-55 (or commercial computer package based on TR-55)		Applicable for land development USDA NRCS plans within limitations described in TR-55
HEC-1, HEC-HMS	US Army Corps of Engineers	Applicable where use of full hydrologic computer model is desirable or necessary.
PSRM	Penn State University	Applicable where use of hydrologic computer model is desirable or necessary; simpler than TR-20 or HEC-1.
Rational Method (or commercial computer package based on Rational Method.	Emil Kuichling (1889)	Applicable for sites less than 200 acres, or as approved by the Muncipality and/or Municipal Engineer.
Other Methods	Varies	Other computation methodologies approved by the Municipality and/or Municipal Engineer.

§370-21. Erosion and Sedimentation Requirements.

A. Whenever the vegetation and topography are to be disturbed, such activity must be in conformance with Chapter 102, Title 25, Rules and Regulations, Part I, Commonwealth of Pennsylvania, DEP of Environmental Protection, Subpart C, Protection of Natural Resources, Article II, Water Resources, Chapter 102, "Erosion Control," and in accordance with the Bucks County Conservation District.

B. Additional erosion and sedimentation control design standards and criteria that must be applied where infiltration BMPs are proposed shall include the following:

1. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase, so as to maintain their maximum infiltration capacity.

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

C. Regulated activities within the Municipality shall not commence until approval by the Municipality of an erosion and sediment control plan for construction activities.

D. The Pennsylvania Department of Environmental Protection (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).

E. In addition, under 25 Pa.Code, Chapter 92, a DEP "NPDES Construction Activities" permit is required for any earth disturbance one acre of more with a point source discharge to surface waters or the Municipality's storm sewer system, or 5 acres or more regardless of the planned runoff. This includes earth disturbance on any portion of, part of, or during any stage of a larger common plan of development.

F. Evidence of any necessary permit(s) for regulated activities from the appropriate DEP regional office or County Conservation District must be provided to the Municipality.

G. 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.

§370-22. Post-Construction Runoff Control Requirements.

A. No regulated activities within the Municipality shall commence until approval by the Municipality of a plan which demonstrates compliance with State water quality requirements after construction is complete.

B. The stormwater facilities must be designed to protect and maintain existing uses (e.g., drinking water use; cold water fishery use) and maintain the level of water quality necessary to protect those uses in all streams, and to protect and maintain water quality in "special protection" streams, as required by Statewide regulations at 25 Pa.Code, Chapter 93 (collectively referred to herein as "State water quality requirements").

C. To control post-construction stormwater impacts from regulated 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 postconstruction 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 chemical and physical pollutants from the stormwater runoff.

3. Streambank and Streambed Protection: management of volume and rate of post-construction stormwater discharges to prevent physical degradation of receiving waters (e.g., from scouring and erosion).

D. DEP has regulations that require municipalities to ensu re design, implementation and maintenance of BMPs that control runoff from new development and redevelopment (hereinafter "development") after regulated activities are complete. These requirements include the need to implement post-construction stormwater BMPs with assurance of long-term operations and maintenance of those BMPs.

E. Evidence of any necessary permit(s) for regulated activities from the appropriate DEP regional office or County Conservation District must be provided to the Municipality.

§370-23. Delaware Canal Areas.

Development on lands adjacent to the Delaware Canal which propose to discharge stormwater into the canal must obtain special right-of-way approval from the Department of Conservation and Natural Resources (DCNR). The DCNR has established a separate policy for granting right-of-way for stormwater drainage into the Delaware Canal, which shall be used in conjunction with this ordinance.

Article IV. Drainage Plan Requirements

§370-24. General Requirements.

For any of the activities regulated by this ordinance, 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 land disturbance activity may not proceed until the applicant or his/her agent has received written approval of a Drainage Plan from the Municipality.

§ 370-25. Exemptions

Any regulated activity that meets the exception criteria in the following table is exempt from the provisions of this section. This criterion shall apply to the total development even if development is to take place in phases. The date of the municipal 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. An exemption shall not relieve the applicant from requirements in §370-11.C. and D. Exemption shall not relieve the applicant from meeting the special requirements for watershed drainage to high quality (HQ) or exceptional value (EV) waters (§370-11) and requirements for groundwater recharge (§370-15), water quality (§370-14) and streambank erosion (§370-16), erosion and sedimentation control (§370-21), post-construction runoff control (§370-22), and prohibitions (Article VIII). Exemptions shall be at the discretion of the Municipality, as recommended by the Municipal Engineer, upon review of site conditions, topography, soils, and other factors as desired appropriate.

A. Exemptions regarding proposed impervious coverage shall be according to the following table:

Stormwater Management Exemption Criteria

Area Total Parcel Size (sq. ft.)	Impervious Exemption
≤ 1/4 acre	1,200 sq. ft.
> 1/4 to 1 acre	2,500 sq. ft.
> 1 acre	5,000 sq. ft.

B. In the case of earth disturbance only, earth disturbance activities less than 5,000 square feet of disturbance are exempt from this Section of this Part.

C. Road maintenance activities involving 25 acres or less earth disturbance are exempt from this Section of this Part.

§370-26. Drainage Plan Contents.

The Drainage Plan shall consist of all applicable calculations, maps, and plans. A note on the maps shall refer to the associated computations and erosion and sedimentation control plan by title and date.

The cover sheet of the computations and erosion and sedimentation control plan shall refer to the associated maps by title and date. All Drainage Plan materials shall be submitted to the municipality in a format that is clear, concise, legible, neat, and well organized; otherwise, the Drainage Plan shall be disapproved and returned to the applicant.

The following items shall be included in the Drainage Plan:

A. *General.*

1. General description of project.

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 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 shall be prepared in a form that meets the requirements for recording at the offices of the Recorder of Deeds of Bucks County. 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 two feet. In areas of steep slopes (greater than 15 percent), five-foot contour intervals may be used.

3. Existing streams, lakes, ponds, or other bodies of water within the project area.

4. Other physical features including flood hazard boundaries, sinkholes, streams, 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. Proposed changes to the land surface and vegetative cover, including limits of earth disturbance and 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 two feet. In areas of steep slopes (greater than 15 percent), five-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 one (1) inch equals no more than fifty (50) feet; for tracts of twenty (20) acres or more, the scale shall be one (1) inch equals no more than one hundred (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 manmade features beyond the property boundary that would be affected by the project.

17. Location of all open channels.

18. Overland drainage paths.

19. A minimum 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 sedimentation control facilities.

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 ordinance.

22. A statement, signed by the landowner, acknowledging the stormwater management system to be a permanent fixture that can be altered or removed only after approval of a revised plan by the municipality, which shall be recorded with the record plan and which shall be applicable to all future landowners.

23. The following signature block for the Design Engineer:

    (Design Engineer), on this date (date of signature), have reviewed and hereby certify that

the Drainage Plan meets all design standards and criteria of the Delaware River South 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 § 370-13.

   b. Stormwater runoff computations as specified in this ordinance.

   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 § 370-37 of this ordinance.

2. A soil erosion and sedimentation control plan, where applicable, including all reviews and approvals, as required by DEP.

3. A geologic assessment of the effects of runoff on sinkholes as specified in this ordinance.

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

5. A Declaration of Adequacy and Highway Occupancy Permit from the PennDOT District Office when utilization of a PennDOT storm drainage system is proposed.

D. *Stormwater Management Facilities.*

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

2. When groundwater recharge methods 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.

§370-27. Plan Submission.

For all activities regulated by this ordinance, the steps below shall be followed for submission. For any

activities that require a DEP Joint Permit Application and regulated under 25 Pa. Code Chapter 105 (Dam Safety and Waterway Management) or 25 Pa. Code Chapter 106 (Floodplain Management) of DEP's Rules and Regulations, require a PennDOT Highway Occupancy Permit, or require any other permit under applicable state or federal regulations, the proof of application for that, the permit(s) shall be part of the plan. The plan shall be coordinated with the state and federal permit process.

A. The Drainage Plan shall be submitted by the applicant as part of the Preliminary Plan submission for the Regulated Activity.

B. A minimum of four (4) copies of the Drainage Plan shall be submitted.

C. Distribution of the Drainage Plan will be as follows:

1. Two (2) or more copies to the Municipality accompanied by the requisite municipal review fee, as specified in this Ordinance.

2. One (1) copy to the Municipal Engineer.

3. One (1) copy to the Bucks County Planning Commission.

§370-28. Drainage Plan Review.

A. The Municipal Engineer shall review the Drainage Plan for consistency with the adopted *Delaware River South Watershed Act 167 Stormwater Management Plan.* The Municipality shall require receipt of a complete plan, as specified in this ordinance.

B. The Municipal Engineer shall review the Drainage Plan for any subdivision or land development against the municipal subdivision and land development ordinance provisions not superseded by this ordinance.

C. For activities regulated by this ordinance, the Municipal Engineer shall notify the Municipality in writing, whether the Drainage Plan is consistent with the stormwater management plan. Should the Drainage Plan be determined to be consistent with the stormwater management plan, the Municipal Engineer will forward a review letter to the Applicant with a copy to the Municipality.

D. Should the Drainage Plan be determined to be inconsistent or noncompliant with the stormwater management plan, the Municipal Engineer will forward a letter to the applicant with a copy to the Municipality citing the reason(s) for the inconsistency or noncompliance. Any Drainage Plans receiving this decision may be revised by the applicant and resubmitted for reevaluation. The Municipality will not grant approval to the proposal until its Drainage Plan is deemed consistent with this ordinance.

E. For Regulated Activities specified in §370-4 of this ordinance, the Municipal Engineer shall notify the Municipal Building Permit Officer in writing, within a time frame consistent with the Municipal Building Code and/or Municipal Subdivision Ordinance, 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 Ordinance.

F. For Regulated Activities requiring a DEP Joint Permit Application, the Municipal Engineer shall notify DEP whether the Drainage Plan is consistent with the stormwater management plan and forward a copy of the review letter to the Municipality and the applicant. DEP may consider the Municipal Engineer's review comments in determining whether to issue a permit.

G. The Municipality shall not approve any subdivision or land development for Regulated Activities specified in §370-4 of this Ordinance if the Drainage Plan has been found to be inconsistent with the stormwater management plan, as determined by the Municipal Engineer. All required permits from DEP must be obtained prior to approval of any subdivision or land development.

H. The Municipal Building Permit Office shall not issue a building permit for any Regulated Activity specified in §370-4 of this ordinance if the Drainage Plan has been found to be inconsistent with the stormwater management plan, as determined by the Municipal Engineer, or without considering the comments of the Municipal Engineer. All required permits from DEP must be obtained prior to issuance of a building permit.

I. 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 Municipal Engineer for final approval. In no case shall the Municipality approve the record drawings until the Municipality receives a copy of an approved Declaration of Adequacy, Highway Occupancy Permit from the PennDOT District Office, and any applicable permits from DEP.

J. The Municipality's approval of a Drainage Plan shall be valid for a period not to exceed four years. This four-year time period shall commence on the date that the Municipality 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 four-year time period, then the Municipality may consider the Drainage Plan disapproved and may revoke any and all permits. Drainage Plans that are considered disapproved by the Municipality shall be resubmitted in accordance with §370-30 of this ordinance.

§370-29. Modification of Plans.

A. A modification to a submitted Drainage Plan 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 Municipal Engineer, shall require a resubmission of the modified Drainage Plan consistent with §370-27 of this

ordinance and be subject to review as specified in §370-28 of this ordinance.

B. A modification to an already approved or disapproved Drainage Plan shall be submitted to the Municipality, accompanied by the applicable fee. A modification to a Drainage Plan for which a formal action has not been taken by the Municipality shall be submitted to the Municipality, accompanied by the applicable Municipality review fee.

§370-30. Resubmission of Disapproved Drainage Plans.

A disapproved Drainage Plan may be resubmitted, with the revisions addressing the Municipal Engineer's concerns documented in writing addressed, to the Municipality in accordance with §370-27 of this ordinance and distributed accordingly and be subject to review as specified in §370-28 of this ordinance. The applicable Municipality review fee must accompany a resubmission of a disapproved Drainage Plan.

§370-31. As-Built Surveys, Completion Certificate and Final Inspection.

A. The developer shall be responsible for completing an "as-built survey" of all stormwater facilities included in the approved drainage plan. The as-built survey and an explanation of any discrepancies with the design plans shall be submitted to the Municipality.

B. The submission shall include a certification of completion from an engineer, architect, surveyor or other qualified person verifying that all permanent stormwater facilities have been constructed according to the plans and specifications and approved revisions thereto.

C. After receipt of the completion certification by the Municipality, the Municipality may conduct a final inspection.

Article V. Inspections

§370-32. Schedule of Inspections.

A. The Municipal Engineer or his municipal assignee shall observe all phases of the installation of the permanent stormwater management facilities as deemed appropriate by the Municipal Engineer. The cost of inspections by the Municipal Engineer or his municipal assignee shall be paid in full by the applicant.

B. During any stage of the work, if the Municipal Engineer determines that the permanent stormwater management facilities are not being installed in accordance with the approved Stormwater Management Plan, the Municipality shall revoke any existing permits until a revised Drainage Plan is submitted and approved, as specified in this ordinance.

Article VI. Fees and Expenses

§370-33. General.

The fee required by this ordinance is the municipal review fee. The municipal review fee shall be established by the Municipality to defray review costs incurred by the Municipality and the Municipal Engineer. All fees shall be paid by the Applicant.

§370-34. Municipality Drainage Plan Review Fee.

The Municipality shall establish a review fee schedule by resolution of the Municipal governing body based on the size of the Regulated Activity and based on the Municipality's costs for reviewing Drainage Plans. The Municipality shall periodically update the review fee schedule to ensure that review costs are adequately reimbursed.

§370-35. Expenses Covered by Fees.

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

A. Municipal filing fee.

B. Administrative/clerical processing.

C. The review of the Drainage Plan by the Municipality and the Municipal Engineer.

D. Attendance at meetings.

E. The site inspections.

F. The inspection of stormwater management facilities and drainage improvements during construction.

G. The final inspection upon completion of the stormwater management facilities and drainage improvements presented in the Drainage Plan.

H. Any additional work required to enforce any permit provisions regulated by this ordinance, correct violations, and ensure proper completion of stipulated remedial actions.

Article VII. Maintenance Responsibilities

§370-36. Performance Guarantee.

The applicant should provide a financial guarantee to the Municipality for the timely installation and proper construction of all stormwater management controls as required by the approved *Delaware River South Stormwater Management Plan* and this ordinance equal to the full construction cost of the required controls.

§370-37. Maintenance Responsibilities.

A. The Drainage Plan for the development site shall contain an operation and maintenance plan prepared by the applicant and approved by the municipal engineer. The operation and maintenance plan shall outline required routine maintenance actions and schedules necessary to ensure proper operation of the facility(ies).

B. The Drainage Plan for the development site shall establish responsibilities for the continuing operating and maintenance of all proposed stormwater control facilities, consistent with the following principals:

1. If a development consists of structures or lots that are to be separately owned and in which streets, sewers, and other public improvements are to be dedicated to the municipality, stormwater control facilities may also be dedicated to and maintained by the Municipality.

2. If a development site is to be maintained in a single ownership or if sewers and other public improvements are to be privately owned and maintained, then the ownership and maintenance of stormwater control facilities may be the responsibility of the owner or private management entity.

C. The municipality, upon recommendation of the Municipal Engineer, shall make the final determination on the continuing operations and maintenance responsibilities prior to final approval of the drainage plan. The municipality reserves the right to accept or reject the ownership and operating responsibility for any or all of the stormwater management controls and BMPs.

§370-38. Operations and Maintenance Agreement for Privately Owned Stormwater Facilities

A. Prior to final approval of the site's stormwater management plan, thc applicant shall sign and record the maintenance agreement contained in Appendix A which is attached and made part hereof, covering all stormwater control facilities that are to be privately owned.

1. The owner, successor and assigns shall maintain all facilities in accordance with the approved maintenance schedule in the O&M Agreement.

2. The owner shall convey to the Municipality conservation easements to assure access for periodic inspections by the Municipality and maintenance, as necessary.

3. The owner shall keep on file with the Municipality the name, address, and telephone number of the person or company responsible for maintenance activities; in the event of

a change, new information shall be submitted by the owner to the Municipality within ten (10) working days of the change.

B. 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 Municipality.

C. The owner is responsible for operation and maintenance of the stormwater control facilities that are to be privately owned. If the owner fails to adhere to the operation and maintenance agreement, the Municipality may perform the services required and charge the owner appropriate fees. Non-payment of fees may result in a lien against the property.

§370-39. Municipal Stormwater Maintenance Fund.

A. Persons installing stormwater management facilities and best management practices shall be required to pay a specified amount to the municipal stormwater maintenance fund to help defray costs of periodic inspections and maintenance expenses. The amount of the deposit shall be determined as follows:

1. If the stormwater management facilities and best management practices is to be privately owned and maintained, the deposit shall cover the cost of periodic inspections performed by the municipality for a period of ten (10) years, as estimated by the Municipal Engineer. After that period of time, inspections will be performed at the expense of the Municipality.

2. If the stormwater management facilities and best management practices facility is to be owned and maintained by the municipality, the deposit shall cover the estimated costs for maintenance and inspections for ten (10) years. The municipal engineer will establish the estimated costs utilizing information submitted by the applicant.

3. The amount of the deposit to the fund shall be converted to present worth of the annual series values. The Municipal Engineer shall determine the present worth equivalents, which shall be subject to the approval of the governing body.

B. If a stormwater management facility and best management practices facility are proposed that also serves as a recreation facility (e.g., ballfield, lake), the Municipality may reduce or waive the amount of the maintenance fund deposit based upon the value of the land for public recreation purpose.

C. 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.

D. If stormwater controls or BMPs are accepted by the municipality for dedication, the municipality may require persons installing stormwater controls or BMPs to pay a specified amount to the municipal stormwater control and BMP operation and maintenance fund, to help defray costs of operations and maintenance activities. The amount may be determined as follows:

1. If the stormwater control or BMP is to be owned and maintained by the municipality, the amount shall cover the estimated cost for operations and maintenance for 10 years, as determined by the municipality.

2. The amount shall then be converted to present worth of the annual series values.

E. If a stormwater control or BMP is proposed that also serves as a recreation facility (e.g., ballfield or lake), the municipality may adjust the amount due accordingly.

F. Long-Term Maintenance. The municipality may require applicants to pay a fee to the municipal stormwater maintenance fund to cover long-term maintenance of stormwater control and best management practices.

G. Stormwater Related Problems. The municipality may require applicants to pay a fee to the municipal stormwater maintenance fund to cover stormwater related problems which may arise from the land development and earth disturbance.

§370-40. Plan Requirements.

A. All plans shall include a plan note stating that the Municipality shall have the right to enter private property to inspect and repair, if necessary, any stormwater management facility.

B. All plans shall note that the stormwater management facilities are a permanent part of the development and shall not be removed, altered, or modified.

§370-41. Adherence to Approved Operations and Maintenance Plan.

It shall be unlawful to alter or remove any permanent stormwater facility or 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.

§370-42. Stormwater Management Easements.

A. Stormwater management easements are required for all areas used for off-site stormwater control unless a waiver is granted by the Municipal Engineer.

B. 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 BMPs, by persons other than the property owner. The purpose of the easement shall be specified in any agreement under this section.

§370-43. Recording of Approved Stormwater Control and BMP Operations and Maintenance Plan and Related Agreements.

A. The owner of any land upon which permanent BMPs will be placed, constructed or implemented, as described in the stormwater control and BMP operations and maintenance plan, shall record the following documents in the Office of the Recorder of Deeds for Bucks

County, within 15 days of approval of the stormwater control and BMP operations and maintenance plan by the Municipality:

1. The stormwater control and BMP operations and maintenance plan, or a summary thereof.

2. Operations and maintenance agreements under §370-38.

3. Easements under §370-42.

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

§370-44. Municipal review of stormwater control and BMP operations and maintenance plan.

A. The municipality shall review the stormwater control and BMP operations and maintenance plan for consistency with the purposes and requirements of this chapter, and any permits issued by DEP.

B. The municipality shall notify the applicant in writing whether the stormwater control and BMP operations and maintenance plan is approved.

Article VIII. Prohibitions

§370-45. Prohibited discharges.

A. No person in the municipality shall allow, or cause to allow, stormwater discharges into the municipality's separate storm sewer system which are not composed entirely of stormwater, except (1) as provided in subsection B of this section, and (2) discharges allowed under a state or federal permit.

B. The following discharges are authorized unless they are determined to be significant contributors to pollution a regulated small MS4 or to the waters of this Commonwealth:

1. Discharges or flows from firefighting activities.

2. Discharges from potable water sources including water line flushing and fire hydrant flushing, if such discharges do not contain detectable concentrations of Total Residual Chlorine (TRC).

3. Non-contaminated irrigation water, water from lawn maintenance, landscape drainage and flows from riparian habitats and wetlands.

4. Diverted stream flows and springs.

5. Non-contaminated pumped ground water and water from foundation and footing drains and crawl space pumps.

6. Non-contaminated HVAC condensation and water from geothermal systems.

7. Residential (i.e., not commercial) vehicle wash water where cleaning agents are not utilized.

8. Non-contaminated hydrostatic test water discharges, if such discharges do not contain detectable concentrations of TRC.

C. In the event that the Municipality or DEP determines that any of the discharges identified in subsection B. of this section significantly contribute to pollutants to a regulated small MS4 or to the of waters of this Commonwealth, the municipality or DEP will notify the responsible person to cease the discharge.

D. Upon notice by the municipality under subsection C of this section, the discharger will have a reasonable time, as determined by the municipality, to cease the discharge consistent with the degree of pollution caused by the discharge.

E. Nothing in this section shall affect a discharger's responsibility under state law.

§370-46. Roof drains and Sump Pumps.

A. 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.

B. When it is more advantageous to connect directly to streets or storm sewers, connections of roof drains to streets or roadside ditches may be permitted on a case-by-case basis as determined by the municipality.

C. Roof drains and sump pumps shall discharge to infiltration areas or vegetative BMPs wherever feasibile.

§370-47. Alteration of BMPs.

A. No person shall modify, remove, fill, landscape, or alter any existing stormwater control or BMP, unless it is part of an approved maintenance program, without the written approval of the municipality.

B. No person shall place any structure, fill, landscaping or vegetation into a stormwater control or BMP within a drainage easement, which would limit or alter the functioning of the stormwater control or the BMP, without the written approval of the municipality.

§370-48. Prohibited connections.

A. The following connections are prohibited, except as provided in subsection 2.

1. Any drain or conveyance, whether on the surface or subsurface, which allows any non-stormwater discharge including sewage, process wastewater, and wash water, to enter a regulated small MS4, or to enter the surface waters of this Commonwealth is prohibited.

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

Article IX. Enforcement and Penalties

§370-49. Right-of-Entry.

Upon presentation of proper credentials, duly authorized representatives of the Municipality may enter at reasonable times upon any property within the Municipality to inspect the condition of the stormwater structures and facilities in regard to any aspect regulated by this ordinance.

§370-50. Notification.

In the event that a person fails to comply with the requirements of this ordinance or fails to conform to the requirements of any permit issued hereunder, the Municipality shall provide written notification of the violation. Such notification shall set forth 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 ordinance. All such penalties shall be deemed cumulative and present by the Municipality 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 ordinance. 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 facilities.

G. Operation and maintenance of stormwater facilities.

§370-51. Enforcement.

The Municipality is hereby authorized and directed to enforce all of the provisions of this ordinance. All inspections regarding compliance with the Drainage Plan shall be the responsibility of the Municipal Engineer or other qualified persons designated by the Municipality.

A. A set of design plans approved by the Municipality shall be on file at the site throughout the duration of the construction activity. Periodic inspections may be made by the municipality or designee during construction.

B. *Adherence to Approved Plan.* It shall be unlawful for any person, firm, or corporation to undertake any Regulated Activity under § 370-4 on any property except as provided for in the approved Drainage Plan and pursuant to the requirements of this ordinance. It shall be unlawful to alter or remove any control structure required by the Drainage Plan pursuant to this ordinance or to allow the property to remain in a condition which 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, applicant shall:

1. Provide a certification of completion from an engineer, 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.

3. After receipt of the certification by the Municipality, a final inspection shall be conducted by the Municipal Engineer or designated representative to certify compliance with this ordinance.

D. Suspension and Revocation of Permits.

1. Any permit issued under this ordinance may be suspended or revoked by the governing body for:

   a. Noncompliance with or failure to implement any provision of the permit.

   b. A violation of any provision of this ordinance or any other applicable law, ordinance, rule or regulation relating to the project.

   c. The creation of any condition or the commission of any act during construction or development that constitutes or creates a hazard, nuisance, or pollution or which endangers the life or property of others.

2. A suspended permit shall be reinstated by the governing body when:

   a. The Municipal Engineer or his designee has inspected and approved the corrections to the stormwater management and erosion and sediment pollution control measure(s), or the elimination of the hazard or nuisance, and/or;

   b. The governing body is satisfied that the violation of the ordinance, law, or rule and regulation has been corrected.

   c. A permit that has been revoked by the governing body cannot be reinstated. The applicant may apply for a new permit under the procedures outlined in this ordinance.

   d. Prior to revocation or suspension of a permit, the governing body will schedule a hearing to discuss the noncompliance if there is no immediate danger to life, public health, or property.

E. *Occupancy Permit.* An occupancy permit shall not be issued unless the certification of compliance has been secured. The occupancy permit shall be required for each lot owner and/or applicant for all subdivisions and land development in the municipality.

§370-52. Public Nuisance.

A. The violation of any provision of this ordinance is hereby deemed a public nuisance.

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

§370-53. Penalties.

A. Anyone violating the provisions of this chapter shall be subject to a fine of not more than $1,000 for each violation, recoverable with costs. Each day that the violation continues shall be a separate offense and penalties shall be cumulative.

B. In addition, the Municipality, through its solicitor may institute injunctive, mandamus, or any other appropriate action or proceeding at law or in equity for the enforcement of this ordinance. 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.

§370-54. Appeals.

A. Any person aggrieved by any action of Morrisville Borough or its designee may appeal to the Borough's governing body or Zoning Hearing Board within thirty (30) days of that action.

B. Any person aggrieved by any decision of the Borough's governing body may appeal to the County Court of Common Pleas of Bucks County within thirty (30) days of the municipal decision.

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ORDINANCE APPENDIX A

Standard Stormwater Facilities Maintenance and Monitoring Agreement

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Ordinance Appendix A

STANDARD STORMWATER FACILITIES MAINTENANCE AND MONITORING

AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____, 20__, by and between _____, (hereinafter the "Landowner"), and _____, _____ County; Pennsylvania, (hereinafter "Municipality");

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 Subdivision/Land Management Plan (hereinafter "Plan") for the _____ Subdivision which is expressly made a part hereof, as approved or to be approved by the Municipality, provides for detention or retention of stormwater within the confines of the Property; and

WHEREAS, the Municipality and the Landowner, his successors and assigns agree that the health, safety, and welfare of the residents of the Municipality require that on-site stormwater management facilities be constructed and maintained on the Property: and

WHEREAS, the Municipality requires, through the implementation of the

_____ Watershed Stormwater Management Plan, that

stormwater management facilities as shown on the Plan be constructed and adequately

maintained by the Landowner, his successors and assigns.

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

1. The on-site stormwater management facilities shall be constructed by the Landowner, his successors and assigns, in accordance with the terms, conditions and specifications identified in the Plan.

2. The Landowner, his successors and assigns, shall maintain the stormwater management facilities in good working condition, acceptable to the Municipality so that they are performing their design functions.

3. The Landowner, his successors and assigns, hereby grants permission to the Municipality, his authorized agents and employees, upon presentation of proper identification, to enter upon the Property at reasonable times, such as following a storm of the intensity for which the facility was designed to control, and to inspect the stormwater management facilities whenever the Municipality deems necessary. The purpose of the inspection is to ensure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structures, pond areas, access roads, etc. When inspections are conducted, the Municipality shall give the Landowner, his successors and assigns, copies of the inspection report with findings and evaluations. At a minimum, maintenance inspections shall be performed in accordance with the following schedule:
   - Annually for the first 5 years after the construction of the stormwater facilities,
   - Once every 2 years thereafter, or
   - During or immediately upon the cessation of a 100-year or greater precipitation event.

4. All reasonable costs for said inspections shall be born by the Landowner and payable to the Municipality.

5. The owner shall convey to the municipality easements and/or rights-of-way to ensure access for periodic inspections by the Municipality and maintenance, if required.

6. In the event the Landowner, his successors and assigns, fails to maintain the stormwater management facilities in good working condition acceptable to the Municipality, the Municipality may enter upon the property and take such necessary and prudent action to maintain said stormwater management facilities and to charge the costs of the maintenance and/or repairs to the Landowner, his successors and assigns. This provision shall not be construed as to allow the Municipality to erect any structure of a permanent nature on the land of the Landowner, outside of any easement belonging to the Municipality. It is expressly understood and agreed that the Municipality is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the Municipality.

7. The Landowner, his successors and assigns, will perform maintenance in accordance with the maintenance schedule for the stormwater management facilities including sediment removal as outlined on the approved schedule and/or drainage plan.

8. In the event the Municipality, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like on account of the Landowner's or his successors' and assigns' failure to perform such work, the Landowner, his successors and assigns, shall reimburse the Municipality upon demand, within 30 days of receipt of invoice thereof, for all costs incurred by the Municipality hereunder. If not paid within said 30-day period, the Municipality may enter a lien against the property in the amount of such costs, or may proceed to recover his costs through proceedings in equity or at law as authorized under the provisions of the Borough Code.

9. The Landowner, his successors and assigns, shall indemnify the Municipality and its agents and employees against any and all damages, accidents, casualties, occurrences or claims that might arise or be asserted against the Municipality for the construction, presence, existence or maintenance of the stormwater management facilities by the Landowner and his successors and assigns.

10. In the event a claim is asserted against the Municipality, its agents, or employees, the Municipality shall promptly notify the Landowner and his successors and assigns, and they shall defend, at their own expense, any suit based on such claim. If any judgment or claims against the Municipality, its agents or employees shall be allowed, the Landowner and his successors and assigns shall pay all costs and expenses in connection therewith.

11. In the advent of an emergency or the occurrence of special or unusual circumstances or situations, the Municipality may enter the property, if the Landowner is not immediately available, without notification

or identification, to inspect and perform necessary maintenance and repairs, if needed, when the health, safety or welfare of the citizens is at jeopardy. However, the Municipality shall notify the Landowner of any inspection, maintenance, or repair undertaken within five days of the activity. The Landowner shall reimburse the Municipality for its costs.

This Agreement shall be recorded among the land records 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 Municipality:

_____

(SEAL) For the Landowner:

_____

ATTEST:

_____ (Borough)

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)

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ORDINANCE APPENDIX B -
STORMWATER MANAGEMENT DESIGN CRITERIA

TABLE OF CONTENTS

Table B-1. Design Storm Rainfall Amount (Inches)

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

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

Source: *Field Manual of Pennsylvania Department of Transportation*
STORM INTENSITY-DURATION-FREQUENCY CHARTS P D T - I D F May 1986.

FIGURE B-1
ALTERNATING BLOCK METHOD FOR RAINFALL DISTRIBUTION

Source: *Applied Hydrology*, Chow, Maidment, Mays, 1988

The alternating block method can be utilized by to develop design hyetographs from the PennDOT Storm Intensity-Duration-Frequency (PDT-IDF) curves. This method redistributes the incremental rainfall values developed from the PDT-IDF curves in a quasi-symmetrical form, where the block of maximum incremental depth is positioned at the middle of the required duration and the remaining blocks of rainfall are arranged in descending order, alternately to the right and to the left of the central block. Example B-1 below shows this method for a 100-year, 2-hour duration storm with 20-minute time intervals.

Example B-1
100-Year, 2-Hour Duration Storm Hyetograph Development
Region 5

(1)	(2)	(3)	(4)	(5)
Time (min)	100-Yr Rainfall Intensity (Inches/hr)	100-Yr Accumulated Rainfall Depth (Inches)	100-Yr Incremental Rainfall Depth (Inches)	100-Yr Rainfall Distribution (Inches)
0	0.00	0.00	0.00	0.00
10	6.91	1.15	1.15	0.07
20	5.34	1.78	0.63	0.15
30	4.41	2.21	0.43	0.21
40	3.78	2.52	0.32	0.26
50	3.33	2.78	0.26	0.43
60	2.98	2.98	0.21	1.15
70	2.75	3.20	0.22	0.63
80	2.51	3.35	0.15	0.32
90	2.28	3.42	0.07	0.22
100	2.15	3.58	0.16	0.16
110	2.01	3.69	0.11	0.11
120	1.88	3.76	0.07	0.07

Notes :

Values from Column (2) are derived from the appropriate rainfall chart based on the location of the site under analysis. (Region 5 in this example, therefore use Figure B-3)

Column (3) = Column (2) * Column (1) / 60 minutes (i.e. 6.91 inches / hr * 10 min / 60 = 1.15).

Column (4) = Difference in Column(3) for each time interval (i.e. 1.78 - 1.15 = 0.63).

Column (5) is Column (4) rearranged with the maximum increment from Column (4) placed at the middle of the event (Time = 60 minutes, in this example), then rearranging the remaining values from Column (4) in descending order, alternately right and left (below and above) the central block.

Figure B-2
(PennDOT Region Map)

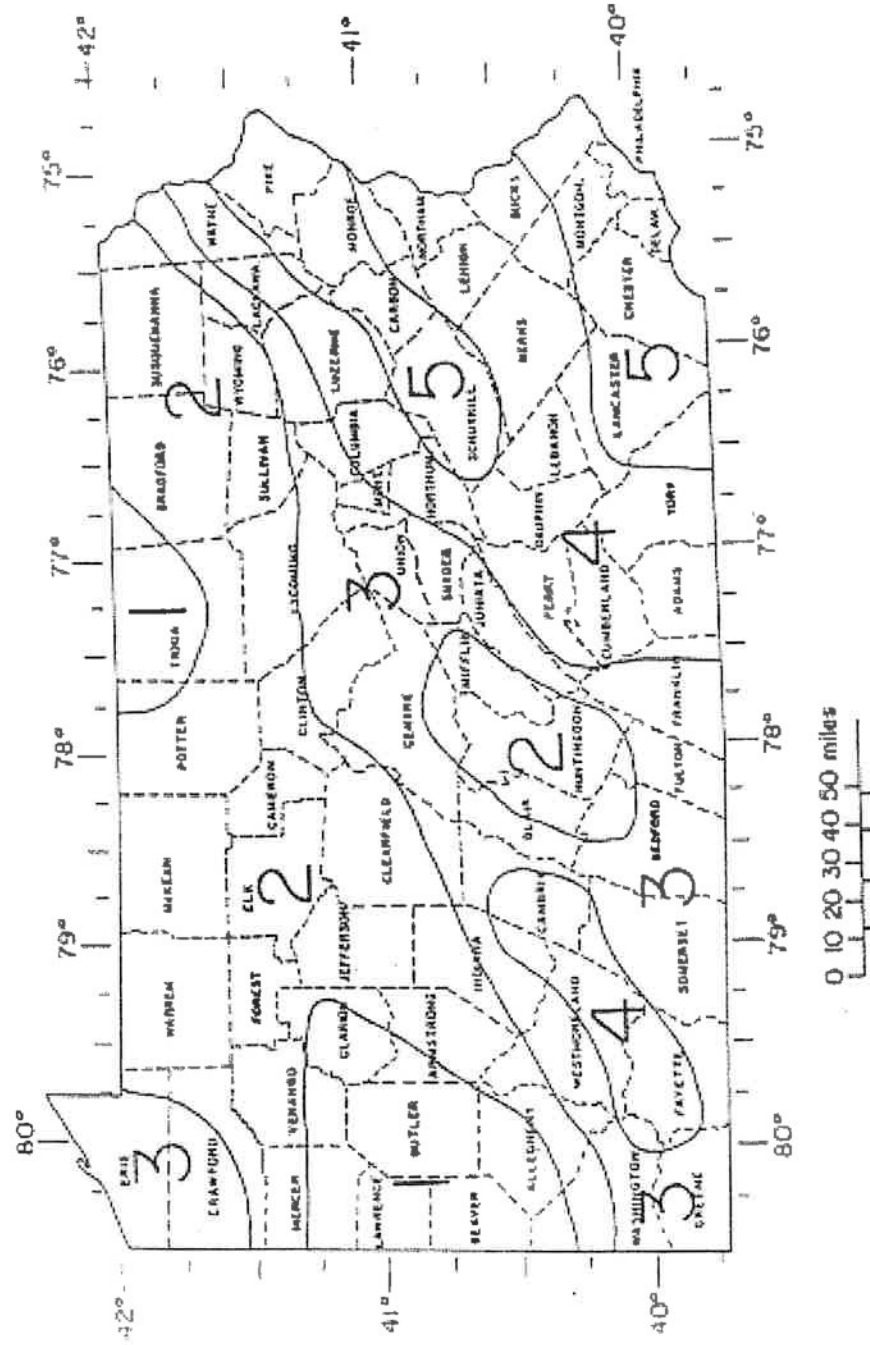

Figure 1. Delineated regions with uniform rainfall

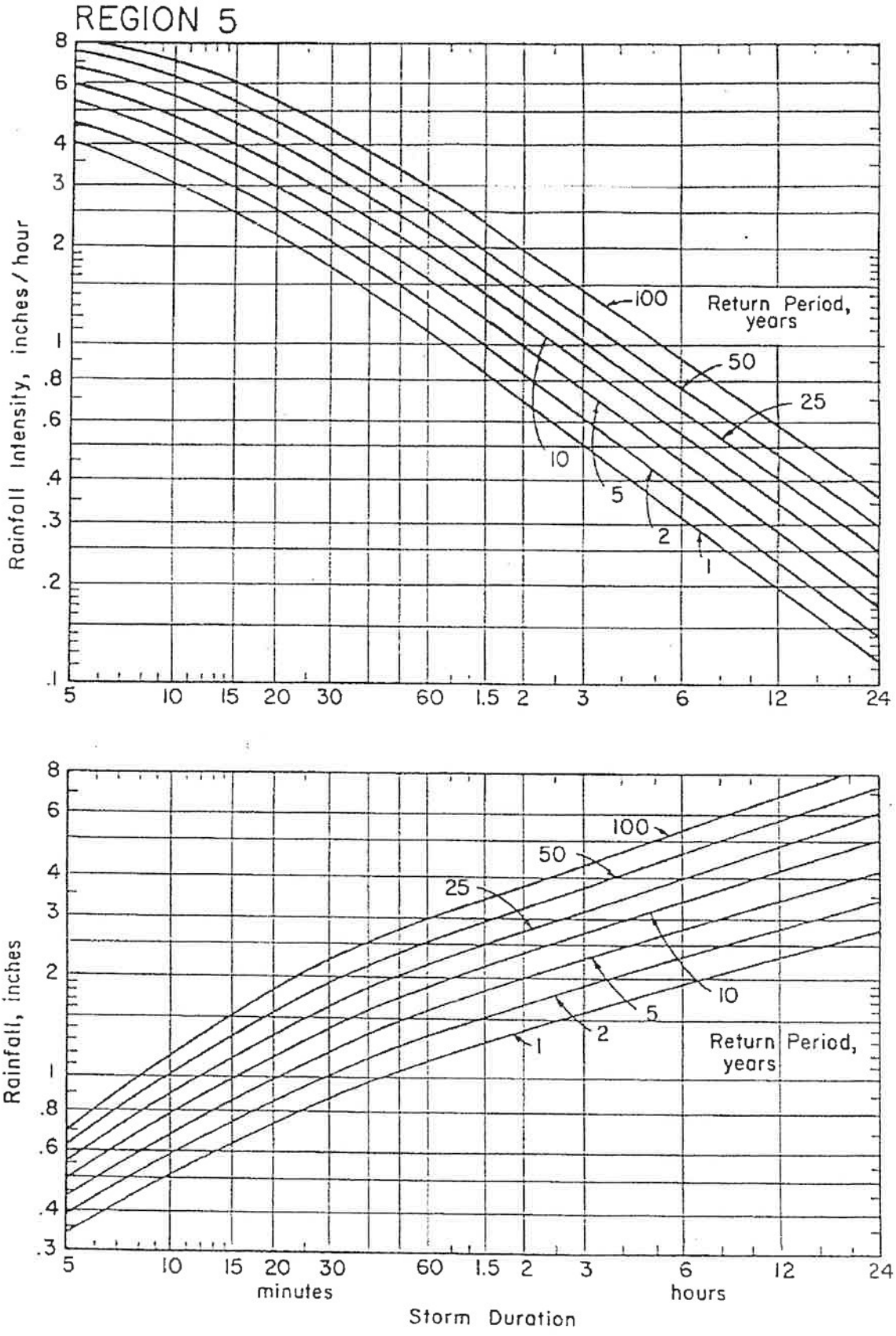
REGION 5
Rainfall Intensity, inches / hour
8
6
4
3
2
1
.8
.6
.4
.3
.2
.1
100
50
25
10
5
2
1
Return Period, years
5
10
15
20
30
60
1.5
2
3
6
12
24
Rainfall, inches
minutes
hours
Storm Duration

Table B-2. Runoff Curve Numbers

Land Use Description			Hydrologic Soil Group A	B	C	D
Open Space			44	65	77	82
Orchard			44	65	77	82
Meadow			30	58	71	78
Agricultural			59	71	79	83
Forest			36	60	73	79
Commercial	(85% Impervious)		89	92	94	95
Industrial	(72% Impervious)		81	88	91	93
Institutional	(50% Impervious)		71	82	88	90
Residential						
Average Lot Size	% impervious					
1/8 acre or less*		65	77	85	90	92
1/8–1/3 acre		34	59	74	82	87
1/3–1 acre		23	53	69	80	85
1–4 acres		12	46	66	78	82
Farmstead			59	74	82	86
Smooth Surfaces (Concrete, Asphalt, Gravel or Bare Compacted Soil)			98	98	98	98
Water			98	98	98	98
Mining/Newly Graded Areas (Pervious Areas Only)			77	86	91	94

*Includes Multifamily Housing unless justified lower density can be provided.

Note: Existing site conditions of bare earth or fallow shall be considered as meadow when choosing a CN value.
Source: NRCS (SCS) TR-55

Table B-3. Rational Runoff Coefficients (AMC II)

Land Use Description		Hydrologic Soil Group A	B	C	D
Cultivated Land : without conservation treatment		.49	.67	.81	.88
: with conservation treatment		.27	.43	.61	.67
Pasture or range land : poor condition		.38	.63	.78	.84
: good conditions		---*	.25	.51	.65
Meadow : good conditions		---*	---*	.44	.61
Wood or Forest Land : thin stand, poor cover, no mulch		---*	.34	.59	.70
: good cover		---*	---*	.45	.59
Open Spaces, lawns, parks, golf courses, cemeteries					
Good conditions : grass cover on 75% or more of the area		---*	.25	.51	.65
Fair conditions : grass cover on 50% to 75% of the area		---*	.45	.63	.74
Commercial and business areas (85% impervious)		.84	.90	.93	.96
Industrial districts (72% impervious)		.67	.81	.88	.92
Residential :					
Average lot size	Average % Impervious				
1/8 acre or less	65	.59	.76	.86	.90
1/4 acre	38	.25	.49	.67	.78
1/3 acre	30	---*	.49	.67	.78
1/2 acre	25	---*	.45	.65	.76
1 acre	20	---*	.41	.63	.74
Paved parking lots, roofs, driveways, etc.		.99	.99	.99	.99
Streets and roads :					
Paved with curbs and storm sewers		.99	.99	.99	.99
Gravel		.57	.76	.84	.88
Dirt		.49	.69	.80	.84

Notes: Values are based on S.C.S. definitions and are average values.
Values indicated by "---" should be determined by the Design Engineer based on site characteristics.
Source: New Jersey Department of Transportation, *Technical Manual for Stream Encroachment*, August 1984

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

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

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

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

(1) Depending upon type, coating, and diameter

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

Table B-5. 24-Hour Storm Values Representing 90 % of Annual Rainfall

PennDOT Rainfall Region	P Inches
1	1.13
2	1.48
3	1.60
4	1.95
5	2.04

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

The developer may, subject to approval of the Municipal Engineer, use the nonstructural stormwater management measures, described in the following table.

Table B-6. Nonstructural Stormwater Management Measures

Stormwater Measure	Description
Natural Area Conservation	Conservation of natural areas such as forest, wetlands, or other sensitive areas in a protected easement thereby retaining their existing conditions hydrologic and water quality characteristics.
Disconnection of Rooftop Runoff	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.
Disconnection of Non-Rooftop Runoff	Disconnect surface impervious cover by directing it to pervious areas where it is either infiltrated or filtered though the soil.
Stream Buffers	Stream buffer effectively treats 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 grass or forested area.
Grass Channel (Open Section Roads)	Open grass channels are used to reduce the volume of runoff and pollutants during smaller storms.
Environmentally Sensitive Rural Development	Environmental site design techniques are applied to low density or rural residential development.

Source: Modified from *Maryland Best Management Practices Manual*, 2000

Ordinance Appendix C

Sample Drainage Plan Application and Fee Schedule

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ORDINANCE APPENDIX C

Sample Drainage Plan Application and Fee Schedule

(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 Morrisivlle Borough 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 _____

Applicant's 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 (Multilot)
____Two-family Lots	____ Garden Apartments	____ Commercial (One lot)
____Multifamily Lots	____ Mobile-Home Park	____ Industrial (Multilot)
____Cluster Type Lots	____ Campground	____ Industrial (One Lot)
____Planned Residential Development	____ Other (_____)	

6. Linear 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 that occurred for existing conditions for the designated design storm?_____

b. Design storm used (on-site 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 Ordinance Appendix D of the Delaware River South Watershed Stormwater Management Plan_____

e. Type of proposed runoff control:_____
_____

f. Does the proposed stormwater control criteria meet the requirement/guidelines of the stormwater ordinance(s)?_____

If not, what variances/waivers are requested?
Reasons_____
_____

g. Does the plan meet the requirements of Article III of the stormwater ordinance?
_____

If not, what variances/waivers are requested?
_____
Reasons _____
_____

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 or staging schedule 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 Bucks County Conservation District?_____

b. Date of Submission _____

c. 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 development:_____

_____

_____

_____

CERTIFICATE OF OWNERSHIP AND ACKNOWLEDGMENT OF APPLICATION:

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF _____

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 Municipality)

_____ Borough official submission receipt:

Date complete application received _____Plan Number____

Fees _____ date fees paid _____ received by_____

Official submission receipt date____

Received by_____

_____
Borough

Drainage Plan
Proposed Schedule of Fees

Subdivision name _____ Submittal No_

Owner _____ Date_

Engineer_____

1.	Filing fee	$_____
2.	Land use	
	2a. Subdivision, campgrounds, mobile home parks, and multi-family dwelling where the units are located in the same local watershed.	$_____
	2b. Multi-family dwelling where the designated open space is located in a different local watershed from the proposed units.	$_____
	2c. Commercial/industrial.	$_____
3.	Relative amount of earth disturbance	
	3a. Residential	
	road <500 l.f.	$_____
	road 500-2,640 l.f.	$_____
	road >2,640 l.f.	$_____
	3b. Commercial/industrial and other	
	impervious area <3,500 s.f.	$_____
	impervious area 3,500-43,560 s.f.	$_____
	impervious area >43,560 s.f.	$_____
4.	Relative size of project	
	4a. Total tract area <1 ac	$_____
	1-5 ac	$_____
	5-25 ac	$_____
	25-100 ac	$_____
	100-200 ac	$_____
	>200 ac	$_____
5.	Stormwater control measures	
	5a. Detention basins & other controls which require a review of hydraulic routings ($ per control).	$_____
	5b. Other control facilities which require storage volume calculations but no hydraulic routings. ($ per control)	$_____
6.	Site inspection ($ per inspection)	$_____
	Total	$_____

All subsequent reviews shall be 1/4 the amount of the initial review fee unless a new application is required as per §370-30 of the stormwater ordinance. A new fee shall be submitted with each revision in accordance with this schedule.

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ORDINANCE APPENDIX D

Stormwater Management District Watershed Map

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SECTION 2. SEVERABILITY.
In the event that any section, sentence, clause, phrase or word of this ordinance shall be declared illegal, invalid or unconstitutional by any Court of competent jurisdiction, such declaration shall not prevent or otherwise foreclose enforcement of any of the remaining portions of this ordinance.

SECTION 3. REPEALER.
All ordinances or parts of ordinances inconsistent herewith or in conflict with any of the specific terms enacted hereby, to the extent of said inconsistencies or conflicts, are hereby specifically repealed.

ORDAINED and **ENACTED** by the Borough Council of Morrisville Borough this 20th day of September, 2022.

BOROUGH COUNCIL
MORRISVILLE BOROUGH

C. Robert Paul
President

ATTEST: Judith A. Danko
Judith A. DANKO