
STORMWATER MANAGEMENT ORDINANCE

19374

**ORDINANCE 10-06
AS AMENDED BY ORDINANCE 11-06
AND ORDINANCE 13-04
AND ORDINANCE 24-08**

**LOWER PAXTON TOWNSHIP, DAUPHIN COUNTY,
PENNSYLVANIA**

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ARTICLE 170

STORMWATER MANAGEMENT, DRAINAGE
& EROSION CONTROL

ARTICLE I - GENERAL PROVISIONS

§170-101. Short Title

This Ordinance shall be known and may be cited as the Lower Paxton Township Stormwater Management Ordinance.

§ 170-102. Statement of Findings

The Board of Supervisors of Lower Paxton Township finds that:

- A. Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of existing streams and storm sewers, greatly increases the cost of public facilities to convey and manage stormwater, undermines floodplain management and flood reduction efforts in upstream and downstream communities, reduces groundwater recharge, threatens public health and safety, and increases non-point source pollution of water resources.
- B. A comprehensive program of stormwater management, including reasonable regulation of land development and redevelopment (that may cause loss of natural infiltration or accelerated erosion) is fundamental to the public health, safety, welfare, and the protection of the people of the Township and all the people of the Commonwealth of Pennsylvania, their resources, and the environment.
- C. Stormwater can be an important water resource by providing groundwater recharge for water supplies and base flow of streams, which also protects and maintains surface water quality.
- D. Public education on the control of pollution from stormwater is an essential component in successfully addressing stormwater.
- E. PA Act 167, the “Storm Water Management Act” requires municipalities adopt and implement Ordinances necessary to regulate development within the municipality in a manner consistent with the applicable storm water plan and the provisions of the Act.
- F. Municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems (MS4) under the National Pollutant Discharge Elimination System (NPDES) stormwater program. Municipal Permittees are required to adopt an Ordinance that is consistent with DEP’s 2022 Model Stormwater Management Ordinance.

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- G. Implement an “illegal discharge detection and elimination program” within MS4 permitted urbanized areas to address non-stormwater discharges into the Township’s separate storm sewer system.
- H. 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.

§ 170-103. Purpose

The purpose of this Article is to promote public health, safety, and welfare within the Township and its watersheds by minimizing the harms and maximizing the benefits through stormwater management provisions designed to:

- A. Manage accelerated runoff and erosion & sedimentation problems at their source by regulating activities that cause these problems.
- B. Provide review procedures, performance standards, and design criteria for watershed-wide stormwater planning and management.
- C. Promote the utilization and preservation of existing natural drainage systems.
- D. Manage stormwater impacts close to the runoff source, which requires a minimum of structures and a maximum use of natural processes.
- E. Focus design and planning on infiltration of stormwater, to maintain groundwater recharge, to prevent degradation of surface and groundwater quality, and to otherwise protect water resources.
- F. Maintain existing flows and quality of streams and watercourses in the Township and the Commonwealth.
- G. Meet legal water quality requirements under state law, including regulations at Pennsylvania Code - Title 25. Environmental Protection - Chapter 93.4a. to protect and maintain “existing uses” and maintain the level of water quality to support those uses in all streams, and to protect and maintain water quality in “special protection” streams.
- H. Prevent scour and erosion of stream banks and streambeds.
- I. Provide for proper operations and maintenance of all permanent stormwater management Best Management Practices (BMPs) that are implemented in the Township.
- J. Provide a mechanism to identify controls necessary to meet the NPDES permit requirements.

- K. Implement an “illicit discharge detection and elimination program” to address non-stormwater discharges that may enter into the Township’s separate storm sewer system.
- L. Preserve and restore the flood carrying capacity of streams and permit the unimpeded flow of natural watercourses.
- M. Ensure the drainage of all low points along the streets and other applicable areas and provide positive drainage away from all structures.
- N. Ensure the proper transference of public storm sewers to the Township’s MS4.
- O. Comply with Act 167 and requirements of the Township’s MS4 permit.

§ 170-104. Statutory Authority

- A. The Township is empowered to regulate land use activities that affect runoff by the authority of the Act of October 4, 1978, 32 P.S., P.L. 864 (Act 167), Section 680.1 et seq., as amended, the "Storm Water Management Act".
- B. The Township also is empowered to regulate land use activities that affect runoff by the authority of the Act of July 31, 1968, P.L. 805, (Act 247), The Pennsylvania Municipalities Planning Code, as amended by Act 170 of December 21, 1988, and Act 131 of December 14, 1992.
- C. Chapter 102 of the Rules and Regulations of the Department of Environmental Protection imposes requirements on earthmoving activities which create accelerated erosion or a danger of accelerated erosion and which require planning and implementation of effective soil conservation measures.

§ 170-105. Applicability

- A. This Article shall apply to any “Regulated Activities” within the Township, and all stormwater runoff entering into the Township’s separate storm sewer system from lands within the boundaries of the Township.
- B. Earth Disturbance activities and associated stormwater management controls are also regulated under existing state law and implementing regulations. This Article shall operate in coordination with those parallel requirements; the requirements of this Article shall be no less restrictive in meeting the purposes of this Ordinance than state law.
- C. All earth disturbance activity and all subdivision and land development applications duly filed under this Ordinance are defined as "Regulated Activities" and shall be regulated by this Article and require a Township Stormwater Management Permit when conditions listed in this Section are met.

"Regulated Activities" are any earth disturbance activities or any activities that involve the alteration or development of land in a manner that may affect stormwater runoff. “Regulated Activities” include, but are not limited to, the following listed items:

<u>Regulated Activity</u>	<u>Conditions Requiring a Township Stormwater Management Permit</u>
Earth Disturbance Activities	5,000 S.F. or more of earth disturbance is proposed
Land Development	All land development
Subdivision	All subdivisions where other regulated activities are proposed
Construction of new or additional impervious or semi-pervious surfaces	80 S.F. or greater of new impervious cover is proposed
Construction of new buildings or additions to existing buildings	80 S.F. or greater of new impervious cover is proposed
Diversion or piping of any natural or man-made stream channel	All instances
Installation of stormwater management control facilities or appurtenances thereto	All instances
Installation of stormwater BMPs	All instances

See Section 302 of this Ordinance for Exemption/Modification Criteria.

§ 170-106. Repealer

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

§ 170-107. Severability

In the event that a court of competent jurisdiction declares any section(s) or provision(s) of this Ordinance invalid, such decision shall not affect the validity of any of the remaining section(s) or provision(s) of this Ordinance.

§ 170-108. Compatibility with Other Ordinance Requirements

Approvals issued and actions taken pursuant to this Ordinance do not relieve the Applicant of the responsibility to comply with or to secure required permits or approvals for activities regulated by any other applicable codes, laws, rules, statutes, or ordinances. To the extent that this Ordinance imposes more rigorous or stringent requirements for stormwater management, the specific requirements contained in this Ordinance shall be followed.

§ 170-109. Duty of Persons Engaged in the Development of Land

Notwithstanding any provision(s) of this Ordinance, including exemptions, any landowner or any person engaged in the alteration or development of land which may affect stormwater runoff characteristics shall implement such measures as are reasonably necessary to prevent injury to health, safety, or other property. Such measures also shall include actions as are required to manage the rate, volume, direction, and quality of resulting stormwater runoff in a manner which otherwise adequately protects health, property, and water quality.

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§ 170-110. Township Liability

The degree of stormwater management sought by the provisions of this Article is considered reasonable for regulatory purposes. This Article shall not create liability on the part of the Township, any appointed or elected official of the Township, the Dauphin County Conservation District, or any officer, engineer, or employee thereof for any erosion, sedimentation, or flood damages that result from reliance on this Article or any administrative decision lawfully made there under. The approval, enforcement or issuance of any permits by the Township under this Ordinance shall not be construed as imposing liability on the Township, nor of waiving any immunities or defenses of the Township related to the same. Moreover, to the extent that the Township undertakes work under this Ordinance to address stormwater management violations, the underlying landowner shall bear all responsibility, maintenance and liability associated with the same.

§ 170-111. 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.

§ 170-112. 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, subject to Section 112, paragraphs B and C.
- 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

§ 170-201. Definitions

All terms not defined in this Ordinance, but which are defined in the Lower Paxton Township Zoning Ordinance shall have the meaning therein defined. Unless otherwise expressly stated, the following words shall, for the purpose of this Ordinance, have the meaning herein indicated.

For the purposes of this Ordinance, 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 words "shall" and "must" are mandatory; the words "may" and "should" are permissive.

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

ACCELERATED RUNOFF - runoff occurring at rates in excess of rates occurring under natural, undisturbed conditions.

ACT 167 PLAN - Plans prepared in accordance with Pennsylvania's Stormwater Management Act (Act 167 of 1978). The Act requires counties to prepare and adopt watershed-based stormwater management plans, and it requires municipalities to adopt and implement ordinances to regulate development consistent with these plans.

AGRICULTURAL OPERATIONS - an enterprise that is actively engaged in the commercial production and preparation for market of crops, livestock and livestock products in the production, harvesting and preparation for market or use of agricultural, agronomic, horticultural, silvicultural and aquacultural crops and commodities. The term includes an enterprise that implements changes in production practices and procedures or types of crops, livestock, livestock products or commodities produced consistent with practices and procedures that are normally engaged by farmers or are consistent with technological development within the agricultural industry. 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; changing of surface conditions by causing the surface to be more or less impervious; land disturbance.

APPLICANT - a landowner or developer, as hereinafter defined, who has filed an application for development including his heirs, successors and assigns.

APPLICATION FOR DEVELOPMENT - every application, whether preliminary, tentative or final, required to be filed and approved prior to start of construction or development including but not limited to an application for a building permit, for the approval of a subdivision plat or plan or for the approval of a development plan.

AS-BUILT PLANS - plans prepared and certified by a Professional Land Surveyor depicting the exact location, orientation, and elevation of all site improvements, which exist as a result of construction activities..

BASE FLOOD ELEVATION - the one hundred (100) year flood elevation as indicated in a Flood Insurance Study (FIS), as revised, for Lower Paxton Township, Dauphin County, Pennsylvania, prepared by the Federal Emergency Management Agency, Federal Insurance Administration that indicates the water surface elevation resulting from a flood that has a one (1) percent chance of equaling or exceeding that level in any given year.

BMPs (BEST MANAGEMENT PRACTICES) - activities, facilities, designs, measures, or procedures used to manage stormwater impacts from Earth Disturbance Activities; to meet State Water Quality Requirements; to promote ground water recharge; and to otherwise meet the purposes of this Ordinance. BMPs include, but are not limited to: infiltration facilities, filter strips, low impact design, bioretention, wet ponds, permeable paving, permeable pavers, grassed swales, forested buffers, sand filters, and detention basins. All references to BMP shall be synonymous with Stormwater Control Measure (SCM).

BMP MANUAL - Shall mean the Pennsylvania Stormwater Best Management Practices Manual as published by the Department of Environmental Protection, Bureau of Watershed Management, document number: 363-0300-002, effective date: December 30, 2006, and as revised.

BOARD OF SUPERVISORS - the Board of Supervisors of Lower Paxton Township, Dauphin County, Pennsylvania.

BUILDING LOT - A designated parcel, tract or area of land established by plat or otherwise as permitted by law and to be used, developed or built upon as a unit.

BUILDING SETBACK, FRONT – The line of that face of the building nearest the front line of the lot. This face includes sun parlors, covered porches, and covered patios, whether enclosed or unenclosed, but does not include steps.

BUILDING SETBACK, REAR – The line of that face of the building nearest the rear line of the lot. This face includes sun parlors, covered porches, and covered patios, whether enclosed or unenclosed, but does not include steps.

BUILDING SETBACK, SIDE – The line of that face of the building nearest the side line of the lot. This face includes sun parlors, covered porches, and covered patios, whether enclosed or unenclosed, but does not include steps.

CHANNEL - a passage for water (or other fluids) to flow through. A natural or artificial open drainage feature that conveys, continuously or periodically, flowing water and through which stormwater flows. Channels include, but shall not be limited to, natural and man-made drainageways, swales, streams, ditches, canals, and pipes flowing partly full.

CHANNEL EROSION - the widening, deepening, and headward cutting of small channels and waterways, due to erosion caused by moderate to large floods.

CHANNEL, MAIN - the downstream later receiving channel designated in the Act 167 Plans that accepts the discharge of un-detained post-development peak runoff without causing any harm for the given design storm.

CISTERN - an underground reservoir or tank for storing rainwater.

COMMON ELEMENTS - land amenities, parts of building, central services and utilities, and any other elements and facilities owned and used by all unit owners and are designated as common elements. These elements may include, but are not limited to:

- A. The land on which the building is located and portions of the building which are not included in a unit.
- B. The foundation, structural parts, supports, main walls, roofs, basements, halls, corridors, lobbies, stairways and entrances and exits of the building.
- C. The yards, parking area and driveways.
- D. Portions of the land and building used exclusively for the management, operation or maintenance of the common elements.
- E. Installations of all central services and utilities.
- F. All other elements of the building necessary or convenient to its existence, management, operation, maintenance and safety or normally in common use.
- G. Such other facilities as are designated as common elements.

COMMON OPEN SPACE - A parcel or parcels of land or an area of water, or a combination of land and water, within a development site and designed and intended for the use or enjoyment of residents of a development, not including streets, off-street parking areas, and areas set aside for public facilities, whether privately or publicly-owned.

CONDOMINIUM - A set of individual dwelling units or other areas of buildings each owned by an individual person(s) in fee simple, with such owners assigned a proportionate interest in the remainder of the real estate which is designated for common ownership, and which is created under the Pennsylvania Uniform Condominium Act of 1980 or Uniform Planned Community Act of 1996, as amended.

CONDOMINIUM ASSOCIATION - the community association which administers and maintains the common property and common elements of a condominium.

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 of the regulations promulgated under 25 Pa Code 102.

COUNTY - County of Dauphin, Pennsylvania.

CROSS-WALK - a right-of-way, publicly or privately owned, intended to furnish access to pedestrians.

CUL-DE-SAC - a minor street open at one (1) end for vehicular and pedestrian access with the opposite end terminating in a vehicular turnaround.

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

CURB - a cut stone, asphalt or concrete boundary usually marking the edge of the roadway, driveway or other paved areas.

CURB CUT - the opening along the curb line at which point vehicles may enter or leave the roadway or other paved area.

CURVE NUMBER - a numerical designation which reflects amounts of runoff based on land use and hydrological soil group.

CUT - an excavation. The difference between a point on the original ground and designated point of lower elevation on the final grade. Also, the material removed from an excavation.

DAM - any artificial barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water or any other fluid or semi-fluid or any refuse bank, fill or structure for highway, railroad or other purposes which does or may impound water or any other fluid or semi-fluid.

DEP - The Pennsylvania Department of Environmental Protection and its relevant bureaus.

DESIGNEE - an agent of the governing body involved with the administration, review or enforcement of any provisions of this Ordinance by employment, contract, or memorandum of understanding.

DESIGN STORM - the magnitude of precipitation from a storm event measured in probability of occurrence and duration and used in computing stormwater management control systems.

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

DETENTION FACILITIES, REGIONAL - a detention facility that detains and treats stormwater runoff for two (2) or more development sites, where the development sites are generally considered to be independent and typically would contain their own separate detention facilities.

DETENTION POND - a vegetated pond designed to collect water runoff for a given storm event and release it at a predetermined rate; also known as a "dry pond."

DETENTION VOLUME - The volume of runoff that is captured and released during or after a storm event into Waters of the Commonwealth at a controlled rate.

DEVELOPER - any landowner, agent of such landowner, or tenant with the permission of such landowner, who makes or causes to be made a subdivision of land or a land development.

DEVELOPMENT PLAN - the provisions for development, including a planned residential development, a plat of subdivision, all covenants relating to use, location and bulk of buildings and other structures, intensity of use or density of development, streets, ways and parking facilities, common open space and public facilities. Such provisions shall be prepared by a surveyor, engineer, or architect and drawings associated with such provisions shall be drawn at a scale no greater than one (1) inch equals 100 feet.

DEVELOPMENT - See "Land Development" in this Section.

DEVELOPMENT SITE - the specific parcel or tract of land for which a development activity is proposed.

DISTURBED AREA - An un-stabilized 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 toward it.

DRAINAGE -

- A. Surface water runoff.
- B. The removal of surface water or ground water from land by drains, grading or other means which include runoff controls to minimize erosion and sedimentation during and after construction or development, the means for preserving the water supply and the prevention or alleviation of flooding.

DRAINAGE AREA - that area in which all of the surface runoff resulting from precipitation is concentrated into a particular point of interest.

DRAINAGE CONVEYANCE FACILITY - any ditch, gutter, swale, culvert, storm sewer or other structure designed, intended or constructed for the purpose of diverting surface waters from or carrying surface waters off streets, public rights-of-way, parks, recreational areas or any parts of any subdivision or land development.

DRAINAGE EASEMENT - an easement required for the installation and maintenance of storm sewers, drainage ditches, other drainage facilities, and/or required for the preservation or maintenance of a natural watercourse, drainageway, channel or stream.

DRAINAGE FACILITY - any ditch, gutter, swale, culvert, storm sewer, or other system designed, intended, or constructed for the purpose of diverting surface waters from or carrying surface waters off streets, public rights-of-way, parks, recreational areas or any part of any subdivision or land development.

DRAINAGE PLAN - the documentation of the design and analysis of a stormwater management or drainage system, if any, to be used for a given development site.

DRAINAGE SYSTEM - pipes, swales, natural features, networks of drainage facilities, and manmade improvements designated to carry drainage.

DRAINAGEWAY - any natural or artificial watercourse, trench, ditch, pipe, swale, channel, or similar depression into which surface water flows.

DRIVEWAY - a private access drive providing access for vehicles to a parking area, space, garage, dwelling or other structure.

DWELLING- A building that contains dwelling units, intended, or designed to be used, rented, leased, let, or hired out to be occupied for living purposes. Dwelling types shall be as described in the Township Zoning Ordinance.

DWELLING UNIT – A single unit providing complete, independent living facilities for one (1) or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.

DWELLING, MOBILE HOME - a transportable, single-family dwelling intended for permanent occupancy, contained in one (1) unit, or in two (2) or more units designed to be joined into one (1) integral unit capable of again being separated for repeated towing, which arrives at a site complete and ready for occupancy except for minor and incidental unpacking and assembly operations, and constructed so that it may be used without a permanent foundation.

EARTH DISTURBANCE ACTIVITY - a construction or other human activity which disturbs the surface of the 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.

EASEMENT - a right-of-way granted for the limited use of land for public, quasi-public or private purposes.

ENGINEER, TOWNSHIP/MUNICIPAL - a registered Professional Engineer in the Commonwealth of Pennsylvania designated by the Township to perform the duties of engineer as herein specified.

ENGINEER, PROFESSIONAL - an individual licensed and registered under the laws of the Commonwealth of Pennsylvania to engage in the practice of engineering. A Professional Engineer may not practice land surveying unless licensed as set forth in P.L. 534, No. 230; however, a Professional Engineer may perform engineering land surveys.

ENGINEERING LAND SURVEYS - surveys for:

- A. The development of any tract of land including the incidental design of related improvements, such as line and grade extension of roads, sewers and grading but not requiring independent engineering judgment; providing, however, that tract perimeter surveys shall be the function of the Professional Land Surveyor.
- B. The determination of the configuration or contour of the earth's surface, or the position of fixed objects thereon or related thereto by means of measuring lines and angles and applying the principles of mathematics, photogrammetry or other measurement methods. Geodetic or cadastral survey, underground survey and hydrographic survey.

- C. Erosion & Sedimentation control surveys.
- D. The determination of the quantities of materials.
- E. Tests for water percolation in soils.
- F. The preparation of plans and specifications and estimates of proposed work as described herein.

ENGINEERING SPECIFICATIONS - the engineering specifications of the Township regulating the installation of any required improvements or for any facility installed by any owner, subject to public use.

EROSION - the process involving the detachment and movement of soil or rock fragments, or the wearing away of the land surface or channels by water, ice, wind, chemical action and gravity.

EROSION AND SEDIMENT POLLUTION CONTROL PLAN - a plan which is designed to minimize accelerated erosion and sedimentation.

EXCAVATION - any act by which earth, sand, gravel, rock or any other similar material is dug into, cut, quarried, uncovered, removed, displaced, relocated or bulldozed. It shall include the conditions resulting thereof.

EXCEPTIONAL VALUE WATERS - surface waters of high quality, which satisfies Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards 93.4b(b) (relating to anti-degradation).

EXISTING CONDITIONS - the dominate land cover during the 5-year period immediately preceding a proposed regulated activity.

EXISTING GRADE - the vertical location of the ground surface prior to excavation or filling.

FEMA - The Federal Emergency Management Agency.

FILL - any act by which earth, sand, gravel, rock or any other material is placed, pushed, dumped, pulled, transported or moved to a new location above the natural surface of the ground or on top of the stripped surface and shall include the conditions resulting there from. The difference in elevation between a point on the original ground and designated point of higher elevation on the final grade. The material used to make a fill.

FINISHED GRADE - the proposed elevation of the land surface of a site after completion of all site preparation work.

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 the Commonwealth.

FLOOD, BASE (ONE HUNDRED (100) YEAR FLOOD) - a flood that on the average, is likely to occur once every one hundred (100) years (i.e., that has a one (1) percent chance of occurring each year, although the flood may occur in any year.)

FLOOD FRINGE - that portion of the floodplain outside the floodway.

FLOOD HAZARD BOUNDARY MAP (FHBM) - an official map of a community, issued by the Federal Insurance Administration.

FLOOD HAZARD, AREAS OF SPECIAL - the land in the floodplain within a community subject to a one (1) percent or greater chance of flooding in any given year.

FLOODPLAIN - any land area susceptible to inundation by water from any natural source or as 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 DEP Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by DEP).

FLOODPROOFING - any combination of structural and nonstructural additions, changes or adjustments to proposed and existing structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

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

FOREST MANAGEMENT/TIMBER OPERATIONS - Planning and activities necessary for the management of forestland. These include timber inventory and 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.

FUTURE - post-development (as with future condition or runoff).

FUTURE CONDITIONS - proposed land use.

FUTURE RIGHT-OF-WAY -

- A. A right-of-way required for the expansion of existing streets to accommodate anticipated future traffic.
- B. A right-of-way established to provide future access to or through undeveloped land.

GOVERNING BODY - the Board of Supervisors of Lower Paxton Township, Dauphin County, Pennsylvania.

GRADE - a slope, usually of a road, channel or natural ground specified in percent and shown on plans as specified herein.

GRADE, EXISTING - see definition, "existing grade."

GRADE, FINISHED - see definition, "finished grade."

GRADE, TO - to finish the surface of a roadbed, top of embankment or bottom of excavation.

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

GREEN INFRASTRUCTURE – systems and practices that use or mimic natural processes to infiltrate, evapotranspire, or reuse stormwater on the site where it is generated.

GROUND WATER RECHARGE - replenishment of existing natural underground water supplies.

HEC-HMS MODEL CALIBRATED - (Hydrologic Engineering Center Hydrologic Modeling System) A computer-based hydrologic model technique adapted to the Paxton Creek, Spring Creek and Multi-Creek Watersheds for the Act 167 Plans. The model has been calibrated by adjusting key model input parameters.

HIGH QUALITY WATERS - surface water 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).

HIGH TUNNEL - A structure which meets the following:

- A. is used for the production, processing, keeping, storing, sale or shelter of an agricultural commodity as defined in section 2 of the Act of December 19, 1974 (P.L. 973, No. 319), known as the "Pennsylvania Farmland and Forest Land Assessment Act of 1974," or for the storage of agricultural equipment or supplies; and
- B. is constructed with all the following:
 - 1. has a metal, wood, or plastic frame.
 - 2. when covered, has a plastic, woven textile, or other flexible covering; and
 - 3. has a floor made of soil, crushed stone, matting, pavers, or a floating concrete slab.

HOMEOWNERS' ASSOCIATION (HOA) – An organization formed to manage the common open space and common facilities within a development plan that are not to be publicly owned and maintained. Membership in and financial support of such organization is mandatory for all owners of private property in the plan.

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 HSG's (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged

wetting. The Natural Resource Conservation Service (NRCS) of the US Department of Agriculture 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 interest may be identified from a soil survey report, which can be obtained from the local NRCS office or Dauphin County Conservation District office.

IDENTIFIED FLOODPLAIN OR DISTRICT - those floodplain areas specifically designated in the Lower Paxton Township Zoning Ordinance (504D) as being inundated by the one hundred (100) year flood. Included would be areas identified as the Floodway (FW) and the Flood Fringe (FF).

ILLICIT DISCHARGE - any discharge to a municipal separate storm sewer or storm water conveyance that is not entirely composed of storm water.

IMPERVIOUS SURFACE (IMPERVIOUS AREA) - a surface that prevents the percolation of water into the ground. Impervious surfaces include, but are not limited to: any roof, parking or driveway areas, any new streets and sidewalks, buildings, paving or concrete, or other man-made surfaces that have a runoff coefficient of 0.85 or greater. Areas of stone regularly used for vehicle parking and movement shall be considered impervious. Decks and pools shall be considered impervious surfaces.

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

IMPROVEMENTS - any manmade, not readily movable item which becomes part of, placed upon or is affixed to, real estate.

INFILTRATION STRUCTURE - a constructed device, such as a seepage pit, trench drain, or infiltration pond designed to facilitate the infiltration of runoff into the soil.

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 depressions, sinkholes, limestone towers and steep-sided hills, underground drainage, and caves. Karst is formed on carbonate rocks, such as limestone or dolomites and sometimes gypsum.

LAND DEVELOPMENT – Includes any of the following activities:

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

B. A subdivision of land.

C. Land development shall not include:

1. The conversion of an existing single-family detached dwelling or single-family semi-detached dwelling into not more than three (3) residential units, unless such units are intended to be a condominium.
2. The addition of an accessory building, including farm buildings, on a lot or lots subordinate to an existing principal building.
3. The addition or conversion of buildings or rides within the confines of an enterprise which would be considered an amusement park. For purposes of this Subsection, an amusement park is defined as a tract or area used principally as a location for permanent amusement structures or rides. This exclusion shall not apply to newly acquired acreage by an amusement park until initial plans for the expanded area have been approved.
4. Where an addition of no more than 15% of the square footage is being added to an existing building, but in no case of an addition of more than 2,000 square feet, a building permit and site plan approval is required to be obtained from the appropriate officer of the Township, but submission of a land development plan and review by the Planning Commission and approval by the Board of Supervisors may be waived, only when:
 - a. The building is added to the existing structure and is not separated; and
 - b. There is no change to any street or public way; and
 - c. There is not interference or substantial change in drainage or the flow of water; and
 - d. The appropriate building officer of the Township determines that the same is otherwise in compliance with all zoning and land development requirements.
 - e. The appropriate building officer of the Township determines that the same is otherwise in compliance with all zoning and land development requirements.

LAND/EARTH DISTURBANCE - any activity involving grading, excavating, digging, or filling of ground or stripping of vegetation or any other activity that causes an alteration to the natural condition of the land.

LANDOWNER - the legal or beneficial owner or owners of land including the holder of an option or contract to purchase (whether or not such option or contract is subject to any condition), a lessee if he

is authorized under the lease to exercise the rights of the landowner or other person having a proprietary interest in land.

LIMIT OF DISTURBANCE - a line provided on the SWM Site Plan that indicates the total area to be disturbed during a proposed earth disturbance activity.

LIMITED ACCESS HIGHWAY - a street, roadway, or highway which carries a large volume of traffic at relatively high speeds with access controlled at designated points and not specifically from adjacent properties.

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

LOT AREA - The total area within the boundary of the lot excluding any areas contained in a public street ROW.

LOT, DOUBLE FRONTAGE - an interior lot having frontage on two (2) streets.

LOT, REVERSE FRONTAGE - a lot extending between and having frontage on an arterial street and a minor street, and with vehicular access solely from the latter.

LOW IMPACT DESIGN (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 Paxton Creek, Spring Creek or Multi-Creek watershed hydrologic models.

MAINTENANCE - provisions to insure proper functioning, safety, structural integrity, weed and pest control, aesthetic appeal or any other measures required to maintain facilities to a standard as approved under the requirements of this ordinance.

MANNING'S EQUATION (MANNING'S 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.

MINIMUM SEPARATION DISTANCE - the minimum distance between the discharge of runoff from impervious surfaces and the receiving stream, storm sewer, or property line, whichever is smaller, whether the discharge is from a point or non-point source. It is intended to provide ample, natural, undisturbed vegetated pervious areas to allow for infiltration of increased volumes of runoff caused by development.

MASTER DEED - a legal instrument under which title to real estate is conveyed and by which a condominium is created and established.

MOBILE HOME, DWELLING - see definition, “dwelling mobile home.”

MOBILE HOME LOT - a parcel of land in a mobile home park, improved with the necessary utility connections and other appurtenances necessary for the erections thereon of a single mobile home.

MOBILE HOME PARK - a parcel or contiguous parcels of land which has been so designated and improved that it contains two (2) or more mobile home lots for the placement thereon of mobile homes.

MODIFIED RATIONAL METHOD - variation of rational methodology. Used to generate hydrographs and required detention volume.

MUNICIPAL AUTHORITY, AUTHORITY - a body politic and corporate created pursuant to the Act of May 2, 1945 (P.L. 382, No. 164), known as the “Municipalities Authority Act of 1945.” For the purpose of this Ordinance, it shall mean the Lower Paxton Township Authority, unless specified otherwise.

MUNICIPALITY - any city of the second-class A or third class, borough, incorporated town, township of the first or second class, county of the second class through eighth class, home rule municipality, or any similar general-purpose unit of government which shall hereafter be created by the General Assembly.

MUNICIPAL SEPARATE STORM SEWER SYSTEM (MS4) – Means all separate stormsewers that are defined as “large” or “medium” or “small” municipal separate stormsewer systems pursuant to 40 CFR §§122.26(b)(4), (b)(7), and (b)(16), respectively, or designed under 40 CFR § 122.26(a)(1)(v). (25 Pa. Code § 92a.32(a) and 40 CFR §122.26(b)(18)).

NATURAL DRAINAGE FLOW - the pattern of surface and stormwater drainage from a particular site before the construction or installation of improvements or prior to any grading operations.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) - National Pollutant Discharge Elimination System, the federal government’s system for issuance of permits under the Clean Water Act, which is delegated to PADEP in Pennsylvania.

NEW IMPERVIOUS SURFACE (NEW IMPERVIOUS AREA) – impervious surface or area constructed after the effective date of Ordinance 10-06, as amended by Ordinance 11-06, excluding impervious surface or area that was constructed to replace an impervious surface or area that pre-existed the effective date of Ordinance 10-06, as amended by Ordinance 11-06, provided that the location, size and dimensions of the replacement of the pre-existing impervious surface or area are the same as the pre-existing impervious surface or area.

NOAA ATLAS 14 - Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2, US Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland (2004). NOAA’s Atlas 14 can be accessed at Internet address: <http://hdsc.nws.noaa.gov/hdsc/pfds/>.

NON-POINT SOURCE POLLUTION - Pollution that enters a water body from diffuse origins in the watershed and does not result from discernible, confined, or discrete conveyances.

NRCS - Natural Resource Conservation Service (previously Soil Conservation Service (SCS)).

OBSTRUCTION - any wall, dam, wharf, embankment, levee, dike, projection, excavation, channel, rectification, culvert, building, fence, stockpile, refuse, fill, structure or matter in, along, across or projecting into any channel, watercourse or flood-prone area, which may impede, retard or change the direction of the flow of water either in itself or by catching or collecting debris carried by such water, or is placed where the flow of the water might carry the same downstream to the damage of life and property.

OPEN CHANNEL - a drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and man-made drainageways, swales, streams, ditches, canals, and pipes not under pressure.

OPEN SPACE, COMMON - see definition, "common open space."

OPEN SPACE, PUBLIC - open space owned by a public agency and maintained by it for the use and enjoyment of the general public.

OPERATION AND MAINTENANCE AGREEMENT (O&M) - An agreement, as described in the latest version of the Township's Stormwater Management Ordinance regarding the required operation and maintenance activities for existing Stormwater Management BMP's and who will be responsible for performing them.

Property owners who request credit(s) for a stormwater management BMP that does not have an existing operation and maintenance agreement with the Authority must: (a) sign the Operation and Maintenance Agreement as shown in the latest version of the Township's Stormwater Management Ordinance, (b) provide to the Authority all of the material requested by the Authority regarding the stormwater management BMP that the property owner is requesting and (c) the design of the stormwater management BMP that the property owner is requesting must be signed and sealed by a Professional Engineer registered in the Commonwealth of Pennsylvania.

OUTFALL -

- A. The point where water flows from a conduit, stream, or drain.
- B. Point Source as defined herein; the point where the Township's storm sewer system discharges to surface waters of the Commonwealth.

OUTLET - points of water disposal from a stream, river, lake, tidewater, or artificial drain.

PADEP - the Pennsylvania Department of Environmental Protection.

PARKING LOT STORAGE - the use of impervious parking areas as temporary impoundments with controlled release rates during rainstorms.

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

PERSON - Individuals, corporations, companies, associations, joint stock companies, firms, partnerships, limited liability companies, corporations, and other entities established pursuant to statutes of the Commonwealth of Pennsylvania; provided that person does not include, or apply to, the Township or to any department or agency of the Township..

PERVIOUS SURFACE (AREA) - surface such as soil or other areas not defined as impervious which allows for the infiltration of water to the ground.

PIPE - a culvert, closed conduit, or similar structure (including appurtenances) that conveys stormwater or other fluids.

PLANNING COMMISSION - The Planning Commission of Lower Paxton Township.

PLAN, COMPREHENSIVE - the development policy plan (master plan) and/or future land use plan and/or official map or other such plans, or portions thereof, as may be adopted, pursuant to statute, for the area of the Township in which the subdivision or land development is located.

PLAN, FINAL - a complete and exact subdivision or land development plan, prepared for official recording as required by statute, to define property rights and proposed streets and other improvements. In all cases where only one plan is required, it shall be a final plan.

PLAN, PRELIMINARY - a tentative subdivision or land development plan, in lesser detail than a final plan, showing approximate proposed street and lot layout as a basis for consideration prior to preparation of a final plan.

PLAN, SKETCH - an informal plan indicating the salient existing features of a tract and its surroundings and the general layout of a proposed subdivision or land development.

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 on the basis of data obtained from the National Oceanographic and Atmospheric Administration (NOAA).

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

POLLUTANT - any introduced gas, liquid or solid that makes a resource unfit for a specific purpose.

POLLUTION - the presence of matter or energy whose nature, location or quantity produces undesired environmental effects.

PRESENT - pre proposed development (as with present conditions or runoff).

PRESENT CONDITIONS - refer to “existing conditions.”

PRINCIPAL BUILDING OR STRUCTURE – The building(s) or structure(s) on a lot in which the principal use or uses are conducted.

PRINCIPAL USE – The primary or predominant use of any lot or structure.

PRIVATE ROAD - a legally established right-of-way, other than a public street, which provides the primary pedestrian and vehicular access to one (1) or more lots and constructed to the design standards contained in this Chapter.

PROBABLE MAXIMUM FLOOD (PMF) - 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 on the basis of data obtained from the National Oceanographic and Atmospheric Administration (NOAA).

PROFESSIONAL CONSULTANTS - persons who provide expert or professional advice, including, but not limited to, architects, attorneys, certified public accountants, engineers, geologists, land surveyors, landscape architects or planners.

PROFILE LINE - the profile of the centerline of the finished surface of the street, which shall be midway between the sidelines of the street.

PROJECT SITE - the specific area of land where any Regulated Activity in the Township is planned, conducted or maintained.

PUBLIC GROUNDS - includes:

- A. Parks, playgrounds, trails, paths and other recreational areas and other public areas.
- B. Sites for schools, sewage treatment, refuse disposal and other publicly owned or operated facilities.
- C. Publicly owned and operated scenic and historic sites.

PUBLIC HEARING - a formal meeting held pursuant to public notice by the Board of Supervisors intended to inform and/or obtain public comment, prior to taking action in accordance with this Chapter.

PUBLIC MEETING - A forum held pursuant to notice under 65 Pa. C.S. CH. 7 (Relating to open meetings).

PUBLIC NOTICE - notice published once not more than sixty (60) days nor less than seven (7) days before passage in one newspaper circulating generally in the Township.

QUALIFIED PROFESSIONAL - any person licensed by the Pennsylvania Department of State or otherwise qualified by law to perform the work required by the Ordinance.

RATIONAL FORMULA - a rainfall-runoff relation used to estimate peak flow.

REAL ESTATE - any fee, leasehold or other estate or interest in, over and under land, including structures, fixtures and other improvements and interests by which by custom, usage or law pass with a conveyance of land though not described in the contract of sale or instrument of conveyance. Real

estate includes parcels with or without upper or lower boundaries and spaces that may be filled with air or water.

RECORD DRAWINGS – Drawings, such as a SWM Site Plan defined herein, that has been recorded with the Dauphin County Recorder of Deeds.

REDEVELOPMENT - development activities on land, which has previously been developed.

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 and which are governed by this Chapter as specified in Section 170-105.C.

REGULATED EARTH DISTURBANCE ACTIVITY - an activity involving Earth Disturbance subject to regulation under 25 PA Code Chapter 92, Chapter 102, or the Clean Streams Law.

REGULATORY FLOOD ELEVATION - the one hundred (100) year base flood elevation as either indicated in a Flood Insurance Study (FIS), as revised, for Lower Paxton Township, Dauphin County, Pennsylvania, prepared by the Federal Emergency Management Agency, Federal Insurance Administration, or in the absence of a Flood Insurance Study, the one hundred (100) year flood elevation computed using acceptable hydrologic and hydraulic engineering principles without respect to a computed floodway.

RELEASE RATE - the percentage of the existing conditions peak rate of stormwater runoff for a development site to which the future conditions peak rate of runoff must be controlled to protect downstream areas.

RELEASE RATE DISTRICT - those subwatershed areas in which post-development flows must be reduced to a certain percentage of pre-development flows as required to meet the plan requirements and the goals of Act 167.

RESERVE STRIP - a strip of land adjacent to a street intended to control access to the street from an adjacent property.

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 over which an event of a given magnitude can be expected to recur. For example, the twenty-five (25) year return period rainfall or runoff event would be expected to recur on the average once every twenty-five (25) years or have one (1) out of twenty-five (25) (four (4) percent) chance of occurring in any given year.

REVERSE FRONTAGE LOT - see definition, “lot, reverse frontage.”

RIGHT-OF-WAY (ROW) – A strip of land acquired by reservation, dedication, forced dedication, prescription, or condemnation and intended to be occupied or occupied by a road, crosswalk, railroad, electric transmission lines, oil or gas pipeline, water line, sanitary or storm sewer, and other

similar uses. A ROW grants a lot interest to the grantee and no permanent structure may be erected therein.

RIPARIAN BUFFER - a permanent vegetated area of trees and shrubs bordering perennial and intermittent streams, ponds, lakes, and wetlands, that serves as a protective filter to help protect streams and wetlands from the impacts of adjacent land uses.

RISER - a vertical pipe or structure extending from the bottom of a pond that is used to control the discharge rate from the pond for a specified design storm.

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

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 - that part of precipitation which flows over the land.

RUNOFF CAPTURE VOLUME - the volume of runoff that is captured (retained) and not released into surface waters of the Commonwealth during or after a storm event.

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

SANITARY SEWAGE SYSTEM (COMMUNITY) - a sanitary sewage collection method serving more than one lot within a subdivision or land development owned and operated by a private entity in which sewage is carried from the site by a system of pipes to a privately owned and operated centralized treatment and disposal facility.

SANITARY SEWER (PUBLIC) - a sanitary sewage collection method owned and operated by a public utility, municipal authority, or other public entity, in which sewage is carried from the site by a system of pipes to a central treatment and disposal plant.

SEDIMENT - soils or other materials transported by surface water as a product of erosion.

SEDIMENT BASIN - a barrier, dam, 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 Waters of the Commonwealth occurring from the failure to properly design, construct, implement or maintain control measures and control facilities in accordance with the requirements of this Ordinance.

SEDIMENTATION - the process by which mineral or organic matter is accumulated or deposited by wind, water or gravity. Once this matter is deposited (or remains suspended in water), it is usually referred to as "sediment."

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

SEMI-PERVIOUS SURFACE - a surface such as stone, rock or other materials which allows some infiltration of water to the ground.

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

SEPTIC SYSTEM - an underground sewage disposal system with a septic tank and drain field used for the decomposition and disposal of domestic wastes. Also referred to as an "on-lot system."

SERVICE DRIVE (PRIVATE) - a service way providing a secondary means of private access to abutting property and not intended for general traffic circulation.

SETBACK LINE - see definition, "building setback line."

SHEET FLOW - runoff that flows over the ground surface as a thin, even layer, not concentrated in a channel.

SIDEWALK - a paved, surfaced or leveled area, paralleling and usually separated from the street, used as a pedestrian walkway.

SIGHT DISTANCE - the length of roadway visible to the driver of a passenger vehicle at any given point on the roadway when the view is unobstructed by traffic or other objects.

SLOPE - the face of an embankment or cut section; any ground whose surface makes an angle with the plane of the horizontal. Slopes are usually expressed in a percentage based upon vertical difference in feet per one hundred (100) feet of horizontal distance.

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).

SOIL STABILIZATION - chemical or structural treatment of a mass of soil to increase or maintain its stability or otherwise to improve its engineering properties.

SPEED, DESIGN - the selected speed for which the horizontal and vertical alignment, sight distances and other engineering elements of a roadway are planned and designed.

SPEED, OPERATING - the speed at which vehicles routinely travel over a portion of a roadway in a free-flow condition. For purposes of this Ordinance, the operating speed shall be considered to be the 85th percentile of the distribution of observed speeds of vehicles traveling over the portion of a roadway in question.

SPEED, POSTED - the speed limit that is specifically stated for a segment of a roadway by way of regulatory signs placed along said segment of roadway.

SPILLWAY (EMERGENCY) - a depression in the embankment of a pond or basin, or other overflow structure, that is used to pass peak discharges greater than the maximum design storm controlled by the pond or basin.

STATE WATER QUALITY REQUIREMENTS - as defined under state regulations -- protection of "designated" and "existing" uses (See 25 Pennsylvania Code Chapters 93 and 96) - including:

- A. Each stream segment in Pennsylvania has a "designated use," such as "cold water fishery" or "potable water supply," which is listed in Chapter 93. These uses must be protected and maintained, under state regulations.
- B. "Existing uses" are those attained as of November 1975, regardless of whether they have been designated in Chapter 93. Earth Disturbance activities must be designed to protect and maintain existing uses and maintain the level of water quality necessary to protect those uses in all streams, and to protect and maintain water quality in special protection streams.
- C. Water quality involves the chemical, biological, and physical characteristics of surface water bodies. After Earth Disturbance activities are complete, these characteristics can be impacted by addition of pollutants such as sediment, and changes in habitat through increased flow volumes and/or rates as a result of changes in land surface area from those activities. Therefore, permanent discharges to surface waters must be managed to protect the stream bank, streambed, and structural integrity of the waterway, to prevent these impacts.
- D. Protection and maintenance of water quality in special protection streams pursuant to 25 Pennsylvania Code Chapter 93.

STORAGE INDICATION METHOD (MODIFIED (PULS)) - a reservoir routing procedure based on solution of the continuity equation (inflow minus outflow equals the change in storage for a give time interval) and based on outflow being a unique function of storage volume.

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 or other conduits and related appurtenances which collects and carries intercepted surface runoff, street water or drainage, 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 DETENTION - any storm drainage technique that retards or detains runoff, such as detention or retention basin, parking lot storage, rooftop storage, porous pavement, dry wells or any combination thereof.

STORMWATER DETENTION BASIN - a vegetated pond designed to drain completely after storing runoff only for a given storm event and releasing it at a predetermined rate; also known as a "dry pond."

STORMWATER CONTROL FACILITIES - any structure, device, dam, channel, swale, pit, trench or any other measure taken, or method employed to control stormwater runoff.

STORMWATER CONTROL PLAN (DRAINAGE PLAN) - the documentation of the design and analysis of proposed stormwater management controls, if any, to be used for a given development site, the contents of which are established in Article 6 of this Ordinance.

STORMWATER HOTSPOT - A land use or activity that generates higher concentrations of hydrocarbons, trace metals, or toxicants than are found in typical stormwater runoff.

STORMWATER MANAGEMENT FACILITIES - any structure, natural or man-made, 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 structures.

STORMWATER MANAGEMENT PLAN - the planned control of runoff to allow water falling on a given site to be absorbed or retained on site to the extent that after development the peak rate of discharge leaving the site is not greater than if the site had remained undeveloped; a plan showing all present and proposed grades and facilities for stormwater management and best management practices (BMPs).

STORMWATER MANAGEMENT SITE PLAN (SWM SITE PLAN) - the plan prepared by the Applicant or his representative indicating how stormwater runoff will be managed at the project site in accordance with this Ordinance.

STREAM - a watercourse with definite bed and banks, which confines and conveys perennially or intermittently flowing water.

STREAM ENCLOSURE - a bridge, culvert, or other structure in excess of one hundred (100) feet in length upstream to downstream which encloses a regulated water of this Commonwealth.

STREET - All land between ROW lines, whether public or private, and whether improved or unimproved, which is intended to accommodate vehicular traffic, including an avenue, drive, boulevard, highway road, freeway, parkway, lane, viaduct, or other vehicular way. The term shall not include the word "Driveway."

STREET GRADE - the officially established grade of the street upon which a lot fronts or in its absence the established grade of the other streets upon which the lot abuts, at the midpoint of the frontage of the lot thereon. If there is no officially established grade, the existing grade of the street at such midpoint shall be taken as the street grade.

STREET WIDTH - the shortest distance between the lines delineating the cartway for a street.

STRUCTURE - any manmade object having an ascertainable stationary location on or in land or water, whether or not affixed to the land.

SUBWATERSHED AREA (SUBAREA) - the smallest drainage unit of a watershed for which stormwater management criteria has been established in the Stormwater Management Plan.

SUBDIVIDER - the owner or authorized agent of the owner of a lot, tract or parcel of land to be subdivided for transfer, sale or development under the terms of this Chapter.

SUBDIVISION - the division or redivision of a lot, tract or parcel of land by any means into two (2) or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, partition by the court for distribution to heirs or devisees, transfer of ownership or building or lot development; provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten (10) acres, not involving any new street or easement of access or any residential dwelling, shall be exempted.

SUBSTANTIALLY COMPLETED - where in the judgment of the Township Engineer, at least ninety (90) percent (based on the cost of the required improvements for which financial security was posted pursuant to the requirements of this Chapter) of those improvements required as a condition for final approval have been completed in accordance with the approval plan, so that the project will be able to be used, occupied or operated for its intended use.

SURFACE DRAINAGE PLAN - a plan showing all present and proposed grades and facilities for stormwater drainage.

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

SURVEYOR, PROFESSIONAL LAND - an individual licensed and registered under the laws of this Commonwealth to engage in the practice of land surveying. A Professional Land Surveyor may perform engineering land surveys but may not practice any other branch of engineering.

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

TIMBER OPERATIONS - see "Forest Management".

TIME OF CONCENTRATION (T_c) - 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.

TOPOGRAPHICAL MAP - a map showing the elevations of the ground by contours or elevations.

TOPOGRAPHY - the configuration of a surface area showing relative elevations.

TOPSOIL - surface soils and subsurface soils which presumably are fertile soils and soil material, ordinarily rich in organic matter or humus debris. Topsoil is usually found in the uppermost soil layer called the "A" Horizon.

TOWNSHIP - the Township of Lower Paxton, Dauphin County, Pennsylvania, Board of Supervisors, its agents or authorized representatives.

TOWNSHIP STORMWATER MANAGEMENT PERMIT - written authorization from the Township to permit regulated activities as defined herein

UNDEVELOPED LAND - any lot, tract or parcel of land which has not been graded or in any other manner prepared for the construction of a building or other improvements and on which no development or building has occurred.

UNIT - a part of the property, structure or building designed or intended for any type of independent use, which has direct exit to a public street or way or to an easement or right-of-way leading to a public street or way, and includes a proportionate undivided interest in common elements, which are assigned to the property, structure or building.

USDA - The United States Department of Agriculture.

UTILITY, PUBLIC OR PRIVATE -

- A. Any agency which under public franchise or ownership, or under certificate of convenience and necessity, provides the public with electricity, gas, heat, steam, communication, rail transportation, water, sewage collection or other similar service, or
- B. A closely regulated private enterprise with a franchise for providing a public service.

VEGETATIVE COVER - such cover shall consist of trees, shrubs, flowers, grass or similar natural cover.

VERGE - an area adjacent to a roadway and located between the curb and sidewalk which is intended to be maintained in grass cover and used as a planting space for street trees.

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

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

WATERSHED - region or area drained by a river, watercourse, or other surface water of this watershed.

WATER POLLUTION - the addition of pollutants to water in concentrations or in sufficient quantities to result in measurable degradation of water quality.

WATER TABLE - the upper surface of groundwater or that level below which the soil is seasonally saturated with water.

WETLAND - An area of land and/or water meeting one or more definitions of a "wetland" under Federal and/or Pennsylvania law and/or regulations. (Note: Wetlands are generally delineated by a specialist based upon an on-site investigation of vegetation, soils and hydrologic conditions. Hydric soils, as mapped by the U.S. Natural Resource Conservation Service, provide an initial indicator of whether wetlands may be present.)

ARTICLE III - GENERAL REQUIREMENTS

§ 170-301. General Requirements

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- A. For all Regulated Activities, unless specifically exempted in §170-302:
1. Preparation and implementation of an approved SWM Site Plan is required.
 2. No Regulated Activities shall commence until the Township issues written approval of a SWM Site Plan, which demonstrates compliance with the requirements of this Ordinance.
 3. The SWM Site Plan shall demonstrate that adequate capacity will be provided to meet the Volume and Rate Control Requirements, as described under §170-303 and §170-304 of this Ordinance.
 4. The SWM Site Plan approved by the Township shall be on-site throughout the duration of the Regulated Activities.
- B. For all Regulated Earth Disturbance Activities, erosion and sediment control BMPs shall be designed, implemented, operated, and maintained during the Regulated Earth Disturbance Activities (e.g., during construction) to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code (including, but not limited to Chapter 102 Erosion and Sediment Control) and the Clean Streams Law. Various BMPs and their design standards are listed in the Erosion and Sediment Pollution Control Program Manual (E&S Manual), No. 363-2134-008 (April 15, 2000), as amended and updated.
- C. For all Regulated Activities, stormwater BMPs shall be designed, installed, implemented, operated, and maintained to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code and the Clean Streams Law, conform to the State Water Quality Requirements, meet all requirements under the Storm Water Management Act and any more stringent requirements as determined by the Township.
- D. The Township may, after consultation with PADEP and/or DCCD, approve measures for meeting the State Water Quality Requirements other than those in this Ordinance, provided that they meet the minimum requirements of, and do not conflict with, state law including, but not limited to, the Clean Streams Law.
- E. All Regulated Activities shall include, to the maximum extent practicable, measures to:
1. Protect health, safety, and property.
 2. Meet the water quality goals of this Ordinance by implementing measures to:
 - a. Minimize disturbance to floodplains, wetlands, natural slopes, existing native vegetation and woodlands.
 - b. Create, maintain, or extend riparian buffers and protect existing forested buffers.

- c. Provide trees and woodlands adjacent to impervious areas whenever feasible.
 - d. Minimize the creation of impervious surfaces and the degradation of Waters of the Commonwealth and promote groundwater recharge.
 - e. Protect natural systems and processes (drainageways, vegetation, soils, and sensitive areas) and maintain, as much as possible, the natural hydrologic regime.
 - f. Incorporate natural site elements (wetlands, stream corridors, mature forests) as design elements.
 - g. Avoid erosive flow conditions in natural flow pathways.
 - h. Minimize soil disturbance and soil compaction.
 - i. Minimize thermal impacts to Waters of the Commonwealth.
 - j. Disconnect impervious surfaces by directing runoff to pervious areas wherever possible and decentralize and manage stormwater at its source.
3. Applicants are encouraged to incorporate the techniques for Low Impact Development Practices described in the “Pennsylvania Stormwater Best Management Practices Manual (BMP Manual)” to reduce the costs of complying with the requirements of this Ordinance and the State Water Quality Requirements.
- F. Impervious Areas:
- 1. The measurement of impervious areas shall include all of the impervious areas in the total proposed development, even if development is to take place in stages.
 - 2. For development taking place in stages, the entire development plan must be used in determining conformance with this Ordinance.
 - 3. For projects that add impervious area to a developed parcel, the new impervious area is subject to the requirements of this Ordinance; and any existing impervious area that is within the new proposed limit of disturbance is also subject to the requirements of this Ordinance.
- G. 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.
- 1. Applicant must provide an executed easement for newly concentrated flow across adjacent properties.

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- H. 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.
 - I. Where watercourses traverse a development site, drainage easements (with a minimum width of 20 feet) 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. Also, maintenance, including mowing of vegetation within the easement may be required, except as approved by the appropriate governing authority.
 - J. 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 drainage ways shall be subject to approval by PADEP under regulations at 25 PA Code Chapter 105 through the Joint Permit Application process, or, where deemed appropriate by PADEP, through the General Permit process.
 - K. Any stormwater management facilities or any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures, etc.) that are regulated by this Ordinance, that will be located in or adjacent to Waters of the Commonwealth (including wetlands), shall be subject to approval by PADEP under regulations at 25 PA Code Chapter 105 through the Joint Permit Application process, or, where deemed appropriate by PADEP, 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 PADEP.
 - L. Should any stormwater management facility require a dam safety permit under PADEP Chapter 105, 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.
 - M. Any stormwater management facilities regulated by this Ordinance that will be located on, or discharged onto State highway rights-of-ways shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).
 - N. When stormwater management facilities are proposed within 1,000 feet of a downstream Township, the stormwater analysis shall be submitted to the downstream Municipal's engineer for review and comment.
 - O. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc., are encouraged, where soil conditions and geology permit, to reduce the size or eliminate the need for detention facilities.
 - P. Infiltration BMPs should be dispersed throughout the site, made as shallow as practicable, and located to maximize use of natural on-site infiltration features while still meeting the other requirements of this Ordinance.

- Q. The design of facilities over karst shall include an evaluation and implementation of measures to minimize adverse effects.
- R. Roof drains, foundation drains, sump pumps and other similar discharges 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 it is advantageous to do so. When it is more advantageous to connect directly to streets or storm sewers, then the Township may permit it on a case-by-case basis.
- S. Normally dry, open top, storage facilities should completely drain both the volume control and rate control capacities over a period of time not less than 24 and not more than 72 hours from the end of the design storm.
- T. The design storm volumes to be used in the analysis of peak rates of discharge should be obtained from the latest version of the Precipitation-Frequency Atlas of the United States, National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland NOAA's Atlas 14.
- U. Various BMPs and their design standards are listed in the current version of the PADEP BMP Manual, or sequel thereof.
- V. For proposed subdivisions, at the time of formal submission of the subdivision plan, the total subdivision shall be considered for the purposes of stormwater management based on the proposed use(s) of the lots. Deferral of addressing stormwater management requirements until improvement plans for each lot are submitted shall be prohibited.

§ 170-302. Exemptions/Modifications

- A. Under no circumstance shall the Applicant be exempt from implementing such measures as necessary to:
 - 1. Meet State Water Quality Standards and Requirements.
 - 2. Protect health, safety, and property.
 - 3. Meet special requirements for High Quality (HQ) and Exceptional Value (EV) watersheds.
- B. The Applicant must demonstrate that the following BMPs are being utilized to the maximum extent practicable to receive consideration for the exemptions:
 - 1. Design around and limit disturbance of Floodplains, Wetlands, Natural Slopes over 15%, existing native vegetation, and other sensitive and special value features.
 - 2. Maintain riparian and forested buffers.
 - 3. Limit grading and maintain non-erosive flow conditions in natural flow paths.

- 4. Maintain existing tree canopies near impervious areas.
- 5. Minimize soil disturbance and reclaim disturbed areas with topsoil and vegetation.
- 6. Direct runoff to pervious areas.

C. The Applicant must demonstrate that the proposed development/additional impervious area will not adversely impact the following:

- 1. Capacities of existing drainageways and storm sewer systems.
- 2. Velocities and erosion.
- 3. Quality of runoff if direct discharge is proposed.
- 4. Existing known problem areas.
- 5. Safe conveyance of the additional runoff.
- 6. Downstream property owners.

D. An Applicant proposing Regulated Activities, after demonstrating compliance with Sections 302.A, 302.B, and 302.C, may be exempted from various requirements of this Ordinance according to the following table:

New Impervious Area [Since the Date of Adoption of this Ordinance] (square footage)	Applicant Must Submit to the Township
0 - 80	---
81 - 1,000	Township Stormwater Management Application
1,000 - 5,000	Township Stormwater Management Application, Volume Controls, SWM Site Plan & Report and Record Drawings
> 5,000	Township Stormwater Management Application, Rate Controls, Volume Controls, SWM Site Plan & Report and Record Drawings

E. The purpose of this section is to ensure consistency of stormwater management planning between local ordinances and NPDES permitting (when required) and to ensure that the Applicant has a single and clear set of stormwater management standards to which the Applicant is subject. The Township may accept alternative stormwater management controls provided that:

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1. The Applicant, in consultation with the Township, PADEP and/or DCCD, states that meeting the requirements of the Volume Controls or Rate Controls of this Ordinance is not possible or creates an undue hardship.
 2. The alternative stormwater management controls, proposed by the Applicant, are documented to be acceptable to the Township, PADEP and/or DCCD for NPDES requirements pertaining to post construction stormwater management requirements.
 3. The alternative stormwater management controls are in compliance with all other sections of this Ordinance, including but not limited to sections 301.D, 302.A, 302.B and 302.C.
- F. Forest management and timber operations are exempt from Rate and Volume Control requirements and SWM Site Plan preparation requirement of this Ordinance provided the activities are performed according to the requirements of 25 PA Code Chapter 102. It should be noted that temporary roadways are not exempt.
- G. Agricultural activities are exempt from the requirements of this Ordinance provided the activities are performed according to the requirements of 25 PA Code Chapter 102.

Included in the same, a High Tunnel is exempt if:

- a. The High Tunnel or its flooring does not result in an impervious surface exceeding 25% of all structures located on the Landowner's total contiguous land area; and
 - b. The High Tunnel meets one of the following:
 - (1) The High Tunnel is located at least 100 feet from any perennial stream or watercourse, public road, or neighboring property line.
 - (2) The High Tunnel is located at least 35 feet from any perennial stream or watercourse, public road or neighboring property line and located on land with a slope not greater than 7%.
 - (3) The High Tunnel is supported with a buffer or diversion system that does not directly drain into a stream or other watercourse by managing stormwater runoff in a manner consistent with the requirements of Pennsylvania Act 167.
- H. Linear roadway improvement projects that create additional impervious area are not exempt from the requirements of this Ordinance. However, alternative stormwater management strategies may be applied at the joint approval of the Township and the Dauphin County Conservation District (if an NPDES permit is required) when site limitations (such as limited right-of-way) and constraints (as shown and provided by the Applicant), preclude the ability of the Applicant to meet the enforcement of the stormwater management standards in this Ordinance. All strategies must be consistent with PADEP's regulations, including NPDES requirements.
- I. The Township may, after an Applicant has demonstrated compliance with Sections 302.A, 302.B, and 302.C, grant a modification of the requirements of one or more

provisions of this Ordinance if the literal enforcement will exact undue hardship because of peculiar conditions pertaining to the land in question, provided that such modification will not be contrary to the public interest and that the purpose and intent of the Ordinance is observed.

1. All requests for a modification shall be in writing and shall state in full the grounds and facts of unreasonableness or hardship on which the request is based, the provision or provisions of the Ordinance involved, and the minimum modification necessary.

J. The Township may deny or revoke any exemption pursuant to this Section at any time for any project that the Township believes may pose a threat to public health and safety or the environment.

§ 170-303. Volume Controls

A. The Low Impact Development Practices provided in the BMP Manual and in Appendix B of this Ordinance shall be utilized for all Regulated Activities to the maximum extent practicable.

B. Stormwater runoff Volume Controls shall be implemented using the Design Storm Method or the Simplified Method. For Regulated Activities equal to or less than one (1) acre, this Ordinance establishes no preference for either method; therefore, the Applicant may select either method on the basis of economic considerations, the intrinsic limitations on applicability of the analytical procedures associated with each methodology, and other factors.

1. The Design Storm Method (CG-1 in the BMP Manual) is applicable to any sized Regulated Activity. This method requires detailed modeling based on site conditions.

a. Do not increase the post-development total runoff volume when compared to the pre-development total runoff volume for the 2-year/24-hour storm event.

b. For hydrologic modeling purposes:

i. Existing non-forested pervious areas must be considered meadow (good condition) for pre-development hydrologic calculations.

ii. Twenty (20) percent of existing impervious area, when present on the proposed project site, and contained within the new proposed limit of disturbance, shall be considered meadow (good condition) for pre-development hydrologic calculations for re-development.

iii. Gravel and crushed stone in the existing condition shall be considered pervious and proposed gravel and crushed stone shall be considered impervious for the purpose of stormwater

management calculations, unless determined otherwise upon consultation with the Township Engineer.

2. The Simplified Method (CG-2 in the BMP Manual) is independent of site conditions and should be used if the Design Storm Method is not followed. This method is not applicable to Regulated Activities greater than one (1) acre. For new impervious surfaces:
 - a. Stormwater control facilities shall capture at least the first two (2) inches of runoff from all new impervious surfaces.
 - b. At least the first one (1) inch of runoff from new impervious surfaces shall be permanently removed from the runoff flow, i.e. it shall not be released into surface Waters of the Commonwealth. Removal options include reuse, evaporation, transpiration, and infiltration.
 - c. Wherever possible, infiltration facilities shall be designed to accommodate infiltration of the entire permanently removed runoff; however, in all cases at least the first one-half (0.5) inch of the permanently removed runoff shall be infiltrated.
- C. All applicable worksheets from Chapter 8 of the BMP Manual must be used when establishing Volume Controls.
- D. Actual field infiltration tests at the location of the proposed elevation of the stormwater BMPs are required when 5,000 square feet or greater of new impervious surface is added. Infiltration test shall be conducted in accordance with BMP Manual. The Township shall be notified 24-hours prior to infiltration tests being conducted as to provide an opportunity for the Township to witness the tests.

ARTICLE IV - STORMWATER MANAGEMENT STANDARDS

§ 170-401. Stormwater Management District Rate Controls (Release Rates)

A. Watersheds

Lower Paxton Township is divided into three (3) watersheds, including Paxton Creek, Spring Creek, and Beaver Creek (all contained within the Dauphin County Act 167 Plan). The map indicating the watershed boundaries is available for inspection at the Township office. All areas within the districts are subject to the specified release rates. The one (1) year, two (2) year, ten (10) year, twenty-five (25) year and one hundred (100) year design storms are all subject to the specified release rates.

B. Stormwater Management Districts

1. If the Applicant can show that the post-development hydrograph matches the pre-development hydrograph for peak flows and volume, for all design storms, then meeting the requirements of the release rates are not required.

2. Specific Watershed Requirements:

- a. Paxton Creek Watershed: Specified Release Rate Districts. For all districts in this category, the future runoff must be controlled to the specified release rate. That is, the post-development runoff rate must be less than or equal to the pre-development rate multiplied by the specified release rate for that district.
 - b. Paxton Creek Watershed: Provisional No Detention Districts. These watershed areas may discharge post-development peak runoff without detention facilities. However, the Applicant must prove that the “local” runoff conveyance facilities which transport runoff from the site to the main channel have adequate capacity to safely transport unattenuated increased peak flows for a twenty- five (25) year storm in accordance with Section 170-114.C. If there is inadequate capacity, the Applicant shall either use one hundred (100) percent release rate control or provide increased capacity within the downstream drainage facilities to convey increased peak flows consistent with Section 170-114.C. When determining if adequate capacity exists in the local watershed drainage network, the Applicant must assume that the entire local watershed is developed per current zoning and that all new development will use the least restrictive runoff controls specified by this Article.
 - c. Spring Creek Watershed: Specified Release Rate Districts. For all districts in this category, the future runoff must be controlled to the specified release rate. That is, the post-development runoff rate must be less than or equal to the pre-development rate multiplied by the specified release rate for that district.
 - d. Beaver Creek Watershed: Specified Release Rate Districts. For all districts in this category, the future runoff must be controlled to the specified release rate. That is, the post-development runoff rate must be less than or equal to the pre-development rate multiplied by the specified release rate for that district.
 - e. Areas Not Within the Paxton, Spring, or Beaver Creek Watersheds: Standard Release Rate District. For all areas within the Township but outside of the Paxton, Spring, or Beaver Creek Watersheds, the future peak rate of runoff for one (1) year, two (2) year, five (5) year, ten (10) year, twenty-five (25) year, fifty (50) year, and one hundred (100) year design storms must be controlled equal to or less than the pre-development runoff rate for the respective storm frequencies.
3. The exact location of any given development site, or activity regulated by this Article relative to the release rate district boundaries shall be determined by mapping the release rate district boundaries using two (2) foot topographic contour mapping provided as part of the Drainage Plan.
 4. For a proposed development site located entirely within one (1) release rate district, the total runoff from the site shall meet the required release rate criteria.

5. For sites within one (1) release rate district and having multiple discharge points, any individual point may be designed to a one hundred (100) percent release rate provided that the total runoff from the site is controlled to the applicable release rate for that district and adequate downstream capacity exists for the unattenuated flow as prescribed herein.
6. For a proposed development site which is located within two (2) or more release rate districts, the maximum runoff discharged at any point shall be equal to the release rate for the district in which the discharge point is located. In the event that a portion of the site is located in a provisional no detention area, no runoff from portions of the site located in areas subject to release rate controls may be drained to or through the provisional no detention area.
7. Each development site shall be considered separately and shall conform to the criteria of the district in which it is located. In no case may the release rate for an area be exceeded as "credit" for a reduction below the criteria or any other restrictions on a separate site.
8. Regional detention facilities may be permitted provided that adequate conveyance is available or provided from the site to the facility. The acceptability and discharge characteristics of the facility will be determined on a case-by-case basis, by the Township Engineer, using the calibrated model developed for the Dauphin County Act 167 Plan.
9. In no case may a waiver be granted to exempt a proposed development from meeting the requirements of the release rate area in which the site is located, except as provided for in §170-302.

ARTICLE V - EROSION & SEDIMENTATION (E&S) STANDARDS

§ 170-501. Erosion and Sedimentation Requirements During Earth Disturbance Activities

- A. The applicant shall meet requirements as contained in 25 PA Code, Chapters 92 and 102 as required and applicable as follows:
 1. The implementation and maintenance of erosion and sediment control BMPs.
 2. Development of written plans.
 3. Submission of plans for approval.
 4. Obtaining Erosion and Sediment Control and NPDES permits.
 5. Maintaining plans and permits on site.
- B. Except for agricultural activities, any earth disturbance over 5,000 square feet of land area shall require the submission of an adequate erosion and sedimentation control plan to the County Conservation District for review and approval.

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- C. Evidence of any necessary plan or permit approval for Earth Disturbance activities from PADEP or the Dauphin County Conservation District must be provided to the Township.
 - D. A copy of the approved Erosion and Sediment Control Plan and any other permit, as required by PADEP or the Dauphin County Conservation District, shall be available at the project site at all times if required under Chapter 102.
 - E. Construction of temporary roadways (e.g., for utility construction, timber harvesting, etc.) shall comply with all applicable standards for erosion and sedimentation control and stream crossing regulations under 25 PA Code, Chapters 102 and 105. The Erosion and Sedimentation Control Plan shall be submitted to the Dauphin County Conservation District for approval and shall address the following, as applicable:
 - 1. Design of the roadway system, including haul roads, skid roads, landing areas, trails, and storage and staging areas.
 - 2. Runoff control structures (e.g., diversions, culverts, detention ponds, etc.).
 - 3. Stream crossings for both perennial and intermittent streams.
 - 4. Access to public roadways, including design of rock construction entrance for mud and debris control.
 - 5. A remediation plan for restoring the disturbed area through re-grading, topsoil placement, reseeding, and other stabilization techniques, as required.
 - F. Additional erosion and sedimentation control design standards and criteria that must be applied where infiltration BMPs are proposed include the following:
 - 1. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase, as to maintain their maximum infiltration capacity.
 - 2. Infiltration BMPs shall be protected from receiving sediment-laden runoff.
 - 3. The source of protection for infiltration BMPs shall be identified (i.e. orange construction fence surrounding the perimeter of the BMP).

§ 170-502. Design Criteria Statement for Stormwater Management and Drainage Facilities Stormwater Management District Implementation Provisions

- A. 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.

- B. "No Harm" Option. For any proposed development site, 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 existing conditions. The "no harm" option is used when an Applicant can prove that the post-development hydrographs can match pre-development hydrographs, or if it can be proven that the post-development conditions will not cause increases in peak flows at all points downstream. Proof of "no harm" would have to be shown based upon a "Downstream Impact Evaluation" which shall include a "Downstream Hydraulic Capacity Analysis" consistent with Section 170-502.C to determine if adequate hydraulic capacity exists. The Applicant shall submit this evaluation of the impacts due to increased downstream stormwater flows in the watershed to the Township.
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 stream flow, or any stream channel section established with the concurrence of the Township.
 2. Proof of "no harm" must be shown from the point of discharge through entire downstream network to the mouth of Paxton Creek or Spring Creek, as applicable, at the Susquehanna River, or from the mouth of Beaver Creek, as applicable, at the Swatara Creek. For those areas outside of the Paxton, Spring, or Beaver Creek Watersheds, proof of "no harm" must be shown through the entire downstream network to the ultimate discharge point at the Susquehanna River or Swatara Creek as applicable.
 3. The peak flow values to be used for downstream areas for the design return period storms (two (2) year, ten (10) year, and twenty-five (25) year) shall be the values from the calibrated model for the Dauphin County Act 167 Plan. These flow values can be obtained from their respective watershed plans.
 4. Applicant-proposed runoff controls which 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.
 5. A financial hardship 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 demonstrate that a less stringent discharge control would not create any harm downstream.
 7. Any available capacity in the downstream conveyance system as documented by an Applicant may be used by the Applicant only in proportion to his/her development site acreage relative to the total upstream undeveloped acreage from the identified capacity (i.e., if the Applicant's site is ten (10) percent of the upstream undeveloped acreage, he may use up to ten (10) percent of the documented downstream available capacity).

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8. The Township in approving a “no harm” option shall notify all downstream municipalities of such approval. The Township shall make all relevant information used to prove a “no harm” option available upon request to any Township within the Paxton, Spring, or Beaver Creek Watershed.
 9. Any "no harm" justifications shall be submitted by the Applicant as part of the Drainage Plan submission. The burden of proof shall rest on the Applicant.
- C. "Downstream Hydraulic Capacity Analysis" - Any downstream capacity hydraulic analysis conducted in accordance with this Article 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 twenty-five (25) 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 DEP Erosion and Sediment Pollution Control Program Manual.
- D. Regional Detention Alternatives - For certain areas within the watershed, 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 is 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 Dauphin County Act 167 Stormwater Management Plan.
- E. Capacity improvements may be provided as necessary to permit direct discharge in a provisional no detention district, to implement any regional or subregional detention alternatives, or to implement a “no harm” option which proposes specific capacity improvements to document the validity of less stringent discharge control which would not create any harm downstream.
- F. General Design Guidelines:
1. Stormwater shall not be transferred from one watershed to another, unless (1) the watersheds are sub-watersheds of a common watershed which join together within the perimeter of the property; (2) the effect of the transfer does not alter the peak rate discharge onto adjacent lands; or (3) easements from the affected landowner(s) are provided.
 2. Consideration shall be given to the relationship of the subject property to the drainage pattern of the watershed. A concentrated discharge of stormwater to an adjacent property shall be within an existing watercourse or confined in an easement or returned to a pre-development flow type condition.

3. Stormwater BMPs and recharge facilities are encouraged (e.g., rooftop storage, drywells, cisterns, recreation area ponding, diversion structures, porous pavements, holding tanks, infiltration systems, stream channel storage, in-line storage in storm sewers, and grading patterns). They shall be located, designed, and constructed in accordance with the latest technical guidance published by PADEP, provided they are accompanied by detailed engineering plans and performance capabilities and supporting site specific soils, geology, runoff and groundwater and infiltration rate data to verify proposed designs. Additional guidance from other sources may be accepted at the discretion of the Township Engineer (a pre-application meeting is suggested).
4. All existing and natural watercourses, channels, drainage systems and areas of surface water concentration shall be maintained in their existing condition unless an alteration is approved by the appropriate regulatory agency.
5. No outlet structure from a stormwater management facility, or swale, shall discharge directly onto a Municipal or State roadway.
6. The invert of all stormwater management facilities and underground infiltration/storage facilities shall be located a minimum of two (2) feet above the seasonal high groundwater table or other soil limiting zone. The invert of stormwater control facilities may be lowered if adequate sub-surface drainage, which does not alter the existing water table level, is provided.
7. Any stormwater management facility may be required to be fenced with a minimum four (4) foot high fence of material acceptable to the Township. Gates with a minimum opening of ten (10) feet shall be provided for access.
8. Stormwater management facilities excavated to carbonate rock must either be fitted with an impervious clay liner, or over-excavated four (4) feet and refilled with a suitable material mix. Suitable backfill material is subject to the approval of the Municipal Engineer.

G. Basin Landscaping

1. Landscaping proposed within basins and stormwater management facilities shall be consistent with the guidelines set forth in the PADEP BMP Manual or future variations thereof in effect at the time of filing the SWM Site Plan.
2. All areas of stormwater management basins, including basin floors, side slopes, berms, impoundment structures, or other earth structures, shall be planted with suitable vegetation, such as meadow plantings or grasses specifically suited for stormwater basins.
3. Trees and shrubs shall be planted around stormwater basins. However, trees and shrubs shall not be planted in locations that would interfere with the function of the basin, such as within 30 feet from the outlet/drain structure, emergency spillway or dam. A minimum average of two trees and 10 shrubs shall be required to be planted around the basin for every 100 linear feet of basin

perimeter. Such perimeter shall be measured at the elevation of the top of the berm. Such trees and shrubs shall be in addition to other Township requirements. Trees shall have an initial trunk diameter of two inches, measured six inches above the ground. Shrubs shall have an initial height of four feet. These plantings shall be located outside of any required easement areas.

4. Natural ground cover plant species shall be planted in the floors and slopes of the basin. These ground covers may include wildflowers, meadows or nonaggressive grasses. Species shall be chosen that are suitable for the expected wetness of various portions of the basin. The plantings shall provide a continuous cover over all earth areas of the basin. The plantings shall not interfere with the proper functioning of the basin, in the determination of the Township Engineer.
5. Lawn grass areas may be sodded or hydroseeded to minimize erosion during the establishment period. Once established, turfgrass areas on nonwet areas of the basin shall be maintained at a height of not more than six inches.
6. To the maximum extent feasible, stormwater basins shall be designed with slopes that blend with the surrounding topography. Areas intended to be mowed shall have a maximum slope of 3:1.

H. Topsoil and Seeding

1. All pond areas including bottoms, side slopes, and top of berms shall be provided with a minimum four (4) inches of topsoil and shall be seeded as prescribed on the approved SWM Site Plan.

I. Where uniform flow is anticipated, the Manning's 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 values as presented in Table C-3 - Appendix C of this Article. Manning's Equation should not be used for analysis of pipes under pressure flow or for analysis of culverts.

J. The Township has the authority to require that computed existing runoff rates be reconciled with field observations and conditions and site history. If the designer can substantiate, through actual physical calibration, that more appropriate runoff and time of concentration values should be utilized at a particular site, then appropriate variations may be made upon review and recommendation of the Township Engineer.

K. Principal outlet structures for stormwater management facilities shall be designed to meet the performance standards of this Article using any generally accepted hydraulic analysis technique or method.

L. At all points of concentrated flow discharge from a site, an adequate channel must be provided downstream of the point of discharge to accommodate the flows from the facility so as to prevent damage to adjacent properties. If an adequate channel does not exist, an adequate channel shall be constructed, or the point of discharge shall be piped to a point where an adequate channel exists. The approval and written consent of all

affected downstream property owners must also be provided in the form of an executed drainage easement.

- M. Stormwater Management Facilities (with a depth of water equal to or greater than 3 feet measured from the lowest point inside a facility to the crest of the emergency spillway):
1. Any stormwater management facility designed to store runoff and requiring a berm or earthen embankment, shall be designed to provide an emergency spillway to handle peak rate of stormwater runoff up to and including the 100-year post-development flow, with a blocked primary outlet structure. The height of embankment must be set as to provide a minimum one (1) foot of freeboard through the spillway, above the maximum water surface elevation, computed when the spillway functions for the 100-year post-development inflow, with a blocked outlet structure. The primary outflow structure must be designed to pass all design storms (up to and including the 100-year event) without discharging through the emergency spillway. The maximum water depth within any stormwater management facility shall be no greater than eight (8) feet when functioning through the primary outlet structure.
 2. Emergency spillways shall be armored to prevent erosion during the 100-year post-development flow, with blocked primary outlet structure. Synthetic liners or riprap may be used, and calculations sufficient to support proposed armor must be provided. An earthen plug must be used to accurately control the spillway invert if riprap is the proposed armoring material. Emergency spillway armor must extend up the sides of the spillway and continue at full width to a minimum of ten (10) feet past the toe of slope.
 3. A stormwater management facility berm cross sections must be at least five (5) feet wide at the top, and eight (8) feet wide through the emergency spillway. For fill embankments, the side slopes shall be no steeper than 3:1 on the inside of the facility and 3:1 on the outside of the facility. For cut slopes, the side slopes shall be no steeper than 2:1.
 4. A cutoff and key trench of impervious material shall be provided under all embankments four (4) feet or greater in height.
 5. Soils used for the construction of stormwater management facilities shall have low-erodibility factors ("K" factors) (refer to E&S Manual) and be identified on the SWM Site Plan.
 6. Trash racks must be provided to prevent clogging of primary outflow structure stages for all orifices equivalent to twelve (12) inches or smaller in diameter.
 7. Anti-seep collars must be provided on all outflow culverts in accordance with the methodology contained in the latest edition of the E&S Manual. An increase in seepage length of 15 percent must be used in accordance with the requirements for permanent anti-seep collars.

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8. Impervious low-flow channels are not permitted within stormwater management facilities to promote water quality and groundwater recharge for frequent storm events. Facilities designed as water quality / infiltration BMPs may have a bottom slope of zero. Minimal maintenance, saturation tolerant vegetation must be provided in basins designed as water quality / infiltration BMPs. Conventional, non-BMP stormwater management facilities must have a minimum slope of 1% extending radially out from the primary outlet structure. Water storage below the lowest outlet structure stage (i.e. dead storage) is permitted in stormwater management facilities designed as water quality / infiltration BMPs.
 9. Stormwater management facilities bottom elevations must be greater than adjacent floodplain elevations (FEMA or HEC-RAS analysis). If no floodplain is defined, bottom elevations must be higher than existing ground elevations fifty (50) feet from top of stream bank in the facilities vicinity.
 10. Basin outflow culverts discharging into floodplains must account for tailwater. Tailwater corresponding to the 100-year floodplain elevation may be used for all design storms, or the Applicant may elect to determine flood elevations of the adjacent watercourse for each design storm. The floodplain is assumed to be fifty (50) feet from top of stream bank in areas where a floodplain is not designated, or where no other evidence is provided.
 11. Exceptions to these requirements may be made at the discretion of the Township for BMPs that retain or detain water, but are of a much smaller scale than traditional stormwater management facilities.

N. Storm Sewer Facilities:

1. Storm sewers must be able to convey post-development runoff from a ten (10) year design storm without surcharging inlets where appropriate. When connecting to an existing storm sewer system, the Applicant must demonstrate that the proposed system will not exacerbate any existing stormwater problems and that adequate downstream capacity exists.
2. A minimum pipe size of fifteen (15) inches in diameter shall be used in all roadway systems (public or private) proposed for construction. Pipes shall be designed to provide a minimum velocity of two and one-half (2 1/2) feet per second when flowing full, but in all cases, the slope shall be no less than 0.5%. Arch pipe of equivalent cross-sectional area may be substituted in lieu of circular pipe where cover or utility conflict conditions exist.
3. In proposed curbed roadway sections, the maximum encroachment of water on the roadway pavement shall not exceed half of a through travel lane or one (1) inch less than the depth of curb during the ten (10) year design storm of five (5) minute duration. Gutter depth shall be verified by inlet capture/capacity calculations that account for road slope and opening area. The maximum distance between inlets in curbed roadway sections shall be no more than 600 feet, however access to underground pipes shall be provided every 300 feet.

4. Standard Type "C" inlets with 8" hoods shall be used along vertical concrete curbs roadway networks. Type "C" inlets with 10" hoods that provide a 2" sump condition may be used with approval of the Municipal Engineer when roadway longitudinal slopes are 1.0% or less.
5. For inlets containing a change in pipe size, the elevation for the crown of the pipes shall be the same or the smaller pipe's crown shall be at a higher elevation.
6. All inlets shall provide a minimum 2" drop between the lowest inlet pipe invert elevation and the outlet pipe invert elevation.
7. On curbed sections, a double inlet shall be placed at the low point of sag vertical curves, or an inlet shall be placed at the low point and on each side of the low point at a distance not to exceed 100 feet, or at an elevation not to exceed 0.2 feet above the low point.
8. At all roadway low points, swales and easements shall be provided behind the curb or swale and through adjacent properties to channelize and direct any overflow of stormwater runoff away from dwellings and structures.
9. Inlets shall be placed so drainage cannot cross intersections or street centerlines.
10. All inlets in paved areas shall have heavy duty bicycle safe grating consistent with PennDOT Publication 72M. A note to this effect shall be added to the SWM Site Plan or inlet details therein.
11. Inlets must be sized to accept the specified pipe sizes without corner penetrations. All pipes entering or exiting inlets shall be cut flush with the inlet wall. A note to this effect shall be added to the SWM Site Plan or inlet details therein.
12. Inlets shall have weep holes covered with geotextile fabric placed at appropriate elevations to completely drain the sub grade prior to placing the base and surface course on roadways.
13. Inlets, junction boxes, or manholes greater than five (5) feet in depth shall be equipped with ladder rungs and shall be detailed on the SWM Site Plan.
14. Inlets shall not have a sump condition in the bottom (unless designed as a water quality BMP). Pipes shall be flush with the bottom of the box or concrete channels shall be poured.
15. Inlets, manholes, pipes, and culverts shall be constructed in accordance with the specifications set forth in PennDOT's Publication 408, latest edition, and as detailed in the PennDOT's Publication 72M - Standards for Roadway Construction (RC), latest edition, or as approved by the Municipal Engineer. All material and construction details (inlets, manholes, pipe trenches, etc.), must be shown on the SWM Site Plan, and a note added that all construction must be

in accordance with PennDOT's Publication 408 and PennDOT's Publication 72M, latest edition. A note shall be added to the plan stating that all frames, concrete top units, and grade adjustment rings shall be set in a bed of full mortar according to Publication 408.

16. Accessible drainage structures shall be located on continuous storm sewer system at all vertical dislocations, at all locations where a transition in storm sewer pipe sizing is required, at all vertical and horizontal angle points exceeding five (5) degrees, and at all points of convergence of two (2) or more storm sewer pipes.
17. All storm drainage piping (equal to or greater than 12") discharging to the ground surface shall be provided with either reinforced concrete headwalls and end sections or plastic and metal pipe end sections compatible with the pipe size involved in accordance with PennDOT Publication 408 and Publication 72M.
18. Outlet protection shall be provided at all surface discharge points with storm drainage piping (equal to or greater than 12") in order to minimize erosion consistent with the E&S Manual.
19. Pavement base drain shall be provided at all low point in cut areas, toe of slope areas, and other areas as dictated by proven engineering principles and design judgment. All base drain shall be in accordance with PennDOT Publication 408.

O. Swale Conveyance Facilities:

1. Swales must be able to convey post-development runoff from a 10-year design storm with six (6) inches of freeboard to top of the swale.
2. Swales shall have side slopes no steeper than 3:1.
3. All swales shall be designed, labeled on the SWM Site Plan, and details provided to adequately construct and maintain the design dimension of the swales.
4. Swales shall be designed for stability using velocity or shear criteria. Velocity criteria may be used for channels with less than 10% slope. Shear criteria may be used for all swales. Documentation must be provided to support velocity and/or shear limitations used in calculations.
5. Where swale bends occur, the computed velocities or shear stresses shall be multiplied by the following factor for the purpose of designing swale erosion protection:
 - a. 1.75 - When swale bend is 30 to 60 degrees
 - b. 2.00 - When swale bend is 60 to 90 degrees
 - c. 2.50 - When swale bend is 90 degrees or greater

6. Swales must be designed for both temporary and permanent conditions in accordance with the latest E&S Manual.

P. Permeable/Porous/Pervious Pavement and Pavers

1. All permeable/porous/pervious pavement and pavers identified as a pervious surface as part of a Township Stormwater Management Permit application shall be designed in accordance with the PADEP BMP Manual and details for the construction of such facilities shall be shown on a SWM Site Plan along with O&M responsibilities and notes in accordance with Article 170-802. Note that this requirement supersedes any exemptions from Article 170-302.D.
2. The applicant shall be required to provide an O&M Agreement in accordance with Article 170-803 for all permeable/porous/pervious pavement and pavers identified as a pervious surface as part of a Township Stormwater Management Permit application. The O&M Agreement and SWM Site Plan shall be recorded according to Article 170-1203.

§ 170-503. **Calculation Methodology**

- A. All calculations shall be consistent with the guidelines set forth in the BMP Manual.
- B. Stormwater runoff from all development sites shall be calculated using either the Rational Method or a Soil Cover Complex methodology. Methods shall be selected by the Qualified Professional based on the individual limitations and suitability of each method for a particular site.
- C. Rainfall Values:
 1. Rational Method - The Pennsylvania Department of Transportation Drainage Manual, Intensity-Duration-Frequency Curves, Publication 584, Chapter 7A, latest edition, shall be used in conjunction with the appropriate time of concentration and return period.
 2. Soil Cover Complex Method - The Soil Conservation Service Type II, 24-hour rainfall distribution shall be used in conjunction with rainfall depths from NOAA Atlas 14..
- D. Peak Flow Rates:
 1. Rational Method - May be used for drainage areas up to 20 acres. Extreme caution should be used by the Qualified Professional if the watershed has more than one main drainage channel, if the watershed is divided so that hydrologic properties are significantly different in one verse the other, if the time of concentration exceeds 60 minutes, or if stormwater runoff volume is an important factor. The combination of Rational Method hydrographs based on timing shall be prohibited.

- a. The use of the Modified Rational Method to design stormwater management facilities must be approved by the Municipal Engineer.
2. Soil Cover Complex Method - May be used for drainage areas greater than 20 acres. This method is recommended for design of stormwater management facilities and where stormwater runoff volume must be taken into consideration.
3. For comparison of peak flow rates, flows shall be rounded to a tenth of a cubic foot per second (cfs).

E. Runoff Coefficients:

1. Rational Method - Use Table C-1 (Appendix C).
2. Soil Cover Complex Method - Use Table C-2 (Appendix C).
3. For the purposes of pre-development peak flow rate and volume determination, existing non-forested pervious areas conditions shall be considered as meadow (good condition).
4. For the purposes of pre-development peak flow rate and volume determination, twenty (20) percent of existing impervious area, when present on the project site, and contained within the new proposed limit of disturbance, shall be considered meadow (good condition) for pre-development hydrologic calculations for re-development.
5. Gravel and crushed stone in the existing condition shall be considered pervious and proposed gravel and crushed stone shall be considered impervious for the purpose of stormwater management calculations unless determined otherwise upon consultation with the Township Engineer.

F. Design Storm:

1. All drainage facilities (inlets, pipes, and swales) shall be designed to safely convey the 10-year storm.
2. All stormwater management facilities shall be verified by routing the proposed 1-year, 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year hydrographs through the facility using the storage indication (Modified Plus) method. The design storm hydrograph shall be computed using a calculation method that produces a full hydrograph.
3. The stormwater management and drainage system shall be designed to safely convey the post-development 100-year storm event to stormwater detention facilities, for the purpose of meeting peak rate control.
4. All structures (culvert or bridges) proposed to convey runoff under a Municipal Road shall be designed to pass the 50-year design storm with a minimum one (1) foot of freeboard measured below the lowest point along the top of the roadway.

5. All design within State or Federal right-of-ways or that falls under the design criteria of any higher authority must meet the requirements of that agency in addition to meeting the minimum requirements of this Ordinance.

G. Time of Concentration:

1. Time of concentration shall be computed using the NRCS Segmental Method as described in TR-55 (SCS 1986 or most current update). The length of sheet flow shall be limited to 100-feet. The Manning's "n" Roughness Coefficient for TR-55 sheet flow can be found in Table C-4 (Appendix C). Time of concentration for channel and pipe flow shall be computed using Manning's equation.
2. For sites with insignificant channelized flow and less than 20% imperviousness coverage, the time of concentration may be computed using the NRCS equation for lag time:

Time of Concentration = $T_c = [(T_{lag}/.6) * 60]$ (minutes)

$$T_{lag} = L^{0.8} \frac{(S+1)^{0.7}}{1900\sqrt{Y}}$$

Where:

T_{lag} = Lag time (hours)

L = Hydraulic length of watershed (feet)

Y = Average overland slope of watershed (percent)

S = Maximum retention in watershed as defined by: $S = [(1000/CN) - 10]$

CN = NRCS Curve Number for watershed as defined by the NRCS Loss Method

3. Additionally, the following provisions shall apply to calculations for time of concentration:
 - a. The post-development time of concentration shall never be greater than the pre-development time of concentration for any watershed or subwatershed.
 - b. The minimum time of concentration for any watershed shall be five (5) minutes.
 - c. The designer may choose to assume a five (5) minute time of concentration for any post-development watershed or subwatershed without providing any computations.
 - d. The designer must provide computations for all pre-development time of concentration paths. A five (5) minute time of concentration can not be assumed for pre-development.

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- e. Undetained fringe areas (areas that are not tributary to a stormwater facility but where a reasonable effort has been made to convey runoff from all new impervious coverage to best management practices) may be assumed to represent the pre-development conditions for purpose of time of concentration calculations.
 - H. Drainage areas tributary to sinkholes or closed depressions in areas underlain by limestone or carbonate geologic features shall be excluded from the modeled point of analysis defining pre-development flows. If left undisturbed during construction activities, areas draining to closed depressions may also be removed from peak runoff rates in the post-development analysis. New, additional contributing runoff shall not be directed to existing sinkholes or closed depressions.
 - I. Where uniform flow is anticipated, the Manning's equation shall be used for hydraulic computations and to determine the capacity of open channels, pipes, and storm sewers. The Manning's equation should not be used for analysis of pipes under pressure flow or for analysis of culverts. Manning's "n" values shall be obtained from Table C-3 (Appendix C). Inlet control shall be checked at all inlet boxes to ensure the headwater depth during the ten (10) year design event is contained below the top of grate for each inlet box.
 - J. The Township may approve the use of any generally accepted full hydrograph approximation technique that shall use a total runoff volume that is consistent with the volume from a method that produces a full hydrograph.
 - K. The Township has the authority to require that computed existing runoff rates be reconciled with field observations, conditions and site history. If the designer can substantiate, through actual physical calibration, that more appropriate runoff and time of concentration values should be utilized at a particular site, then appropriate variations may be made upon review and approval of the Township.

ARTICLE VI - SWM SITE PLAN & REPORT REQUIREMENTS

§ 170-601. General Requirements

For any of the activities regulated by this Ordinance and not eligible for the exemptions provided in Section 302, the 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 has received written approval of a SWM Site Plan from the Township.

§ 170-602. SWM Site Plan & Report Contents

The SWM Site Plan & SWM Site Report shall consist of all applicable calculations, maps, and plans. All SWM Site Plan materials shall be submitted to the Township in a format that is clear, concise, legible, neat and well organized; otherwise, the SWM Site Plan shall be rejected.

Appropriate sections from the Township Subdivision and Land Development Ordinance, and other applicable local ordinances, shall be followed in preparing the SWM Site Plan.

- A. SWM Site Plan shall include (but not limited to):
1. Plans no larger than 24-inch x 36-inch sheets and in a form that meets the requirements for recording in the Office of the Recorder of Deeds of Dauphin County.
 2. The name of the development; name and location address of the property site; name, address, and telephone number of the Applicant/Owner of the property; and name, address, telephone number, email address, and engineering seal of the individual preparing the SWM Site Plan.
 3. The date of submission and dates of all revisions.
 4. A graphical and written scale on all drawings and maps.
 5. A north arrow on all drawings and maps.
 6. A location map at a minimum scale of one (1) inch equals one thousand (1,000) feet.
 7. Metes and bounds description of the entire tract perimeter.
 8. Existing and final contours at intervals of two (2) feet.
 9. Existing water bodies within the project area including streams, lakes, ponds, field delineated wetlands or other bodies of water, sinkholes, flood hazard boundaries (FEMA delineated floodplains and floodways), areas of natural vegetation to be preserved, the total extent of the upstream area draining through the site, and overland drainage paths.
 10. The location of all existing and proposed utilities, on-lot wastewater facilities, water supply wells, sanitary sewers, and water lines on and within fifty (50) feet of property lines.
 11. A key map showing all existing man-made features beyond the property boundary that may be affected by the project.
 12. Soil names and boundaries with identification of the Hydraulic Soil Group classification.
 13. The proposed limit of disturbance line and associated proposed disturbed acres.
 14. Proposed structures, roads, paved areas, and buildings, including plans and profiles of roads and paved areas and floor elevations of buildings.
 15. Horizontal alignment, vertical profiles, and cross sections of all open channels, pipes, swales and other BMPs.

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16. The location and clear identification of the nature of permanent stormwater BMPs.
 17. The location of all erosion and sedimentation control facilities.
 18. A minimum twenty (20) foot wide access easement around all stormwater management facilities that would provide ingress to and egress from a public right-of-way. In lieu of providing an easement to the public right-of-way, a note may be added to the plan granting the Township or their designee's access to all easements via the nearest public right-of-way.
 19. Construction details for all drainage and stormwater BMPs.
 20. Construction details of any improvements made to sinkholes.
 21. Identification of short-term and long-term ownership, operations, and maintenance responsibilities, as well as an inspection schedule meeting or exceeding requirements within Section 901.C.
 22. Notes and Statements:
 - a. A statement, signed by the landowner, acknowledging that the stormwater BMPs are fixtures that cannot be altered or removed without prior approval by the Township.
 - b. A statement referencing the Operation and Maintenance (O&M) Agreement and stating that the O&M Agreement is part of the SWM Site Plan.
 - c. A note indicating that Record Drawings will be provided for all stormwater management facilities prior to occupancy, or the release of financial security.
 - d. A note indicating that storm sewers are to be flushed by the applicant prior to final inspection. Flushing shall be performed in a manner that protects downstream features from erosion and sedimentation.
 - e. The following information shall be included in tabular form on the plan in square feet and acres:
 - i. Existing impervious area (constructed prior to 2009)
 - ii. Existing impervious area (constructed after 2009)
 - iii. Proposed impervious area.
 - iv. If the proposed SWM Site Plan affects multiple lots, the information required in items i-iii shall be listed on a per lot basis.
 - v. Where BMPs are proposed on a SWM Site Plan, the amount of impervious area that each BMP was designed to manage shall be listed. This shall include separate amounts for the actual amount of impervious

surface proposed within the BMP's drainage area and any excess that may have been allowed for in the design.

- f. The following signature block for the Qualified Professional preparing the SWM Site Plan:

“I, _____, hereby certify that the Stormwater Management Plan meets all design standards and criteria of the Lower Paxton Township's Stormwater Management Ordinance.”

B. SWM Site Report shall include (but not limited to):

1. The name of the development; name and location address of the property site; name, address, and telephone number of the Applicant/Owner of the property; and name, address, telephone number, email address, and engineering seal of the individual preparing the SWM Site Report.
2. Project description narrative including expected project time schedule.
3. Location map showing the project site and its location relative to release rate districts.
4. Drainage area maps for all watersheds and inlets depicting the time of concentration paths.
5. A detailed description of the existing site conditions in accordance with the BMP Manual. A detailed site evaluation shall be completed for projects proposed in areas of carbonate geology or karst topography, and other environmentally sensitive areas such as brownfields.
6. Complete hydrologic, hydraulic and structural computations, calculations, assumptions, and criteria for the design of all stormwater BMPs.
7. Description of, justification, and actual field results for infiltration testing with respect to the type of test and test location for the design of infiltration BMPs.
8. Calculations showing the total drainage area and impervious area loading rates to each BMP.
9. The effect of the project (in terms of runoff volumes, water quality, and peak flows) on surrounding properties and aquatic features and on any existing municipal stormwater collection system that may receive runoff from the project site.
10. Description of the proposed changes to the land surface and vegetative cover including the type and amount of impervious area to be added.
11. All applicable worksheets from Chapter 8 of the BMP Manual when establishing volume controls.

12. Identification of short-term and long-term ownership, operation, and maintenance responsibilities as well as schedules and costs for inspection and maintenance activities for each permanent stormwater or drainage BMP, including provisions for permanent access or maintenance easements.

C. Supplemental information to be provided prior to recording of the SWM Site Plan, as applicable:

1. Signed and executed Operations and Maintenance Agreement (Appendix A).
2. Signed and executed easements, as required for all on-site and off-site work.
3. An Erosion and Sedimentation Control Plan & approval letter from the Dauphin County Conservation District.
4. A NPDES Permit.
5. Permits from PADEP and ACOE.
6. A Geologic Assessment.
7. A Wetland Delineation Report.
8. A Highway Occupancy Permit from PennDOT when utilization of a PennDOT storm drainage system is proposed or when proposed facilities would encroach onto a PennDOT right-of-way.

§ 170-603. SWM Site Plan & Report Submission

- A. The Applicant shall submit the SWM Site Plan & Report for the Regulated Activity.
- B. Copies of the SWM Site Plan & Report shall be submitted to the Township and may be distributed as follows:
 1. One (1) paper copy for the Township accompanied by the requisite Municipal Review Fee, as specified in this Ordinance
 2. One (1) digital copy for the Township and Township Engineer
- C. Additional copies shall be submitted as requested by the Township, Tri-County Regional Planning Commission, Dauphin County Conservation District or PADEP.

§ 170-604. SWM Site Plan & Report Review

- A. The Township shall require receipt of a complete SWM Site Plan & Report as specified in this Ordinance. The Township shall review the SWM Site Plan & Report for consistency with the purposes, requirements, and intent of this Ordinance.

- B. The Township shall not approve any SWM Site Plan & Report that is deficient in meeting the requirements of this Ordinance. At its sole discretion and in accordance with this Article, when a SWM Site Plan & Report is found to be deficient, the Township may disapprove the submission and require a resubmission, or in the case of minor deficiencies, the Township may accept submission of modifications.
- C. The Township shall notify the Applicant in writing within forty-five (45) calendar days whether the SWM Site Plan & Report is approved or disapproved if the SWM Site Plan & Report is not part of a Subdivision or Land Development Plan. If the SWM Site Plan & Report involves a Subdivision or Land Development Plan, the timing shall following the Subdivision and Land Development process according to the Municipalities Planning Code.
- D. If the Township disapproves the SWM Site Plan, the Township will state the reasons for the disapproval in writing. The Township also may approve the SWM Site Plan with conditions and, if so, shall provide the acceptable conditions for approval in writing.
- E. The Township Building Permit Office shall not issue a building permit for any Regulated Activity if the SWM Site Plan & Report has been found to be inconsistent with this Ordinance, as determined by the Township. All required permits from PADEP must be obtained prior to issuance of a building permit.

§ 170-605. Modification of Plans

A modification to a submitted SWM Site Plan & Report 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 SWM Site Plan as determined by the Township, shall require a resubmission of the modified SWM Site Plan in accordance with this Ordinance.

§ 170-606. Resubmission of Disapproved SWM Site Plan & Report

A disapproved SWM Site Plan & Report may be resubmitted with the revisions addressing the Township's concerns documented in writing, to the Township in accordance with this Ordinance. The applicable Township Review Fee must accompany a resubmission of a disapproved SWM Site Plan & Report.

§ 170-607. Authorization to Construct and Term of Validity

The Township's approval of a SWM Site Plan & Report authorizes the Regulated Activities contained in the SWM Site Plan for a maximum term of validity of five (5) years following the date of approval. The Township may specify a term of validity shorter than five (5) years in the approval for any specific SWM Site Plan. Terms of validity shall commence on the date the Township signs the approval for a SWM Site Plan. If stormwater management facilities included in the approved SWM Site Plan have not been constructed, or if a Record Drawing of these facilities has not been approved within this time, then the Township may consider the SWM Site Plan disapproved and may revoke any and all permits or approvals.

§ 170-608. **Record Drawings, As-Built Plans, Completion Certificate and Final Inspection**

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- A. The Applicant shall be responsible for providing Record Drawings of all stormwater BMPs included in the approved SWM Site Plan. The Record Drawings and an explanation of any discrepancies with the approved SWM Site Plan shall be submitted to the Township.
 - B. The Record Drawings shall include a certification of completion signed by a Qualified Professional verifying that all permanent stormwater BMPs have been constructed according to the approved SWM Site Plan & Report.
 - C. After receipt of the Record Drawings and certification of completion, the Township may conduct a final inspection.
 - D. In instances where discrepancies exist with the approved SWM Site Plan, the Applicant shall be responsible for providing As-Built Plans, meeting the requirements of the Township Subdivision and Land Development Ordinance, for all stormwater management and control facilities. The approved As-Built Plans shall be recorded with the office of the Dauphin County Recorder of Deeds to supersede any previous version of the Record Drawings.
 - E. In instances where no discrepancies exist with the approved SWM Site Plan, the approved SWM Site Plan shall be recorded with the office of the Dauphin County Recorder of Deeds to serve as the project Record Drawings.
 - F. An AutoCAD file (.dwg file) with properly georeferenced SWM Facilities must be provided with all As-Built Plans and Record Drawings.
 - G. All As-Built Plans and Record Drawings associated with non-residential SWM Site Plans shall include a topographic survey of the total impervious area associated with the project with a tabular breakdown of pre-existing and newly added impervious surface listed in square feet.
 - H. For all SWM Site Plans requiring a Financial Guarantee in accordance with Article 170-801, the financial guarantee shall include an equitable amount to ensure the timely delivery of acceptable As-Built Plans and Record Drawings to the Township. Such amount shall be held in force until evidence has been supplied to the Township that all requirements tied to As-Built Plans and Record Drawings have been satisfied.
 - I. The following information shall also be included for As-Built Plans and Record Drawings:
 - 1. Detention Basins (above ground and subsurface)
 - a. Information to verify the volume of the basin
 - b. Actual outlet structure details, including, but not limited to, type, size, and inverts of outlet pipes and orifices.
 - c. Actual elevation and width of the embankment and emergency spillway.

- d. Information to verify the stage/storage/discharge curve for the constructed conditions.
- e. The horizontal location of all above items.

ARTICLE VII - EASEMENTS

§ 170-701. Easements

- A. Easements shall be established to accommodate the existence of drainageways.
- B. Easements shall be established for all on-site stormwater management or drainage facilities, including but not limited to: detention facilities (above or below ground), infiltration facilities, all stormwater BMPs, drainage swales, and drainage facilities (inlets, manholes, pipes, etc.).
- C. Easements are required for all areas used for off-site stormwater control.
- D. All easements shall be a minimum of twenty (20) feet wide.
- E. Easements shall provide ingress to and egress from a public right-of-way. In lieu of providing an easement to the public right-of-way, a note may be added to the plan granting the Township or their designee's access to all easements via the nearest public right-of-way. Such Agreements shall set forth the scope and ability of the authorized representatives of the Township may enter at times to perform inspections to determine compliance with this ordinance.
- F. Where possible, easements shall be centered on side and/or rear lot lines.
- G. The following note shall be placed on the recorded plan, "Nothing shall be planted or placed within the easement which would adversely affect the function of the easement, or conflict with any conditions associated with such easement."
- H. A note shall be placed on the SWM Site Plan identifying the party responsible for assuring the continued functionality and required maintenance of any easement.

ARTICLE VIII - MAINTENANCE RESPONSIBILITIES

§ 170-801. Financial Guarantee

- A. The Applicant shall provide a Financial Guarantee to the Township for the timely installation and proper construction of all stormwater management facilities as required by the approved SWM Site Plan and this Ordinance, equal to 110% of the full construction cost of the required controls in accordance with the Municipalities Planning Code.

- B. At the completion of the project and as a prerequisite for the release of the Financial Guarantee, the Applicant shall:
1. Provide a certification of completion from an engineer, architect, surveyor or other qualified professional, verifying that all permanent stormwater management facilities have been constructed according to the SWM Site Plan & Report and approved revisions thereto.
 2. Provide a set of Record Drawings.
 3. Request a final inspection from the Township to certify compliance with this Ordinance, after receipt of the certification of completion and Record Drawings being provided to the Township. Provide Maintenance Phase Financial Security for dedicating stormwater management facilities, as applicable per Article 170-804 and ensure storm sewer flushing is completed.

§ 170-802. Maintenance Responsibilities

- A. The SWM Site Plan & Report for the project site shall describe the future operation and maintenance responsibilities. The operation and maintenance description shall identify the responsible party and outline required routine maintenance actions and schedules necessary to ensure proper operation of the stormwater control facilities.
- B. The SWM Site Plan & Report for the project site shall establish responsibilities for the continuing operation 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 Township or Authority, stormwater control facilities/BMPs may also be dedicated to and maintained by the Township or Authority.
 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/BMPs shall be the responsibility of the owner or private management entity such as a Homeowners' Association, as approved by the Township.
 - a. Unless and until the SWM facilities are accepted for dedication by the Township or Authority, such SWM facilities shall be the responsibility of the applicable Homeowners' Association, and the Homeowners' Association shall submit to the Township and Authority for approval an annual budget for the maintenance and operation of the same.
 3. Facilities, areas, or structures used as stormwater BMPs shall be enumerated as permanent real estate appurtenances and recorded as deed restrictions or easements that run with the land.

4. The SWM Site Plan & Operation and Maintenance (O&M) Agreement shall be recorded as a restrictive deed covenant that runs with the land.
 5. The Township may take enforcement actions against an Applicant for failure to satisfy any provision of this Ordinance.
- C. The Township, upon recommendation of the Township Engineer, shall make the final determination on the continuing maintenance responsibilities prior to final approval of the SWM Site Plan & Report. The Township may require a dedication of such facilities as part of the requirements for approval of the SWM Site Plan. Such a requirement is not an indication that the Township or Authority will accept the facilities. The Township or Authority reserves the right to accept or reject the ownership and operating responsibility for any portion of the stormwater management controls.
 - D. If the Township or Authority accepts ownership of stormwater BMPs, the Township or Authority may, at its discretion, require a fee from the Applicant to the Township or Authority to offset the future cost of inspections, operations, and maintenance.
 - E. It shall be unlawful to alter or remove any permanent stormwater BMP required by an approved SWM Site Plan, or to allow the property to remain in a condition, which does not conform to an approved SWM Site Plan, unless the Township grants an exception in writing.
 - F. In the instance where O&M responsibilities are not clearly defined on an approved SWM Site plan, those responsibilities shall default to: 1) Home Owner's Association (HOA) or similar organization if one of record exists for the community and maintains those responsibilities for other SWM facilities in the community; 2) the individual owner(s) of the property where the SWM facilities reside if no HOA exists.

§ 170-803. Maintenance Agreement for Privately Owned Stormwater Control Facilities

- A. Prior to final approval of the SWM Site Plan & Report, the Applicant shall sign the Operation and Maintenance (O&M) Agreement (Appendix A) covering all stormwater control facilities that are to be privately owned. The Operation and Maintenance (O&M) Agreement shall be recorded with the SWM Site Plan and made a part hereto.
 1. The owner, successor and assigns shall maintain all facilities in accordance with the approved maintenance schedule in the O&M Agreement.

The owner shall keep on file with the Township 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 Township within ten (10) working days of the change.
- B. Other items may be included in the Operation and Maintenance (O&M) Agreement where determined necessary to guarantee the satisfactory operation and maintenance of all BMP facilities. The Operation and Maintenance (O&M) Agreement shall be subject to the review and approval of the Township and the Municipal Solicitor.

- C. The owner is responsible for operation, inspection, and maintenance of the stormwater BMPs. If the owner fails to adhere to the Operation and Maintenance (O&M) Agreement, the Township may perform the services required and charge the owner appropriate fees plus a penalty of 10% of the same. Non-payment of fees may result in a lien against the property.

§ 170-804. Dedication of Stormwater Control Facilities for Public Use

- A. Applicant shall submit Deed of Dedication/Bill of Sale and two (2) sets of plats and legal descriptions for any storm sewers and appurtenances to be dedicated to the Authority, prior to approval of applicant's Drawings. At completion of work, these shall be used in the dedication process. See Authority Standard Specifications for the standard Deed of Dedication form and dedication procedures.
- B. Applicant shall submit Record Drawings as outlined later in Section 170-608.
- C. Applicant shall submit revised plats and legal descriptions, if needed, for dedication of easements both on and off the Applicant's property, as necessary.
- D. Applicant shall submit to the Authority a Guarantee Phase Financial Security (Maintenance Security):
1. The security shall be in the amount of 15 percent of the approved construction cost estimate.
 2. The security shall be in effect for 18 months from the date of executed deed of dedication.
 3. Thirty (30) days prior to expiration of the Maintenance Security, Applicant shall contact the Authority or the Authority's Engineer to perform an inspection of the facilities. Any deficiencies shall be corrected at the Applicant's expense prior to release of the Maintenance Security, irrespective of whether such take place before or after the expiration of the 18 month period. If Applicant refuses to correct deficiencies, the Maintenance Security will be used by the Authority to correct them.

§ 170-805. Additional Rules and Regulations

- A. The Township Authority is hereby authorized and empowered to promulgate additional rules and regulations as it deems necessary under this article, which additional rules and regulations, to the extent appropriate, shall be construed as part of this article.

ARTICLE IX - INSPECTIONS

§ 170-901. Schedule of Inspections

- A. PADEP or its designees normally ensure compliance with any permits issued, including those for stormwater management. In addition to PADEP compliance programs, the Township or their municipal assignee may inspect all phases of the installation of temporary or permanent stormwater management facilities.

- B. During any stage of Earth Disturbance Activities, if the Township determines that the temporary or permanent stormwater management facilities are not being installed in accordance with the approved SWM Site Plan, the Township shall revoke any existing permits or approvals until a revised SWM Site Plan is submitted and approved as specified in this Ordinance.

- C. The landowner or the owner's designee (including the Township or Authority for dedicated and owned facilities) shall inspect SWM BMPs, facilities and/or structures installed under this Ordinance according to the following frequencies at a minimum, to ensure the BMPs, facilities and/or structures continue to function as intended:
 - 1. Annually for the first 5 years.
 - 2. Once every 3 years thereafter.
 - 3. During or immediately after the cessation of a 10-year or greater storm.
 - 4. Inspections should be conducted during or immediately following precipitation events. A written inspection report shall be created to document each inspection. The inspection report shall contain the date and time of the inspection, the individual(s) who completed the inspection, the location of the BMP, facility or structure inspected, observations on performance, and the recommendations for improving performance, if applicable. Inspection reports may be requested to be submitted to the Municipality, and individuals shall submit the requested reports within fifteen (15) days of the issuance of the request.
 - 5. The Township may require copies of the inspection reports, in a form as stipulated by the Township.
 - 6. If such inspections are not conducted or inspection reports not submitted as scheduled, the Township, or their designee, may conduct such inspections and charge the owner appropriate fees. Non-payment of fees may result in a lien against the property.
 - a. Prior to conducting such inspections, the Township shall inform the owner of its intent to conduct such inspections. The owner shall be given thirty (30) days to conduct required inspections and submit the required inspection reports to the Township.
 - 7. A note shall be added to the SWM Site Plan referencing the requirements for owner performed inspections described above in Section 170-901.C.

§ 170-902. Right-of-Entry

- A. Upon presentation of proper credentials, duly authorized representatives of the Township may request to enter at reasonable times, upon any property within the Township, to inspect the implementation, condition, or operations and maintenance of the stormwater BMPs in regard to any aspect governed by this Ordinance. To the extent that a landowner refuses to grant such access, the Township may take all necessary actions to obtain lawful access or pursue enforcement per this Ordinance. Nothing herein shall be construed to limit any easement or right of entry provisions provided within easement between the landowner and the Township.

- B. Subject to subsection A above, Stormwater BMP owners and operators shall allow persons working on behalf of the Township ready access to all parts of the premises for the purposes of determining compliance with this Ordinance.
- C. Subject to subsection A above, persons working on behalf of the Township shall have the right to temporarily locate on any stormwater BMP in the Township such devices, as are necessary, to conduct monitoring and/or sampling of the discharges from such stormwater BMP.

ARTICLE X - ENFORCEMENT AND PENALTIES

§ 170-1001. Notification

- A. In the event that a person fails to comply with the requirements of this Ordinance, an approved SWM Site Plan, or fails to conform to the requirements of any permit or approval issued hereunder, the Township, through its designee, shall provide written notification, via certified mail, of the violation to the Landowner. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of the violation(s). In the event that the Landowner either refuses or fails to take delivery of the notice served by certified mail, the notice may be served by first class mail, postage pre-paid and/or posted on the property.
- B. Failure to comply within the time specified shall subject such person to the penalties provisions of this Ordinance. All such penalties shall be deemed cumulative and shall not prevent the Township from pursuing any and all other 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.

§ 170-1002. Enforcement

- A. The Township, through its designee, is hereby authorized and directed to enforce all of the provisions of this Ordinance. The approved SWM Site Plan shall be on file at the project site throughout the duration of the construction activity. The Township, through its designee, may make periodic inspections during construction.
- B. Adherence to Approved SWM Site Plan:
 1. It shall be unlawful for any person, firm, or corporation to undertake any Regulated Activity on any property except as provided for by an approved SWM Site Plan and pursuant to the requirements of this Ordinance. In addition, it shall be the responsibility of the landowner of the property on which the facilities subject to this Ordinance are located to comply with the applicable terms and conditions of this Ordinance.
 2. It shall be unlawful to alter or remove any control structure required by the SWM Site Plan pursuant to this Ordinance.

3. It shall be unlawful to allow a property to remain in a condition that does not conform to an approved SWM Site Plan.

§ 170-1003. Public Nuisance

- A. A 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.

§ 170-1004. Suspension and Revocation

- A. Any approval or permit issued by the Township may be suspended or revoked for:
 1. Non-compliance with or failure to implement any provision of the approved SWM Site Plan or Operation and Maintenance (O&M) Agreement.
 2. A violation of any provision of this Ordinance or any other applicable law, Ordinance, rule or regulation relating to the Regulated Activity.
 3. The creation of any condition or the commission of any act, during the Regulated Activity which constitutes or creates a hazard or nuisance, pollution, or which endangers the life or property of others.
- B. A suspended approval or permit may be reinstated by the Township when:
 1. The Township or their designee has inspected and approved the corrections to the violation(s) that caused the suspension.
 2. The Township is satisfied that the violation(s) has been corrected.
- C. An approval that has been revoked by Lower Paxton Township cannot be reinstated. The Applicant may apply for a new approval under the provisions of this Ordinance.
- D. If a violation causes no immediate danger to public life, public health, or property, at its sole discretion, the Township may provide a limited time period for the owner to correct the violation. In these cases, the Township will provide the owner, or the owner's designee, with a written notice of the violation and the time period allowed for the owner to correct the violation. If the owner does not correct the violation within the allowed time period, the Township may revoke or suspend any, or all, applicable approvals and permits pertaining to any provision of this Ordinance.

§ 170-1005. Penalties

- A. Any person violating or permitting the violation of the provisions of this Ordinance shall be subject to a fine of not more than one thousand (\$1,000) dollars for each violation, recoverable with costs. The establishment of a violation for purposes of setting fines or penalties for such violation shall be in accordance with a citation to a magisterial district judge with jurisdiction and venue over the location of the violation and such an action will be subject to the procedures provided for the enforcement of

summary offenses under the Pennsylvania Rules of Criminal Procedure. A separate offense shall arise for each day or portion thereof a violation is found to exist and may be determined for each section of this Ordinance which is found to have been violated.

- B. In addition, the Township, through its solicitor, may institute injunctive, mandamus, or any other appropriate action or proceeding at law or in equity for the enforcement of this 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. Such relief may include costs, fees and charges, including the Township's attorneys' fees (charged at the hourly rate approved by the Township), engineering fees, and costs, as may be permitted by law.

§ 170-1006. Appeals

- A. Any person aggrieved by any action of the Township, or its designee, relevant to the provisions of this Ordinance, may appeal to the Board of Supervisors within thirty (30) days of that action.
- B. Any person aggrieved by any decision of the Board of Supervisors, relevant to the provisions of this Ordinance, may appeal to the Dauphin County Court of Common Pleas with thirty (30) days of the decision of the Board of Supervisors.

ARTICLE XI - PROHIBITIONS

§ 170-1101. Prohibited Discharges and Connections

- A. Any drain (including indoor drains and sinks), or conveyance whether on the surface or underground, that allows any non-stormwater discharge including sewage, process wastewater, and wash water to enter the Township's separate storm sewer system or Waters of the Commonwealth is prohibited.
- B. Any drain or conveyance connected from a commercial or industrial land use to the Township separate storm sewer system, which has not been documented in plans, maps, or equivalent records, and approved by the Township is prohibited.
- C. No person shall allow, or cause to allow discharges into the Township's separate storm sewer system or into surface Waters of the Commonwealth, which are not composed entirely of stormwater, except: (1) as provided in subsection 1101.D below, and (2) discharges allowed under a state or federal permit.
- D. The following discharges are authorized unless they are determined to be significant contributors to pollution to a regulated small MS4 or to enter the Waters of the 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.
- E. In the event that the Township or PADEP determines that any of the discharges identified in subsection 1101.D, significantly contribute to pollution of Waters of the Commonwealth, or is so notified by PADEP, the Township will notify the responsible person(s) to cease the discharge.
- F. Upon notice provided by the Township or PADEP under subsection 1101.E, the discharger will have a reasonable time, as determined by the Township or PADEP, to cease the discharge, consistent with the degree of pollution caused by the discharge.
- G. Nothing in this Section shall affect a discharger's responsibilities under Commonwealth Law.

§ 170-1102. Roof Drains, Foundation Drains and Sump Pumps

- A. Roof drains, foundation drains, sump pumps and other similar discharges shall discharge to infiltration areas, vegetative BMPs, or pervious areas to the maximum extent physically feasible. Direct connections to stormsewer systems shall be avoided to the maximum extent possible.
- B. Any public or private issues related to discharges from roof drains, foundation drains, sump pumps, and similar discharges shall be subject to the requirements of this Article based on the date of the Township's discovery of the issue and not the date of construction of any of these features.

§ 170-1103. Alteration of BMPs

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

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

ARTICLE XII - FEES AND EXPENSES

§ 170-1201. General

The fee required by this Ordinance is the Township Review Fee. The Township Review Fee shall be established by resolution of the Board of Supervisors of Lower Paxton Township to defray review costs incurred by the Township and the Township Engineer. The Applicant shall pay all fees.

§ 170-1202. Expenses Covered by Fees

- A. The fees required by this Ordinance shall, at a minimum, cover:
1. Administrative and Clerical Costs.
 2. Review of the SWM Site Plan & Report by the Township.
 3. Pre-construction meetings.
 4. Inspection of stormwater management facilities/BMPs and drainage improvements during construction.
 5. Final inspection upon completion of the stormwater management facilities/BMPs and drainage improvements presented in the SWM Site Plan.
 6. Any additional work required to enforce any permit provisions regulated by this Ordinance, correct violations, and assure proper completion of stipulated remedial actions.

§ 170-1203. Recording of Approved SWM Site Plan and Related Agreements

- A. The owner of any land upon which permanent stormwater control facilities and BMPs will be placed, constructed, or implemented, as described in the SWM Site Plan, shall record the following documents in the Office of the Recorder of Deeds of Dauphin County, within (30) days of approval of the SWM Site Plan by the Township and shall produce a recording receipt to the Township prior to the issuance of a storm water management permit:
1. The SWM Site Plan.
 2. Operations and Maintenance (O&M) Agreement (Appendix A).
 3. Easements under Section 701.
- B. Lower Paxton Township may suspend or revoke any approvals granted for the project site upon discovery of the failure of the owner to comply with this Section.

**APPENDIX A - OPERATION AND MAINTENANCE (O&M) AGREEMENT
STORMWATER MANAGEMENT BEST MANAGEMENT PRACTICES (SWM BMPs)**

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

WITNESSETH

WHEREAS, the Landowner is the owner of certain real property as recorded by deed in the land records of Dauphin County, Pennsylvania, Deed Book _____ at Page _____, (hereinafter "Property").

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

WHEREAS, the SWM Site Plan approved by the Township (hereinafter referred to as the "Plan") for the property identified herein, which is attached hereto as Appendix A and made part hereof, as approved by the Township, provides for management of stormwater within the confines of the Property through the use of BMPs; and

WHEREAS, the Township, and the Landowner, his successors and assigns, agree that the health, safety, and welfare of the residents of the Township and the protection and maintenance of water quality require that on-site SWM BMPs be constructed and maintained on the Property; and

WHEREAS, the Township requires, through the implementation of the SWM Site Plan, that stormwater BMPs as required by said Plan and the Municipal Stormwater Management Ordinance be constructed and adequately operated and maintained by the Landowner, successors and assigns.

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

1. The Landowner shall construct the BMPs in accordance with the plans and specifications identified in the SWM Site Plan.
2. The Landowner shall operate and maintain the BMPs as shown on the Plan in good working order in accordance with the specific maintenance requirements noted on the approved SWM Site Plan.
3. The Landowner hereby grants permission to the Township, its authorized agents, and employees, to enter upon the property, at reasonable times and upon presentation of proper credentials, to inspect the BMPs whenever necessary. Whenever possible, the Township shall notify the Landowner prior to entering the property.
4. In the event the Landowner fails to operate and maintain the BMPs per paragraph 2, the Township or its representatives may enter upon the property and take whatever action is deemed necessary to maintain said BMPs. It is expressly understood and agreed that the Township is under no obligation to maintain, or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the Township. The Landowner may be subjected to the Penalties Section of the applicable Ordinance.

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- 5. In the event the Township, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner shall reimburse the Township for all expenses (direct and indirect) incurred within ten (10) days of receipt of invoice from the Township.
- 6. The intent and purpose of this Agreement is to ensure the proper maintenance of the onsite BMPs by the Landowner; provided, however, that this Agreement shall not be deemed to create or affect any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.
- 7. The Landowner, its executors, administrators, assigns, and other successors in interests, shall release the Township from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against said employees and representatives from the construction, presence, existence, or maintenance of the BMPs by the Landowner or Township.
- 8. The Township may inspect the BMPs whenever necessary to ensure their continued functioning.

For the Landowner:

ATTEST:

_____ (City, Borough, Township)

_____ (County, State)

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)

For the Township:

ATTEST:

_____ (City, Borough, Township)

_____ (County, State)

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

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

NOTARY PUBLIC (SEAL)

APPENDIX B - LOW IMPACT DEVELOPMENT PRACTICES

LOW IMPACT DEVELOPMENT PRACTICES ALTERNATIVE APPROACHES FOR MANAGING STORMWATER RUNOFF

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

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

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

- ◆ **Preserving Natural Drainage Features.** Protecting natural drainage features, particularly vegetated drainage swales and channels, is desirable because of their ability to infiltrate and attenuate flows and to filter pollutants. However, this objective is often not accomplished in land development. In fact, commonly held drainage philosophy encourages just the opposite pattern - streets and adjacent storm sewers typically are located in the natural headwater valleys and swales, thereby replacing natural drainage functions with a completely impervious system. As a result, runoff and pollutants generated from impervious surfaces flow directly into storm sewers with no opportunity for attenuation, infiltration, or filtration. Developments designed to fit site topography also minimize the amount of grading on site.
- ◆ **Protecting Natural Depression Storage Areas.** Depressional storage areas have no surface outlet or drain very slowly following a storm event. They can be commonly seen as ponded areas in farm fields during the wet season or after large runoff events. Traditional development practices eliminate these depressions by filling or draining, thereby obliterating their ability to reduce surface runoff volumes and trap pollutants. The volume and release-rate characteristics of depressions should be protected in the design of the development site. The depressions can be protected by simply avoiding the depression or by incorporating its storage as additional capacity in required detention facilities.

- ◆ **Avoiding Introduction of Impervious Areas.** Careful site planning should consider reducing impervious coverage to the maximum extent possible. Building footprints, sidewalks, driveways, and other features producing impervious surfaces should be evaluated to minimize impacts on runoff.
- ◆ **Reducing the Hydraulic Connectivity of Impervious Surfaces.** Impervious surfaces are significantly less of a problem if they are not directly connected to an impervious conveyance system (such as storm sewer). Two basic ways to reduce hydraulic connectivity are: routing of roof runoff over lawns; and reducing the use of storm sewers. Site grading should promote increasing travel time of stormwater runoff and should help reduce concentration of runoff to a single point in the development.
- ◆ **Routing Roof Runoff Over Lawns.** Roof runoff can be easily routed over lawns in most site designs. The practice discourages direct connections of downspouts to storm sewers or parking lots. The practice also discourages sloping driveways and parking lots to the street. The routing of roof drains and crowning the driveway to allow runoff to discharge to pervious areas is desirable as the pervious area essentially acts as a filter strip.
- ◆ **Reducing the Use of Storm Sewers.** By reducing the use of storm sewers for draining streets, parking lots, and backyards, the potential for accelerating runoff from the development can be greatly reduced. The practice requires greater use of swales and may not be practical for some development sites, especially if there are concerns for areas that do not drain in a “reasonable” time. The practice requires educating local citizens and public works officials, who expect runoff to disappear shortly after a rainfall event.
- ◆ **Reducing Street Widths.** Street widths can be reduced by either eliminating on-street parking or by reducing cartway widths. Municipal planners and traffic designers should encourage narrower neighborhood streets, which ultimately could lower maintenance and maintenance related costs.
- ◆ **Limiting Sidewalks to One Side of the Street.** A sidewalk on one side of the street may suffice in low-traffic neighborhoods. The lost sidewalk could be replaced with bicycle/recreational trails that follow back-of-lot lines. Where appropriate, backyard trails should be constructed using pervious materials.
- ◆ **Using Permeable Paving Materials.** These materials include permeable interlocking concrete paving blocks or porous bituminous concrete. Such materials should be considered as alternatives to conventional pavement surfaces, especially for low use surfaces such as driveways, overflow parking lots, and emergency access roads.
- ◆ **Reducing Building Setbacks.** Reducing building setbacks reduces driveway and entry walks and is most readily accomplished along low-traffic streets where traffic noise is not a problem.

- ◆ **Constructing Cluster Developments.** Cluster developments can also reduce the amount of impervious area for a given number of lots. The biggest savings is in street length, which also will reduce costs of the development. Cluster development “clusters” the construction activity onto less-sensitive areas without substantially affecting the gross density of development.

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

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APPENDIX C - STORMWATER MANAGEMENT DESIGN CRITERIA**TABLE C-1 - RATIONAL METHOD RUNOFF COEFFICIENTS**
Hydrologic Soil Group and Slope Range

Land Use	A			B			C			D		
	0 to 2%	2 to 6%	6+%	0 to 2%	2 to 6%	6+%	0 to 2%	2 to 6%	6+%	0 to 2%	2 to 6%	6+%
Cultivated Land	0.08 ^a	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
	0.14 ^b	0.18	0.22	0.16	0.21	0.28	0.20	0.25	0.34	0.24	0.29	0.41
Pasture	0.12	0.20	0.30	0.18	0.28	0.37	0.24	0.34	0.44	0.30	0.40	0.50
	0.15	0.25	0.37	0.23	0.34	0.45	0.30	0.42	0.52	0.37	0.50	0.62
Meadow	0.10	0.16	0.25	0.14	0.22	0.30	0.20	0.28	0.36	0.24	0.30	0.40
	0.14	0.22	0.30	0.20	0.28	0.37	0.26	0.35	0.44	0.30	0.40	0.50
Forest	0.05	0.08	0.11	0.08	0.11	0.14	0.10	0.13	0.16	0.12	0.16	0.20
	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25
Residential 1/8 acre	0.25	0.28	0.31	0.27	0.30	0.35	0.30	0.33	0.38	0.33	0.36	0.42
	0.33	0.37	0.40	0.35	0.39	0.44	0.38	0.42	0.49	0.41	0.45	0.54
Residential 1/4 acre	0.22	0.26	0.29	0.24	0.29	0.33	0.27	0.31	0.36	0.30	0.34	0.40
	0.30	0.34	0.37	0.33	0.37	0.42	0.36	0.40	0.47	0.38	0.42	0.52
Residential 1/3 acre	0.19	0.23	0.26	0.22	0.26	0.30	0.25	0.29	0.34	0.28	0.32	0.39
	0.28	0.32	0.35	0.30	0.35	0.39	0.33	0.38	0.45	0.36	0.40	0.50
Residential 1/2 acre	0.16	0.20	0.24	0.19	0.23	0.28	0.22	0.27	0.32	0.26	0.30	0.37
	0.25	0.29	0.32	0.28	0.32	0.36	0.31	0.35	0.42	0.34	0.38	0.48
Residential 1 acre	0.14	0.19	0.22	0.17	0.21	0.26	0.20	0.25	0.31	0.24	0.29	0.35
	0.22	0.26	0.29	0.24	0.28	0.34	0.28	0.32	0.40	0.31	0.35	0.46
Industrial	0.67	0.68	0.68	0.68	0.68	0.69	0.68	0.69	0.69	0.69	0.69	0.70
	0.85	0.85	0.86	0.85	0.86	0.86	0.86	0.86	0.87	0.86	0.86	0.88
Commercial	0.71	0.71	0.72	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.90	0.89	0.89	0.90
Streets	0.70	0.71	0.72	0.71	0.72	0.74	0.72	0.73	0.76	0.73	0.75	0.78
	0.76	0.77	0.79	0.80	0.82	0.84	0.84	0.85	0.89	0.89	0.91	0.95
Open Space	0.05	0.10	0.14	0.08	0.13	0.19	0.12	0.17	0.24	0.16	0.21	0.28
	0.11	0.16	0.20	0.14	0.19	0.26	0.18	0.23	0.32	0.22	0.27	0.39
Parking	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97

NOTES:

^a Runoff coefficients for storm recurrence intervals less than 25 years.^b Runoff coefficients for storm recurrence intervals of 25 years or more.

Source: Rawls, W.J., S.L. Long, and R.H. McCuen, 1981. Comparison of Urban Flood Frequency Procedures. Preliminary Draft Report prepared for the Soil Conservation Service, Beltsville, Maryland.

TABLE C-2 - RUNOFF CURVE NUMBERS (FROM NRCS (SCS) TR-55)

Runoff Curve Numbers for Urban Areas					
Cover Description		Curve Numbers for Hydrologic Soil Groups			
Cover Type and Hydrologic Condition	Average Percent Impervious Area	A	B	C	D
Fully Developed Urban Areas (Vegetation Established)					
Open Space (lawns, parks, golf courses, etc):					
Poor Condition (grass cover < 50%)		68	79	86	89
Fair Condition (grass cover 50% to 75%)		49	69	79	84
Good Condition (grass cover > 75%)		39	61	74	80
Impervious Areas:					
Paved Parking Lots, Roofs, Driveways, etc.		98	98	98	98
Streets and Roads:					
Paved: Curbed and Storm Sewers		98	98	98	98
Paved: Open Ditches		83	89	92	93
Gravel		76	85	89	91
Dirt		72	82	87	89
Urban Districts:					
Commercial and Business	85%	89	92	94	95
Industrial	72%	81	88	91	93
Residential Districts by Average Lot Size:					
1/8 Acres or less	65%	77	85	90	92
1/4 Acre	38%	61	75	83	87
1/3 Acre	30%	57	72	81	86
1/2 Acre	25%	54	70	80	85
1 Acre	20%	51	68	79	84
2 Acres	12%	46	65	77	82

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Runoff Curve Numbers for Cultivated Agricultural Lands						
Cover Description			Curve Numbers for Hydrologic Soil Groups			
Cover Type	Treatment	Hydrologic Condition	A	B	C	D
Fallow	Bare Soil	--	77	86	91	94
	Crop Residue Cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row Crops	Straight Row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & Terraced (C & T)	Poor	66	74	80	82
		Good	62	71	78	81
	C & T + CR	Poor	65	73	79	81
		Good	61	70	77	80
Small Grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C & T	Poor	61	72	79	82
		Good	59	70	78	81
	C & T + CR	Poor	60	71	78	81
		Good	58	69	77	80
Close Seeded or Broadcast Legumes Or Rotation Meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C & T	Poor	63	73	80	83
		Good	51	67	76	80

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Runoff Curve Numbers for Other Agricultural Lands					
Cover Description		Curve Numbers for Hydrologic Soil Groups			
Cover Type	Hydrologic Condition	A	B	C	D
Pasture, Grassland, or Range - Continuous Forage for Grazing	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow - Continuous Grass, Protected from Grazing and Generally Mowed for Hay	--	30	58	71	78
Brush - Brush, Weed, Grass Mixture with brush the major element	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	30	48	65	73
Woods - Grass Combination (orchard or tree farm)	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	30	55	70	77
Farmsteads - Buildings, Lanes, Driveways and Surrounding Lots.	--	59	74	82	86

TABLE C-3 - MANNING'S EQUATION "n" ROUGHNESS COEFFICIENTS

Description	Manning's "n"
Smooth-Wall Plastic Pipe	0.011
Concrete Pipe	0.012
Smooth-Lined Corrugated Metal Pipe	0.012
Corrugated Plastic Pipe	0.024
Annular Corrugated Steel And Aluminum Alloy Pipe (Plain or Polymer Coated)	
68 mm × 13 mm (2 2/3 in × 1/2 in) Corrugations	0.024
75 mm × 25 mm (3 in × 1 in) Corrugations	0.027
125 mm × 25 mm (5 in × 1 in) Corrugations	0.025
150 mm × 50 mm (6 in × 2 in) Corrugations	0.033
Helically Corrugated Steel And Aluminum Alloy Pipe (Plain or Polymer Coated)	
75 mm × 25 mm (3 in × 1 in), 125 mm × 25 mm (5 in × 1 in), or 150 mm × 50 mm (6 in × 2 in) Corrugations	0.024
Helically Corrugated Steel And Aluminum Alloy Pipe (Plain or Polymer Coated)	
68 mm × 13 mm (2 2/3 in × 1/2 in) Corrugations	
a. Lower Coefficients*	
450 mm (18 in) Diameter	0.014
600 mm (24 in) Diameter	0.016
900 mm (36 in) Diameter	0.019
1200 mm (48 in) Diameter	0.020
1500 mm (60 in) Diameter or larger	0.021
b. Higher Coefficients**	0.024
Annular or Helically Corrugated Steel or Aluminum Alloy Pipe Arches or Other Non- Circular Metal Conduit (Plain or Polymer Coated)	0.024
Vitrified Clay Pipe	0.012
Ductile Iron Pipe	0.013
Asphalt Pavement	0.015
Concrete Pavement	0.014
Grass Medians	0.050
Grass - Residential	0.030
Earth	0.020
Gravel	0.030
Rock	0.035
Cultivated Areas	0.030 - 0.050
Dense Brush	0.070 - 0.140
Heavy Timber (Little undergrowth)	0.100 - 0.150
Heavy Timber (with underbrush)	0.40
Streams:	
Some Grass And Weeds (Little or no brush)	0.030 - 0.035
Dense Growth of Weeds	0.035 - 0.050
Some Weeds (Heavy brush on banks)	0.050 - 0.070

Notes:

- * Use the lower coefficient if any one of the following conditions apply:
 - a. A storm pipe longer than 20 diameters, which directly or indirectly connects to an inlet or manhole, located in swales adjacent to shoulders in cut areas, shoulders in cut areas or depressed medians.
 - b. A storm pipe which is specially designed to perform under pressure.
- ** Use the higher coefficient if any one of the following conditions apply:
 - a. A storm pipe which directly or indirectly connects to an inlet or manhole located in highway pavement sections or adjacent to curb or concrete median barrier.
 - b. A storm pipe which is shorter than 20 diameters long.
 - c. A storm pipe which is partly lined helically corrugated metal pipe.

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TABLE C-4 - MANNING'S EQUATION "n" ROUGHNESS COEFFICIENTS FOR TR-55 TIME OF CONCENTRATION CALCULATIONS (SHEET FLOW)

Surface Description	Manning's "n" ¹
Smooth Surfaces (Concrete, Asphalt, Gravel, or Bare Soil)	0.011
Fallow (No Residue)	0.050
Cultivated Soils:	
Residue Cover (less than or equal to 20%)	0.060
Residue Cover (greater than 20%)	0.170
Grass:	
Short Grass Prairie	0.150
Dense Grasses ²	0.240
Bermudagrass	0.410
Range (Natural)	0.130
Woods: ³	
Light Underbrush	0.400
Dense Underbrush	0.800

Notes:

1. The "n" values are a composite of information compiled by Engman (1986).
2. Includes species such as weeping lovegrass, bluegrass, buffalo grass, blue grama grass, and native grass mixtures.
3. When selecting "n", consider cover to a height of about 0.1 feet. This is the only part of the plant cover that will obstruct sheet flow.

DULY ORDAINED, ENACTED AND ADOPTED BY THE BOARD OF SUPERVISORS OF LOWER PAXTON TOWNSHIP THIS 3rd DAY OF SEPTEMBER, 2024.

LOWER PAXTON TOWNSHIP
BOARD OF SUPERVISORS

By: Robin Lindsey
Robin Lindsey, Chair

Attest:

Chris Judd
Chris Judd, Secretary

[SEAL]

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