TOWNSHIP OF UPPER SAUCON
LEHIGH COUNTY, PENNSYLVANIA
ORDINANCE NO. 108-C

UPPER SAUCON TOWNSHIP ACT 167 STORMWATER MANAGEMENT ORDINANCE OF 2024

SECTION 1: STATEMENT OF LEGISLATIVE FINDINGS

WHEREAS, the Township of Upper Saucon (hereinafter, "Township") is a township of the second class organized and existing under and pursuant to the laws and regulations of the Commonwealth of Pennsylvania, as a political subdivision of the Commonwealth of Pennsylvania and County of Lehigh governed by a five-member Board of Supervisors (hereinafter, "Supervisors"); and

WHEREAS, the Supervisors are authorized by Pennsylvania's Second Class Township Code, *as amended*, 53 P.S. § 65101 *et seq*., and Storm Water Management Act, Act 167 of Oct. 4, 1978, P.L. 864, *as amended*, 32 P.S. § 680.1, to adopt regulations for the management of storm water runoff within the Township; and

WHEREAS, the Supervisors have previously exercised the authority granted by the Second Class Township Code and Storm Water Management Act to adopt regulations relating to storm water management by adopting Township Ordinances 108, 108-A, and 108-B; and

WHEREAS, the Supervisors have determined that it is in the best interest of the Township and its residents to update and amend the Township's regulations relating to storm water runoff within the Township; and

WHEREAS, attached hereto as **Exhibit A** and made a material part hereof is a copy of the Township's new, substantive regulations governing storm water runoff within the Township which shall be known and cited as the "Upper Saucon Township Act 167 Stormwater Management Ordinance of 2024;" and

WHEREAS, the purpose of this Ordinance is to adopt the substantive regulations contained in **Exhibit A** attached hereto and made a material part hereof as the official regulations of the Township pertaining to the management of storm water runoff within the Township.

NOW, THEREFORE, BE IT HEREBY ORDAINED AND ENACTED by the Board of Supervisors of Upper Saucon Township, Lehigh County, Pennsylvania, as follows.

SECTION 2: ORDINANCE TEXT

The document attached hereto as **Exhibit A** (and incorporated herein by reference and made a material part hereof), including any and all appendices and attachments thereto, is hereby adopted in full as the Township's comprehensive storm water management ordinance and shall be

known and cited as the "Upper Saucon Township Act 167 Stormwater Management Ordinance of 2024."

SECTION 3: SAVINGS CLAUSE

To the extent that any word, phrase, portion, or provision of the text hereof is found by any court of competent jurisdiction to be invalid or void on constitutional or other grounds, such word, phrase, portion, or provision shall, if possible, be deemed to be repealed and those remaining valid portions of the text shall remain in full force and effect if the same can be accomplished without the structure of the Ordinance having been destroyed by elimination of that word, phrase, portion, or provision found to be invalid or void.

SECTION 4: REPEALER

Unless otherwise specifically stated in this Ordinance, all ordinances, resolutions, regulations, and policies that predate this Ordinance and are in conflict with the provisions of this Ordinance are hereby repealed to the extent of such conflict. Notwithstanding the foregoing, Ordinances 108, 108-A, and 108-B shall remain in full force and effect; but only to the extent that they may apply to a pending land development plan, permit application, or other activity.

SECTION 5: EFFECTIVE DATE

This Ordinance shall become effective five (5) days after enactment by the Board of Supervisors of the Township of Upper Saucon.

[SIGNATURE PAGE FOLLOWS]

(Signature Page to Ordinance No. 108-C)

DULY ENACTED AND ORDAINED, this 10th day of June, 2024, by the Board of Supervisors of the Township of Upper Saucon, Lehigh County, Pennsylvania, in lawful session duly assembled.

ATTEST:

Township Manager

TOWNSHIP OF UPPER SAUCON
BOARD OF SUPERVISORS

Chairman

Vice Chairman

Supervisor

Supervisor

Supervisor

Attachment:
Exhibit A – Upper Saucon Township Act 167 Stormwater Management Ordinance of 2024

EXHIBIT A
(See attached)

ARTICLE 1 - GENERAL PROVISIONS

SECTION 101. SHORT TITLE

This Ordinance shall be known and may be cited as the "Upper Saucon Township Act 167 Stormwater Management Ordinance of 2024."

SECTION 102. STATEMENT OF FINDINGS

The Upper Saucon Township Board of Supervisors finds that:

(A) Inadequate management of accelerated Runoff of Stormwater resulting from development throughout a Watershed increases Runoff volumes, flows, and velocities, contributes to Erosion and sedimentation, changes the natural hydraulic patterns, overtaxes the carrying capacity of Streams and Storm Sewers, destroys aquatic habitat, elevates aquatic pollution concentrations and loadings, greatly increases the cost of public facilities to carry and control Stormwater, undermines flood plain management and flood control efforts in 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 development and activities causing Accelerated Erosion and loss of natural infiltration, is fundamental to the public health, safety, and welfare and the protection of all of the people in the Commonwealth, their resources, and the environment.

(C) Stormwater is an important water resource that provides Groundwater Recharge for water supplies and supports the 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) 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.

(F) Federal and state regulations require the Township to implement a program of Stormwater controls. Under certain circumstances, the Township is required to

obtain a permit for Stormwater discharges from their Separate Storm Sewer Systems under the National Pollutant Discharge Elimination System (NPDES) program.

(G) Non-Stormwater discharge to municipal Separate Storm Sewer Systems can contribute to pollution of Waters of the Commonwealth by the Township and/or its residents.

(H) Clear delineations are necessary with respect to the requirements for ownership and maintenance responsibilities for permanent Stormwater Management Facilities/BMPs.

SECTION 103. PURPOSE

The purpose of this Ordinance is to promote public health, safety, and welfare within the Township and the Saucon Creek Watershed by minimizing the harms and maximizing the benefits described in Section 102 of this Ordinance through provisions designed to:

(A) Meet legal water quality requirements under state law, including regulations at 25 Pa. Code 93 to protect, maintain, reclaim, and restore the existing and designated uses of the waters of this Commonwealth;

(B) Utilize and preserve natural drainage systems;

(C) Manage Stormwater Runoff close to the source, reduce Runoff volumes and mimic predevelopment hydrology;

(D) Provide procedures and performance standards for Stormwater planning and management.

(E) Maintain Groundwater Recharge to prevent degradation of surface and groundwater quality and to otherwise protect water resources;

(F) Prevent scour and Erosion of Stream banks and Stream beds;

(G) Provide proper operation and maintenance of all Stormwater Management Facilities that are implemented within the Township;

(H) Provide standards to meet NPDES permit requirements;

(I) Maintain the existing flows and quality of Streams and Watercourses in the Township and the Commonwealth; and

(J) Preserve and restore the flood carrying capacity of Streams.

SECTION 104. STATUTORY AUTHORITY

The Township is empowered to regulate land use activities that affect Runoff by the authority of Act of July 31, 1968, P.L. 805, No. 247 known as The Pennsylvania Municipalities Planning Code, as amended, 53 P.S. § 10101 *et seq.* ("MPC"), Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. § 680.1 *et seq.*, as amended, known as The Stormwater Management Act, and the Second Class Township Code, as amended, 53 P.S. § 65101 *et seq.*

SECTION 105. APPLICABILITY

(A) All Regulated Activities and all other activities that may affect Stormwater Runoff in the Township, including Land Development and Earth Disturbance Activity, are subject to regulation by this Ordinance. Where a Regulated Activity extends beyond the borders of the Township and discharge of Stormwater Runoff enters the Township, this Ordinance shall apply.

(B) Regulated Activities, as defined by this Ordinance, include but are not limited to the following:

(1) Land Development;

(2) Subdivision;

(3) Construction of new or additional Impervious Surfaces or semipervious surfaces (driveways, parking lots, etc.);

(4) Construction of new buildings or additions to existing buildings;

(5) Diversion or piping of any natural or man-made Stream channel;

(6) Installation of BMPs, other Stormwater Management Facilities, and with respect to all, appurtenances thereto; and

(7) Regulated Earth Disturbance Activities.

(C) This Ordinance shall apply only to permanent Stormwater Management Facilities designed, constructed, operated, and maintained as part of any of the Regulated Activities listed above. Stormwater management and Erosion and sedimentation controls provided during construction involved with any of the Regulated Activities are specifically not regulated by this Ordinance but shall continue to be regulated under existing laws and ordinances.

SECTION 106. EXEMPTIONS

(A) Any proposed Regulated Activity which would create ten thousand (10,000) square feet or less of additional Impervious Cover is exempt from the SWM Site Plan (as defined herein) preparation provisions of this Ordinance.

(1) The date of the Township adoption of the original Saucon Creek Act 167 Stormwater Management Ordinance (October 26, 1993), and the date of the adoption of this Ordinance for the Little Lehigh Creek, Tohickon Creek, and Cooks Creek/Delaware River North Act 167 Stormwater Management Watersheds shall be the starting point from which to consider tracts as "parent tracts" in which future Subdivision and respective Impervious Area computations shall be cumulatively considered.

(i) For development taking place in stages, the entire development plan must be used in determining conformance with this Ordinance.

(ii) Impervious Cover shall include, but not be limited to, additional indoor living spaces, patios, garages, storage sheds and similar structures, any roof, parking, or driveway areas and any new streets and sidewalks constructed as part of or for the proposed Regulated Activity.

(iii) Areas existing as gravel or crushed stone that serve as load bearing surfaces, hard packed soil, etc. shall be deemed Impervious for the purpose of comparison to the exemption criteria.

(iv) Porous paving systems may be considered Pervious at the discretion of the Township depending upon the type of system utilized, the type of use proposed, and the submission by an Applicant of documentation demonstrating to the satisfaction of the Township an ability to properly and actually maintain the same in a porous condition.

(2) Any and all Impervious Cover added incrementally to a site above the initial ten thousand (10,000) square feet shall be subject to the provisions of this Ordinance.

(3) If a site has previously received an exemption and additional development is proposed such that the total Impervious Cover on the site exceeds ten (10,000) square feet, the total Impervious Cover constructed on the site since October 26, 1993, must meet the provisions of this Ordinance.

(B) Any Regulated Activity for which a SWM Site Plan was previously prepared as part of a Subdivision or Land Development proposal that received preliminary plan approval from the Township prior to the effective date of this Ordinance is exempt from the SWM Site Plan preparation provisions of this Ordinance, except as cited in Subsection 106(E); provided that the approved SWM Site Plan included design of Stormwater Management Facilities to control Runoff from the site currently proposed for Regulated Activities consistent with the ordinance provisions in effect at the time of approval and the approval has not lapsed under the Municipalities Planning Code.

If significant revisions are made to the SWM Site Plan after both the preliminary plan approval and the effective date of this Ordinance, preparation of a new SWM Site Plan, subject to the provisions of this Ordinance, shall be required. Significant revisions include a change in control methods or techniques, relocation or redesign of control measures, changes necessary because soil or other conditions are not as stated on the original SWM Site Plan; and other changes deemed material by the Township.

(C) Agricultural Activity is exempt from the SWM Site Plan preparation requirements of this Ordinance provided the activities are performed in accordance with the requirements of 25 Pa. Code Chapter 102.

(D) Forest management and timber operations are exempt from the SWM Site Plan preparation requirements of this Ordinance provided that the activities are performed in accordance with the requirements of 25 Pa. Code Chapter 102.

(E) Exemptions from any provisions of this Ordinance shall not relieve the Applicant from the requirements of Subsections 301(F)-(J).

(F) The Township may deny or revoke any exemption pursuant to this Section 106 at any time for any project that it believes may pose a threat to public health and safety or the environment.

SECTION 107. SEVERABILITY

If a court of competent jurisdiction declares any Section or provision of this Ordinance invalid, such decision shall not affect the validity of any of the remaining provisions of this Ordinance.

SECTION 108. COMPATIBILITY WITH OTHER LEGAL REQUIREMENTS

(A) Approvals issued and actions taken under this Ordinance do not relieve the Applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable law, regulation, ordinance, or code.

(B) To the extent that this Ordinance or another ordinance imposes more rigorous or stringent requirements, the more rigorous or stringent requirements shall control.

(C) Nothing in this Ordinance shall be construed to affect any other Stormwater regulations or requirements that do not conflict with the requirements of this Ordinance.

(D) If a requirement of this Ordinance conflicts with a regulation or other requirement of a governmental agency having jurisdiction, then the regulation or requirement of that governmental agency shall prevail to the extent of such conflict.

SECTION 109. ERRONEOUS PERMIT

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

SECTION 110. WAIVERS

(A) Except as otherwise set forth in this Section 110, the Township may approve a waiver of a requirement of this Ordinance for the one or more of the following reasons:

(1) Enforcement will enact undue hardship because of peculiar conditions pertaining to the land in question; provided that the grant of such waiver will not be contrary to the public interest and will preserve the purposes of this Ordinance;

(2) There exists an alternative standard or approach which will provide equal or better achievement of the purposes of this Ordinance; or

(3) A requirement of this Ordinance is in direct conflict with applicable federal or State law or PADEP regulations.

(B) With respect to Subsection 110(A)(1), above, cost, or financial burden shall not be considered a hardship.

(C) The request for a waiver shall be submitted to the Township in writing and shall accompany the submission of the SWM Site Plan. The Applicant shall set forth in

the request the specific Sections and, as applicable, the specific Subsections from which each waiver is sought and with reference to Subsections (A)(1), (A)(2), and/or (A)(3), above, the specific reasons supporting the request. In all instances, the Applicant shall propose an alternate standard or approach. A failure to comply with the requirements of this Subsection (C) may result in the rejection and return, or denial, of the request in whole or in part.

(D) Upon receipt of a fully completed waiver request the Township shall forward the same to the Township Engineer for review. Upon completion of review, the Township Engineer may issue a determination or forward a recommendation to the Township Zoning Officer for issuance of a determination.

(1) For waiver requests falling within the scope of MPC Subsection 909.1(a), Sub-Subsections 909.1(a)(3), 909.1(a)(4), and 909.1(a)(9), unless otherwise agreed by the Developer in writing, either the Township Engineer or the Zoning Officer shall within 60 days issue a written determination approving, conditionally approving, or denying each waiver request. Any Person affected by the determination may file an appeal to the Township Zoning Hearing Board in accordance with the requirements of the MPC and the Township Zoning Ordinance.

(2) For waiver requests falling within the scope of MPC Sub-Subsection 909.1(b)(6) and involving an application for Land Development under MPC Articles V and VII, unless otherwise agreed by the Developer in writing, either the Township Engineer or the Zoning Officer shall issue a written determination approving, conditionally approving, or denying each waiver request prior to issuance of an official recommendation by the Township Planning Commission on the Developer's Land Development plan. Any Person affected by the determination may file an appeal to the Township Board of Supervisors. Appeals to, and adjudications by, the Board of Supervisors shall be governed by the Local Agency Law, *as amended* and as codified at 2 Pa.C.S.A. §§ 551-555, 751-754, and related procedures adopted by the Township.

(E) No waiver shall be approved from the water quality provisions of this Ordinance. No waiver of any regulated Stormwater activity involving earth disturbance greater than or equal to one acre may be approved unless that action is approved in advance by the PADEP or the LCCD.

SECTION 111. DUTY OF PERSONS ENGAGED IN THE DEVELOPMENT OF LAND

(A) Notwithstanding any provision of this Ordinance, including exemption and waiver provisions, any Owner and/or any Person engaged in the alteration or development of land which may affect Stormwater Runoff characteristics shall

implement such measures as are necessary to prevent injury to health, safety, or other property. Such measures shall include such actions as are required to manage the rate, volume, direction, and quality of resulting Stormwater Runoff in a manner which otherwise protects health and property from injury and damage.

(B) Township review and approval of the SWM Site Plan or the subsequent observation and approval of Stormwater Management Facilities, shall not constitute Land Development on behalf of or by the Township or otherwise cause it to be engaged in the alteration or development of land. By submitting an application under this Ordinance, the Applicant hereby agrees to indemnify, defend, and hold harmless the Township and all its agents, servants, employees, officials and consultants, including without limitation the Township Solicitor and Engineer of and from any and all claims, demands, causes of action or suite which arise out of or relate to the review, approval, construction or observation of the Applicant's SWM Site Plan, ILGP, BMPs, and Stormwater Management Facilities.

SECTION 112. PULIC RECORDS AND WAIVER OF COPYRIGHT

(A) By making a submission under this Ordinance, the Applicant acknowledges and agrees that all documents and other information submitted to the Township pursuant hereto constitute public records within the meaning of the Pennsylvania Right to Know Law, Act 3 of 2008, as amended, and are subject to review and inspection upon request in accordance with that Law.

(B) To the extent that any documents or materials constitute public records but are subject to copyright protection pursuant to applicable law, the Applicant and all of its agents, employees and consultants by filing such documents with the Township pursuant to this Ordinance, shall be deemed to have waived all copyright protection and damages related hereto. This waiver of copyright protection shall relate only to the reproduction and use of such documents in connection with the review, analysis, or approval of a plan and the use of the information contained within such documents for the purpose of review and analysis of the impact of the plan to other property.

(C) By making a submission under this Ordinance, the Applicant hereby agrees to indemnify, defend, and hold harmless the Township and all its agents, servants, employees, elected and appointed officials and consultants, including without limitation the Township Solicitor and Engineer of and from any and all claims, damages, suites or causes of actions arising out of violations or allegations of violations of copyright law.

SECTION 113. UNSWORN FALSIFICATION TO AUTHORITIES

All statements to the Township, whether written or oral, made in connection with any submission pursuant to this Ordinance shall be true and correct to the best of the knowledge, information and belief of the Applicant or its agents and consultants, and with the understanding that any false statement is subject to the penalties of 18 Pa. C.S.A. § 4904, relating to "Unsworn Falsification to Authorities".

ARTICLE 2 - DEFINITIONS

SECTION 201. INTERPRETATION

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 word "may" is permissive;

(D) Words or phrases not herein defined shall be defined using definitions in other Township Ordinances addressing the same subject or matter;

(E) Defined words and phrases are capitalized throughout this Ordinance as an aid to interpretation, however the absence of capitalization shall not negate application of the definition unless the context clearly indicates otherwise;

(F) Undefined words or phrases shall be given their ordinary definition as the same appear in the Merriam-Webster, Revised edition (October 25, 2022); and

(G) The captions and Section headings used in this Ordinance are inserted for convenience only and are not intended to be part of the Ordinance. Such captions and Section headings shall not affect nor be utilized in the construction or interpretation of this Ordinance.

SECTION 202. DEFINITIONS

The following words and phrases when used in this Ordinance shall have the meanings given to them in this Section 202 unless the context clearly indicates otherwise:

Accelerated Erosion: The removal of the surface of the land through the combined action of human activities and natural processes, at a rate greater than would occur because of the natural process alone.

Agricultural Activity: Activities associated with agriculture such as agricultural cultivation, agricultural operation, and animal heavy use areas. This includes the work of producing crops including tillage, land clearing, plowing, disking, harrowing, planting, harvesting crops or pasturing and raising of livestock (not including a CAFO) and installation of conservation measures. Construction of new buildings or Impervious Area is not considered Agricultural Activity.

Applicant: An Owner, Developer, or other Person, as hereinafter defined, including the Applicant's heirs, successors, transferees, and assigns, who has filed an application under any Township ordinance proposing to undertake a Regulated Activity.

Best Management Practice ("**BMP**"): Those activities, facilities, designs, measures, or procedures identified in the BMP Manual and used to manage Stormwater impacts from Regulated Activities, to meet State Water Quality Requirements, to promote Groundwater Recharge, and to otherwise meet the purposes of this Ordinance. BMPs are a type of Stormwater Management Facility. BMPs are commonly grouped into one of two broad categories or measures including "structural" or "non-structural." Non-structural BMPs or measures refer to operational and/or behavior-related practices that attempt to minimize the contact of pollutants with Stormwater Runoff. Structural BMPs or measures are those that consist of a physical device or practice that is installed to capture and treat Stormwater Runoff. Structural BMPs include, but are not limited to, a wide variety of practices and devices, ranging from large-scale retention ponds and Constructed Wetlands to small-scale underground treatment systems, infiltration facilities, Vegetated Buffers, low impact design, Bioretention, wet ponds, permeable paving, grassed Swales, riparian or forested buffers, sand filters, Detention Basins, and manufactured devices. Structural BMPs are permanent appurtenances to the land.

Best Management Practice Operation and Maintenance Plan ("**BMP O&M Plan**"): Documentation, included as part of a SWM Site Plan which details among other things the proposed BMPs and Stormwater Management Facilities, their designs, their method of operation and maintenance, and all responsible Persons.

BMP Manual: The Pennsylvania Department of Environmental Protection, Bureau of Watershed Management, Pennsylvania Stormwater Best Management Practices Manual, latest edition.

Bioretention: Densely vegetated, depressed features that store Stormwater and filter it through vegetation, mulch, planting soil, and other media, wherein Stormwater is evapotranspirated, infiltrated, or discharged. Optimal Bioretention areas mimic natural forest ecosystems in terms of species diversity, density, distribution, use of native plants, etc.

Capture/Reuse: The use of stormwater management techniques such as Cisterns and rain barrels which direct runoff into surface or sub-surface storage devices for re-use, such as for irrigation of gardens and other planted areas.

Closed Depression: A topographically low area or basin of various size and shape with no positive external drainage and with an unbroken ground surface.

Commonwealth: The Commonwealth of Pennsylvania, including its departments and agencies.

Concentrated Drainage Discharge: Stormwater Runoff leaving a property via a Point Source.

Constructed Wetlands: Constructed Wetlands are similar to wet ponds (see below) and consist of a basin which provides for necessary Stormwater storage as well as a permanent pool or water level, planted with Wetland vegetation. To be successful, Constructed Wetlands must have adequate natural hydrology (both Runoff inputs as well as soils and water table which allow for maintenance of a permanent pool of water). In such cases, the permanent pool must be designed carefully, usually with shallow edge benches, so that water levels are appropriate to support carefully selected Wetland vegetation.

Culvert: A pipe, conduit or similar structure including appurtenant works which carries surface water.

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

Design Storm: The magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g., a 5-year storm) and duration (e.g., 24 hours) used in the design and evaluation of Stormwater Management Facilities. Also see Return Period.

Detention Basin: A basin designed to retard Stormwater Runoff by temporarily storing the Runoff and releasing it at a predetermined rate.

Developer: An individual, corporation, partnership, association, limited liability company, Person, or other legal entity, or any responsible Person therein or agent thereof, that undertakes any Regulated Activity under this Ordinance.

Diffused Drainage: See "Sheet Flow."

Direct Recharge BMP: A BMP which directs Runoff to an underground infiltration surface such that nearly all Runoff becomes recharged to ground water, such as infiltration trenches, seepage beds, and drywells.

Disturbed Area: An unstabilized land area where an Earth Disturbance Activity is occurring or has occurred.

Drainage Easement: An interest in land, the purpose of which is to manage Stormwater.

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.

Erosion: The natural process by which the surface of the land is worn away by water, wind, or chemical action.

Erosion and Sediment Control Plan: A plan which is designed to minimize Accelerated Erosion and sedimentation.

Evapotranspiration: A BMP which provides opportunity for Runoff evaporation and transpiration by vegetation such as Bioretention, irrigation, and surface infiltration basins.

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

FEMA: The Federal Emergency Management Agency.

Fill: Man-made deposits of natural soils or rock products and waste materials.

Floodplain: Any land area susceptible to inundation by water from any natural source or delineated by applicable FEMA maps and studies as being a special flood hazard area. Floodplain also includes areas that comprise Group 13 Soils, as listed in Appendix A of

the PADEP Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by PADEP).

Freeboard: The incremental depth in a Stormwater Management Facility, provided as a safety factor of design, above that required to convey the design Runoff event.

Green Infrastructure ("GI"): Systems and practices that use or mimic natural processes to infiltrate, evapotranspire, or reuse Stormwater on the site where it is generated.

Groundwater Recharge: The replenishment of existing natural underground flow systems or aquifers.

Hot Spot Land Uses: A land use or activity that generates higher concentrations of hydrocarbons, trace metals, or other toxic substances than typically found in Stormwater Runoff. Such land uses are listed in Appendix E.

Impervious/Impervious Surface/Impervious Areas/Impervious Cover: A surface not readily penetrated by water under normal pressure associated with rainfall or other typical conditions associated with the proposed use.

Individual Lot Grading Plan ("ILGP"): A form of SWM Site Plan as defined in the Upper Saucon Township Zoning Ordinance of 2009, as amended.

Infiltration Practice: A practice designed to direct Runoff into the ground, which may include french drains, Seepage Pits, Seepage Trenches, Bioretention areas, Vegetated Swales, and similar BMPs.

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

Land Development: As defined by the Municipalities Planning Code, Act of July 31, 1968, P.L. 805 No. 247, as amended, 53 P.S. § 10101 *et seq.* ("MPC").

LCCD: The Lehigh County Conservation District.

Low Impact Development ("LID"): Site design approaches and small-scale Stormwater Management Facilities 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 Channel: Any Stream segment, channel, or other conveyance used as a Reach in the Saucon Creek hydrologic model.

Manning Equation: 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 (a/k/a "Manning Formula"). "Open channels" may include closed conduits so long as the flow is not under pressure.

MPC: The Pennsylvania Municipalities Planning Code, as amended.

NPDES: The National Pollutant Discharge Elimination System.

NRCS: The Natural Resource Conservation Service – U.S. Department of Agriculture, formerly the Soil Conservation Service.

Owner: Unless the context clearly indicates otherwise, as used herein, the term "Owner" shall mean the Person defined as "Owner" in the Stormwater Agreement with the Township, or such Person's designee or successor in interest responsible for the operation and maintenance of the Stormwater Management Facilities covered by the Stormwater Agreement.

PADEP: The Pennsylvania Department of Environmental Protection.

Peak Discharge: The maximum rate of Stormwater Runoff from a specific storm event.

PennDOT: The Pennsylvania Department of Transportation.

Person: An individual, partnership, corporation, limited liability company, limited liability partnership, firm, company, association, governmental entity other than the Township, trustee, receiver, assignee, or similar representative who or which undertakes a Regulated Activity.

Pervious/Pervious Area: Any area not defined as Impervious.

Point Source: Any discernable, confined, and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, or conduit from which Stormwater is or may be discharged, as defined in 25 Pa. Code § 92.1.

Project Site: The specific area of land in the Township where a Regulated Activity is planned, conducted, established, or maintained.

Public Water Supplier: A Person who owns or operates a Public Water System.

Public Water System: A system which provides water to the public for human consumption which has at least fifteen (15) service connections or regularly serves an average of at least twenty-five (25) individuals daily at least sixty (60) days out of the year.

Qualified Professional: Any Person licensed by the Commonwealth or otherwise qualified by law to perform the work required by this Ordinance.

Rational Method: A method of peak Runoff calculation using a standardized Runoff coefficient (rational 'c'), acreage of tract, and rainfall intensity determined by Return Period and by the time necessary for the entire tract to contribute Runoff. The Rational Method formula is stated as follows: Q=ciA, where "Q" is the calculated peak flow rate in cubic feet per second, "c" is the dimensionless Runoff coefficient (see Appendix B) "i" is the rainfall intensity in inches per hour, and "A" is the area of the tract in acres.

Reach: Any of the natural or man-made Runoff conveyance channels used for water shed Runoff modeling purposes to connect the Subareas and transport flows downstream.

Regulated Activities: Any Earth Disturbance Activities or any activities that involve the alteration or development of land in a manner that may affect Stormwater. See Section 105 of this Ordinance.

Regulated Earth Disturbance Activity: Activity involving earth disturbance subject to regulation under 25 Pa. Code 92, 25 Pa. Code 102, or the Clean Streams Law or any Earth Disturbance Activity on any portion, part, or during any stage of a larger common plan of development that involves one (1) acre or more of disturbance activity over the life of the project.

Release Rate: The percentage of the pre-development peak rate of Runoff for a development site to which the post-development peak rate of Runoff must be controlled to avoid peak flow increases throughout the Watershed.

Retention Basin: An impoundment in which Stormwater is stored and not released during the storm event. Stored water may be released from the basin after the end of the storm.

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

Riparian Buffer: An area of trees, shrubs, and other vegetation, adjacent to a body of water that is managed so as to maintain the integrity of Stream channels and shorelines in order to reduce the impact of upland sources of pollution by using techniques such as trapping, filtering, and converting Sediments and other substances into food, cover, habitat, and thermal protection for wildlife.

Road Maintenance: Earth Disturbance Activities within the existing road cross-section such as grading and repairing existing unpaved road surfaces, cutting road bands, cleaning or clearing drainage ditches, and other similar activities.

Runoff: Any part of precipitation that flows over the land.

SCS Method – A method of Runoff computation developed by NCRS which is based upon relating soil type and land use/cover to a Runoff parameter called a Curve Number. Also known as Soil-Cover Complex Method.

Sediment: Soils or other materials transported by surface water as a product of Erosion.

Sediment Traps/Catch Basin Sumps: Chambers which provide storage below the outlet in a storm inlet to collect Sediment, debris and associated pollutants, and which typically requires periodic clean out.

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.

Separate Storm Sewer System: A conveyance or system of conveyances, including roads with drainage systems, municipal streets, Catch Basin Sumps, curbs, gutters, ditches, man-made channels or storm drains and which are primarily used for collecting and conveying Stormwater Runoff.

Sheet Flow: Stormwater Runoff flowing in a thin layer over the ground surface.

Special Geologic Features: Carbonate bedrock features, including but not limited to Closed Depressions, existing sinkholes, fracture traces, lineaments, joints, faults, caves, pinnacles, and geologic contacts between carbonate and non-carbonate bedrock, and which may exist and must be identified on a site when 1) BMPs are being considered, and 2) where there occurs land with steep slopes (greater than 15%).

Spill Prevention and Response Program: A program that identifies procedures for preventing and remediating potential spills and which makes such procedures known and identifies the necessary equipment available to appropriate personnel.

Spillway (Emergency): A depression in the embankment of a dam, pond or basin, or other detention structure, that is used to pass Peak Discharges greater than the maximum Design Storm controlled by the pond or basin.

State Water Quality Requirements: The regulatory requirements to protect, maintain, reclaim, and restore water quality under Title 25 of the Pennsylvania Code and the Clean Streams Law.

Storage Indication Method: A method of routing or moving an inflow hydrograph through a reservoir or detention structure. The method solves the mass conservation equation to determine an outflow hydrograph as it leaves the storage facility.

Storm Sewer: A system of pipes or other conduits which carries intercepted surface Runoff, street water and other wash waters, 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 Filters: A structural mechanism such as multi-chamber Catch Basin Sumps, sand/peat filters, sand filters, and other devices which are installed to intercept Stormwater flow and remove pollutants prior to discharge. Typically, these systems require periodic maintenance and clean out.

Stormwater Management Facility: Any natural or man-made structure or feature which due to its condition, design, or construction, collects, conveys, stores, or otherwise controls Stormwater Runoff. A BMP is a type of Stormwater Management Facility, but the term Stormwater Management Facility is broader than the definition of BMP.

Stormwater Management Facility Construction, Operation, and Maintenance Agreement ("Stormwater Agreement"): An agreement entered into between the Township and an Applicant which, among other things, governs the construction, operation, maintenance, and repair responsibilities of the Applicant following receipt of Township approval for the undertaking of a Regulated Activity. The Stormwater Agreement shall be recorded at the expense of the Applicant, run with the land, and bind all future Owners and occupants and shall be identified in subsequent deeds and leases with respect to the encumbered land.

Stormwater Management Plan: The plan for managing Stormwater runoff within differing Watersheds adopted by the respective Counties as required by the Act of October 4, 1978, P.L. 864, (Act 167), as amended, and known as the "Stormwater Management Act".

Stormwater Management Site Plan ("SWM Site Plan"): The plan prepared by the Applicant or its representative documenting the quantity and quality controls to be used to manage Stormwater Runoff at a site where a Regulated Activity is undertaken pursuant to this Ordinance. The SWM Site Plan shall include all drawings, reports, narratives, and supporting documentation relating to management of Stormwater Runoff at the site. See also "ILGP."

Stream: Any natural or man-made channel of conveyance of surface water with an annual or intermittent flow within a defined bed and bank.

Subarea: The smallest unit of Watershed breakdown for hydrologic modeling purposes for which the Runoff control criteria have been established in the SWM Site Plan.

Subdivision: As defined by the Municipalities Planning Code, Act of July 31, 1968, P.L. 805 No. 247 ("MPC").

Swale: A channel-like stretch of land which gathers or carries surface water Runoff. See also Vegetated Swale.

Time of Concentration: 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.

Township: The Township of Upper Saucon, Lehigh County, Pennsylvania, including its agents, employees, consultants, and contractors.

Vegetated Buffers: Gently sloping areas that convey Stormwater as Sheet Flow over a broad, densely vegetated earthen area, possibly coupled with the use of level spreading devices. As water quality BMPs, Vegetated Buffers serve to filter pollutants from Runoff and promote infiltration. Vegetated Buffers shall be situated on minimally disturbed soils, have low-flow velocities and extended residence times. Vegetated Buffers may be, but are not restricted to being, used in riparian conditions.

Vegetated Roofs: Vegetated systems installed on roofs that generally consist of a waterproof layer, a root-barrier, drainage layer (optional), growth media, and suitable vegetation. Vegetated roofs store and eventually evapotranspirate the collected rooftop rainfall; overflows may be provided for larger systems.

Vegetated Swales: Vegetated earthen channels designed to convey and treat Stormwater. As water quality BMPs, these are broad, shallow, densely vegetated earthen channels designed to treat Stormwater through infiltration, Evapotranspiration, and sedimentation. Swales shall be gently sloping with low flow velocities to prevent Erosion. Check dams may be added to enhance performance.

Waters of the Commonwealth: Any and all rivers, Streams, creeks, rivulets, impoundments, ditches, Watercourses, Storm Sewers, lakes, dammed water, Wetlands, ponds, springs, and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.

Watercourse: A permanent or intermittent Stream, river, brook, run, creek, channel, Swale, pond, lake, or other body of surface water carrying or holding surface water, whether natural or artificial.

Watershed: A region or area drained by a river, Watercourse, or other surface water of this Commonwealth.

Wet Detention Pond: A type of basin that provides for Stormwater storage as well as a permanent pool of water. To be successful, wet ponds must have adequate natural hydrology (both Runoff inputs as well as soils and water table which allow for maintenance of a permanent pool of water) and must be able to support a healthy aquatic community to avoid creation of a mosquito and other health and nuisance problems.

Wetland: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, and similar areas, and which shall be identified using the United States Army Corps of Engineers Technical Report Y87-1, Corps of Engineers Wetlands Delineation Manual.

ARTICLE 3 – STORM WATER MANAGEMENT STANDARDS

SECTION 301. GENERAL REQUIREMENTS

(A) All Regulated Activities in the Township shall be subject to the Stormwater management requirements of this Ordinance.

(B) For all Regulated Activities, unless preparation of a SWM Site Plan is specifically exempted by Section 106, preparation and implementation of an approved SWM Site Plan is required.

(C) For all Regulated Activities, Stormwater Management Facilities shall be designed, 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, the Clean Streams Law, and the Storm Water Management Act, all as may be amended from time-to-time.

(D) All Stormwater Management Facilities shall be designed, and the SWM Site Plan prepared and certified, by individuals registered in the Commonwealth and qualified to perform such duties.

(E) No Earth Disturbance Activities associated with any Regulated Activities shall commence until approval by the Township of a SWM Site Plan which demonstrates compliance with the requirements of this Ordinance.

(F) All Regulated Activities shall include such measures as are necessary to:

(1) Protect health, safety, and property,

(2) Meet the water quality goals of this Ordinance by implementing measures to:

(i) Minimize disturbance to Floodplains, Wetlands, and wooded areas;

(ii) Maintain or extend Riparian Buffers;

(iii) Avoid erosive flow conditions in natural pathways;

(iv) Minimize thermal impacts to waters of this Commonwealth;

(v) Disconnect Impervious Surfaces by directing Runoff to Pervious Areas, wherever possible;

(vi) Provide trees and woodlands adjacent to Impervious Areas whenever feasible;

(vii) Protect natural systems and processes (drainageways, vegetation, soils, and sensitive areas) and maintain, as much as possible, the natural hydrologic regime;

(viii) Incorporate natural site elements (Wetlands, Stream corridors, mature forests) as design elements; and

(ix) Minimize soil disturbance and soil compaction.

(3) Incorporate methods described in the BMP Manual. If methods other than GI and LID are proposed to achieve the volume and rate controls required under this Ordinance, the SWM Site Plan must include a detailed justification demonstrating that the use of GI or LID are not practicable. Various BMPs and their design standards are listed in the BMP Manual.

(G) Storm drainage systems shall be provided to permit unimpeded flow in natural Watercourses except as modified by Stormwater detention facilities, recharge facilities, water quality facilities, pipe systems or open channels consistent with this Ordinance.

(H) Except in accordance with applicable law, Stormwater flows onto adjacent property shall not be created, increased, decreased, relocated, or otherwise altered without written notification to the adjacent property owner(s). Such Stormwater flows shall be subject to the requirements of this Ordinance.

(I) The existing locations of Concentrated Drainage Discharge onto adjacent property shall not be altered without written approval of the affected property owner(s).

(J) Areas of existing Diffused Drainage discharge onto adjacent property shall be managed such that, at a minimum, the peak diffused flow does not increase in the general direction of discharge, except as otherwise provided in this Ordinance. If diffused flow is proposed to be concentrated and discharged onto adjacent property (including flows from Detention Basin Emergency Spillways), the Applicant must document that there are adequate downstream conveyance facilities to safely transport the Concentrated Drainage Discharge to the point of pre-development flow concentration, to the Stream Reach or otherwise prove that no harm will result from the concentrated discharge. Areas of existing Diffused Drainage discharge shall be subject to any applicable Release Rate criteria in the general direction of existing discharge whether they are proposed to be concentrated or maintained as Diffused Drainage areas.

(K) Where a site is traversed by Watercourses, there shall be provided Drainage Easements conforming substantially with the line of such Watercourses. The width of any such easement shall be adequate to provide for unimpeded flow of the 100-year storm Runoff and to provide a Freeboard allowance of one-half (0.5) foot above the design water surface level. The easement limits shall be based on the higher of specific 100-year flood profiles (elevations) identified in the Flood Insurance Study by FEMA, or elevations from HEC-RAS modeling (or other modeling methods as approved by the Township) utilizing flow rate calculations made in conformance with Section 308. The terms of the easement shall be enforceable by the Township and prohibit excavation, the placement of Fill or structures, and any alterations which may adversely affect the flow of Stormwater within any portion of the easement. It shall be the obligation of the Owner to perform periodic maintenance of the easement to ensure the proper Runoff conveyance is maintained. The terms of such easements shall be identified by notes on the SWM Site Plan and Record Plan, as applicable.

Watercourses for which the 100-year Floodplain is formally defined by the Township are also subject to the applicable Township Floodplain regulations.

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

(M) Any Direct Recharge BMPs shall be reviewed and approved by the Township's Geotechnical Consultant.

SECTION 302. PERMIT REQUIREMENTS AND APPROVALS BY GOVERNMENT ENTITIES

(A) No Regulated Activities shall commence until all necessary permits and approvals by government entities are obtained.

(B) SWM Site Plans approved by the Township, in accordance with Section 406, shall be on site throughout the duration of the Regulated Activity.

(C) The Township may after consultation with PADEP and/or LCCD, 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, applicable law including, but not limited to, the Clean Streams Law.

SECTION 303. EROSION AND SEDIMENT CONTROL DURING REGULATED EARTH DISTURBANCE ACTIVITIES

(A) No Regulated Earth Disturbance Activities within the Township shall commence until review by the Township of an Erosion and Sediment Control Plan and NPDES Plan for construction activities. Written approval by PADEP or LCCD along with necessary Township approvals, may satisfy this requirement.

(B) Approval by the LCCD of an Erosion and Sedimentation Control Plan is required for: any 1) Earth Disturbance Activity of 5,000 square feet or more; or 2) when requested by the Township, for sites draining to an Exceptional Value or High Quality Watershed, and not otherwise included under a previously approved and active NPDES Permit.

(C) No Regulated Earth Disturbance Activities within the Township shall commence until Erosion and sedimentation control facilities are in place.

(D) Evidence of receipt of all necessary permit(s) for Regulated Earth Disturbance Activities from the PADEP or LCCD must be provided to the Township before the commencement of a Regulated Earth Disturbance Activity.

(E) For all Regulated Earth Disturbance Activities Erosion and Sediment control Stormwater Management Facilities shall be designed, implemented, operated, and maintained during the course of the Regulated Earth Disturbance Activities 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. Various Stormwater Management Facilities and their design standards are listed in the *Erosion and Sediment Pollution Control Program Manual* (E&S Manual) No. 363-2134-008, as amended and updated.

(F) A copy of the Erosion and Sediment Control Plan and any permit, as required by PADEP regulations, shall be available at the Project Site at all times.

SECTION 304. POST CONSTRUCTION WATER QUALITY CRITERIA

(A) No Regulated Earth Disturbance Activities within the Township shall commence until approval of a SWM Site Plan which demonstrates compliance with this Ordinance. This Ordinance provides standards to meet NPDES Permit requirements associated with construction activities and MS4 permit requirements.

(B) GI and LID practices provided in the BMP Manual shall be utilized for all Regulated Earth Disturbance Activities wherever practical. Water volume controls shall be implemented using the *Design Storm Method* in Sub-subsection (B)(1), directly below, or the *Simplified Method* in Sub-subsection (B)(2) below. For Regulated Activity areas encompassing less than one (1) acre that do not require hydrologic routing to design the Stormwater Management Facilities, this Ordinance establishes no preference for either methodology; therefore, the Applicant may select either methodology 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 size of Regulated Activity. This method requires detailed modeling based on site conditions and additional considerations as follow:

(i) Do not increase the post-development total Runoff volume for all storms equal to or less than the 2-year 24-hour precipitation.

(ii) For hydrologic modeling purposes:

(a) Existing (predevelopment) non-forested Pervious Areas must be considered meadow in good condition.

(b) Twenty percent (20%) of existing Impervious Area, when present, shall be considered meadow in good condition in the model for Existing Conditions.

(c) The effect of Closed Depressions on the site shall be considered in this calculation.

(2) The *Simplified Method* (CG-2 in the BMP Manual) provided below is independent of site conditions and shall be used if the *Design Storm Method* is not followed. This method is not applicable to Regulated Activities which encompass one (1) acre or more or that require design of Stormwater storage facilities. For new Impervious Surfaces:

(i) Stormwater storage facilities shall capture at least the first two (2) inches of Runoff from all new Impervious Surfaces.

(ii) At least the first one inch of Runoff from new Impervious Surfaces shall be permanently removed from the Runoff flow, i.e., it shall not be released into the Surface Waters of the Commonwealth; removal options include reuse, evaporation, transpiration, and infiltration;

(iii) Wherever possible, infiltration facilities shall be designed to accommodate infiltration of the entire permanently removed Runoff, however in all cases at least the first 0.5 inch of the permanently removed Runoff shall be infiltrated;

(iv) Actual field infiltration tests at the location of the proposed elevation of the BMPs conducted in accordance with the BMP Manual, are required; and

(v) This method is exempt from the requirements of Section 306, Rate Controls.

(C) If an Applicant is proposing to use a BMP that ponds water on the land surface and may receive direct sunlight, the discharge from that BMP must be treated by infiltration, a Vegetated Buffer, Bioretention, Vegetated Swale or other BMP that provides thermal benefit.

(D) Sites where Applicants intend to use infiltration BMPs must meet the following criteria:

(1) Depth to bedrock below the invert of the BMP greater than or equal to two (2) feet;

(2) Depth to seasonal high water table below the invert of the BMP greater than or equal to two (2) feet; except for infiltration of residential roof Runoff where the seasonal high water table must be below the invert of the BMP;

(3) Soil permeability (as measured using the standards listed in Appendix C of the Pennsylvania Stormwater Best Management Practices Manual, latest edition) greater than or equal to one-tenth (0.1) inch/hour and less than or equal to ten (10) inches per hour; and

(4) Setback distances or buffers as follows:

(i) One hundred feet (100') from water supply wells;

(ii) Twenty feet (20') downgradient or one hundred feet (100') upgradient from building foundations. A reduction of the twenty foot (20') downgradient setback may be permitted based on the Township's geotechnical consultant review of soil type and profile, depth of infiltration, and managed drainage area;

(iii) Fifty feet (50") feet downgradient or one hundred feet (100') feet upgradient from septic system drain fields. A reduction of the one hundred foot (100') upgradient setback may be permitted based on the Township's geotechnical consultant review of soil type and profile, depth of infiltration, and managed drainage area; and

(iv) One hundred feet (100') from the rim of sinkholes, Closed Depressions and disappearing Streams and fifty feet (50') from lineaments, fracture traces or surface or subsurface pinnacles.

(E) For proposed infiltration BMPs, the Applicant shall conduct site investigation and testing as outlined in Appendix C of the Pennsylvania Stormwater Best Management Practices Manual, latest edition. This testing must be performed and evaluated by the Applicant's qualified geotechnical professional. The soil depth, percolation rate, and proposed loading rate, each weighted as described in Section 308, along with the buffer from Special Geologic Features shall be compared to the Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock in Appendix D and reviewed by the Township's geotechnical consultant to determine if the site is recommended for infiltration.

(F) Site areas proposed for infiltration shall be delineated in the field and protected from disturbance and compaction except as necessary for construction of infiltration BMPs.

(G) Stormwater Runoff from Hot Spot Land Uses shall be pre-treated. Appendix E contains guidance regarding acceptable methods of pre-treatment.

(H) The use of infiltration BMPs is prohibited on hot spot Land Use areas.

(I) Stormwater infiltration BMPs shall not be placed in or on Special Geologic Features. Additionally, Stormwater Runoff shall not be discharged into existing sinkholes or water-filled quarries.

(J) Infiltration systems may not receive Runoff until the entire tributary drainage area to the infiltration system has received final stabilization.

(K) Applicants shall request, in writing, that Public Water Suppliers provide the Zone I Wellhead Protection radius, as calculated by the method outlined in PADEP wellhead protection regulations, for any public water supply well within four hundred feet (400') of the site. In addition to the setback distances specified in Sub-subsection 304(D)(4), infiltration is prohibited in the Zone I radius as defined and substantiated by the Public Water Supplier in writing. If the Applicant does not receive a response from the Public Water Supplier, the Zone I radius shall be assumed to be one hundred feet (100').

(L) The Township may, after consultation with PADEP, approve alternative methods for meeting the State Water Quality Requirements other than those in this Section 304, provided that they meet the minimum requirements of and do not conflict with applicable laws and regulations.

SECTION 305. STORMWATER MANAGEMENT DISTRICTS

(A) Mapping of Stormwater Management Districts – To implement the provisions of the Township Stormwater Management Ordinance, the Township is hereby divided into Stormwater Management Districts consistent with the Saucon Creek Release Rate Map presented in the Stormwater Management Plan. The boundaries of the Stormwater Management Districts are shown on an official map which is available for inspection at the Township office. A copy of the official map at a reduced scale is included in Appendix A for general reference.

(B) Description of Stormwater Management Districts – The 10-, 25-, and 100-year post-development peak Runoff must be controlled to the stated percentage of the pre-development peak. Release Rates associated with the 10- through 100-year events vary from fifty percent (50%) to one hundred percent (100%) depending upon location in the Watershed.

(C) Any areas of the Township outside the Saucon Creek Watershed (Little Lehigh Creek, Perkiomen Creek, Tohickon Creek, Cooks Creek/Delaware River North) are subject to the Release Rate criteria for their respective Watersheds as identified in their Act 167 Stormwater management plan as adopted by Lehigh or Bucks County. For any areas not shown on the Release Rate maps, the post-development discharge rates shall not exceed the pre-development discharge rates.

SECTION 306. STORMWATER MANAGEMENT DISTRICT IMPLEMENTATION PROVISIONS

(A) Applicants shall provide a comparative pre- and post-construction Stormwater management hydrograph analysis for each direction of discharge and for the site overall to demonstrate compliance with the provisions of this Ordinance.

(B) Any Stormwater Management Facilities required by this Ordinance and subject to a dual Release Rate criteria shall meet the applicable Release Rate criteria for each of the 10-, 25-, and 100-year Return Period Runoff events consistent with the calculation methodology specified in Section 308.

(C) The exact location of the Stormwater Management District boundaries as they apply to a given development site shall be determined by mapping the boundaries using the two-foot topographic contours provided as part of the SWM Site Plan. The district boundaries as originally drawn coincide with topographic divides or, in certain instances, are drawn from the intersection of the Watercourse and a physical feature such as the confluence with another Watercourse or a potential flow obstruction (e.g., road, Culvert, bridge, etc.). The physical feature is the downstream limit of the Subarea and the Subarea boundary is drawn from that point up slope to each topographic divide along the path perpendicular to the contour lines.

(D) Any downstream capacity analysis conducted in accordance with this Ordinance shall use the following criteria for determining adequacy for accepting increased peak flow rates:

(1) Natural or man-made channels or Swales must be able to convey the increased Runoff associated with a 2-year Return Period event within their banks at velocities consistent with protection of the channels from Erosion;

(2) Natural or man-made channels or Swales must be able to convey the increased 25-year Return Period Runoff without creating any hazard to Persons or property; and

(3) Culverts, bridges, Storm Sewers or any other facilities which must pass or convey flows from the tributary area must be designed in accordance with PADEP Chapter 105 regulations (if applicable) and, at a minimum, pass the increased 25-year Return Period Runoff.

(E) For a proposed Project Site located within one Release Rate category Subarea, the total Runoff from the site shall meet the applicable Release Rate criteria. For Project Sites with multiple directions of Runoff discharge, individual drainage directions may be designed for up to a 100% Release Rate provided that the total Runoff from the site is controlled to the applicable Release Rate and no increase in Runoff volume is proposed in the 100% Release Rate direction.

(F) For a proposed Project Site located within two or more release category Subareas, the Peak Discharge rate from any Subarea shall be the pre-development Peak Discharge for that Subarea multiplied by the applicable Release Rate.

(G) No portion of a Project Site may be regraded to redirect Runoff onto adjacent property (i.e., modify the pre-development drainage area) unless Runoff peak flow rate and volume controls are proposed which limit post-development peak flow rates to the required Release Rate criteria and volume discharges to pre-development levels.

(H) Within a Release Rate category area, for a proposed Project Site which has areas draining to a Closed Depression on the site, the design Release Rate from the site will be the lesser of (a) the applicable Release Rate flow assuming no Closed Depression or (b) the existing peak flow actually leaving the site. In cases where (b) would result in an unreasonably small design release, the design discharge of less than or equal to the Release Rate will be determined by the available downstream conveyance capacity to the Main Channel calculated using Subsection 306(D) and the minimum orifice criteria.

(I) Off-site areas which drain through a proposed Project 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 Project Site using the capacity criteria in Subsection 306(D) and the detention criteria in Subsection 307(C). In addition to the criteria in Section 306(D), on-site conveyance systems designed to carry Runoff to a Detention Basin must be able to transport the basin's 100-year tributary flow either in-system, in-gutter, or overland.

(J) For sites proposed to be developed in phases, all detention facilities shall be designed to meet the applicable Release Rate(s) applied to all site areas tributary to the proposed facility discharge direction. All site tributary areas will be

assumed as developed, regardless of whether all site tributary acres are proposed for development at that time. An exception shall be sites with multiple detention facilities in series where only the downstream facility must be designed to the stated Release Rate.

(K) Where the site area to be impacted by a proposed development activity differs significantly from the total site area, only the proposed impact areas shall be subject to the Release Rate criteria. The impact area includes any proposed cover or grading changes.

(L) Development proposals which, through groundwater recharge or other means, do not increase the rate of Runoff and do not increase the volume of Runoff discharged from the site compared to the pre-development condition are not subject to the Release Rate provisions of this Ordinance.

(M) Regional Detention Alternatives – For certain areas within the study area, it may be more cost-effective to provide one control facility for more than one development site than to provide an individual control facility for each development site. The initiative and funding for any regional Runoff control alternatives are the responsibility of prospective Developers. 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 based on the required Release Rate at the point of discharge.

SECTION 307. STORMWATER MANAGEMENT FACILITIES

(A) **Design Capacity for Maximum Impervious Cover** – In the case of residential subdivisions, an Applicant shall design all Stormwater Management Facilities to accommodate the total, maximum impervious cover, calculated on a per lot basis, as authorized by the Township Zoning Ordinance.

(B) **Collection/Conveyance** – Stormwater Management Facilities involving collection and conveyance shall be designed to meet all of the following criteria.

(1) In any Stormwater Management District, Storm Sewer piping, Swales and inlet systems shall be designed for a 25-year Return Period storm, or a 100-year Return Period storm where the system is required to convey 100-year storm flows to a detention facility. Bridges and Culverts along or across roadways shall be designed to convey the 100-year Return Period storm. Flows from offsite upstream areas shall be determined in accordance with the procedure identified in Section 308, conditioned on documentation being provided to document 100-year storm Runoff is safely conveyed through the site.

(2) Storm Sewer pipes, Culverts, manholes, inlets, endwalls, and end-sections proposed for dedication, or located along streets, shall conform to the requirements of the Upper Saucon Township Standard Construction Documents and *PennDOT, Bureau of Design, Standards for Roadway Construction, Publication No. 72* (as modified by the Upper Saucon Township Standard Construction Documents), in effect at the time the design is submitted.

(3) Capacities – The capacities of the pipes, gutters, inlets, Culverts, outlet structures, and Swales shall consider all possible hydraulic conditions. The following minimum standards shall apply:

(i) Grass Swales and roadside gutters shall consider both the channel velocity and stability based upon a low degree of retardant ("n" of 0.03), and the channel capacity based upon a high degree of retardant ("n" of 0.05);

(ii) The velocity to be used in the design of any piped Stormwater conveyance system shall be based on the maximum velocity obtainable;

(iii) The capacity shall be based upon 100-year storm conditions;

(iv) In all cases where drainage is collected by a headwall or Catch Basin Sumps, where inlet or outlet control may govern, the pipe shall be designed as a Culvert, as outlined in *Hydraulic Engineering Design Series No. 5, latest edition of the U.S. Department of Transportation Federal Highway Administration*, Washington, DC., and the allowable headwater shall be determined by the specific entrance conditions and sound engineering;

(v) The capacities of pipes shall be computed from the Manning Equation; and

(vi) The design of Culverts shall not create excessive headwater depths.

(4) Minimum Pipe Size – Stormwater management pipe collection and conveyance systems which are to be dedicated to the Township shall have a minimum diameter of eighteen inches (18") and shall be installed on sufficient slope to provide a minimum velocity of three feet (3') per second (3fps) during 100-year storm flows.

(5) Pipe sizes with nominal diameters greater than seventy-two inches (72") shall require structural design submittals for review and approval.

(6) All Culvert structures shall require submission of construction drawings, to assure compliance to HS-25 loading, and flow design capacity.

(7) All Storm Sewer pipes and Culverts shall be laid to a minimum depth specified by the pipe manufacturer.

(8) Endwalls and end-sections shall be used where Stormwater Runoff enters or leaves the Storm Sewer horizontally from a natural or man-made channel.

(9) Inlets shall be placed on both sides of the street at low spots, and at points such that one traffic lane of at least ten feet (10') in width in each direction of travel shall be provided free from Stormwater. Inlets shall normally be along the curb line at or beyond the curb radius points. At intersections, the depth of flow across the through streets shall not exceed one and one-half inches (1½"). Inlets shall be depressed two inches (2") below the grade of the gutter or ground surface. Manholes may be substituted for inlets at locations where inlets are not required to handle surface Runoff.

(10) Manholes shall not be spaced more than four hundred feet (400') apart for pipes that are less than thirty-six inches (36") in diameter and six-hundred feet (600') apart for all pipes of greater than thirty-six inches (36") in diameter. Additionally, manholes shall be placed at points of abrupt changes in the convergence of two (2) or more storm water lines. Inlets may be substituted for manholes where they will serve a useful purpose.

(11) Curves in pipes or box Culverts, without an inlet or manhole, are prohibited. Tee joints, elbows, and wyes are also prohibited.

(12) Grass-lined channels shall be designed with a minimum slope of tow percent 2% and shall be designed to accommodate design velocities without Erosion.

(13) The capacities of open channels shall be computed from the Manning Equation.

(14) Flow velocities from any Storm Sewer may not result in a deflection of the receiving channel.

(15) Energy dissipaters shall be provided at all Storm Sewer outlets and shall be designed in accordance with PADEP, Office of Water Management, *Erosion and Sediment Pollution Control Program Manual*, latest edition.

(16) Protective grating must be provided at all open pipe inlets and outlets to prevent clogging and unauthorized access to Stormwater Management Facilities.

(17) Stormwater Management Facilities shall be contained in an easement. It shall be the obligation of the Owner to perform periodic maintenance of the easement and facilities to ensure that the proper Runoff conveyance is maintained, to preclude modifications to the Stormwater Management Facilities, and to preclude the installation or placement of structures, landscaping, or unauthorized plant materials in the easement area. The terms of such easements shall be identified by notes on the SWM Site Plan and Record Plan, as applicable.

(C) Detention Basins and Retention Basins

(1) Permanent Detention Basins and Retention Basins shall be designed to store the Stormwater Runoff of the 100-year post-development storm event minus the water discharged, if any, from the basin by any primary and/or secondary outlets.

(2) Wet Detention Ponds designed to have a permanent pool shall assume that the permanent pool volume below the primary outlet is full at the beginning of design event routing for the purposes of evaluating peak outflows. All Wet Detention Ponds shall be subject to review by the Township's geotechnical consultant.

(3) The minimum circular orifice diameter for controlling discharge rates from detention facilities shall be three (3) inches. Designs where a lesser size orifice is required to fully meet Release Rates shall be acceptable provided that as much of the site Runoff as practical is directed to the detention facilities.

(4) Normally dry, open top, storage facilities shall completely drain both the volume control and rate control capacities over a period of time not less than twenty-four (24) and not more than seventy-two (72) hours from the end of the Design Storm.

(5) Basins which are not designed to release all storm water shall be specifically identified as Retention Basins or wet pond basins. All other basins shall be designed to provide a minimum bottom slope of 2% to drain

the facility, except for Infiltration Practices meeting the PADEP standards for BMPs, approved as part of a site's approved PCSM Plan and NPDES Permit.

(6) Low flow channels are not required in basins, unless required by PADEP as part of an approved NPDES permit.

(7) Discharge structures shall be designed to eliminate the possibility of blockage during operation (such as trash racks).

(8) All outlet structures and Emergency Spillways shall include a satisfactory means of dissipating the energy flow at its outlet to assure conveyance of flow, without endangering the safety and integrity of the basin and the downstream drainage area.

(9) All above-ground Stormwater detention facilities shall provide a minimum one-half foot (0.5') of Freeboard above the maximum pool elevation associated with the 2- through 100-year Runoff events, or an additional ten percent (10%) of the 100-year storage volume as Freeboard volume, whichever is greater. All below-ground Stormwater detention and infiltration facilities shall have an additional ten percent (10%) of the 100-year storage volume available within the storage medium, as well as a minimum of one-half foot (0.5') of Freeboard. The Freeboard shall be measured from the maximum pool elevation to the invert of the Emergency Spillway for above-ground facilities, and from the maximum pool elevation to the lowest overflow elevation for below-ground facilities. The 2- through 100-year storm events shall be controlled by the primary outlet structure. An Emergency Spillway for each above-ground basin shall be designed to pass with a minimum one-half foot (0.5') Freeboard measured to the top of basin. The Freeboard criteria shall be met considering any offsite areas tributary to the basin as developed, as applicable. Exceptions to the Freeboard requirements are as follows:

(i) Bioretention BMPs with a ponded depth less than or equal to one-half foot (0.5') are exempt from the Freeboard requirements.

(ii) Small Detention Basins, with a ponded depth less than or equal to one and one-half feet (1.5') or having a depth to the top of the berm less than or equal to two and one-half feet (2.5'), may provide twenty percent (20%) additional storage volume measured from the maximum ponded depth to the invert of the Emergency Spillway in lieu of the above requirements. The depth of the Emergency Spillway must be sufficient to pass either two (2) times the 100-year

peak or the 100-year peak with two tenths of one foot (0.2') of Freeboard to the top of berm, whichever is greater.

(iii) Small infiltration basins, with a ponded depth less than or equal to one and one-half feet (1.5') or having a depth to the top of the berm less than or equal to two and one-half (2.5'), may provide twenty percent (20%) additional storage volume measured from the maximum ponded depth to the top of the berm in lieu of the above requirements. In this case, an Emergency Spillway is only necessary if Runoff in excess of the basin volume would cause harm to downstream landowners. If an Emergency Spillway is necessary, it must be sufficiently sized to pass the 100-year peak inflow.

(10) If a detention facility is considered to be a dam as per PADEP Chapter 105, the design of the facility must be consistent with the requirements of Chapter 105 and may be required to pass a storm greater than the 100-year event.

(11) All Detention Basins and/or Retention Basins shall include fencing or other acceptable devices that restrict access.

(12) All Detention Basins and/or Retention Basins to be dedicated to the Township shall include:

(i) Fencing constructed according to the Upper Saucon Township Standard Construction Documents, latest edition;

(ii) "No Trespassing" signs; and

(iii) A minimum twelve-foot (12') wide ramp at a maximum ten percent (10%) percent slope. The ramp shall be near the basin access to permit access to the bottom of basins for maintenance.

(13) Detention Basins and/or Retention Basins which are designed with earth embankments shall incorporate the following minimum standards:

(i) The maximum water depth shall not exceed six feet (6').

(ii) The minimum top width of berm shall be ten feet (10').

(iii) The inside and outside side slopes shall not be steeper than three (3) horizontal to one (1) vertical.

(iv) A key trench of compacted, relatively impervious material shall be installed at a depth of at least two feet (2'), or extending down to stable subgrade, whichever is deeper. Minimum bottom widths for the key trench shall be four feet (4'). Maximum side slopes for the key trench shall be one (1) horizontal to one (1) vertical. A compacted impervious core at least eight feet (8') wide at the top, having a maximum side slope of one (1) horizontal to one (1) vertical, shall extend for the full length of the embankment, and the top elevation shall be set at the 25-year design water surface elevation.

(v) All pipes and Culverts through basin embankments shall have properly spaced concrete cutoff collars or anti-seep collars designed in accordance with PA PADEP, Office of Water Management, *Erosion and Sediment Pollution Control Program Manual*, latest edition.

(vi) Minimum finished floor elevations for all buildings that adjoin a basin, other temporary impoundments, or open conveyance systems, shall be two feet (2') above the water surface of a one hundred (100) year storm event. If a basement is proposed below the bottom elevation of the basin, it shall have a structural capacity to retain expected hydrostatic pressure, and detailed calculations addressing the effects of Stormwater ponding on the building, and waterproofing and/or floodproofing design information consistent with the Floodplain standards in the Township Zoning Ordinance shall be submitted.

(14) Retention Basins must provide enough capacity to store the entire Runoff volume created by a 100-year, 24-hour storm event.

(15) Below-ground Stormwater Detention

(i) Materials – All materials used in underground detention facilities shall be corrosion resistant consisting of reinforced concrete, aluminized corrugated metal pipe, corrugated high density polyethylene pipe, or similar approved material.

(ii) Capacity – Underground detention facilities shall be sized such that the 100-year Design Storm may be routed through the facility with no damage to the surface property.

(iii) Accessibility and Maintainability – Underground detention facilities shall be designed to be readily accessible for periodic inspection

and maintenance from the surface without the need to perform confined space entry. Pre-treatment to remove Sediments before entrance of the underground detention facility shall be considered to improve water quality and/or improve maintainability.

(iv) Storage Volume – Routing calculations must be used to demonstrate that the storage volume is adequate. See Section 307(C)(9) for Freeboard requirements.

(v) Overburden Support – Underground detention vaults and tanks must meet structural requirements for overburden support and traffic loading if applicable.

SECTION 308. CALCUATION METHODOLOGY

Stormwater Runoff from all development sites shall be calculated using either the Rational Method or the soil-cover-complex methodology. The following requirements shall apply:

(A) Infiltration BMP loading rate percentages in the Recommendation Chart for Infiltration Stormwater BMPs in carbonate bedrock in Appendix D shall be calculated as follows:

(Area tributary to infiltration BMP/Base Area of Infiltration BMP) x 100%

The area tributary to the infiltration BMP shall be weighted as follows:

All Disturbed Areas to be made impervious:	weight at 100%
All Disturbed Areas to be made pervious:	weight at 50%
All undisturbed Pervious Areas:	weight at 0%
All existing Impervious Area:	weight at 100%

(B) The design of any Detention Basin intended to meet the requirements of this Ordinance shall be verified by routing the Design Storm hydrograph through the proposed basin using the Storage Indication Method or other methodology demonstrated to be more appropriate. For basins designed using the Rational Method, the design hydrograph for routing shall be the Universal Rational Hydrograph or as otherwise permitted by the Township.

(C) BMPs designed to store or infiltrate Runoff and discharge to surface Runoff or pipe flow shall be routed using the Storage Indication Method.

(D) BMPs designed to store or infiltrate Runoff and discharge to surface Runoff or pipe flow shall provide storage volume for the full WQv below the lowest outlet invert.

(E) Runoff calculations using the SCS Method shall use the Natural Resources Conservation Service Type II 24-hour rainfall depths for the various Return Periods to be used consistent with this Ordinance may be taken from NOAA Atlas 14, Volume 2 Version 2.1, 2004 or the PennDOT Intensity – Duration Frequency Field Manual ("PDT-IDF") (May 1986) for Region 4. The following values are taken from the PDT-IDF Field Manual:

Return Period	24-Hour Rainfall Depth
1-year	2.40 inches
2-year	3.00 inches
5-year	3.60 inches
10-year	4.56 inches
25-year	5.52 inches
50-year	6.48 inches
100-year	7.44 inches

A graphical and tabular presentation of the Type II 24-hour distribution is included in Appendix B.

(F) Runoff calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration and Return Periods 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.

(G) Runoff Curve Numbers (CN's) to be used in the SCS Method shall be based upon the matrix presented in Appendix B.

(H) Runoff coefficients for use in the Rational Method shall be based upon the table presented in Appendix B.

(I) All Time of Concentration calculations shall use a segmental approach which may include one or all of the following flow types:

(1) Sheet Flow (overland flow) calculations shall use either the NRCS average velocity chart (Figure 3-1, Technical Release -55, 1975) or the modified kinematic wave travel time equation (equation 3-3, NRCS TR-55, June 1986). If using the modified kinematic wave travel time equation, the Sheet Flow length shall be limited to 150 feet for designs using the Soil-Cover-Complex method.

(2) Shallow Concentrated Flow travel times shall be determined from the Watercourse slope, type of surface and the velocity from Figure 3-1 of TR-55, June 1986.

(3) Open Channel Flow travel times shall be determined from velocities calculated by the Manning Equation. Bankfull flows shall be used for determining velocities. Manning 'n' values shall be based on the table presented in Appendix B.

(4) Pipe Flow travel times shall be determined from velocities calculated using the Manning Equation assuming full flow and the Manning 'n' values from Appendix B.

(J) If using the Rational Method, all pre-development calculations for a given discharge direction shall be based on a common Time of Concentration considering both on-site and any off-site drainage areas. If using the Rational Method, all post-development calculations for a given discharge direction shall be based on a common Time of Concentration considering both on-site and any off-site drainage areas.

(K) When conditions exist such that a proposed detention facility may experience a tailwater effect, the basin shall be analyzed without any tailwater effect for all storm events for comparison against the required Release Rates. An additional routing of the 100-year storm with the full tailwater effect shall be performed to check that the basin has sufficient storage to contain the 100-year tributary flow with a tailwater.

(L) The Manning Equation shall be used to calculate the capacity of Watercourses. Manning 'n' values used in the calculations shall be consistent with the table presented in Appendix B or other appropriate standard engineering 'n' value resources. Pipe capacities shall be determined by methods acceptable to the Township.

(M) PADEP Chapter 105, Rules and Regulations, apply to the construction, modification, operation or maintenance of both existing and proposed Dams, water obstructions and encroachments throughout the Watershed. Criteria for design and construction of Stormwater Management Facilities according to this Ordinance may not be the same criteria that are used in the permitting of Dams under the Dam Safety Program.

ARTICLE 4 – SWM SITE PLAN REQUIREMENTS

SECTION 401. GENERAL REQUIREMENTS

Prior to undertaking any Regulated Activities under this Ordinance, any Person shall submit to the Township for review and approval a SWM Site Plan. No such activity shall commence until the SWM Site Plan is approved by the Township in writing.

SECTION 402. SWM SITE PLAN SUBMISSION

(A) For Regulated Activities Involving Subdivision or Land Development:

(1) The SWM Site Plan shall be submitted to the Township as part of the Land Development plan submission.

(2) Except for SWM Site Plans involving less than 10,000 square feet of additional Impervious Cover, two (2) copies of the SWM Site Plan shall be submitted by the Applicant to the LVPC as part of the plan submission.

(B) For Regulated Activities specified in Sub-subsections 105(B)(3) and 105(B)(4), the SWM Site Plan shall be submitted to the Township as part of any permit required by the Zoning Ordinance.

(C) For Regulated Activities specified in Sub-subsections 105(B)(5), 105(B)(6), and 105(B)(7), one (1) copy of the SWM Site Plan shall be submitted by the Applicant to the LVPC for coordination with the PADEP permit application process under Chapter 105 (Dam Safety and Waterway Management), Chapter 106 (Flood Plain Management) of PADEP's Rules and Regulations, and the NPDES regulations.

(D) Earthmoving for all Regulated Activities under Subsection 105.B shall be conducted in accordance with current federal and State regulations applicable to the NPDES permit process and PADEP 25 PA Code Chapter 102 regulations.

SECTION 403. SWM SITE PLAN CONTENTS

(A) All SWM Site Plan materials shall be submitted 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 ordinances, shall be followed in preparing the SWM Site Plan. The SWM Site Plan shall contain at least the following information as well as all other information deemed relevant by the Township:

(1) General description of the project and the address of the Project Site, the name of the property owner(s), and contact information for individual or firm preparing the Plan;

(2) The overall Stormwater management concept for the project;

(3) Maps of the project area including the following information:

(i) The location of the Project Site relative to highways, municipal boundaries, and other identifiable landmarks;

(ii) Existing contours at intervals of two (2) feet; in areas of steep slopes (greater than 15%) five-foot contour intervals may be used;

(iii) Off-site drainage areas impacting the project including topographic detail;

(iv) A determination of Project Site conditions in accordance with the BMP Manual with a detailed site evaluation for projects proposed in areas of carbonate geology or Karst topography, and other environmentally sensitive areas, such as brownfields;

(v) Streams, lakes, ponds, or other bodies of water and Watercourses within the development area;

(vi) Other physical features including existing drainage Swales, Wetlands, Closed Depressions, sinkholes, steep slopes, and areas of natural vegetation to be preserved;

(vii) Locations of proposed underground utilities, sewers, and water lines and the locations of all existing and proposed utilities, sanitary sewers, and water lines within fifty (50) feet of the site;

(viii) The locations of existing and proposed on-lot wastewater facilities and water supply wells;

(ix) Soil types and boundaries based on the Lehigh or Bucks County Soil Survey and/or NCRS, as applicable, latest edition with any hydric soils present on the site being identified as such;

(x) Geologic types and boundaries and any Special Geologic Features present on the site;

(xi) Proposed changes to land surface and vegetated cover;

(xii) Proposed man-made features including, structures, roads, paved areas, and buildings;

(xiii) Final contours at intervals of two (2) feet, however in areas of steep slopes, five-foot contours intervals maybe used;

(xiv) Stormwater Management District boundaries applicable to the site;

(xv) 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 Stormwater conveyance system that may be affected by the project;

(xvi) Plan and profile drawings of all BMPs, including drainage structures, pipes, open channels, and wales;

(xvii) If provided in lieu of right-of-entry, an adequate access easement around all BMPs that would provide municipal ingress and egress from a public right-of-way;

(xviii) The location of all public water supply wells within 400 feet of the Project Site and all private water supply wells within 100 feet of the Project Site;

(xix) Expected project time schedule; and

(xx) A Soil Erosion and Sediment Control Plan, where applicable, as prepared for and submitted to the approval authority.

(4) Stormwater Management Facilities, including the following:

(i) Stormwater Runoff design computations and documentation as specified in this Ordinance.

(ii) The process for operation and maintenance of all existing and proposed, physical Stormwater Management Facilities which shall include long-term ownership and responsibilities for operation and maintenance as well as schedules and costs for operation and maintenance activities.

(iii) Justification in accordance with Sub-subsection 301(F)(3) if BMPs other than GI and LID methods and practices are proposed to

achieve the volume, rate, and water quality controls under this Ordinance.

SECTION 404. PLAN REVIEW

(A) The Township shall review the SWM Site Plan for consistency with the provisions of this Ordinance and with any permits issued by PADEP. The Township shall also review the SWM Site Plan against any additional storm drainage plan provisions contained in the Township's Subdivision and Land Development or zoning ordinance, as applicable.

(B) The Township shall notify the Applicant in writing within forty-five (45) days whether the SWM Site Plan is approved. If the SWM Site Plan involves a Subdivision and Land Development plan, the notification shall be consistent with the timeframes as established by the MPC. If a longer notification period is provided by other statue, regulation, or ordinance, the Applicant will be so notified.

(C) For any SWM Site Plan that proposes to use any BMPs other than GI or LID methods or practices to achieve the volume and rate controls required under this Ordinance, the Township will not approve the SWM Site Plan unless it determines that GI or LID methods and practices are not practicable in accordance with Sub-subsection 301(F)(3).

(D) The Township shall not approve any Subdivision or Land Development plan or zoning permit application if the SWM Site Plan has been found to be inconsistent with the Stormwater Management Plan.

SECTION 405. MODIFICATION OF SWM SITE PLANS

A modification to a SWM Site Plan, whether or not approved by the Township, that involves a change in BMPs or techniques; the relocation or redesign of BMPs is necessary because of outside agency approvals; or that soil or other conditions are not as stated on the SWM Site Plan as determined by the Township shall require a resubmission of a modified SWM Site Plan in accordance with Sections 402 and 404, above.

SECTION 406. AUTHORIZATION TO CONSTRUCT AND TERM OF VALIDITY

Unless a shorter time period is specified, the approval of a SWM Site Plan authorizes the Regulated Activities contained in the SWM Site Plan for a maximum validity of five (5) years following the date of approval. The validity period shall commence on the date the Township signs the approval for a SWM Site Plan. Unless otherwise agreed by the Applicant and the Township, if within the five (5) year validity period the 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 and recorded within this time; the SWM Site Plan shall be disapproved and any and all permits shall be deemed disapproved and any and all permits shall be deemed revoked or invalidated.

SECTION 407. AS-BUILT PLANS, COMPLETION CERTIFICATE, AND FINAL INSPECTIONS

(A) Every Applicant proposing to undertake Regulated Activities under this Ordinance shall be responsible for providing a record set of as-built plans of all BMPs included in the approved SWM Site Plan or ILGP. The as-built plans and an explanation of any discrepancies with the prior approved, construction plans shall be submitted to the Township.

(B) The as-built submission shall include a certification of completion signed by a Qualified Professional verifying that the permanent BMPs have been constructed according to the approved plans and specifications along with a metes and bounds description of the area encompassed by the BMPs.

(C) Following receipt of this information, the Township Engineer will perform a final inspection prior to the issuance of a Certificate of Occupancy or other approval, as applicable.

ARTICLE 5 – FEES AND EXPENSES

SECTION 501. GENERAL

Applicants shall be subject to the prevailing fees for Subdivisions and Land Developments or Individual Lot Grading Plans as set forth in the most current Township-adopted fee schedule.

ARTICLE 6 – OPERATION AND MAINTENANCE

Section 601. GENERAL REQUIREMENTS

(A) The SWM Site Plan for the Project Site shall describe the future operation and maintenance responsibilities for every Stormwater Management Facility. This description shall include, among other things, required routine maintenance actions and schedules necessary to ensure the proper operation of all Stormwater Management Facilities. It shall also include the names of, and all location and contact information for, the Persons and individuals responsible for such operation and maintenance. Ownership of permanent Stormwater

Management Facilities shall be at the discretion of the Township. The Township reserves the right to accept or reject ownership and operational and maintenance responsibility for any or all Stormwater Management Facilities.

(B) OWNERSHIP BY TOWNSHIP

(1) Where an approved SWM Site Plan provides for the dedication of permanent Stormwater Management Facilities to the Township, and the Township indicates its willingness to accept dedication; the Stormwater Management Facilities shall be located on a separate lot or lots and shall be dedicated to the Township subject to an agreement and related documents, satisfactory to the Township Solicitor. Upon unconditional acceptance of the offer of dedication, the Stormwater Management Facilities shall be operated and maintained by the Township. Nothing contained in this Ordinance or in an SWM Site Plan shall require the Township to accept dedication of a Stormwater Management Facility until the Township determines that it is constructed and operates in accordance with the requirements of the approved SWM Site Plan, the Land Development plan, and any other ordinances or requirements of the Township. The Applicant shall be responsible for the proper construction, operation, maintenance, and repair of each Stormwater Management Facility until the unconditional acceptance of an offer of dedication by the Township. Typically, all offers of dedication of Stormwater Management Facilities will be accepted at one time.

(2) Where an approved Land Development plan proposes Township ownership of a Stormwater Management Facility, the Stormwater Management Facility shall be located on a separate lot with deeded access to a public street, unless another method of access is approved by the Township.

(3) Upon acceptance by the Township of an offer of dedication, the Applicant shall pay to the Township a perpetual maintenance fee for each Stormwater Management Facility. The purpose of the fee shall be to defray the perpetual costs of insurance, operation, maintenance, inspections, and repair activities. The amount shall be determined by calculating the present value of the estimated annual costs for operation, maintenance, repair, inspection, and insurance for a period of fifty (50) years, as calculated by the Township Engineer.

(C) OWNERSHP BY PERSONS OTHER THAN THE TOWNSHIP

(1) Every Person installing, or causing the installation of, a privately owned Stormwater Management Facility shall execute a Stormwater Agreement

with the Township covering all Stormwater Management Facilities that are to be privately owned. The Stormwater Agreement shall be recorded as a restrictive covenant that runs with the land and the Owner shall bear the cost of recording the Stormwater Agreement.

(2) Where an approved SWM Site Plan provides for ownership of a Stormwater Management Facility by a Person other than the Township, then the operation and maintenance thereof shall be the responsibility of that Person or other approved entity in accordance with the Stormwater Agreement with the Township.

(3) The Owner is responsible for operation and maintenance of the Stormwater Management Facilities. If the Owner fails to adhere to the SWM Site Plan or the Stormwater Agreement, then the Township may perform the services required and charge the Owner appropriate fees. Nonpayment of fees may result in the institution of proceedings including, but not limited to, placing a lien against the property.

(4) The Township shall have a right-of-entry which shall extend to duly authorized employees or representatives of the Township and other governmental agencies upon presentation of proper credentials and upon reasonable notice to the Owner. The purpose of the right of entry shall be to inspect, investigate, or ascertain whether operation, maintenance, and repairs are being properly performed by the Owner. The right of entry shall extend also to emergency situations, in which case notice shall not be required. The purpose of such emergency entry shall be to undertake such activities as the Township determines are necessary to address the emergency.

(5) The Owner shall maintain all Stormwater Management Facilities in accordance with the SWM Site Plan and the Stormwater Agreement with the Township.

(6) The Owner shall keep on file with the Township the name, address (electronic and postal), and telephone number of any other Person responsible for operation and maintenance activities; and in the event of a change to any of that information the Owner shall submit updated information to the Township within ten (10) working days of the change.

(7) To the extent that the Owner is an association, the requirements of the SWM Site Plan and Stormwater Agreement shall be referenced in, and made a part of, a recorded declaration, which declaration shall be subject to the review and approval of the Township. The termination of an association shall not be approved unless and until arrangements have

been made satisfactory to the Township to cover the operation, maintenance, and repair of the Stormwater Management Facilities by a qualified Person.

(8) Facilities, areas, or structures used as Stormwater Management Facilities shall be enumerated as permanent real estate appurtenances and recorded as deed restrictions or conservation easements that run with the land. It shall be the obligation of every Owner to provide a copy of the Stormwater Agreement to every subsequent Owner.

(9) The Township may take enforcement actions against any Person for any failure to satisfy the provisions of this Article 6.

SECTION 602. RIGHT-OF-ENTRY

(A) Upon presentation of proper credentials and upon reasonable notice, the Township may enter at reasonable times upon any property located within the Township to inspect the condition of the Stormwater Management Facilities in regard to any aspect regulated by this Ordinance. The right of entry shall extend also to emergency situations, in which case notice shall not be required. The purpose of such emergency entry shall be to undertake such activities as the Township determines are necessary to address the emergency.

(B) Owner shall provide to the Township ready access to all parts of the property for the purposes of determining compliance with this Ordinance, the SWM Site Plan and the Stormwater Agreement.

(C) The Township shall have the right to temporarily locate on or in any Stormwater Management Facility such devices as are deemed necessary by the Township, to conduct monitoring and/or sampling of the discharges from such Stormwater Management Facility.

(D) Unreasonable delay in granting access to the Township to a Stormwater Management Facility for the purposes of enforcing this Ordinance shall constitute a violation of this Ordinance.

SECTION 603. INSPECTIONS

(A) The PADEP, LCCD, or their designees normally ensure compliance with any permits issued, including those for Stormwater management. In addition to PADEP compliance programs, the Township may inspect all phases of the construction, operations, maintenance, repair, and any other aspect of Stormwater Management Facilities.

(B) During any stage of a Regulated Earth Disturbance Activity, if the Township determines that any Stormwater Management Facilities are not being implemented in accordance with this Ordinance, the SWM Site Plan, or the Stormwater Agreement, the Township may take action in accordance with Article 8 hereof.

(C) Stormwater Management Facilities provided in accordance with this Ordinance shall be inspected by the Owner according to the inspection schedule described on the SWM Site Plan for each Stormwater Management Facility or, at a minimum, according to the following frequencies, to ensure that all Stormwater Management Facilities continue to function as intended.

(1) The Owner shall inspect the Stormwater Management Facilities annually for the first five (5) years;

(2) Once every three (3) years thereafter; and

(3) During and/or immediately after the cessation of a rainstorm producing three (3) or more inches of rainfall within a twenty-four (24) hour period.

All inspections shall be conducted during or immediately following precipitation events.

(D) A written inspection report shall be created to document each inspection and shall contain the date and time of the inspection, the names and contact information for the individual(s) who completed the inspection, the location of the Stormwater Management Facility inspected, observations concerning the Stormwater Management Facility performance, and recommendations for improving performance, if any.

(E) Inspection reports shall be submitted to the Township within thirty (30) days following completion of the inspection.

(F) If inspections are not conducted or inspection reports are not submitted as required, the Township may conduct such inspections and charge the owner an appropriate fee including staff charges, reasonable engineering/consulting fees, and reasonable attorney fees. Nonpayment of fees may result in the placement of a lien against the property or such other legal proceedings as appropriate. Prior to conducting inspections, the Township shall inform the Owner of its intent to conduct an inspection. The Owner shall be given thirty (30) days to make the required inspections and submit inspection reports to the Township.

(1) The Township may require copies of the inspection reports, in a form as stipulated by the Township.

(2) If inspections are not conducted or inspection reports are not submitted as scheduled, the Township may conduct such inspections and charge the Owner appropriate fees. Nonpayment of fees may result in a lien against the property. Prior to conducting inspections, the Township shall inform the Owner of its intent to conduct an inspection. The Owner shall be given 30 days to make the required inspections and submit inspection reports to the Township.

SECTION 604. RECORDING

(A) Where the Township has approved a Land Development, the SWM Site Plan shall be considered part of the record plan and shall be deemed incorporated into the record plan by reference.

(B) The Township may require in its sole discretion that the BMP O&M Plan be recorded with the record plan.

(C) The Stormwater Agreement shall be recorded by the Township at the cost of the Applicant.

(D) Where the requirement to install Stormwater Management Facilities is not due to a Land Development, the Applicant shall record all documents and agreements deemed appropriate by the Township. All recording costs shall be paid by the Applicant.

ARTICLE 7 – PROHIBITIONS

SECTION 701. PROHIBITED DISCHARGES

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

(B) No Person shall allow or cause to allow Stormwater discharges into a regulated small MS4, or discharges into waters of this Commonwealth, which are not composed entirely of Stormwater, except: (1) as provided in Subsection 701(C), below; and (2) discharges authorized under a state or federal permit.

(C) The following discharges are authorized unless they are determined by the Township to be significant contributors to pollution of a regulated MS4 or to the surface waters of this Commonwealth:

(1) Discharges or flows from firefighting activities;

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

(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; and

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

(D) In the event that the Township or PADEP determines that any of the discharges identified in Subsection 701(C) significantly contribute pollutants to a regulated small MS4 or to the waters of this Commonwealth, the Township or PADEP will notify the responsible Person(s) to cease the discharge.

(E) Upon notice provided by the Township under Section 803 (relating to notice), the discharger shall cease the discharge within a time period specified by the Township.

(F) Nothing in this Section shall affect a discharger's responsibilities under state or federal law.

SECTION 702. PROHIBITED CONNECTIONS

The following connections are prohibited, except as provided in Subsection 701(C) above:

(A) Any drains or conveyances, whether on the surface or subsurface, which allow any non-Stormwater discharge including sewage, process wastewater and wash water to enter the Separate Storm Sewer System and any connections to the storm drain system from indoor drains and sinks.

(B) Any drains or conveyances connected from a non-residential land use to the Separate Storm Sewer System which have not been documented in plans, maps or equivalent records and approved by the Township.

SECTION 703. ROOF DRAINS AND SUMP PUMPS

(A) Roof drains and sump pumps shall discharge to infiltration or vegetative BMPs or Pervious Areas.

(B) Unless approved by the Township, roof drains shall not be connected to streets, sanitary or Storm Sewers or roadside ditches.

(C) All discharge shall be setback from the right-of-way and the front and rear property lines by ten feet (10') and from the side property line by a minimum of five feet (5')

SECTION 704. ALTERATION OF STORMWATER MANAGEMENT FACILITIES

(A) No Person shall modify, remove, fill, landscape, or otherwise alter any Stormwater Management Facilities, easements, areas, or structures that were provided as a requirement of this Ordinance without the written approval of the Township. A note which indicates this requirement shall be included on the plan(s) to be recorded. In addition, the Owner or Developer shall impose covenants and restrictions upon subsequent Owners, transferees and occupants in a form satisfactory to the Township to carry out the intent of this Section 704.

(B) No Person shall place any structure, Fill, landscaping, or vegetation into a Stormwater Management Facility or within a Drainage Easement which would limit or alter the functioning of the Stormwater Management Facility or Drainage Easement without written approval of the Township.

SECTION 705. EFFECT OF STORMWATER AGREEMENT

The Stormwater Agreement shall run with the land and bind Owner and all subsequent Owners, transferees and occupants of the land. Any violation of the Stormwater Agreement shall constitute a violation of this Ordinance.

ARTICLE 8 ENFORCEMENT AND PENALTIES

SECTION 801. VIOLATIONS

The failure to comply with any provision of this Ordinance or any agreement as provided in this Ordinance shall constitute a violation of this Ordinance.

SECTION 802. PENALTIES AND ENFORCEMENT

Where it appears that there has occurred a violation of any provision of this Ordinance, the Township shall have the following remedies or any combination thereof:

(A) Issuance of a Cease and Desist Order;

(B) Suspension or revocation of any permits or approvals which have been granted by the Township related to the Regulated Activity pursuant to Section 804;

(C) Abatement by the Township and filing of a municipal lien in accordance with the Pennsylvania Municipal Claims and Tax Lien Law and applicable Township Ordinances or commencement of an action in assumpsit;

(D) Initiation of a summary criminal proceeding pursuant to Section 805;

(E) Commencement of a proceeding at law or in equity; and

(F) Any other remedies and penalties available to the Township as a matter of law.

SECTION 803. NOTICE OF VIOLATION

(A) Whenever the Township determines that there has occurred a violation of this Ordinance, it may order compliance by issuing a written Notice of Violation to the responsible Person(s).

(B) The Notice of Violation shall include the following:

(1) The date of the notice;

(2) The name of the Owner and any other Person against whom the Township intends to take action;

(3) The location of the property in violation;

(4) The nature of the violation;

(5) A statement of required action, which may include the following:

(i) The performance of monitoring, analysis, and reporting;

(ii) The elimination of prohibited connections or discharges;

(iii) Cessation of any prohibited discharges, practices, or operations;

(iv) The abatement or remediation of Stormwater pollution or contamination hazards and the restoration of any affected property;

(v) The implementation or construction of Stormwater Management Facilities;

(vi) Operation, repair, and maintenance of Stormwater Management Facilities; and/or

(vii) Such other action as the municipality deems appropriate to carry out the intent of this Ordinance.

(6) Establishment of a time limit for correction of the violation; and

(7) A statement of enforcement options and penalties available to the Township for failure to comply, as described in this Article 8.

(C) The failure to comply with a Notice of Violation shall subject the violator to the penalty provisions of this Ordinance. All such penalties shall be deemed cumulative and shall not prevent the Township from pursuing any and all other remedies available at law or equity.

(D) The occurrence of the violation shall be deemed to have commenced on the date of the Notice of Violation for the purposes of calculating penalties and costs for failure to comply with the Notice of Violation.

(E) Issuance of a Notice of Violation shall not be required where the Township reasonably determines that an emergency situation necessitates the immediate abatement of the violation.

SECTION 804. SUSPENSION AND REVOCATION

(A) Any approval or permit issued by the Township pursuant to this Ordinance may be suspended or revoked for:

(1) Non-compliance with or failure to implement any provision of the approved SWM Site Plan or Stormwater Agreement;

(2) A violation of any provision of this Ordinance or any other applicable law, ordinance, rule, or regulation relating to the Regulated Activity; or

(3) The creation of any condition or the commission of any act during the Regulated Activity which constitutes or creates a hazard, nuisance, pollution, or endangers the life or property of others.

(B) A suspended approval may be reinstated by the Township when:

(1) The Township has inspected and approved the corrections to the violations that caused the suspension;

(2) The Township is satisfied that the violation has been corrected; and

(3) Any PADEP approval necessitated by the violation has been obtained.

(C) Any suspension of, or refusal to reinstate, an approval or permit may be appealed to the Township Board of Supervisors pursuant to the Local Agency Law (2 Pa.C.S.A. § 105 *et seq.*).

SECTION 805. PENALTIES

(A) Any Person who shall violate any provision of this Ordinance shall, upon conviction thereof before a District Justice, be subject to a penalty or fine in an amount not less than $100.00 and not more than $1000.00, together with the costs of prosecution and attorney fees; and in default of payment of such penalty, fine, or costs, to imprisonment for a term not to exceed ninety (90) days for each such violation. Each day or portion thereof that such violation continues shall constitute a separate offense. The provisions of this Ordinance shall be enforced in the same manner as provided for the enforcement of summary offenses under the Pennsylvania Rules of Criminal Procedure.

(B) In addition, the Township may institute injunctive, mandamus, or any other appropriate action or proceeding at law or in equity or seek any other remedy available to the Township 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.

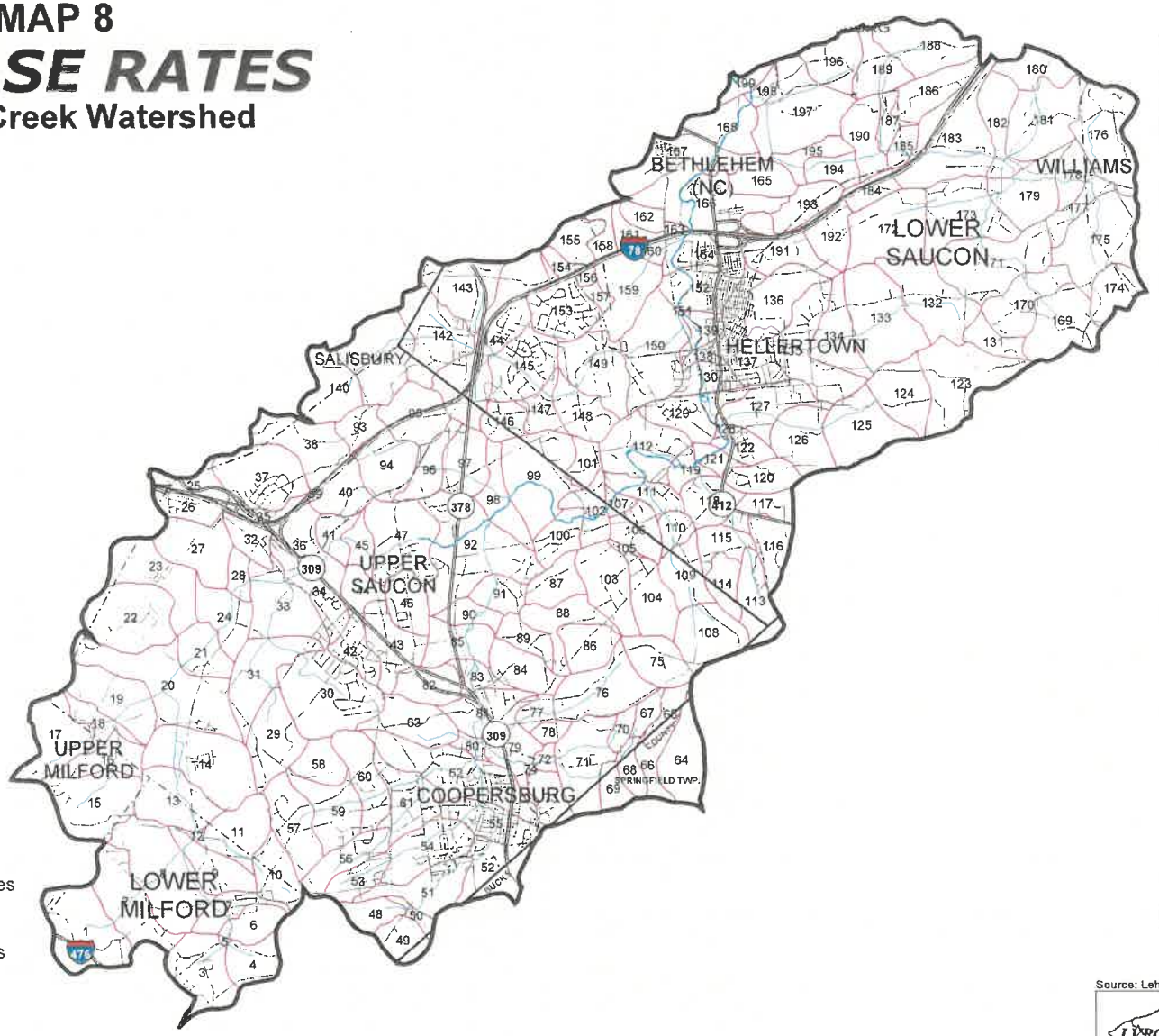
SECTION 806. INTEREST, FEES, AND COSTS

In any action at law or in equity brought by or against the Township pursuant to this Ordinance, the Township shall be entitled to claim and, if successful, in whole or in part, recover, interest at the legal rate or such other rate as specified by Ordinance and all costs and fees incurred, including without limitation reasonable attorneys' and consultants' fees. In any action brought by the Township pursuant to Section 805, the Township shall be entitled to claim and, if successful, in whole or in part, recover as restitution, interest at the legal rate and all costs and fees incurred, including without limitation reasonable attorneys' and consultants' fees.

MAP 8

RELEASE RATES

Saucon Creek Watershed



23 Subarea Boundaries

Watershed Boundaries

County Boundaries

Municipal Boundaries

Streams/Rivers

Major Roads

Minor/Other Roads

RELEASE RATE SUMMARY TABLE

Dual Release Rate Categories (30/–) define a 30% Release Rate for the 2-Year storm and the indicated Release Rate for the 10-, 25- and 100-Year storms.

SAUCON CREEK			
Subarea	Release Rate (%)	Subarea	Release Rate (%)
1 - 2	30/90	119	30/100
3 - 5	30/100	120	30/50
6 - 7	30/80	121 - 122	30/100
8	30/90	123 - 124	30/80
9	30/80	125 - 126	30/70
10	30/90	127	30/100
11 - 12	30/80	128 - 130	30/PND*
13 - 14	30/70	131 - 132	30/100
15 - 16	30/90	133	30/80
17 - 18	30/80	134 - 136	30/70
19 - 21	30/70	137	30/100
22 - 23	30/90	138 - 139	30/PND*
24	30/70	140	30/100
25 - 28	30/50	141 - 142	30/80
29	30/70	143	30/90
30	30/80	144	30/70
31	30/60	145 - 146	30/60
32	30/50	147 - 149	30/50
33 - 34	30/60	150	30/100
35 - 47	30/50	151 - 152	30/PND*
48	30/70	153 - 158	30/80
49	30/80	159	30/70
50	30/70	160 - 162	30/60
51 - 54	30/60	163 - 168	30/PND*
55	30/50	169 - 172	30/70
56	30/70	173	30/60
57	30/80	174	30/90
58 - 60	30/70	175 - 178	30/70
61	30/60	179	30/60
62	30/50	180 - 181	30/70
63	30/60	182	30/60
64 - 65	30/80	183 - 184	30/50
66	30/70	185 - 187	30/100
67	30/80	188	30/50
68	30/70	189	30/100
69	30/60	190	30/PND*
70	30/70	191	30/100
71 - 74	30/60	192	30/50
75	30/70	193	30/100
76 - 78	30/60	194 - 195	30/PND*
79 - 111	30/50	196	30/100
112	30/100	197 - 199	30/PND*
113 - 118	30/50		

*Provisional No Detention Areas do not need detention controls for the 10-, 25- or 100-year storms provided that adequate downstream capacity can be shown for increased peak flows. (See Plan Update for additional details.)

N

0 6,000 12,000 Feet

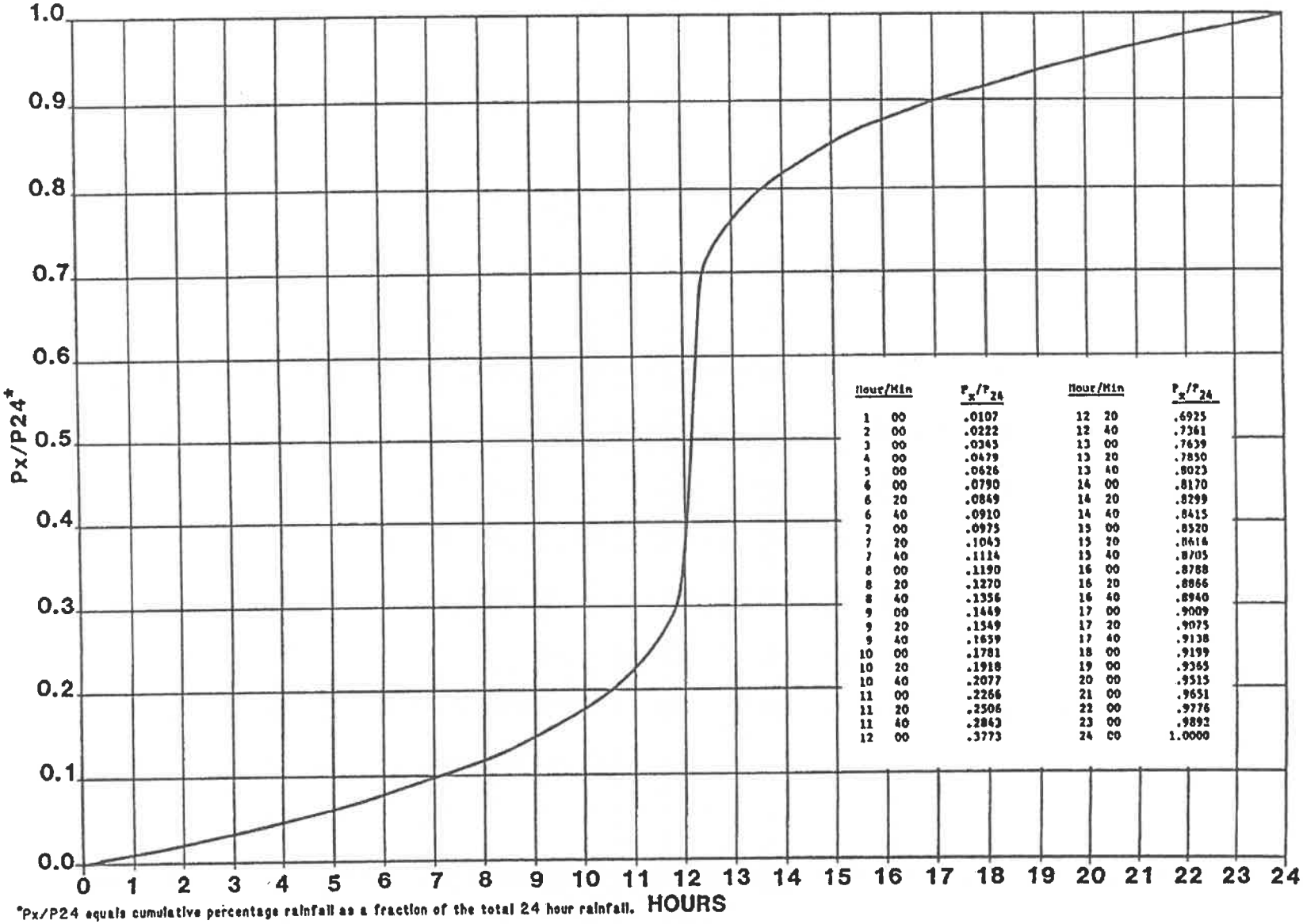
1" = 6,000'

Source: Lehigh Valley Planning Commission

LEHIGH VALLEY PLANNING COMMISSION
961 Marcon Boulevard, Suite 310
Allentown, PA 18109-9368
(610) 264-4544

APPENDIX A

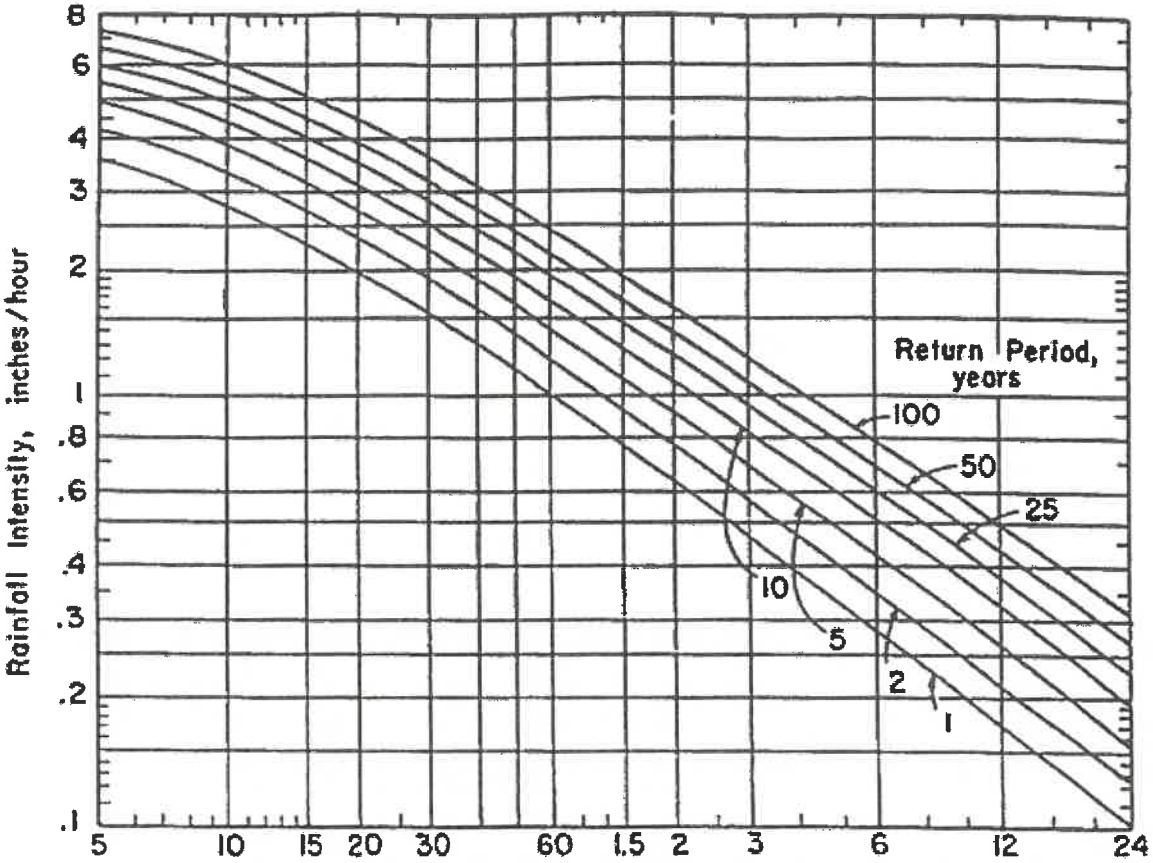
NRCS TYPE II RAINFALL DISTRIBUTION

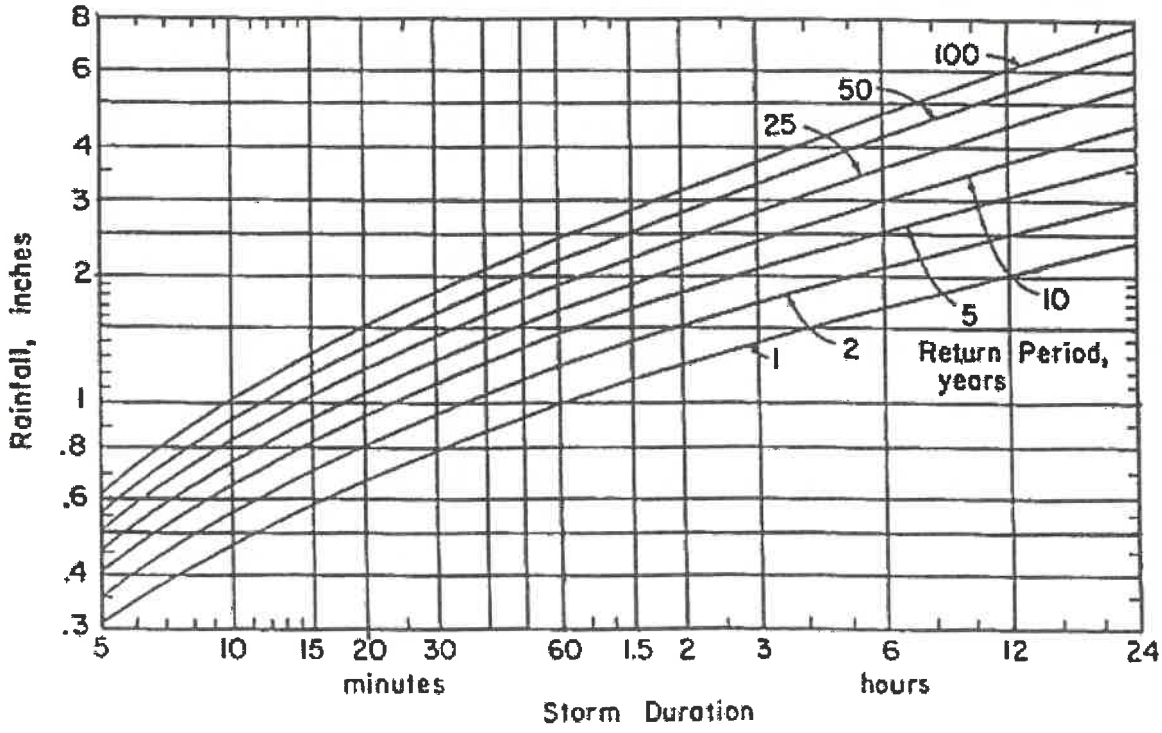


Hour/Min	P_x/P_{24}	Hour/Min	P_x/P_{24}
1 00	.0107	12 20	.6925
2 00	.0222	12 40	.7361
3 00	.0345	13 00	.7639
4 00	.0479	13 20	.7850
5 00	.0626	13 40	.8023
6 00	.0790	14 00	.8170
6 20	.0849	14 20	.8299
6 40	.0910	14 40	.8415
7 00	.0975	15 00	.8520
7 20	.1043	15 20	.8614
7 40	.1114	15 40	.8705
8 00	.1190	16 00	.8788
8 20	.1270	16 20	.8866
8 40	.1356	16 40	.8940
9 00	.1449	17 00	.9009
9 20	.1549	17 20	.9075
9 40	.1659	17 40	.9138
10 00	.1781	18 00	.9199
10 20	.1918	19 00	.9365
10 40	.2077	20 00	.9515
11 00	.2266	21 00	.9651
11 20	.2506	22 00	.9776
11 40	.2843	23 00	.9892
12 00	.3773	24 00	1.0000

*Px/P24 equals cumulative percentage rainfall as a fraction of the total 24 hour rainfall.

INTENSITY-DURATION-FREQUENCY CURVES*





*Source:Pennsylvania Dept. of Transp. Design Rainfall Curves (1986).

RUNOFF CURVE NUMBERS AND PERCENT IMPERVIOUSNESS VALUES*

Cover Description		Curve numbers for hydrologic soil group**			
Land Use/Cover Type	Average percent impervious area	A	B	C	D
Open space (lawns, parks, golf courses, cemeteries, etc.):					
Good condition (grass cover greater than 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
$\frac{1}{8}$ acre or less (townhouses)	65	77	85	90	92
$\frac{1}{4}$ acre	38	61	75	83	87
$\frac{1}{3}$ acre	30	57	72	81	86
$\frac{1}{2}$ acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Woods		30	55	70	77
Agriculture		Refer to Table 2-2b in source document (TR55) by crop type and treatment.			

*Source: Natural Resources Conservation Service Technical Release No. 55, Second Edition, June 1986.

**Hydrologic Soil Group based on the County Soil Survey latest edition.

RUNOFF COEFFICIENTS FOR THE RATIONAL METHOD*

HYDROLOGIC SOIL GROUP AND SLOPE RANGE**

LAND USE	A			B			C			D		
	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Cultivated[A]	[a]0.18 [b]0.23	0.23 0.29	0.28 0.34	0.24 0.30	0.29 0.36	0.33 0.40	0.30 0.36	0.34 0.41	0.38 0.45	0.33 0.39	0.37 0.44	0.41 0.48
Pasture[B]	0.09 0.12	0.13 0.17	0.17 0.23	0.19 0.24	0.24 0.30	0.29 0.36	0.27 0.33	0.31 0.38	0.36 0.43	0.31 0.37	0.35 0.42	0.39 0.46
Meadow, Lawn[C]	0.05 0.07	0.08 0.12	0.12 0.17	0.15 0.19	0.20 0.25	0.24 0.30	0.23 0.28	0.28 0.34	0.32 0.39	0.28 0.33	0.32 0.39	0.36 0.43
Forest, Woods	0.03 0.04	0.05 0.08	0.08 0.12	0.11 0.15	0.16 0.21	0.20 0.26	0.20 0.25	0.25 0.31	0.29 0.36	0.25 0.31	0.30 0.37	0.34 0.41
Gravel	0.24 0.30	0.29 0.36	0.33 0.40	0.32 0.38	0.36 0.43	0.40 0.47	0.35 0.42	0.39 0.46	0.43 0.50	0.37 0.44	0.41 0.48	0.44 0.51
Parking, Other Impervious	0.85 0.95	0.86 0.96	0.87 0.97	0.85 0.95	0.86 0.96	0.87 0.97	0.85 0.95	0.86 0.96	0.87 0.97	0.85 0.95	0.86 0.96	0.87 0.97
Residential, Commercial, Industrial and Other "Developed"	Runoff coefficients should be calculated based upon weighted average of impervious area coefficients and pervious area coefficients from above based upon soil type, slope and the particular development proposal.											

*Coefficients for all land uses except parking and other impervious cover are based on the Rossmiller Equation for translating NRCS curve numbers into Rational Method 'c' values. The source for the parking and other impervious cover coefficients is RAWLS, W.J., S.L. WONG and R.H. McCUEN, 1981. Comparison of urban flood frequency procedures. Preliminary draft report prepared for the Soil Conservation Service, Beltsville, MD.

**Hydrologic Soil Group based on the county soil survey latest edition.

a – Runoff coefficients for storm recurrence intervals less than 25 years.

b – Runoff coefficients for storm recurrence intervals of 25 years or more.

[A]Represents average of cultivated land with and without conservation treatment from TR-55, January 1975. These values are consistent with several categories of cultivated lands from TR-55, June 1986.

[B]Represents grasslands in fair condition with 50% to 75% grass cover.

[C]Represents grasslands in good condition with greater than 75% grass cover.

MANNING 'n' VALUES BY TYPICAL REACH DESCRIPTION

Reach Description	Manning 'n'
Natural stream, clean, straight, no rifts or pools	0.030
Natural stream, clean, winding, some pools and shoals	0.040
Natural stream, winding, pools, shoals, stony with some weeds	0.050
Natural stream, sluggish with deep pools and weeds	0.070
Natural stream or swale, very weedy or with timber under brush	0.100
Concrete pipe, culvert or channel	0.012
Corrugated metal pipe	0.012-0.027*

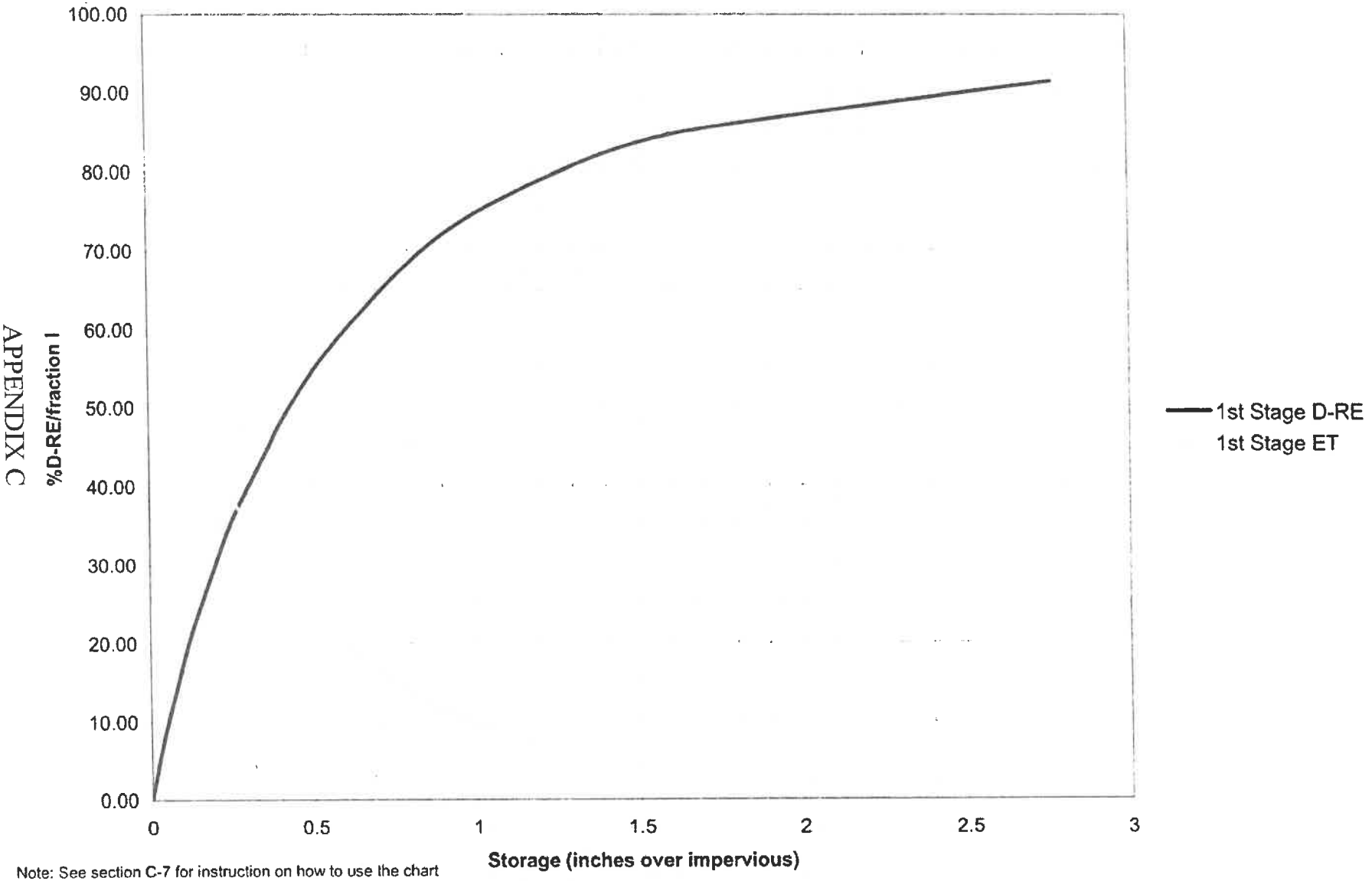
*Depending upon type and diameter.

ROUGHNESS COEFFICIENTS (MANNING 'n') FOR SHEET FLOW

Surface Description	Manning 'n'[1]
Smooth surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.050
Cultivated soils:	
Residue cover <= 20%	0.060
Residue cover > 20%	0.170
Grass:	
Short grass prairie	0.150
Dense grasses[2]	0.240
Bermuda grass	0.410
Range (natural)	0.130
Woods:[3]	
Light underbrush	0.400
Dense underbrush	0.800

[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 ft. This is the only part of the plant cover that will obstruct sheet flow.

% Direct Recharge (D-RE) per Fraction Impervious vs. Storage



Note: See section C-7 for instruction on how to use the chart

PERCENT D-RE PER FRACTION IMPERVIOUS VERSUS STORAGE CURVE USAGE INSTRUCTIONS

The "1st Stage D-RE" curve is based on impervious areas being diverted first to a D-RE BMP designed to capture less than the 2-year event, with the remaining 2-year runoff overflowing into an ET BMP. The "1st stage ET" curve is based on reversing the above. The curves may be used for the whole site, or for pieces of a site to achieve successful designs as follows:

A. If used for whole site designs, the "fraction I" used is the proposed impervious as a fraction of the entire site. As an example, for a 60% impervious site with all impervious directed to a first stage D-RE BMP, use 30% D-RE with 0.60 fraction I to yield 50% D-RE/fraction I and translate into 0.42 inches of storage over impervious areas. The total first stage D-RE maximum BMP storage is 0.42 inches of depth times the surface area of the impervious cover. Similarly, if a first stage ET BMP followed by a second stage D-RE BMP was used, the minimum ET storage is 0.15 inches over the impervious cover.

B. If used for pieces of the site smaller than the whole site, the fraction I used is the impervious cover of the part of the site in question as a fraction of the area of the same piece. Each piece may be designed for 30% D-RE if desired, but individual pieces may exceed 30% D-RE provided all BMPs on site are providing less than 30% D-RE in aggregate. In this case, the BMP storage for each piece is used in the chart with the fraction I using the whole site area to determine the contribution of each piece to the 30% D-RE allowable. As an example, still using the 60% impervious site, a piece of the site uses a D-RE BMP first. The piece is half of the total area of the site and is 80% impervious. The BMP is designed for 0.6 inches of runoff from the impervious surfaces. Using 0.6 inches of storage and a fraction I of 0.80, the piece is designed for (%D-RE/Fraction I = 60) 48% D-RE. The impervious cover in this piece has fraction I of 0.4 of the overall site acreage and, therefore, using 0.6 inches of storage and a fraction I of 0.4 yields a D-RE/ fraction I of 60% using the graph which solves to a D-RE of 24%. This means that this piece uses 24% of the allowable 30% D-RE. The remaining piece(s) will need to be designed for 6% or less D-RE. The remaining piece in this example has a fraction I of the overall site of 0.2. Using 6% D-RE and a fraction I of 0.2 yields a D-RE/fraction I of 30%. Entering the graph at that value, the maximum storage for the piece in a first stage D-RE BMP is 0.2 inches over the impervious portion of its tributary area.

C. If more than two stages of ET and D-RE BMPs are used to control the WQv, the design considerations are as follows:

1. If the design has a first stage ET BMP draining to additional stage ET BMPs and subsequent D-RE BMP, add the storage volumes of the ET BMPs and use this volume as the first stage ET storage volume.
2. Similarly, if two or more D-RE BMPs are used first followed by an ET BMP, add the storage volumes of the D-RE BMPs and use this volume as the first stage D-RE storage volume.

3. In designs with more than two ET or D-RE BMPs used in series to control the WQv and rules C.1 and C.2 don't apply, the chart shall be applied conservatively to assure the D-RE standard is not violated. For example, with proposed use of a first stage D-RE BMP, second stage ET BMP, and third stage D-RE BMP, all storage provided shall be assumed to be D-RE for use in the chart. Essentially, any ET BMP applied beyond the first stage will be ignored for purposes of determining compliance with the D-RE standard.

APPENDIX D

Recommendation Chart for Infiltration Stormwater Management BMPs in Carbonate Bedrock*

SITE RISK FACTORS																												
	Geology Type	CARBONATE BEDROCK																										
	Effective Soil Thickness	Less than 2 Feet	2 to 4 Feet							Over 4 Feet to 8 Feet									Over 8 Feet									
	Special Geologic Features**	Low/Med/High Buffer	Low Buffer			Medium Buffer			High Buffer				Low Buffer			Medium Buffer			High Buffer				Low Buffer			Medium Buffer			High Buffer		
SITE INVESTIGATION RECOMMENDED		(Unacceptable)	Preliminary			Preliminary			Preliminary				Preliminary			Preliminary			Preliminary				Preliminary			Preliminary			Preliminary		
DESIGN FACTORS	Infiltration Loading Rates (% increase)***	(Unacceptable)	0-100%	100-300%	300 - 500%	0-100%	100-300%	300 - 500%	0-100%	100-300%	300 - 500%		0-100%	100-300%	300 - 500%	0-100%	100-300%	300 - 500%	0-100%	100-300%	300 - 500%		0-100%	100-300%	300 - 500%	0-100%	100-300%	300 - 500%	0-100%	100-300%	300 - 500%
PROGRAM SUMMARY GUIDANCE ****						1	1				1		2								1		2					1			

RECOMMENDED

NOT RECOMMENDED

* Source. Developed by Cahill Associates based on information in "Technical Best Management Practice Manual & Infiltration Feasibility Report", November 2002 and input from the LVPC. 2003.

** Special Geologic Feature Buffer widths are as follows:

Low Buffer is less than 50 feet
Medium Buffer is 50 feet to 100 feet
High Buffer is greater than 100 feet

*** Rates greater than 500% not recommended.

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

1 Infiltration systems may be allowed at the determination of the Engineer and/or Geologist, provided that a Detailed Site Investigation is undertaken which confirms nature of rock, location of Special Geologic Features, and adequacy of the buffer between the SGF and the proposed stormwater system(s).

2 In these Special Geologic Features, Low Buffer situations, infiltration systems may be allowed at the determination of the Engineer and/or Geologist, provided that a Detailed Site Investigation is undertaken and a 25 foot buffer from SGFs is maintained.

Note: Buffers shall be in accordance with this Ordinance and the Upper Saucon Township Zoning Ordinance, as amended. The terms "Engineer" and "Geologist" shall be defined as "Township Geotechnical Consultant".

LIST OF ACCEPTABLE BMPs

Best Management Practice	Design Reference Number[C]
Bioretention[A]	4, 5, 11, 16
Capture/Reuse[B]	4, 14
Constructed Wetlands	4, 5, 8, 10, 16
Dry Extended Detention Ponds	4, 5, 8, 12, 18
Minimum Disturbance/ Minimum Maintenance Practices	1, 9
Significant Reduction of Existing Impervious Cover	N/A
Stormwater Filters[A] (Sand, Peat, Compost, etc.)	4, 5, 10, 16
Vegetated Buffers/Filter Strips	2, 3, 5, 11, 16, 17
Vegetated Roofs	4, 13
Vegetated Swales[A]	2, 3, 5, 11, 16, 17
Water Quality Inlets[D]	4, 7, 15, 16, 19
Wet Detention Ponds	4, 5, 6, 8

[A] This BMP could be designed with or without an infiltration component. If infiltration is proposed, the site and BMP will be subject to the testing and other infiltration requirements in this Ordinance.
[B] See table below.
[C] Water Quality Inlets include such BMPs as Oil/Water Separators, Sediment Traps/Catch Basin Sumps, and Trash/Debris Collectors in Catch Basins.

Number	Design Reference Title
1	"Conservation Design For Stormwater Management – A Design Approach to Reduce Stormwater Impacts From Land Development and Achieve Multiple Objectives Related to Land Use", Delaware Department of Natural Resources and Environmental Control, The Environmental Management Center of the Brandywine Conservancy, September 1997
2	"A Current Assessment of Urban Best Management Practices: Techniques for Reducing Nonpoint Source Pollution in the Coastal Zone", Schueler, T. R., Kumble, P. and Heraty, M., Metropolitan Washington Council of Governments, 1992.
3	"Design of Roadside Channels with Flexible Linings", Federal Highway Administration, Chen, Y. H. and Cotton, G. K., Hydraulic Engineering Circular 15, FHWA-IP-87-7, McLean Virginia, 1988.

LIST OF ACCEPTABLE BMPs

Number	Design Reference Title
4	"Stormwater Best Management Practices Manual", Pennsylvania Department of Environmental Protection, December 2006.
5	"Evaluation and Management of Highway Runoff Water Quality", Federal Highway Administration, FHWA-PD-96-032, Washington, D.C., 1996.
6	"Evaporation Maps of the United States", U.S. Weather Bureau (now NOAA/National Weather Service) Technical Paper 37, Published by Department of Commerce, Washington D.C., 1959.
7	"Georgia Stormwater Manual", AMEC Earth and Environmental, Center for Watershed Protection, Debo and Associates, Jordan Jones and Goulding, Atlanta Regional Commission, Atlanta, Georgia, 2001.
8	"Hydraulic Design of Highway Culverts", Federal Highway Administration, FHWA HDS 5, Washington, D.C., 1985 (revised May 2005).
9	"Low Impact Development Design Strategies *An Integrated Design Approach*, Prince Georges County, Maryland Department of Environmental Resources, June 1999.
10	"Maryland Stormwater Design Manual", Maryland Department of the Environment, Baltimore, Maryland, 2000.
11	"Pennsylvania Handbook of Best Management Practices for Developing Areas", Pennsylvania Department of Environmental Protection, 1998.
12	"Recommended Procedures for Act 167 Drainage Plan Design", LVPC, Revised 1997.
13	"Roof Gardens History, Design, and Construction", Osmundson, Theodore. New York: W.W. Norton & Company, 1999.
14	"The Texas Manual on Rainwater Harvesting", Texas Water Development Board, Austin, Texas, Third Edition, 2005.
15	"VDOT Manual of Practice for Stormwater Management", Virginia Transportation Research Council, Charlottesville, Virginia, 2004.
16	"Virginia Stormwater Management Handbook", Virginia Department of Conservation and Recreation, Richmond, Virginia, 1999.
17	"Water Resources Engineering", Mays, L. W., John Wiley & Sons, Inc., 2005.
18	"Urban Hydrology for Small Watersheds", Technical Report 55, US Department of Agriculture, Natural Resources Conservation Service, 1986.
19	US EPA, Region 1 New England web site (as of August 2005) http://www.epa.gov/NE/assistance/ceitts/stormwater/techs/html.

LIST OF ACCEPTABLE BMPs

PRE-TREATMENT METHODS FOR "HOT SPOT" LAND USES

Hot Spot Land Use	Pre-treatment Method(s)
Vehicle Maintenance and Repair Facilities including Auto Parts Stores	-Water Quality Inlets -Use of Drip Pans and/or Dry Sweep Material Under Vehicles/Equipment -Use of Absorbent Devices to Reduce Liquid Releases -Spill Prevention and Response Program
Vehicle Fueling Stations	-Water Quality Inlets -Spill Prevention and Response Program
Storage Areas for Public Works	-Water Quality Inlets -Use of Drip Pans and/or Dry Sweep Material Under Vehicles/Equipment -Use of Absorbent Devices to Reduce Liquid Releases -Spill Prevention and Response Program -Diversion of Stormwater away from Potential Contamination Areas
Outdoor Storage of Liquids	-Spill Prevention and Response Program
Commercial Nursery Operations	-Vegetated Swales/Filter Strips -Constructed Wetlands -Stormwater Collection and Reuse
Salvage Yards and Recycling Facilities*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Fleet Storage Yards and Vehicle Cleaning Facilities*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Facilities that Store or Generate Regulated Substances*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Marinas*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit
Certain Industrial Uses (listed under NPDES)*	-BMPs that are a part of a Stormwater Pollution Prevention Plan under an NPDES Permit

*Regulated under the NPDES Stormwater Program

Design references for the pre-treatment methods, as necessary, are listed below. If the applicant can demonstrate to the satisfaction of the municipality that the proposed land use is not a Hot Spot, then the pre-treatment requirement would not apply.

LIST OF ACCEPTABLE BMPs

Pre-treatment Method	**Design Reference[A]**
Constructed Wetlands	5, 6, 10, 12, 18
Diversion of Stormwater Away from Potential Contamination Areas	5, 13
Stormwater Collection and Reuse (especially for irrigation)	5, 16
Stormwater Filters (Sand, Peat, Compost, etc.)	5, 6, 12, 18
Vegetated Swales	2, 4, 6, 13, 18, 19
Water Quality Inlets	5, 9, 17, 18, 21

[A]These numbers refer to the Design Reference Title Chart in beginning on page H-1.