STORMWATER MANAGEMENT ORDINANCE

ORDINANCE NO. 2022-01

MUNICIPALITY OF

DOVER TOWNSHIP

YORK COUNTY, PENNSYLVANIA

Adopted at a Public Meeting Held on

July 25th, 2022

ARTICLE I – GENERAL PROVISIONS

Section 101. Short Title

This Ordinance shall be known and may be cited as the "(Name of Municipality) Stormwater Management Ordinance."

Section 102. Statement of Findings

The governing body of the municipality finds that:

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

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

D. 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.

E. Federal and state regulations require certain municipalities to implement a program of stormwater controls called a Municipal Separate Storm Sewer System (MS4) Program. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES) program.

Section 103. Purpose

The purpose of this Ordinance is to promote health, safety, and welfare within the municipality and its 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. Preserve natural drainage systems.

C. Manage stormwater runoff close to the source, reduce runoff volumes, and mimic pre-development 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 streambeds.

G. Provide proper operation and maintenance of all stormwater best management practices (BMPs) that are implemented within the municipality.

H. Provide standards to meet and enforce NPDES permit requirements.

I. Create a platform with which to advocate and grow the use of low-impact development procedures and green infrastructure.

J. Protecting people and property from the known and unknown changes to our climate and weather patterns.

Section 104. Statutory Authority

The municipality is empowered to regulate land use activities that affect runoff by the authority of the Act of July 31, 1968, P.L. 805, No. 247, The Pennsylvania Municipalities Planning Code, as amended, and/or the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. Section 680.1, et seq., as amended, The Stormwater Management Act.

Section 105. Applicability

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

Section 106. Repealer

It is the intent of this Ordinance to replace in its entirety Chapter 19, "Stormwater Management," and that the provisions of this Ordinance shall control the management of stormwater within Dover Township and shall conform to the numbering system in Chapter 19 of the Dover Township Code of Ordinances.

Section 107. Severability

In the event that 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 Requirements

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 code, law, regulation, or ordinance.

Section 109. Erroneous Permit

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

Section 110. Waivers

A. If the Municipality determines that any requirement under this Ordinance cannot be achieved for a particular regulated activity, the Municipality may, after an evaluation of alternatives, approve measures other than those in this Ordinance, subject to Section 110, paragraphs B and C.

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

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

Section 111. Amendment

Amendments to the Appendices and Tables attached to this chapter may be made from time to time by Resolution of the approval body, and reference to such amendments shall be listed in a new Appendix E - "Amendments to Appendices and Tables."

ARTICLE II – DEFINITIONS

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

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

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

C. The words "shall" and "must" are mandatory; the words "may" and "should" are permissive.

D. Any term defined within 25 PA Code (Chapter 102) shall be the default definition.

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

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 and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

Applicant – A landowner, developer, or other person who has filed an application to the municipality for approval to engage in any regulated activity at a project site in the municipality.

As Built Plans – also refered to as Record Plans or As Built Drawings, are a set of plans, required to be submitted to the Township by the developer, at the completion of the project, showing the actual constructed size, location, elevation and detail of all SWM BMPs included in the approved SWM Site Plan. As built plans shall meet the requirements of Section 2.7- As Built Drawings of the Dover Township Construction Specifications and Section 408 of this ordinance.

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

CG-1 – A standard method for design flood estimation in ungauged catchments that investigates set design storms characterized by a specific duration, temporal distribution, rainfall intensity, return frequency, and total depth of rainfall.

CG-2 – A simplified method for design storm estimation that is focused on capturing and removing the first flush of stormwater runoff. This method is applicable to designing projects with a land disturbance of 0.5 acres or less.

Clean Water Act (CWA) – Means the Federal Water Pollution Control Act, as amended, 33 U.S.C.A. §§ 1251 - 1387.

Cleaning Agent – Any product, substance, or chemical other than water that is used to clean.

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

Designated Uses – Uses specified in 25 Pa. Code §§ 93.4(a) and 93.9a – 93.9z for each water body or segment whether or not they are being attained. (25 Pa. Code § 93.1)

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

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

DEP – The Pennsylvania Department of Environmental Protection.

Development Site (Site) – See Project Site.

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

Dry Weather – Condition in which there are no precipitation, snowmelt, drainage or other events producing a stormwater discharge for more than 48 consecutive hours.

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.

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

FEMA – Federal Emergency Management Agency.

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. It also includes areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania DEP Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by DEP).

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

Forest Management/Timber Operations – Planning and activities necessary for the management of forestland. These include conducting a timber inventory, preparation of forest management plans,

silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, site preparation, and reforestation.

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

HEC-RAS (Hydrological Engineering Centre – River Analysis System) – Is a one-dimensional hydraulic modeling program based on four types of analysis in rivers: Steady Flow, Unsteady Flow, Sediment Transport, and Water Quality Analysis. Models simulate the flow in natural riverbeds or artificial channels to determine water levels using various data inputs. HEC-RAS Analyses are primarily developed for flood studies and determining potential drainage impacts to waterways.

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

Illicit Connection – Any physical connection to a municipal separate storm sewer system that can convey illicit discharges into the system.

Illicit Discharge – Any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except non-stormwater discharges as described in the "Discharges Authorized by this General Permit" section of this General Permit. Examples of illicit discharges include dumping of motor vehicle fluids, household hazardous wastes, grass clippings, leaf litter, animal wastes, or unauthorized discharges of sewage, industrial waste, restaurant wastes, or any other non-stormwater waste into a municipal separate storm sewer system. Illicit discharges can be accidental or intentional.

Impaired Waters – Surface waters that fail to attain one or more of its designated uses under 25 Pa. Code Chapter 93 and as listed in Categories 4 and 5 of Pennsylvania's Integrated Water Quality Monitoring and Assessment Report.

Impervious Surface (Impervious Area) – A surface that prevents the infiltration of water into the ground. Impervious surfaces (or areas) shall include, but not be limited to: roofs; additional indoor living spaces, patios, garages, tongue and groove trex deck, storage sheds, and similar structures; and any new streets, driveway, access drives, parking areas, and sidewalks. Any areas designed to be covered by loose surfacing materials such as gravel, stone, and/or crushed stone and intended for storage of and/or travel by motorized or non-motorized vehicles or travel by pedestrians shall be considered impervious. Surfaces or areas designed, constructed, and maintained to permit infiltration as specified herein may be considered pervious. For the purposes of this Ordinance, a surface or area, such as a wooden deck with gaps between the boards, shall not be considered impervious if such surface or area does not diminish the capacity for infiltration of stormwater for storms up to, and including, a two (2)-year, 24-hour storm event.

Infiltration Testing – That testing performed with a double-ring infiltrometer in accordance with the current edition of the BMP Manual, at the location and elevation of the bottom of the proposed facility. Guidance for Infiltration Testing is found in Appendix C of this ordinance.

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

Land Development (Development) – Inclusive of any or all of the following meanings: (i) the improvement of one lot or two or more contiguous lots, tracts, or parcels of land for any purpose involving (a) a group of two or more buildings or (b) the division or allocation of land or space between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups, or other features; (ii) any subdivision of land; (iii) development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

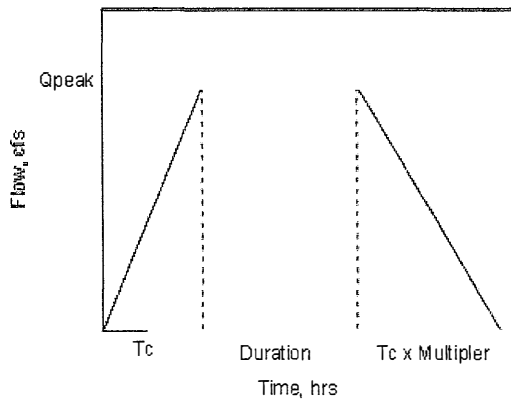
Low Impact Development (LID) – Site design approaches and small-scale stormwater management practices that promote the use of natural systems for infiltration, evapotranspiration, and reuse of rainwater. LID can be applied to new development, urban retrofits, and revitalization projects. LID utilizes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

Municipal Separate Storm Sewer – A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a State, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, stormwater, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to surface waters; (ii) Designed or used for collecting or conveying stormwater; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2. (25 Pa. Code § 92a.32(a) and 40 CFR § 122.26(b)(8))

Municipal Separate Storm Sewer System (MS4) – All separate storm sewers that are defined as “large” or “medium” or “small” municipal separate storm sewer systems pursuant to 40 CFR §§ 122.26(b)(4), (b)(7), and (b)(16), respectively, or designated under 40 CFR § 122.26(a)(1)(v). (25 Pa. Code § 92a.32(a) and 40 CFR § 122.26(b)(18))

Municipality – A city, town, borough, county, township, school district, institution, authority, or other public body created by or pursuant to State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes. (25 Pa. Code § 92a.2)

Modified Rational Method – The Modified Rational Method provides a way to calculate the hydrograph from a catchment-based on rational method C values and the peak intensity. There is no "loss method" associated with the modified rational method. The underlying assumption is that the peak intensity is maintained for a long enough duration to reach peak flow at the outlet of the catchment. This results in a trapezoidal hydrograph, as shown below.



Qpeak is determined from the rational method (see definition for "Rational Method").

Q = C i A

When using English units, i is intensity in: in/hr, A = area, acres, Q = flow, cfs, and C is runoff coefficient, dimensionless. The time to reach the peak is based on the time of concentration in the catchment, which the user can manually enter or calculate using a variety of methods ("Rational Method"). The length of the recession leg is based on the time of concentration times a recession multiplier which is set in the calculations options. The intensity and duration are taken from the IDF curves (tables) based on the duration and frequency (return period) of the storm.

Non-Structural BMPs – Actions that involve management and source controls such as (1) policies and ordinances that provide requirements and standards to direct growth to identified areas, promote redevelopment, protect areas such as wetlands and riparian areas, maintain and/or increase open space, provide buffers along water bodies, minimize impervious surfaces, and minimize disturbance of soils and vegetation; (2) education programs for developers and the public about minimizing water quality impacts; (3) measures such as minimizing the percentage of impervious area after development, use of measures to minimize directly connected impervious areas, and source control measures such as good housekeeping, maintenance, and spill prevention; and other BMPs as referenced in the current version of the Pennsylvania Stormwater BMP Manual.

NRCS – Natural Resources Conservation Service, a subset of the United States Department of Agriculture.

Ordinance – A law enacted by the government of a municipality.

Outfall – A point source as defined by 40 CFR § 122.2 at the point where a municipal separate storm sewer discharges to surface waters and does not include open conveyances connecting two municipal separate storm sewers, or pipes, tunnels, or other conveyances which connect segments of the same stream or other surface waters and are used to convey surface waters. (25 Pa. Code § 92a.32(a) and 40 CFR § 122.26(b)(9))

Owner or Operator – The owner or operator of any "facility" or "activity" subject to regulation under the NPDES program. (25 Pa. Code § 92a.3(b)(1) and 40 CFR § 122.2)

Permittee – The owner or operator of a regulated small MS4 authorized to discharge under the terms of this General Permit.

Point Source – A discernible, confined, and discrete conveyance, including, but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, Concentrated Aquatic Animal Production Facility (CAAP), Concentrated Animal Feeding Operation (CAFO), landfill leachate collection system, or vessel or other floating craft from which pollutants are or may be discharged. (25 Pa. Code § 92a.2)

Pollutant – any contaminant or other alteration of the physical, chemical, biological, or radiological integrity of surface water which causes or has the potential to cause pollution as defined in section 1 of the Pennsylvania Clean Streams Law, 35 P.S. § 691.1. (25 Pa. Code § 92a.2)

Peak Discharge – The maximum rate of stormwater runoff from a specific storm event.

Pervious Area – Any area not defined as impervious.

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

PSRM – The Penn State Runoff Model.

PULS Method – The Modified PULS routing method, also known as storage routing or level-pool routing, is based upon a finite difference approximation of the continuity equation, coupled with an empirical representation of the momentum equation (Chow, 1964; Henderson, 1966).

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

Rational Method – The Rational method solves for peak discharge based on watershed area, Rational coefficient, and rainfall intensity for the watershed. The following equation is used to compute flow using the Rational method:

$$Q = CiA$$

Q = Flow (cfs) for drainage area A

C = Weighted runoff coefficient for drainage area A

i = Intensity (in/hr.) for the given design frequency and storm duration (this value is taken from the I-D-F curves for your design area)

A = Drainage area (acres)

C, the Rational coefficient, is the parameter that is most open to engineering judgment. In many cases, an area-weighted average of C coefficients is used as the C for the entire drainage area.

Regulated Activities – Any earth disturbance activities or any activities that involve the alteration or development of land in a manner that may affect stormwater runoff.

Regulated Earth Disturbance Activity – Activity involving earth disturbance subject to regulation under 25 Pa. Code 92, 25 Pa. Code 102, or the Clean Streams Law.

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

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

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

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

Small Projects Guide – Option of Stormwater Management Guidance, found in Apendix D of this ordinance, for regulated activities that propose 501 to 2,000 square feet of new impervious area.

Stormwater – Runoff from precipitation, snow melt runoff, and surface runoff and drainage. "Stormwater" has the same meaning as "storm water." (25 Pa. Code § 92a.2)

Structural BMPs – Stormwater storage and management practices including, but not limited to, wet ponds and extended detention outlet structures; filtration practices such as grassed swales, sand filters, and filter strips; infiltration practices such as infiltration basins and infiltration trenches; and other BMPs as referenced in current version of the Pennsylvania Stormwater BMP Manual (363-0300-002).

Surface Waters – perennial and intermittent streams, rivers, lakes, reservoirs, ponds, wetlands, springs, natural seeps, and estuaries, excluding water at facilities approved for wastewater treatment such as wastewater treatment impoundments, cooling water ponds, and constructed wetlands used as part of a wastewater treatment process. (25 Pa. Code § 92a.2)

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

SCS Curve Number Method – The SCS curve number method is simple, widely used, and an efficient method for determining the approximate amount of runoff from a rainfall event in a particular area. Although the method is designed for a single storm event, it can be scaled to find average annual runoff values. The curve number is based on the area's hydrologic soil group, land use, treatment, and hydrologic condition.

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.

Stormwater – Drainage runoff from the surface of the land resulting from precipitation or snow or ice melt.

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

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

Stormwater Management Site Plan will be designated as **SWM Site Plan** throughout this Ordinance.

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

Total Maximum Daily Load (TMDL) – the sum of individual waste load allocations for point sources, load allocations for nonpoint sources and natural quality and a margin of safety expressed in terms of mass per time, toxicity, or other appropriate measures. (25 Pa. Code § 96.1)

Urbanized Area (UA) – land area comprising one or more places (central place(s)) and the adjacent densely settled surrounding area (urban fringe) that together have a residential population of at least 50,000 and an overall population density of at least 1,000 people per square mile, as defined by the United States Bureau of the Census and as determined by the latest available decennial census. The UA outlines the extent of automatically regulated areas.

Wasteload Allocation (WLA) – the portion of a surface water's loading capacity that is allocated to existing and future point source discharges. (25 Pa. Code § 96.1)

Water Quality Criteria – numeric concentrations, levels or surface water conditions that need to be maintained or attained to protect existing and designated uses. (25 Pa. Code § 93.1)

Water Quality Standards – the combination of water uses to be protected and the water quality criteria necessary to protect those uses. (25 Pa. Code § 92a.2)

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

Watershed – Region or area drained by a river, watercourse, or other surface water of this Commonwealth.

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

USDA – United States Department of Agriculture.

ARTICLE III – STORMWATER MANAGEMENT STANDARDS

Section 301. General Requirements

a. Regulated activities are subject to the following permitting requirements:

i. Regulated activities that propose up to 500 square feet of new impervious (measured cumulatively from the adoption date of this ordinance) qualify to pay a fee in lieu of completing a stormwater management plan. Payment of a fee does not alleviate the applicant from the management of stormwater or the regulatory requirements of this ordinance. This fee shall be determined by resolution.

ii. Regulated activities that propose 501 to 2,000 square feet of new impervious area qualify for utilization of the small projects guide contained within this ordinance. (See Appendix D).

iii. Regulated activities that propose greater than 2,000 square feet of new impervious area shall be required to submit a stormwater management plan that meets the requirements set forth in Section 401.

iv. Alternate methods of volume control contained in the PA STORMWATER BMP Manual, where appropriate, may be considered.

v. No regulated activities shall commence until the municipality issues written approval of a SWM Site Plan or other applicable authorization which demonstrates compliance with the requirements of this Ordinance.

B. SWM Site Plans approved by the municipality, in accordance with Section 406, shall be on site throughout the duration of the regulated activity.

C. The municipality may, after consultation with DEP, approve measures for meeting the state water quality requirements other than those in this Ordinance, provided that they meet the minimum requirements of, and do not conflict with, state law including, but not limited to, the Clean Streams Law.

D. For all regulated earth disturbance activities, erosion and sediment control BMPs shall be designed, implemented, operated, and maintained during the regulated earth disturbance activities (e.g., during construction beginning with initial topsoil removal and through the conversion and operation of all Post Construction Stormwater Management 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 BMPs and their design standards are listed in the *Erosion and Sediment Pollution Control Program Manual* (E&S Manual[3]), No. 363-2134-008, as amended and updated.

E. Impervious areas:

1. The measurement of impervious areas shall include all of the impervious areas in the total proposed development, even if development is to take place in stages.

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

3. For projects that add impervious area to a parcel, the total impervious area on the parcel is subject to the requirements of this Ordinance; except that the volume controls in Section 303 and the peak rate controls of Section 304 do not need to be retrofitted to existing impervious areas that are not being altered by the proposed regulated activity.

F. Stormwater flows onto adjacent property shall not be created, increased, decreased, relocated, or otherwise altered without a recorded easement. Such stormwater flows shall be subject to the requirements of this Ordinance. Water discharges cannot be discharged within 10' of the property line unless there is an existing recorded easement.

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

1. Protect health, safety, and property.

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

a. Minimize disturbance to floodplains, wetlands, and wooded areas.

b. Maintain or extend riparian buffers.

c. Avoid erosive flow conditions in natural flow pathways.

d. Minimize thermal impacts to waters of this Commonwealth.

e. Disconnect impervious surfaces by directing runoff to pervious areas, wherever possible.

3. Incorporate methods described in the *Pennsylvania Stormwater Best Management Practices Manual* (BMP Manual[4]). If methods other than green infrastructure and LID methods 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 LID and green infrastructure is not practicable.

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

I. Infiltration BMPs should be spread out, made as shallow as practicable, and located to maximize use of natural on-site infiltration features while still meeting the other requirements of this Ordinance.

J. Normally dry, open top, storage facilities should completely drain both the volume control and rate control capacities over a period of time not more than 72-hours from the end of the design storm.

K. The design storm volumes to be used in the analysis of peak rates of discharge should be obtained from the latest version of the Precipitation-Frequency Atlas of the United States, National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland. NOAA's Atlas 14[5] can be accessed at: http://hdsc.nws.noaa.gov/hdsc/pfds/.

L. For all regulated activities, SWM BMPs 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. Various BMPs and their design standards are listed in the BMP Manual[4].

M. Financial Security for the completion of stormwater management facilities is set forth in Section 408 of this ordinance.

N. Prior to the full release of financial security, the applicant shall be responsible for providing a Record Plan of all stormwater management facilities included in the approved stormwater management plan. The Record Plan and an explanation of any discrepancies with the design plans shall be submitted to the Municipality or its designee for final approval. The Record Plan shall include a final certification as required by Chapter 102 from an Engineer, Landscape Architect, Surveyor, or other qualified person registered in the Commonwealth of Pennsylvania.

Section 302. Exemptions

A. Agricultural activity is exempt from the SWM Site Plan preparation requirements of this Ordinance, provided the activities are performed according to the requirements of 25 Pa. Code Chapter 102.

B. Forest management and timber operations are exempt from the SWM Site Plan preparation requirements of this Ordinance, provided the activities are performed according to the requirements of 25 Pa. Code Chapter 102.

C. The use of land for domestic (i.e., for a single individual dwelling unit) gardening and landscaping is exempt from specific approval and permitting under this Chapter so long as such activities comply with all other applicable ordinances and statutes.

D. Exemptions from any provisions of this Ordinance shall not relieve the applicant from the requirements in Sections 301.D. through L.

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

Section 303. Volume Controls

Green Infrastructure and Low Impact Development practices provided in the BMP Manual[4] shall be utilized for all regulated activities wherever possible. Water volume controls shall be implemented using the *Design Storm Method* in Subsection A or the *Simplified Method* in Subsection B below. This ordinance establishes that only the *Design Storm Method* may be used for regulated activities that add greater than one-half (1/2) acre of new impervious area or disturb greater than one acre of total area.

A. The *Design Storm Method* (CG-1 in the BMP Manual[4]) is applicable to any size of regulated activity. This method requires detailed modeling based on site conditions.

   1. Do not increase the post-development total runoff volume for all storms equal to or less than the 2-year, 24-hour duration precipitation.

   2. For modeling purposes:

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

      b. 20% of existing impervious areas to be disturbed by the project, when present, shall be considered meadow in good condition in the model for existing conditions. Regulated activities not requiring an NDPES Permit are exempt from this requirement.

B. The *Simplified Method* (CG-2 in the BMP Manual[4]) provided below is independent of site conditions and should be used if the *Design Storm Method* is not followed. This method is not applicable for regulated activities that add greater than one-half (1/2) acre of new impervious area or for projects that require routing of stormwater storage facilities. For new impervious surfaces:

1. Stormwater facilities shall capture at least the first two (2) inches of runoff from all new impervious surfaces.

2. 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 this Commonwealth. Removal options include reuse, evaporation, transpiration, and infiltration.

3. Wherever possible, infiltration facilities should 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 should be infiltrated.

4. This method is exempt from the requirements of Section 304, Rate Controls.

Section 304. Rate Controls

A. For computation of pre-development peak discharge rates, 20% of existing impervious areas to be disturbed by the project, when present, shall be considered meadow. Regulated activities not requiring an NDPES Permit are exempt from this requirement.

B. For areas not covered by a release rate map from an approved Act 167 Stormwater Management Plan:

Post-development discharge rates shall not exceed the pre-development discharge rates for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storm events. If it is shown that the peak rates of discharge indicated by the post-development analysis are less than or equal to the peak rates of discharge indicated by the pre-development analysis for 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storms, then the requirements of this section have been met. Otherwise, the applicant shall provide additional controls as necessary to satisfy the peak rate of discharge requirement.

C. For areas covered by a release rate map from an approved Act 167 Stormwater Management Plan:

For the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storm events, the post-development peak discharge rates will follow the applicable approved release rate maps. For any areas not shown on the release rate maps, the post-development discharge rates shall not exceed the pre-development discharge rates.

Section 305. Riparian Buffers

A. In order to protect and improve water quality, a Riparian Buffer Easement shall be created and recorded as part of any subdivision or land development that encompasses a Riparian Buffer located, in whole or in part, in the Dover Township designated MS4 Area.

B. Except as required by Chapter 102, the Riparian Buffer Easement shall be measured to be the greater of the limit of the 100 year floodplain or a minimum of 35 feet from the top of the streambank (on each side).

C. Minimum Management Requirements for Riparian Buffers.

1. Existing native vegetation shall be protected and maintained within the Riparian Buffer Easement.

2. Whenever practicable invasive vegetation shall be actively removed, and the Riparian Buffer Easement shall be planted with native trees, shrubs and other vegetation to create a diverse native plant community appropriate to the intended ecological context of the site.

D. The Riparian Buffer Easement shall be enforceable by the municipality and shall be recorded in the appropriate County Recorder of Deeds Office so that it shall run with the land and shall limit the use of the property located therein. The easement shall allow for the continued private ownership and shall count toward the minimum lot area required by Zoning.

E. Any permitted use within the Riparian Buffer Easement shall be conducted in a manner that will maintain the extent of the existing 100-year floodplain, improve or maintain the stream stability, and preserve and protect the ecological function of the floodplain.

F. The following conditions shall apply when public and/or private recreation trails are permitted within Riparian Buffers:

1. Trails shall be for non-motorized use only.

2. Trails shall be designed to have the least impact on native plant species and other sensitive environmental features.

G. Septic drainfields and sewage disposal systems shall not be permitted within the Riparian Buffer Easement and shall comply with setback requirements established under 25 Pa. Code Chapter 73.

Section 306. Design Criteria

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

B. *On-Site Areas*. On-site areas proposed to remain undisturbed as part of the regulated activity, including previously developed areas, shall be considered as existing conditions.

C. *Downstream Hydraulic Capacity Analysis*. Any existing downstream capacity hydraulic analysis shall be conducted in accordance with this Chapter.

1. All downstream facilities impacted by the total site area of the regulated facility shall be studied to determine if the facility has adequate capacity to handle existing and proposed flows. An impacted downstream facility is one to which the runoff from the total site area of the regulated activity comprises more than 50% of the total flow to such a facility. The study shall end at a perennial stream unless directed otherwise by the Municipal Engineer. Downstream facilities include, but are not limited to, man-made or natural swales and open channels, pipes, inlets, culverts, bridges, and roadways.

2. If any private facility is found to be undersized, the applicant shall be responsible for updating the facility in coordination with the regulated activity.

3. If any public facility is found to be undersized or inadequate, the applicant shall work with the Municipality or State Agency on upgrading the facility in coordination with the regulated activity.

D. *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 on a case-by-case basis using the hydrologic model of the watershed consistent with protection of the downstream watershed areas. "Hydrologic model" refers to the calibrated model as developed for the stormwater management plan.

E. *Capacity Improvements of Local Drainage Networks*. In certain instances, local drainage conditions may dictate more stringent levels of runoff control than those based upon protection of the entire watershed. In these instances, if the developer could prove that it would be feasible to provide capacity improvements to relieve the capacity deficiency in the local drainage network, then the capacity improvements could be provided by the developer in lieu of runoff controls on the development site. Any capacity improvements would be designed based upon development of all areas tributary to the proposed improvement and the capacity criteria specified in Section 308. In addition, all new development upstream of a proposed capacity improvement shall be assumed to implement the applicable runoff controls consistent with this Chapter except that all new development within the entire subarea(s) within which the proposed development site is located shall be assumed to implement the developer's proposed discharge control if any.

F. Capacity improvements may also be provided as necessary to implement any regional or sub-regional detention alternatives.

G. Where the potential for groundwater and/or surface water contamination exists, based on the proposed use of the regulated activity, safeguards shall be incorporated into the site.

H. Roof drains, and sump pumps shall discharge to infiltration or vegetative BMPs and to the maximum extent practicable satisfy the criteria for DIAs.

I. Watershed Integrity. Stormwater runoff shall not be transferred from one watershed to another unless the watersheds are sub-watersheds of a common watershed which join together within the perimeter of the property. The transfer of watersheds may be permitted in the event the transfer does not alter the peak discharge onto downstream lands or drainage easements are acquired from the affected landowners.

J. All storm sewer pipes, culverts, bridges, gutters, and swales (excluding outfall structures from stormwater management facilities) conveying water originating only from within the boundaries of the project site shall be designed for a twenty-five (25) year storm event. All other storm sewer pipes, culverts and bridges, gutters and swales (excluding detention and retention basin outfall structures and excluding sole access structures) conveying water originating from off-site shall be designed for a fifty-(50) year storm event. Sole access structures shall be designed to convey the One-Hundred-(100) Year storm event without roadway overtopping. Drainage and access easements shall be provided to encompass the water surface limits of the One-Hundred (100) Year storm event throughout the project site and to provide access from a public street to the stormwater facility. Easements shall begin at the furthest upstream property line of the proposed development in the watershed.

K. The maximum water depth for aboveground storage facilities shall not exceed six (6) feet measured at the emergency spillway.

L. Flow velocities from any storm sewer may not result in erosion of the receiving channel. Adequate erosion protection shall be provided along all open channels and at all points of discharge.

M. For all swales, capacities, and velocities shall be computed using the Manning Equation. The following design considerations shall be met:

1. Two analysis of channel velocity and stability shall be provided with each swale design. One analysis shall be based upon the swale in an unvegetated state with control matting and the second shall consider the channel in permanent, designed conditions.

2. All swales shall have a minimum slope of one (1%) percent unless otherwise approved by the Municipal Engineer.

N. Design Standards – Facilities within the public street right-of-way:

1. Storm sewer pipes, other than those used for street subbase underdrains, shall have a minimum diameter of fifteen (15") inches. Structural calculations that address the actual design requirements will be required where installation conditions merit.

2. Storm Sewer Pipes and culverts shall be installed with a minimum slope of one-half (0.5%) percent.

3. Allowable pipes, culvert, and bridge materials shall be as outlined in the municipality's Construction and Material Specifications

4. All storm sewer crossings of streets shall not deviate by more than fifteen (15°) degrees from perpendicular to the street centerline.

5. All storm sewer pipes and culverts shall be laid to a minimum depth of twelve (12") inches from finished subgrade to the crown of the pipe in paved and grassed areas, or more if specified by the manufacturer.

6. Curves or angle points in pipes or box culverts without the use of an inlet or manhole are prohibited unless pre-approved by the municipality. Tee joints, elbows, and wyes shall be limited for use in constructing underground detention facilities, underground retention facilities, underdrain systems, and roof leader collection systems.

7. Manholes, inlets, headwalls, endwalls, and end sections shall conform to the requirements of the PennDOT, Publication 408.

8. Inlets shall be placed on both sides of the street at low spots, at a maximum of six hundred (600') feet apart along a storm sewer pipe or culvert, and at points of abrupt changes in the horizontal or vertical directions of storm sewers. Inlets shall normally be along the curb line at or beyond the curb radius points. Within the street right-of-way, the gutter spread based on the twenty-five (25') year storm event shall be no greater than one-half (1/2) of the travel lane width and have a maximum depth of three (3") inches at the curb line. A parking lane shall not be considered as part of the travel lane. In the absence of pavement markings separating a travel lane from the parking lane, the parking lane shall be assumed to be eight (8') feet wide if parking is permitted on the street. At intersections and access driveways, the depth of flow across the through-streets and across the access driveways (proposed and existing) shall not exceed one and one-half (1-1/2) inches for the twenty-five (25) year storm event. Manholes may be substituted for inlets at locations where inlets are not required to handle surface runoff.

9. Placement or use of BMPs within the public street right-of-way shall only be allowed after municipal approval.

O. Design Standards – Facilities outside of the public street right-of-way:

1. The design of all BMP facilities shall incorporate best engineering practices. The design engineer shall utilize all available design criteria in the BMP Manual to meet the requirements of this ordinance and shall provide all the necessary backup documentation with their submittal.

2. The BMPs must be designed to protect and maintain existing uses and maintain the level of Water Quality necessary to protect those uses in all streams, and to protect and maintain Water Quality in "Special Protection" streams, as required by statewide regulations at 25 Pa. Code Chapter 93.

3. No regulated earth disturbance activities within the Municipality shall commence until approval by the Municipality of a plan that ensures post-construction stormwater discharges do not degrade the physical, chemical, or biological characteristics of the receiving waters.

P. Design Standards - Subsurface Infiltration Facilities:

1. Positive overflow must be provided in the subsurface infiltration facility. Overflow structures or pipes must be designed to convey the inflow capacity of the facility. Volume control credits may not be used above the lowest invert of the positive overflow structure or pipe.

2. The minimum allowable distance between a subsurface infiltration facility and structure/building/retaining wall is ten (10') feet.
3. The subsurface infiltration facility must be located at least two feet above any limiting zone, i.e., seasonal high groundwater table, bedrock, or poorly infiltrating soils.

4. Soils with rates exceeding ten (10") inches per hour require soil amendments. During construction, upon reaching the subgrade of the infiltration facility, a two-foot thick layer of soil amendments must be spread across the entire facility bottom area, below the designed bottom of the facility. Soil media infiltration rate must be provided upon design.

5. The infiltration facility must include an acceptable form of pretreatment before stormwater enters the facility. An acceptable form of pretreatment includes an inlet with an eighteen (18'') inch sump and one (1") inch diameter weep holes. Other forms of pretreatment must be approved by the Municipal Engineer.

6. Subsurface Infiltration Facilities may not use a geotextile liner to separate the storage area from the subgrade. Geotextile liners may only be used on the sides and top. AASHTO Class 1 or Class 2 geotextile is recommended.

7. Subsurface Infiltration facilities must contain a cleanout or observation well at the end of any portion of underdrain. The observation well or cleanout must be placed at the invert of the stone bed and extend up to grade. Adequate inspection and maintenance access to the observation well or cleanout must be provided.

8. In subsurface infiltration facilities that include chamber, pipe, or other storage system, a sufficient number of access features must be provided to efficiently inspect and maintain the infiltration area.

9. Perforated distribution pipes must contain a bedding of at least 4" separating the pipe and subgrade.

10. Infiltration Testing standards set forth in Appendix C shall be followed when designing a subsurface infiltration facility.

Q. Design Standards; Water Carrying Facilities.

1. When a pipe or culvert is intended to convey the discharge from a stormwater management facility, its required capacity shall be computed by the rational method and compared to the peak outflow from the stormwater facility for the 100-year storm. The greater flow shall govern the design of the pipe or culvert.

2. When a pipe is part of a storm sewer system and crosses the roadway, it shall be designed as a storm sewer with the same design storm as the remainder of the drainage system.

3. Greater design frequencies may be justified on individual projects.

4. A 100-year storm frequency may be required for design of the stormwater collection system to ensure that the runoff from the post-development storm is directed into the intended management facility.

5. In general, inlets shall be spaced such that, based upon the rational method, tc = 5 min. and 10-year rainfall intensity, the area contributing to the inlet shall not produce a peak runoff of greater than 4 cfs. Also, inlets shall be spaced so that their efficiency, based upon efficiency curves published by the Pennsylvania Department of Transportation, is not less than sixty-five (65%) percent.

6. Proposed channels or swales must be able to convey the increased runoff associated with a proposed 100-year return period event within their banks at velocities consistent with protection of the channels from erosion. Acceptable velocities shall be based upon criteria included in the PADEP *Erosion and Sediment Pollution Control Program Manual*.

7. All other storm sewer manholes and inlets shall have smooth flow lines grouted.

8. Inlets shall be placed on both sides of the street at low spots and at the upper side of street intersections to prevent stormwater from crossing an intersection. Other devices such as high efficiency grates or perforated pipe may be required if conditions warrant. All inlets at low points along the roadway shall have an 8" curb reveal and shall be equipped with pavement base drain extending fifty (50') feet in either direction, parallel to the centerline of the roadway.

9. Headwalls and endwalls shall be used where stormwater runoff enters or leaves the storm sewer horizontally from a natural or man-made channel. In all cases where drainage is picked up by means of a headwall, the pipe shall be designed as a culvert. Inlet and outlet conditions shall be analyzed. PennDOT type "dw" headwalls and endwalls shall be utilized for pipes fifteen (15") inches and larger in diameter. End sections shall be utilized for pipes smaller than fifteen (15") inches in diameter.

10. Guards shall be provided on all intake and outfall structures as well as outlet structures. The guard bars shall be ½-inch diameter galvanized bars on 6- inch centers attached to the structure with 3/8-inch diameter stainless steel anchors. Guards shall also be provided for any pipe opening, eighteen (18") inch in diameter or larger.

11. Manholes, inlets, headwalls, and endwalls shall conform to the requirements of the PennDOT Publication 408, as modified by the Municipal Construction and Materials Standards.
12. Stormwater runoff on roadways (i.e., gutter spread, lane encroachment, etc.) shall be controlled in accordance with PennDOT Publications 13M, "Design Manual," Part 2, Chapter 10, and 584, "Drainage Manual."

R. Design Standards; Detention and Retention Basins.

1. Permanent detention and retention basins shall be designed to meet the following standards:

   (a) The maximum permitted depth for detention or retention basins shall be six (6') feet, measured from the bottom of the emergency spillway to the lowest point in the basin.

   (b) The minimum top width of all basin embankments shall be eight (8') feet.

   (c) The maximum permitted inside side-slopes for detention or retention basins shall be 4 to 1 vertical. 3 to 1 vertical inside side-slopes may be approved upon furnishing an appropriate planting schedule. The maximum permitted outside side-slopes shall be 3 to 1 vertical and utilize a seed mix designed for embankments. Areas for vehicle access shall be provided and encompassed by a 20' wide easement and shall have slopes no greater than 5 to 1 vertical. The proposed vegetation shall be low maintenance varieties.

   (d) Any stormwater management facility (i.e., detention basin) designed to store runoff and requiring a berm or earthen embankment required or regulated by this Chapter shall be designed to provide an emergency spillway to handle flow up to and including the 100-year, 24-hour design storm at post-development conditions, assuming the principal outlet structure to be clogged. The height of the embankment must be set as to provide a minimum of one (1') foot of freeboard above the maximum elevation computed. Should any stormwater management facility require a dam safety permit under PADEP 25 Pa.Code, Chapter 105, the facility shall be designed in accordance with PADEP 25 Pa.Code, Chapter 105, and meet the regulations of PADEP 25 Pa.Code, Chapter 105, concerning dam safety which may be required to pass storms larger than the 100-year event.

   (e) A cutoff trench composed of four (4') feet wide of impervious material shall be provided within all basin embankments.

   (f) Where a basin embankment is constructed using fill on an existing fifteen (15%) percent or greater slope, the basin must be keyed into the existing grade.

   (g) All outlet structures and emergency spillways shall include a non-erosive means of energy dissipation at its outlet to assure conveyance and flow without endangering the safety and integrity of the basin and the downstream drainage area.

   (h) Plans for infiltration must show the locations of existing and proposed septic tank infiltration areas and wells. A minimum 25-foot separation from on-lot disposal systems (OLDS) infiltration areas, including replacement areas, is desired and will be evaluated by the Municipality on a case-by-case basis. However, the separation shall not be less than the PADEP required 10 feet. Infiltration rates shall be based upon perk and probe tests conducted at the site of the proposed facility.

   (i) Above-ground infiltration facilities shall provide a means of emergency dewatering of the facilities to the bottom elevation. If amended soils are used in the facility bottom, an underdrain shall be placed below or at the bottom of the amended soils to dewater the amended soils in emergency situations.

S. Design Standards; Rain Gardens/ Bioretention Facilities.

1. A rain garden/bioretention facility is an excavated shallow surface depression or storage area created by an earthen embankmentin which ammended soils are planted with specific native vegetation to treat and capture runoff. Rain gardens shall meet the following design standards (note: any SWM facility exceeding these design standards shall be considered a retention/detention basin and subject to their design standards):

    a. The maximum ponding depth shall be twelve (12") inches.

    b. Infiltration Testing standards set forth in Appendix C shall be followed when designing a rain garden facility.

    c. The bottom of the rain garden storage area must be located at least two feet above any limiting zone, i.e., seasonal high groundwater table, bedrock, or poorly infiltrating soils.

    d. Pretreatment shall be used in the design of the facility. Pretreatment can include structures such as sumped and trapped inlets, sediment/grit chambers or separators, media filters, inlet inserts, or other appropriate prefabricated or proprietary designs to remove sediment, floatables, and/or hydrocarbons from stormwater runoff prior to being conveyed to a rain garden/bioretention basin. A facility may be exempt from pretreatment at the discretion of the municipal engineer.

    e. Maximum side slopes for surface storage areas shall be 4(H):1(V).

    f. Any stone storage systems incorporated into the rain garden design must be separated from the soil media by a geotextile liner. A geotextile liner shall not be used to separate the stone storage system from the subgrade. Stone storage systems shall have a level bottom or use a terraced system if installed along slope.

    g. In the event a sand layer is to be used as part of the underground filtration/storage system. The sand must be placed between the soil medium and stone storage. All sides of the sand must be separated by a geotextile liner.

    h. The planting soil medium must have a minimum depth of eighteen (18") inches. Planting soil shall be a loam soil capable of supporting a healthy vegetative cover. Soils shall be amended with a composted organic material. At minimum the organic amended soil shall be combined with 20-30% organic material (compost), and 70-80% soil base (topsoil) free of clay. Amended soils shall be spread throughout the bottom floor of the facility.

    i. Underdrains must be provided for all rain gardens and extend throughout the entire rain garden bottom. Underdrains must be surrounded by a stone layer with a minimum of four (4") inches above and below the pipe.

    j. Rain Gardens and other above ground storage facilities that are used for volume control credits shall have an underdrain with a valve that is to remain closed at all times unless dewatering the facility to perform maintenance or dewatering has not occurred within the maximum allotted 72 hours.

k. A sufficient number of cleanouts must be provided to access underdrains to allow for maintenance and inspection of the underdrain pipe.

l. Native plants, capable of supporting the proposed ponding depth, shall be utilized. The designer shall refer to the PA DEP BMP manual for a list of potential native plant species.

Section 307. Regulations Governing SWM Facilities

1. Any stormwater facility located on State highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).

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

3. Any stormwater management facility located within the vicinity of a floodplain shall be subject to approval in accordance with PADEP 25 Pa.Code, Chapter 105, "Floodplain Management," of PADEP's rules and regulations and the municipal floodplain management regulations.

4. The design of all stormwater management facilities shall incorporate good engineering principles and practices. The Municipality shall reserve the right to disapprove any design that would result in the occupancy or continuation of adverse hydrologic or hydraulic conditions within the watershed.

5. The existing points of concentrated drainage that discharge onto adjacent property shall not be altered without permission of the adjacent property owner(s) and shall be subject to any applicable discharge criteria specified in this Chapter. New proposed discharge points shall be no closer than 10' to the property line in which they are located.

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

7. Where a development site is traversed by watercourses, 20' wide minimum drainage easements (10' from top of bank out) shall be provided conforming to the line of such watercourses. The terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations that may adversely affect the flow of stormwater within any portion of the easement. Also, maintaining of vegetation in a natural state within the easement shall be required, except as approved by the appropriate governing authority.

8. When it can be shown that, due to topographic conditions, natural drainage ways on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainage ways. Work within natural drainage ways shall be subject to approval by PADEP through the joint permit application process or, where deemed appropriate by PADEP, through the general permit process.

9. Roof drains, and sump pumps shall discharge to infiltration or vegetative BMPs wherever feasible. Roof drains and Sump Pumps must not be connected to streets, sanitary or storm sewers, or roadside ditches to promote overland flow and infiltration/percolation of stormwater where advantageous to do so. When it is more advantageous to connect directly to streets or storm sewers, then it may be permitted on a case by case basis by the Municipality.

10. *Special Requirements for Areas Falling Within Defined Exceptional Value and High-Quality Subwatersheds*. The temperature and quality of water and streams that have been declared as exceptional value and high quality is to be maintained as defined in 25 Pa.Code, Chapter 93, "Water Quality Standards," Pennsylvania Department of Environmental Protection rules and regulations. Temperature-sensitive BMP's and stormwater conveyance systems are to be used and designed with storage pool areas and supply outflow channels and should be shaded with trees. This will require modification of berms for permanent ponds and the relaxation of restrictions on planting vegetation within the facilities, provided that capacity for volumes and rate control is maintained. At a minimum, the southern half on pond shorelines shall be planted with shade or canopy trees within 10 feet of the pond shoreline. In conjunction with this requirement, the maximum slope allowed on the berm area to be planted is 10 to 1. This will lessen the destabilization of berm soils due to root growth. A long-term maintenance schedule and management plan for the thermal control BMPs is to be established and recorded for all development sites within defined exceptional value and/or high-quality subwatersheds.

11. The use of soil amendment, or amended soil, BMP shall not be utilized on residential use lots, except for lots which include other BMP facilities which utilize the soil amendment included in the facility design. Such as the use of soil amendment within infiltration basins or rain gardens.

12. No SWM facilities shall be installed over existing utility mains or services

Section 308. Calculation Methodology

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

1. Any stormwater runoff calculations involving drainage areas greater than two-hundred (200) acres, including on- and off-site areas, shall use generally accepted calculation technique that is based on the NRCS soil cover complex method. It is assumed that all methods will be selected by the design professional based on the individual limitations and suitability of each method for a particular site.

2. The Municipality may allow the use of the rational method or modified rational method to estimate peak discharges from drainage areas that contain less than two hundred (200) acres. When using the rational method, an ascending and descending limb factor of 3 and 7 shall be used, respectively.

3. All calculations consistent with this Chapter using the soil cover complex method shall use the appropriate design rainfall depths. If a hydrologic computer model such as PSRM or HEC-RAS is used for stormwater runoff calculations, then the duration of rainfall shall be 24-hours. The SCS Rainfall Type II curve shall be used for the rainfall distribution. Those projects proposing infiltration structures shall utilize this method.

4. When routing a detention basin, the rational method or SCS method may be used to determine peak rates through the primary outlet structure. Only the SCS Method may be used to determine the peak water surface elevation during the 100-year, 24-hour design storm, dictating the height of the embankment.

5. Underground Storage Facilities that solely receive stormwater and are designed to capture and infiltrate the entire 100-year, 24-hour SCS runoff volume may have their drainage areas removed from the overall post-development drainage area(s).

6. For the purposes of pre-development flow rate determination, undeveloped land, including disturbed areas, shall be considered as "meadow" in good condition, unless the natural ground cover generates a lower curve number or rational "C" value (i.e., forest), as listed in Tables 1 and 2, respectively.

7. All calculations using the rational method shall use rainfall intensities consistent with appropriate times of concentration for overland flow and return periods. Times of concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of *Urban Hydrology for Small Watersheds*, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Time of concentration for channel and pipe flow shall be computed using Manning's equation.

8. Runoff curve numbers (CN) for both existing and proposed conditions to be used in the soil cover complex method shall be obtained from Table 1.

9. Runoff coefficients (c) for both existing and proposed conditions for use in the rational method shall be obtained from Table 2.

10. Where uniform flow is anticipated, the Manning equation shall be used for hydraulic computations such as the capacity of open channels, pipes, and storm sewers. Values for Manning's roughness coefficient (n) shall be consistent with Table 3.

11. The design of any stormwater detention facilities intended to meet the performance standards of this Chapter shall be verified by routing the design storm hydrograph through these facilities, using either manual methods or computerized routing. Routing shall be based upon the modified PULS method; other routing methodologies shall be subject to the approval of the Municipal Engineer.

12. The stormwater collection system shall be designed using the peak discharge computed using the rational formula.

Section 309. Carbonate Geology

In areas of carbonate geology, a geologist shall certify to the following:

A. No stormwater management facility will be placed in, over, or immediately adjacent to the following features:

   1. Closer than 100-feet from sinkholes.

   2. Closer than 100-feet from closed depressions.

   3. Closer than 100-feet from caverns, intermittent lakes, or ephemeral streams.

   4. Closer than 50-feet from lineaments in carbonate areas.

   5. Closer than 50-feet from fracture traces.

   6. Closer than 25-feet from bedrock pinnacles (surface or subsurface).

B. Stormwater resulting from regulated activities shall not be discharged into sinkholes.

C. If the developer can prove through analysis that the project site is an area underlain by carbonate geology, and such geologic conditions may result in sinkhole formations, then the project site is

exempt from recharge requirements as described in Section 304, "Volume Control." However, the project site shall still be required to meet all other standards found in this Chapter.

D. It shall be the developer's responsibility to verify if the project site is underlain by carbonate geology. The following note shall be attached to all stormwater management plans and signed and sealed by the developer's registered professional : "I, _____, certify that the proposed stormwater management facility (circle one) is/is not underlain by carbonate geology."

E. Whenever a stormwater management facility will be located in an area underlain by carbonate geology, a geological evaluation of the proposed location by a geologist shall be conducted to determine susceptibility to sinkhole formation. The evaluation may include the use of impermeable liners to reduce or eliminate the separation distances listed in the BMP manual. Additionally, the evaluation shall, at a minimum, address soil permeability, depth to bedrock, seasonally high groundwater table, susceptibility for sinkhole formation, suitability of stormwater management facilities, subgrade stability, and maximum infiltration capacity in depth of water per unit area.

F. A detailed soils evaluation of the project site shall be performed to determine the suitability of recharge facilities. The evaluation shall be performed by a qualified professional, and at a minimum, address soil permeability, depth to bedrock, susceptibility to sinkhole formation, and subgrade stability. The general process for designing the infiltration BMP shall be:

   (1) Site evaluation to determine general areas of suitability for infiltration practices.

   (2) Provide field percolation tests throughout the area proposed for development to determine appropriate percolation rate and/or hydraulic conductivity. At least one infiltration test must be included in each soil group and at least one infiltration test must be conducted for each five lots proposed for development. Infiltration tests must be taken at the location and depth of all proposed infiltration structures.

   (3) Design infiltration structure for required storm volume based on all available data.

G. Extreme caution shall be exercised where infiltration is proposed in geologically susceptible areas such as strip mine or limestone areas. It is also extremely important that the design professional evaluate the possibility of groundwater contamination from the proposed infiltration/recharge facility and recommend a hydrogeologic study be performed if necessary. Whenever a basin will be located in an area underlain by limestone, a geological evaluation of the proposed location shall be conducted to determine susceptibility to sinkhole formations. The design of all facilities over carbonate formations shall include measures to prevent groundwater contamination and, where necessary, sinkhole formation. The infiltration requirement in the high quality/exceptional waters shall be subject to the Department's 25 Pa.Code, Chapter 93, and anti-degradation regulations. A detailed hydrogeologic investigation may be required by the Municipality, and where appropriate, the Municipality may require the installation of an impermeable liner in detention basins.

Section 310. Erosion and Sedimentation Control Requirements

A. As required in Section 301.D, whenever the vegetation and topography are to be disturbed, such activity must be in conformance with PADEP 25 Pa.Code, Chapter 105, rules and regulations, Part I, Subpart C, "Protection of Natural Resources," Article II, "Water Resources," Chapter 102, "Erosion Control," and in accordance with the County Conservation District.

B. It is extremely important that strict erosion and sedimentation control measures be applied surrounding infiltration structures during installation to prevent the infiltrative surfaces from becoming clogged. Additional erosion and sedimentation control design standards and criteria must be applied where infiltration BMPs are proposed shall include the following:

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

C. Fencing for sedimentation basins or traps must comply with Section 306.R.1.(g).

D. The developer shall demonstrate that the post-development hydrograph flows during erosion and sedimentation control phase are less than or equal to the pre- development hydrograph flows to assure the rate and volume of runoff leaving the site is controlled for the 2-, 5-, and 10-year frequency storms. All calculation methodology shall be in accordance with Section303 through 309.

E. In the event a regulated activity falls under the Chapter 102 thresholds for requiring a written erosion and sedimentation plan and/or NPDES permit, the applicant is still required to provide suitable erosion and sedimentation best management practices to prevent an illicit discharge caused by erosion during a precipitation event.

ARTICLE IV – STORMWATER MANAGEMENT (SWM) SITE PLAN REQUIREMENTS

Section 401. Plan Requirements.

A. Appropriate sections from the municipal's Subdivision and Land Development Ordinance, and other applicable local ordinances, shall be followed in preparing the SWM Site Plans. In instances where the Municipality lacks Subdivision and Land Development Regulations, the content of SWM Site Plans shall follow the county's Subdivision and Land Development Ordinance.

B. The Municipality shall not approve any SWM Site Plan that is deficient in meeting the requirements of this Ordinance. At its sole discretion and in accordance with this Article, when a SWM Site Plan is found to be deficient, the municipality may either disapprove the submission and require a resubmission, or in the case of minor deficiencies, the Municipality may accept submission of modifications.

C. Provisions for permanent access or maintenance easements for all physical SWM BMPs, such as ponds and infiltration structures, as necessary to implement the operation and maintenance (O&M) plan discussed in paragraph E.16 below.

1. A minimum twenty (20') foot wide drainage easement shall be provided for all stormwater management facilities. Drainage easements shall provide for ingress and egress to a public right-of-way.

2. A minimum twenty (20') foot wide drainage easement shall be provided where the conveyance, treatment, of stormwater, either existing or proposed, is identified on the storm water management plan. Drainage easements shall be provided to contain and convey the One-Hundred (100) year storm event.

3. A note on the stormwater management plan indicating that nothing shall be placed, planted, set, or put within the area of an easement. No alterations to swales, basins, BMPs, or other stormwater management shall be permitted, without prior approval.

4. Stormwater Management Facilities not located within a public right-of-way shall be contained in and centered within a drainage easement. Easements shall follow property boundaries where possible.

D. The following signature block for the municipality:

"(Design Professional)", on this date (Signature date), hereby certifies that the SWM Site Plan meets all design standards and criteria of the Municipal Ordinance No. (number assigned to ordinance)."

E. The SWM Site Plan shall provide the following information:

1. A written report including an overall project description of the proposed stormwater management concepts, including a summary identifying specific LID and Green Infrastructure practices and the existing site conditions. Including stormwater runoff calculations for both predevelopment and post-development conditions, including complete hydrologic, hydraulic, and structural computations for all stormwater management facilities.

2. A determination of site conditions in accordance with the BMP Manual[4]. A detailed site evaluation shall be completed for projects proposed in areas of carbonate geology or karst topography and other environmentally sensitive areas, such as brownfields.

3. All calculations, assumptions, and criteria used in the design of the stormwater management facilities must be shown. If multiple facilities are used in conjunction with each other, such as infiltration BMPs with vegetation-based management practices, a summary narrative shall be included describing any sequencing and how the facilities are meant to function with each other to manage stormwater runoff in accordance with this ordinance.

4. The sheet sizes shall be either 11 inches by 17 inches, 18 inches by 24 inches or 24 inches by 36 inches. If the plan is prepared in two (2) or more drawing sheets, a full-size drawing and key map showing the location of the sheets and a match line shall be placed on each sheet. Each sheet shall be numbered to show the relationship to the total number of sheets in the plan set.

5. Proposed name or identifying title of project.

6. Name and address of the landowner and APPLICANT of the PROJECT SITE.

7. The limit of disturbance (LOD) shall be shown with its area labeled in square feet or acres.

8. Plan date and date of the latest revision to the plan, north point, graphic scale and written scale. All plans shall be drawn at a scale sufficient to determine consistency with this and other municipal ordinances.

9. A table on the plan indicating the total acreage of the project site and the tract of land on which the project site is located, assumed square footage of impervious surface for each lot, and the assumed square footage of impervious surface permitted for each stormwater management facility.

10. A location map, for the purpose of locating the project site to be developed, at a minimum scale of 1,000 feet to the inch, showing the relation of the tract to adjoining property and to all streets and the Municipality boundaries existing within 400 feet of any part of the tract of land on which the project site is proposed to be developed.

11. A soil erosion and sediment control plan, where applicable, as prepared for and submitted to the approval authority as well as the Municipality.

12. 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.

13. A hydrogeologic assessment of the effects of stormwater runoff on sinkholes, where present.

14. Plan and profile drawings of all SWM BMPs, including drainage structures, pipes, open channels, and swales. All plans and profiles should align vertically on the sheets for reference. All utility crossings shall be shown on these profiles.

15. SWM Site Plan shall show the locations of existing and proposed on-lot wastewater facilities and water supply wells.

16. The SWM Site Plan shall include an O&M Plan for all existing and proposed physical stormwater management facilities. This plan shall address long-term ownership and responsibilities for O&M as well as schedules and costs for O&M activities.

17. A justification must be included in the SWM Site Plan if BMPs other than green infrastructure methods and LID practices are proposed to achieve the volume, rate, and water quality controls under this Ordinance.

18. A description of permanent stormwater management techniques, including the construction specifications and the materials to be used for stormwater management facilities.

19. A notarized signature of the owner of the parcel for which the SWM site plan is proposed indicating that they are aware of and will be responsible for operation and maintenance of the facilities.

20. A list of all requested waivers to the stormwater management ordinance or a statement identifying that the stormwater management plan is not requesting waivers to the stormwater management ordinance.

21. Existing features.

    a. Tract boundaries showing distances, bearings, and curve data, as located by field survey or by deed plotting.

    b. Existing contours at vertical intervals of one (1) or two (2) feet for land with an average natural slope of twenty (20) percent or less and at vertical intervals of five (5) feet for more steeply sloping land. The location of the benchmark and the datum used shall also be indicated.

    c. The names of all owners of all immediately adjacent unplatted land and the locations and dimensions of any streets or easements shown thereon.

    d. The names, locations, and dimensions of all existing streets, railroads, watercourses, drainage facilities, floodplains, streams, lakes, ponds, and other water bodies, existing drainage courses, Karst features, and other significant features within two hundred (200') feet of any part of the tract proposed to be developed and the location of all buildings and structures.

    e. Other physical features including wetlands, sinkholes, areas of native vegetation to be preserved, including trees greater than two (2") inches in diameter at breast height, woodlands, other environmentally sensitive areas, and the total extent of the upstream area draining through the project site.

    f. The locations of all existing utilities, including on-lot disposal systems and wells, sanitary sewers, and water lines within two hundred (200') feet of the property lines.

    g. Soil boundaries and soil types as designated by the NRCS.

    h. Existing zoning districts and property line setbacks.

    i. A note on the plan identifying the presence or absence of carbonate geology. See Section 309. D. of this ordinance

22. Proposed features

    a. The proposed land use, the number of lots and dwelling units and the extent of commercial, industrial or other nonresidential uses.

    b. The locations and dimensions of all proposed streets, parks, playgrounds, and other public areas, sewer and water facilities; lot lines and building locations, and parking compounds, driveways, paved areas and other impervious surfaces.

    c. The proposed changes to land surface and vegetative cover including areas to be cut or filled.

d. Proposed contours at vertical intervals of two (2') feet for land with an average natural slope of fifteen (15%) percent or less and at vertical intervals of five (5') feet for more steeply sloping land.

e. Finished elevations on tops of curbs at lot lines projected and lot corners. Elevations shall be shown to the nearest tenth of a foot.

f. A summary table depicting the minimum lowest floor elevation, which includes the basement for all lots located immediately adjacent to the floodplain area.

g. The location of any proposed on-lot disposal system, replacement drainfield easements, and water supply wells.

h. The location of any proposed signage identifying the constructed BMP. Proposed signage shall be installed on any nonresidential property or property under the control of a homeowners association or community association.

23. A summary table on the plan identifying all BMPs including BMP ID, drainage area to the BMP, name of receiving waterbody, the BMP's inspection and maintenance frequency, name of responsible person or organization at the time of stormwater management plan approval, and the lot numbers where the BMP is located.

24. The name of the development, the name and address of the owner of the property, and the name and address of the individual or firm preparing the plan. Also to be included are the name, address, signature and seal of any registered surveyor, professional engineer, landscape architect, or professional geologist (for geomorphological assessments) contributing to and/or with a responsibility for any aspect of the plan where applicable.

25. A planting plan is required for all vegetated stormwater BMPs.

a. Native or naturalized/non-invasive species suitable to the soil and hydrologic conditions of the site shall be used unless otherwise specified in the BMP Manual.

b. Invasive vegetation may not be included in any planting schedule. (See Invasive Plants in Pennsylvania as published by the Department of Conservation and Natural Resources.)

c. The limit of existing, native vegetation to remain shall be delineated on the plan along with proposed construction protection measures.

d. Prior to construction, a tree protection zone shall be delineated at the dripline of the tree canopy. The tree protection zone of trees scheduled to remain shall be marked. Groups of trees may be marked by a protection zone along the outermost drip line boundary. A forty-eight (48") inch high snow fence or forty-eight (48") inch high construction fence mounted on steel posts located eight (8') feet on center shall be placed along the tree protection boundary. No construction, storage of material, temporary parking, pollution of soil, or regrading shall occur within the tree protection zone.

e. All planting shall be performed in conformance with good nursery and landscape practice. Plant materials shall conform to the standards recommended by the American Association of Nurseryman, Inc. in the American Standard of Nursery Stock.

(1) Planting designs are encouraged to share planting space for optimal root growth whenever possible.

(2) No staking or wiring of trees shall be allowed without a maintenance note requiring the stake and/or wire to be removed within one (1) year of planting.

Section 402. Plan Submission

All materials submitted to the municipality for review must be provided in a PDF format.

In addition, ffour (4) physical paper copies of the stormwater management site plan shall be submitted as follows:

1. Two (2) copies to the municipality.

2. One (1) copy to the municipal engineer (when applicable).

3. One (1) copy to the County Conservation District.

4. Proof of NPDES Application and permit obtained (when required).

Section 403. Plan Review

A. SWM Site Plans shall be reviewed by the municipality for consistency with the provisions of this Ordinance.

B. From the time an application for approval of a plat involving a subdivision or land development plan, whether preliminary or final, which includes a SWM site plan, is duly filed with the Municipality, no change or amendment of the ordinance or other governing ordinance or plan shall affect the decision on such application in accordance with the provisions of the governing ordinances or plans as they stood at the time the application was duly filed, as specified in § 508(4)(i) of the Pennsylvania Municipalities Planning Code, 53 P.S. § 10508(4)(i).

C. The Municipality shall notify the applicant in writing within 45 days whether the SWM Site Plan is approved or disapproved. If the SWM Site Plan involves a Subdivision and Land Development Plan, the notification shall occur within the time period allowed by the Municipalities Planning Code (90 days). If a longer notification period is provided by another statute, regulation, or ordinance, the applicant will be notified by the municipality. If the Municipality denies approval of the SWM Site Plan, the Municipality will state the reasons for the denial in writing. The Municipality may also approve the SWM Site Plan with conditions and, if so, shall provide the acceptable conditions for approval in writing.

D. For any SWM Site Plan that proposes to use any BMPs other than Green Infrastructure and LID practices to achieve the volume and rate controls required under this Ordinance, the Municipality will not approve the SWM Site Plan unless it determines that Green Infrastructure and LID practices are not practicable.

Section 404. Modification of Plans

Modifications to a submitted SWM Site Plan that involve a change in SWM BMPs or techniques, or that involves the relocation or redesign of SWM BMPs, or that is necessary because soil or other conditions are not as stated on the SWM Site Plan, as determined by the Municipality, shall require a resubmission of the modified SWM Site Plan in accordance with this Article.

A. When reviewing a SWM site plan, whether or not the SWM site plan is included in a subdivision and/or land development plan application, the Municipality may, after consulting with DEP, grant a modification of the requirements of one or more provisions of this Chapter if the literal enforcement will enact undue hardship because of peculiar conditions pertaining to the land in question, provided that such modification will not be contrary to the public interest and that the purpose and intent of the ordinance is observed.

B. All requests for a modification from an applicant shall be in writing and shall accompany and be a part of the application for approval of a SWM site plan and/or a subdivision or land development plan as applicable. The request shall state in full the grounds and facts of unreasonableness or hardship on which the request is based, the provision or provisions of the ordinance involved and the minimum modification necessary.

C. In granting any modification, the Municipality may attach such reasonable conditions and safeguards as it may deem necessary to implement the purposes of the Act 167 Plan and this Chapter.

D. The Municipality shall keep a written record of all action on requests for modifications. The response of any consultation and/or review by DEP shall be included as an original report if available or otherwise documented in the required written record.

Section 405. Resubmission of Disapproved SWM Site Plans

A disapproved SWM Site Plan may be resubmitted, with the revisions addressing the Municipality's concerns, to the Municipality in accordance with this Article. The applicable review fee must accompany a resubmission of a disapproved SWM Site Plan.

Section 406. Authorization to Construct and Term of Validity

A. *SWM Site Plans Independent of Subdivision and Land Development Plans*. The Municipality's approval of a SWM site plan, when such plan is submitted independent of a subdivision and/or land development plan, authorizes the regulated activities contained in the SWM site plan for a maximum term of validity of 5 years following the date of approval. The Municipality may specify a term of validity shorter than 5 years in the approval for any specific SWM site plan, particularly if the nature of the proposed SWM facilities require more frequent maintenance and/or short-term replacement of certain components. Terms of validity shall commence on the date the The Municipality signs the approval for a SWM site plan. If an approved SWM site plan is not completed according to Section 407 within the term of validity, then the Municipality may consider the SWM site plan disapproved and may revoke any and all permits. SWM site plans that are considered disapproved by the Municipality may be resubmitted in accordance with Section 405 of this Chapter.

B. *SWM Site Plans Included in a Subdivision and/or Land Development Plan*. The Municipality's approval of a SWM site plan, which is a part of a subdivision and/or land development plan, authorizes that plan and the regulated activities therein so that no subsequent change or amendment in this Chapter or other governing ordinances or plans shall be applied to affect adversely the right of the applicant to commence and to complete any aspect of the approved development in accordance with the terms of such approval within 5 years from such approval, as specified in § 508(4)(ii)–(vii) of the Pennsylvania Municipalities Planning Code, 53 P.S. § 10508(4)(ii)–(vii).

Section 407. Construction Inspections

A. Schedule of Inspections

1. The Design Professional, or their assignee, shall inspect all phases of the installation of the permanent stormwater management facilities being constructed for a non- residential facility or constructed under an NPDES permit.

2. Individual residential on-lot stormwater management systems shall be inspected by Municipal staff or their designated representative.

3. During any stage of the work, if the Municipal staff or their designated representative, determines that the permanent stormwater management facilities are not being installed in accordance with the approved stormwater management plan, the Municipality shall revoke any existing approvals issued under this Chapter until a revised drainage plan is submitted and approved, as specified in this Chapter.

4. All work shall conform to the latest edition of the "Dover Township Construction Specifications."

Section 408. As-Built Plans, Completion Certificate, and Final Inspection

A. The developer shall be responsible for providing the municipality with as-built plans of all SWM BMPs included in the approved SWM Site Plan. The as-built plans and an explanation of any discrepancies with the construction plans shall be submitted to the Municipality.

B. The as-built submission shall include a certification of completion signed by a qualified professional verifying that all permanent SWM BMPs have been constructed according to the approved plans and specifications. The latitude and longitude coordinates for all permanent SWM BMPs must also be submitted at the central location of the BMPs. If any licensed, qualified professionals contributed to the construction plans, then a licensed qualified professional must sign the completion certificate.

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

D. The financial guarantee, as discussed under Section 503, shall not be released by the Municipality until the items in this Section are completed.

ARTICLE V – OPERATION AND MAINTENANCE

Section 501. Responsibilities of Developers and Landowners

Unless otherwise noted or if a facility is located within a municipal right of way, operation and maintenance of stormwater management facilities and conveyance systems is the sole responsibility of the property owner or assigns, in perpetuity.

A. The Municipality shall make the final determination on the continuing maintenance responsibilities prior to final approval of the SWM Site Plan. The municipality may require a dedication of such facilities as part of the requirements for approval of the SWM Site Plan. Such a requirement is not an indication that the municipality will accept the facilities. The municipality reserves the right to accept or reject the ownership and operating responsibility for any portion of the stormwater management controls.

B. Facilities, areas, or structures used as SWM BMPs shall be enumerated as permanent real estate appurtenances and recorded as deed restrictions or conservation easements that run with the land.

C. The O&M Plan shall be recorded as a restrictive deed covenant that runs with the land.

D. No person shall modify, remove, fill, landscape, or alter any SWM BMPs, facilities, areas, or structures without the written approval of the Municipality, with the exception of necessary maintenance activities such as mowing.

E. The Municipality may take enforcement actions against an owner for any failure to satisfy the provisions of this Article.

Section 502. Operation and Maintenance Agreements

A. Prior to final approval of the SWM Site Plan, the property owner shall sign and record The Dover Township Operation and Maintenance (O&M) Agreement (see Appendix A) covering all stormwater control facilities which are to be privately owned.

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

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

   3. The owner shall keep on file with the Municipality the name, address, and telephone number of the person or company responsible for maintenance activities; in the event of a change, new information shall be submitted by the owner to the Municipality within ten (10) working days of the change.

B. The owner is responsible for operation and maintenance (O&M) of the SWM BMPs. If the owner fails to adhere to the O&M Agreement, the Municipality may perform the services required and charge the owner appropriate fees. Nonpayment of fees may result in a lien against the property.

Section 503. Performance Guarantee

A. For SWM Site Plans that involve subdivision and land development, the applicant shall provide a financial guarantee to the Municipality for the timely installation and proper construction of all stormwater management controls as required by the approved SWM Site Plan and this Ordinance in accordance with the provisions of Sections 509, 510, and 511 of the Pennsylvania Municipalities Planning Code.

Section 504. Municipal Stormwater Maintenance Fund

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

A. If the storage facility is to be privately owned and maintained, the fee shall cover the cost of periodic inspections performed by the Municipality for a period of 10 years, as estimated by the Municipality Engineer. After that period of time, inspection expenses will be assessed by the Municipality on an as needed basis thereafter.

B. If the storage facility is to be owned and maintained by the Municipality, the fee shall cover the estimated costs for maintenance and inspections for 10 years. The Municipal Engineer will establish the estimated costs utilizing information submitted by the applicant.

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

ARTICLE VI – FEES AND EXPENSES

Section 601. General

A. The developer shall be required to submit a subdivision/land development or building permit application prior to any stormwater management facilities construction. The fee for plan reviews, permit issuance, and inspections shall be established by resolution of the Municipality to defray the following expenses:

1. The review of the stormwater management/erosion and sedimentation control plan by the Municipal Engineer.

2. The site inspections.

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

4. The final inspection upon completion of the stormwater management facilities and drainage improvements presented in the stormwater management/erosion and sedimentation control plan.

5. Any additional work required to enforce any permit provisions regulated by this Chapter, correct violations, and assure proper completion of stipulated remedial actions.

B. All fees shall be paid by the applicant at the time of application and shall be included in the required deposit for review of subdivision/land development plans.

C. Any additional costs incurred by the Municipality in the administration of this Chapter shall be charged to the applicant and shall be paid promptly by the applicant.

ARTICLE VII – PROHIBITIONS

Section 701. Ultimate Responsibility

The standards set forth herein and promulgated by this Section are minimum standards; therefore, this Section does not intend nor imply that compliance by any person will ensure that there will be no contamination, pollution, nor unauthorized discharge of pollutants.

Section 702. Prohibited Discharges and Connections

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, 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 paragraph C below and (2) discharges authorized under a state or federal permit.

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

- Discharges from firefighting activities

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

- None contaminated irrigation water from lawn maintenance, landscape drainage and flows from riparian habitats and wetlands.

- Diverted stream flows and springs.

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

- Non-contaminated HVAC condensation and water from geothermal systems

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

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

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

Section 703 Roof Drains and Sump Pumps

Roof drains, and sump pumps shall discharge to infiltration or vegetative BMPs wherever feasible.

Section 704. Alteration of SWM BMPs

No person shall modify, remove, fill, landscape, or alter any SWM BMPs, facilities, areas, or structures that were installed as a requirement of this Ordinance without the written approval of the Municipality.

Section 705. Suspension of MS4 Access

A. *Suspension Due to Illicit Discharges in Emergency Situations*. The Municipality may, without prior notice, suspend MS4 discharge access to a person when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent and substantial danger to the environment, or to the health or welfare of persons, or to the MS4 or waters of this Commonwealth. If the violator fails to comply with a suspension order issued in an emergency, the Municipality may take such steps as deemed necessary to prevent or minimize damage to the MS4 or waters this Commonwealth, or to minimize danger to persons including, without limitation, entering onto property for the purpose of disconnecting and/or performing emergency maintenance or repairs to storm sewers. In the event the Municipality must disconnect or perform emergency maintenance and/or repairs, the Municipality may file and attach a municipal lien on the property which is causing the illicit discharge.

B. *Suspension Due to the Detection of Illicit Discharge or Illicit Connection*. Any person discharging to the MS4 in violation of this Section may have their MS4 access terminated if such termination would abate or reduce an illicit discharge or illicit connection. The Municipality will notify a violator of the proposed termination of its MS4 access. The violator may petition the Municipality for a reconsideration and hearing.

C. A person commits an offense if the person reinstates MS4 access to premises terminated pursuant to this Section, without the prior approval of the Municipality.

Section 706. Industrial or Construction Activity Discharges

Any person subject to an industrial or construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with said permit shall be required in a form acceptable to the Municipality prior to the allowing of discharges to the MS4.

Section 707. Monitoring of Discharges

A. *Applicability*. This Section applies to all facilities that have stormwater discharges associated with industrial activity, including construction activity.

B. *Access to Facilities*.

1. The Municipality shall be permitted to enter and inspect facilities subject to regulation under this Section as often as may be necessary to determine compliance with this Section. If a discharger has security measures in force which require proper identification and clearance before entry into its premises, the discharger shall make the necessary arrangements to allow access to representatives of the Municipality.

2. Facility operators shall allow the Municipality ready access to all parts of the premises for the purposes of inspection, sampling, examination and copying of records that must be kept under

the conditions of an NPDES permit to discharge stormwater, and the performance of any additional duties as defined by State and Federal law.

3. The Municipality shall have the right to set up on any permitted facility such devices as are necessary in the opinion of the authorized enforcement agency to conduct monitoring and/or sampling of the facility's stormwater discharge.

4. The Municipality has the right to require the discharger to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the discharger at its own expense. All devices used to measure stormwater flow and quality shall be calibrated to ensure their accuracy.

5. Any temporary or permanent obstruction to safe and easy access to the facility to be inspected and/or sampled shall be promptly removed by the operator at the written or oral request of Municipality and shall not be replaced. The costs of clearing such access shall be borne by the operator.

6. Unreasonable delays in allowing Municipality access to a permitted facility is a violation of a stormwater discharge permit and of this Section. A person who is the operator of a facility with a NPDES permit to discharge stormwater associated with industrial activity commits an offense if the person denies the Municipality reasonable access to the permitted facility for the purpose of conducting any activity authorized or required by this Section.

7. If the Municipality has been refused access to any part of the premises from which stormwater is discharged, and it is able to demonstrate probable cause to believe that there may be a violation of this Section, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with this Section or any order issued hereunder or to protect the overall public health, safety, and welfare of the community, then the Municipality may seek issuance of a search warrant from any court of competent jurisdiction.

Section 708. Requirements to Prevent, Control, and Reduce Stormwater Pollutants by the Use of BMPs

The Municipality will adopt requirements identifying best management practices for any activity, operation, or facility which may cause or contribute to pollution or contamination of stormwater, the storm drain system, or waters of this Commonwealth. The owner or operator of a commercial or industrial establishment shall provide, at their own expense, reasonable protection from accidental discharge of prohibited materials or other wastes into the municipal storm drain system or watercourses through the use of these structural and non-structural BMPs. Further, any person responsible for a property or premises, which is, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional structural and non-structural BMPs to prevent the further discharge of pollutants to the municipal separate storm sewer system. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of stormwater associated with industrial activity, to the extent practicable, shall be deemed compliance with the provisions of this Section. These BMPs shall be part of a stormwater pollution prevention plan (SWPP) as necessary for compliance with requirements of the NPDES permit.

Section 709. Watercourse Protection

A. Every person owning property through which a watercourse passes, or such person's lessee, shall keep and maintain that part of the watercourse within the property free of trash, debris, excessive vegetation, and other obstacles that would pollute, contaminate, or significantly retard the flow of water through the watercourse.

B. In addition, the owner or lessee shall maintain existing privately owned structures within or adjacent to a watercourse so that such structures will not become a hazard to the use, function, or physical integrity of the watercourse.

Section 710. Notification of Spills

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation or responsible for emergency response for a facility or operation has information of any known or suspected release of materials which are resulting or may result in illicit discharges or pollutants discharging into stormwater, the storm drain system, or water of this Commonwealth said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials, said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services. In the event of a release of non-hazardous materials, said person shall notify the Municipality in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the Municipality within 3 business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also retain an on-site written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least 3 years.

Section 711. Enforcement

A. *Notice of Violation*. Whenever the Municipality finds that a person has violated a prohibition or failed to meet a requirement of this Section, the Municipality may order compliance by written notice of violation to the responsible person. Such notice may require, without limitation:

   1. The performance of monitoring, analyses, and reporting.

   2. The elimination of illicit connections or illicit discharges.

   3. That violating discharges, practices, or operations shall cease and desist.

4. The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property.

5. Payment of a fine to cover administrative and remediation costs.

6. The implementation of source control or treatment BMPs.

B. If abatement of a violation and/or restoration of affected property is required, the notice shall set forth a deadline within which such remediation or restoration must be completed. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, the violator may be subject to prosecution for a summary offense.

Section 712. Injunctive Relief

It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this Section. If a person has violated or continues to violate the provisions of this Section, the Municipality may petition for a preliminary or permanent injunction restraining the person from activities which would create further violations or compelling the person to perform abatement or remediation of the violation.

Section 713. Violations Deemed as Public Nuisance

In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this Section is a threat to public health, safety, and welfare, and is declared and deemed a public nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such public nuisance may be taken. In the event that a violator fails to correct or abate a violation after notice to do so, the Township reserves the right to enter into the property to correct or abate the public nuisance and to collect the costs thereof from the property owner, including the filing of a lein pursuant to the Municipal Claims and Tax Liens Law

Section 714. Criminal Prosecution

Any person that has violated or continues to violate this Section shall be liable to criminal prosecution pursuant to Article IX – Enforcement and Penalties.

Section 715. Remedies Not Exclusive

The remedies listed in this Section are not exclusive of any other remedies available under any applicable Federal, State, or local law, and it is within the discretion of the Municipality to seek cumulative remedies.

ARTICLE VIII – ENFORCEMENT AND PENALTIES

Section 801. Right-of-Entry

Upon presentation of proper credentials, the municipality or its designated agent may enter at reasonable times upon any property within the municipality to inspect the condition of the stormwater structures and facilities in regard to any aspect regulated by this Ordinance.

Section 802. Inspection

The landowner or the owner's designee (including the Municipality for dedicated and owned facilities) shall inspect SWM BMPs, facilities and/or structures installed under this Ordinance according to the following frequencies, at a minimum, to ensure the BMPs, facilities and/or structures continue to function as intended:

1. Annually for the first five (5) years.

2. Once every three (3) years thereafter.

3. During or immediately after the cessation of a 10-year or greater storm.

4. All stormwater BMPs serving non-residential development or serving more than one residential unit shall be inspected, and a report of such inspection shall be submitted to the Municipality for review on an annual basis.

5. All inspection records shall be maintained by the landowner and shall be made available to the Municipality upon written request.

Inspections should be conducted during or immediately following precipitation events. A written inspection report shall be created to document each inspection. The inspection report shall contain the date and time of the inspection, the individual(s) who completed the inspection, the location of the BMP, facility or structure inspected, observations on performance, and recommendations for improving performance, if applicable. Inspection reports shall be submitted to the Municipality within 30 days following completion of the inspection.

Section 803. Notification

In the event that a person fails to comply with the requirements of this Chapter, or fails to conform to the requirements of any permit issued hereunder, the Municipality shall provide written notification of the violation. Such notification shall set forth the nature of the violations and establish a time limit for the correction of these violation(s). Failure to comply within the time specified shall subject such person to the penalty provisions of this Chapter. All such penalties shall be deemed cumulative and does not prevent the Municipality from pursuing any and all remedies. It shall be the responsibility of the owner of the real property on which any regulated activity is proposed to occur, is occurring, or has occurred, to comply with the terms and conditions of this Chapter.

Section 804. Enforcement

A. It shall be unlawful for a person to undertake any regulated activity except as provided in an approved SWM Site Plan, unless specifically exempted in Section 302.

B. It shall be unlawful to violate Section 803 of this Ordinance.

C. Inspections regarding compliance with the SWM Site Plan are a responsibility of the Municipality.

Section 805. Suspension and Revocation

A. Any approval or permit issued by the Municipality 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 O&M Agreement.

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

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

B. A suspended approval may be reinstated by the Municipality when:

1. The Municipality has inspected and approved the corrections to the violations that caused the suspension.

2. The Municipality is satisfied that the violation has been corrected.

C. An approval that has been revoked by the Municipality cannot be reinstated. The applicant may apply for a new approval under the provisions of this Ordinance.

D. If a violation causes no immediate danger to life, public health, or property, at its sole discretion, the Municipality may provide a limited time period for the owner to correct the violation. In these cases, the Municipality will provide the owner, or the owner's designee, with a written notice of the violation and the time period allowed for the owner to correct the violation. If the owner does not correct the violation within the allowed time period, the municipality may revoke or suspend any, or all, applicable approvals and permits pertaining to any provision of this Ordinance.

Section 806. Penalties

A. Any person that has violated or continues to violate any provision of this ordinance shall be subject to a summary criminal proceeding brought before a District Justice and upon being found guilty of the violation shall be subject to a fine not to exceed one thousand ($1,000.00) per violation, to a term of imprisionment to the extent allowed by law for the punishment of summary offenses, or to a term of imprisionment for the failure to pay the fine pursuant to the Pennsylvania Rules of Criminal Proceedure. A seperate offense shall arise for each day in which a violation is found to exist or for each section of this ordinance that is found to have been violated.

B. In addition, the municipality may institute injunctive, mandamus, or any other appropriate action or proceeding at law or in equity for the enforcement of this Ordinance. Any court of competent jurisdiction shall have the right to issue restraining orders, temporary or permanent injunctions, mandamus, or other appropriate forms of remedy or relief.

ARTICLE IX – REFERENCES

1. U.S. Department of Agriculture, National Resources Conservation Service (NRCS). *National Engineering Handbook.* Part 630: Hydrology, 1969-2001. Originally published as the *National Engineering Handbook*, Section 4: Hydrology. Available from the NRCS online at: http://www.nrcs.usda.gov/.

2. U.S. Department of Agriculture, Natural Resources Conservation Service. 1986. *Technical Release 55: Urban Hydrology for Small Watersheds*, 2nd Edition. Washington, D.C.

3. Pennsylvania Department of Environmental Protection. No. 363-0300-002 (December 2006), as amended and updated. *Pennsylvania Stormwater Best Management Practices Manual*. Harrisburg, PA.

4. Pennsylvania Department of Environmental Protection. No. 363-2134-008 (March 31, 2012), as amended and updated. *Erosion and Sediment Pollution Control Program Manual.* Harrisburg, PA.

5. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Hydrometeorological Design Studies Center. 2004-2006. *Precipitation-Frequency Atlas of the United States, Atlas 14*, Volume 2, Version 3.0, Silver Spring, Maryland. Internet address: http://hdsc.nws.noaa.gov/hdsc/pfds/.

Ordinance 2022-01

ENACTED and **ORDAINED** at a regular meeting of the

Dover Township Board of Supervisors on this 25th day of July, 2022.

This Ordinance shall take effect immediately.

Dover Township, Board of Supervisors

Stephen Stefanowicz, Chairman

ATTEST:

Trena M. Hall, Township Secretary

APPENDIX A

UPI:
Street Address:
Dover Township
SWMP No:

STORMWATER OPERATION AND MAINTENANCE AND ACCESS AGREEMENT

THIS AGREEMENT is made and entered into this ____ day of _____, 20___, by and between _____with an address at _____ , its/his/her successors, heirs, personal representatives and assigns, including specifically any future lot owner ("Landowner"), and Dover Township, a Township of the Second Class, with municipal offices at 2480 West Canal Road, Dover Township, York County; Pennsylvania, ("Township").

W I T N E S S E T H

WHEREAS, the Landowner is the owner of real property located in Dover Township, York County, known as _____ with a UPI No. _____ (the "Property").

ALTERNATE 1 (to be used with a SALDO plan):

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

WHEREAS, the Subdivision/Land Development Plan ("Subdivision Plan") for the _____ _____ **[Name of Subdivision]** which is expressly made a part hereof, as approved or to be approved by the Township and recorded in part with the land records of York County, Pennsylvania, provides for the management of stormwater within the confines of the Property pursuant to a SWM Site Plan (the "SWM Site Plan"); and]

ALTERNATE 2 (to be used when there is no SALDO plan):

[WHEREAS, the Landowner is proceeding to build on and/or further develop impervious surface on the Property; and

WHEREAS, the SWM Site Plan (the "SWM Site Plan") which is expressly made a part hereof, as approved or to be approved by the Township, provides for the management of stormwater within the confines of the Property; and]

WHEREAS, the SWM Site Plan includes a SWM Operation and Maintenance Plan approved by the Township (the "O&M Plan") for the Property, [**PICK ONE**: which is attached hereto as Appendix A and made a part hereof - **OR** - which is on file at the Township offices and made a part hereof] provides for the establishment, operation and maintenance of SWM facilities and BMPs; and

WHEREAS, the Township and the Landowner agree that the health, safety and welfare of the residents of the Township and the protection and maintenance of water quality require that SWM facilities and BMPs be established, constructed and maintained on the Property; and

WHEREAS, the Township requires, through the implementation of the Township's Stormwater Management Ordinance, Ordinance No. 2011-06, as amended (the "Stormwater Ordinance"), that SWM facilities and BMPs as required by the SWM Site Plan and the Stormwater Ordinance be established, constructed and adequately operated and maintained by the Landowner in accordance with the O&M Plan.

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

Section 1. Unless otherwise defined in this Agreement, the terms used herein shall have the meaning given to them in the Stormwater Ordinance, as amended.

Section 2. The Landowner shall establish and/or construct the SWM facilities and BMPs in accordance with the terms, conditions and specifications identified in the SWM Site Plan. Except when expressly allowed by the Stormwater Ordinance, the Landowner shall not alter, modify, replace, relocate or in any way interfere with any SWM facilities or BMPs without the prior written permission of the Township.

Section 3. The Landowner shall adequately maintain the SWM facilities and BMPs shown on the SWM Site Plan in good working order in accordance with the specific O&M requirements set forth in the O&M Plan. This includes all swales, pipes, channels built to convey and control stormwater, as well as all SWM BMP structures, improvements, and vegetation provided to control the quantity and quality of the stormwater. Adequate O&M is defined as good working condition, acceptable to the Township, so those facilities are performing their design functions and not having any adverse effects either on water quality or on adjoining or nearby roads, structures or properties. Adequate O&M will not be demonstrated merely by strict compliance with the SWM Site Plan or O&M Plan where the SWM Site Plan and O&M Plan are inadequate for stormwater management in the field.

Section 4. A. The Landowner hereby grants to the Township an easement over, along, and through the Property for the periodic inspections by the Township and repair of the SWM facilities and BMPs, if necessary. The Landowner, with prior notice to and approval by the Township, may choose and periodically modify the easement location so long as the Landowner at all times maintains or provides an unobstructed means for access to and emergency maintenance of the SWM facilities and BMPs. The Township shall not be liable for restoration of the Property in the event of emergency maintenance or for any damages due to failure of the Landowner to provide unobstructed access to the SWM facilities and BMPs. Whenever possible, the Township shall notify the Landowner prior to entering the Property.

B. The Township reserves the right to inspect the SWM facilities and BMPs annually for the first five (5) years and every three (3) years thereafter to ensure continued functioning. The Township may inspect the SWM facilities and BMPs at more or less frequent intervals, and at other times as set out in the Stormwater Ordinance, as amended from time to time.

C. If inspections are conducted by the Township, the Township shall give the Landowner, if requested, copies of the inspection report with findings and evaluations. All reasonable costs for inspections of SWM facilities and BMPs shall be borne by the Landowner and payable to the Township.

Section 5. In the event the Landowner fails to maintain the SWM facilities and/or BMPs in accordance with Section 3 after thirty (30) days written notice to do so (unless in the case of an emergency), the Township or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain the SWM facilities and BMPs. It is expressly understood and agreed that the Township is under no obligation to maintain or repair said SWM facilities and BMPs, and in no event shall this Agreement be construed to impose any such obligation on the Township. The Landowner shall be responsible to provide the Township with a current mailing address if different than the address stated above.

Section 6. In the event the Township, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like on account of the Landowner's failure to perform such work, the Landowner shall reimburse the Township upon demand, within 30 days of receipt of invoice thereof, for all costs, including engineer and attorney fees, incurred by the Township hereunder. If not paid within said 30-day period, the Township may enter a municipal lien against the property in the amount of such costs, or may proceed to recover his costs through proceedings in equity or at law as authorized under the provisions of the Municipal Claims and Tax Lien Act, 53 P.S.§ 7101 *et seq*.

Section 7. The Landowner hereby releases, indemnifies and holds harmless the Township, its supervisors, employees, officers, agents and representatives, from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against said persons from the construction, presence, existence or maintenance of the SWM facilities and BMPs by Landowner or Township. The Township disclaims all liability for design, construction, installation or operation defects. The grant of a permit or approval of a subdivision and/or land development plan shall not constitute a representation, guarantee, or warranty of any kind or liability upon the Township, its officials, or employees. None of the conditions or covenants contained in this Agreement shall be deemed a waiver of Township's rights or immunities granted by statute.

Section 8. Should any provision of this Agreement be interpreted to conflict with the Stormwater Ordinance, as amended or superseded, the provisions and requirements of the Stormwater Ordinance shall control interpretation. Should any provision of this Agreement be determined by a court to be unenforceable, such provision of this Agreement shall be deemed to be void; provided, however, the balance of the Agreement shall remain in full force and effect.

Section 9. This Agreement may be recorded in the land records of York County, Pennsylvania and shall constitute a covenant running with the Property and/or equitable servitude, and shall be binding on the Landowner, its/his/her successors, receivers, heirs, personal representatives and assigns, in perpetuity. Landowner will reference this Agreement and recording information in any deeds transferring or conveying the Property or any subdivided outparcels thereof.

Section 10. The laws of the Commonwealth of Pennsylvania shall govern the interpretation of this Agreement. Jurisdiction and venue shall be exclusively in the county in which the Property is located. The obligations and duties of the Landowner under this Agreement shall be specifically enforceable by the Township, and the Landowner agrees that a court shall have the specific authority to order compliance with this Agreement in the form of a preliminary injunction or other equitable relief.

Section 11. A violation or breach of this Agreement shall be deemed a violation of the Stormwater Ordinance, as amended, which shall be subject to all remedies and enforcement set forth therein. Landowner shall be responsible for all costs of enforcement (including attorney fees) of this Agreement, which costs shall be reimbursed to the Township upon demand within 30 days of the receipt of an invoice thereof. All invoiced amounts due under this Agreement for administration, maintenance, enforcement or otherwise that remain unpaid after 30 days from the date of invoice shall be assessed interest at the legal rate until paid in full.

Section 12. This Agreement may only be amended by a written amendment executed by the party against whom enforcement is sought.

IN WITNESS WHEREOF, the parties have set their hand and seals the day and year written above.

ATTEST: DOVER TOWNSHIP

Dover Township Assistant Secretary Dover Township Chairperson

ATTEST/WITNESS: [LANDOWNER]

COMMONWEALTH OF PENNSYLVANIA :

: SS

COUNTY OF YORK :

On this the _____ day of _____, 20___, before me, the undersigned officer, personally appeared _____, who acknowledged him/herself to be the Chairperson of Dover Township Board of Supervisors, and that he/she as such Chairperson, being authorized to do so, executed the foregoing document for the purposes therein contained by signing the name of the Township by him/herself as Chairperson.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Notary Public

COMMONWEALTH OF PENNSYLVANIA :

: SS

COUNTY OF YORK :

On this the _____ day of _____, 20___, before me, the undersigned officer, personally appeared _____, _____, who executes this document and acknowledges he/she is authorized to do so and acknowledged that he/she executed the same for the purposes therein contained.

IN WITNESS WHEREOF, I hereunto set my hand and official seal.

Notary Public

Appendix B

Disconnected Impervious Area (DIA)

1. Rooftop Disconnection

When rooftop downspouts are directed to a pervious area that allows for infiltration, filtration, and increased time of concentration, the rooftop may qualify as completely or partially DIA and a portion of the impervious rooftop area may be excluded from the calculation of total impervious area.

A rooftop is considered to be completely or partially disconnected if it meets the requirements listed below:

- The contributing area of rooftop to each disconnected discharge is 500 square feet or less, and
- The soil, in proximity of the roof water discharge area, is not designated as hydrologic soil group "D" or equivalent, and
- The overland flow path from roof water discharge area has a positive slope of 5% or less, and .
- The total proposed disconnection does not total an amount greater than 5,000 square feet or does not exceed more than 5% of the tract area, whichever is greater.

For designs that meet these requirements, the portion of the roof that may be considered disconnected depends on the length of the overland path as designated in Table B.1.

Table B.1: Partial Rooftop Disconnection

Length of Pervious Flow Path*	**Roof Area Treated as Disconnected**
(ft)	(% of contributing area)
0 – 14	0
15 – 29	20
30 – 44	40
45 – 59	60

60 – 74	80
75 or more	100
* Flow path cannot include impervious surfaces and must be at least 15 feet from any impervious surfaces.	

2. Pavement Disconnection

When pavement runoff is directed to a pervious area that allows for infiltration, filtration, and increased time of concentration, the contributing pavement area may qualify as a DIA that may be excluded from the calculation of total impervious area. This applies generally only to small or narrow pavement structures such as driveways and narrow pathways through otherwise pervious areas (e.g., a walkway or bike path through a park).

Pavement is disconnected if the pavement, or area adjacent to the pavement, meets the requirements below:

- The contributing flow path over impervious area is not more than 75 feet, and
- The length of overland flow is greater than or equal to the contributing length, and
- The soil is not designated as hydrologic soil group "D" or equivalent, and
- The slope of the contributing impervious area is 5% or less, and
- The slope of the overland flow path is 5% or less.
- The total proposed disconnection does not total an amount greater than 5,000 square feet or does not exceed more than 5% of the tract area, whichever is greater.

If the discharge is concentrated at one or more discrete points, no more than 1,000 square feet may discharge to any one point. In addition, a gravel strip or other spreading device is required for concentrated discharges. For nonconcentrated discharges along the edge of the pavement, this requirement is waived; however, there must be a provision for the establishment of vegetation along the pavement edge and temporary stabilization of the area until vegetation becomes stabilized.

REFERENCE

Philadelphia Water Department. 2006. *Stormwater Management Guidance Manual.*

Section 4.2.2: Integrated Site Design. Philadelphia, PA.

Appendix C

Infiltration Testing

Infiltration BMPs shall be designed in the following manner: A detailed soils evaluation of the project site shall be performed to determine the suitability of recharge facilities. The evaluation shall be performed by a qualified professional and, at a minimum, address soil permeability, depth to bedrock, susceptibility to sinkhole formation, and subgrade stability, seasonally high groundwater table, suitability of stormwater management facilities and maximum infiltration capacity in depth of water per unit area. The general process for designing the infiltration BMP shall be:

A. Site evaluation to determine general areas of suitability for infiltration practices.

B. Infiltration tests must be taken at the location and elevation of the facility's bottom for each proposed practice. At least two separate tests shall be taken at the location of each SWM facility.

C. A double-ring infiltrometer test shall be used for all infiltration tests in accordance with the current edition of the BMP Manual.

D. Upon completion of site evaluation and infiltration tests, the design infiltration rate shall be determined from the tested infiltration rates by using the geometric mean. The geometric mean, not the arithmetic mean, of the multiple infiltration tests must be reported and used. In some situations, a measured rate of zero may be obtained. In these cases, a default value should be used based on one decimal digit less than the smallest detectable reading for that particular test. For example, if the smallest detectable reading using an infiltrometer is a 0.15 inch drop, then 0.14 inches should be substituted for the zero reading. The geometric mean of a data set is the nth root of the product of "n" numbers:

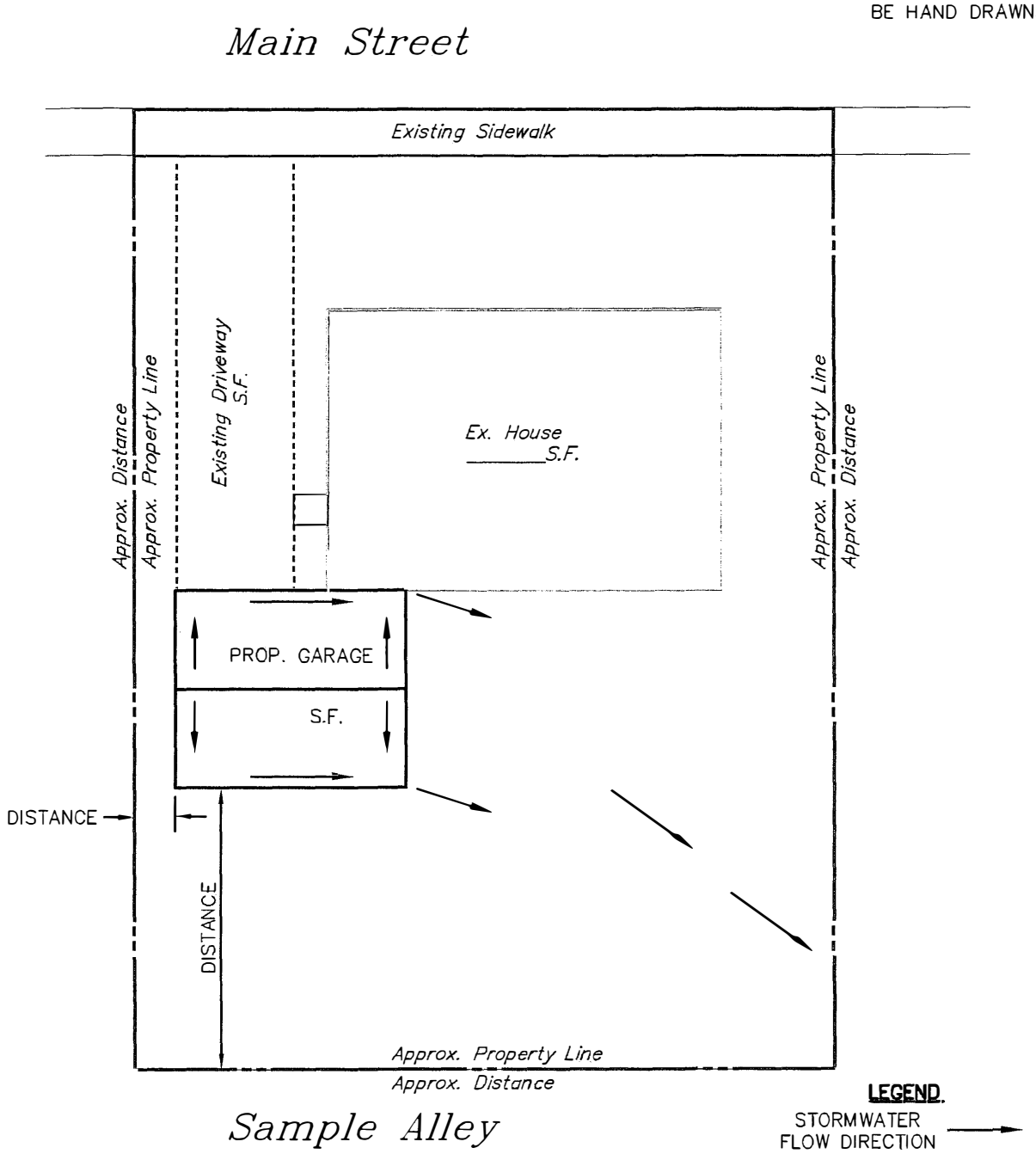
$$\sqrt[n]{x_1 * x_2 * x_3 \ldots x_n}$$

E. The infiltration requirement in the high-quality/exceptional waters shall be subject to Title 25, Chapter 93, of the Pennsylvania Code of Regulations and the antidegradation regulations promulgated by DEP thereunder.

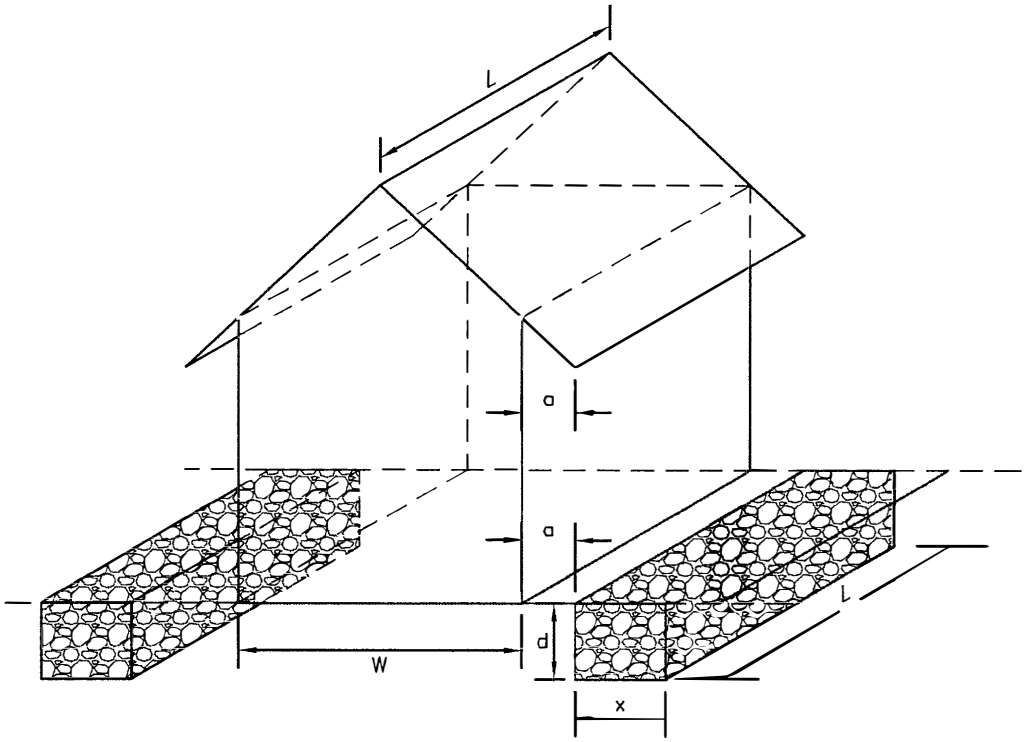
Appendix D

Stormwater Management Small Projects Guide

NOTE:
THIS PLAN CAN
BE HAND DRAWN.



SAMPLE SKETCH/ SITE PLAN



KEY

L = LENGTH OF STRUCTURE = LENGTH OF SEEPAGE TRENCH (FT.)
W = WIDTH STRUCTURE (FT)
a = EAVE OVERHANG (FT) = TRENCH DISTANCE FROM STRUCTURE (FT)
x = WIDTH OF SEEPAGE TRENCH (FT)
d = DEPTH OF SEEPAGE TRENCH (FT) = 2'

REQUIRED STORAGE VOLUME

Impervious Area (SF)	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Total Required Storage (CF)	83	100	117	133	150	167	183	200	217	233	250	267	283	300	317	333
Required Storage Volume Per Pit (CF)	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

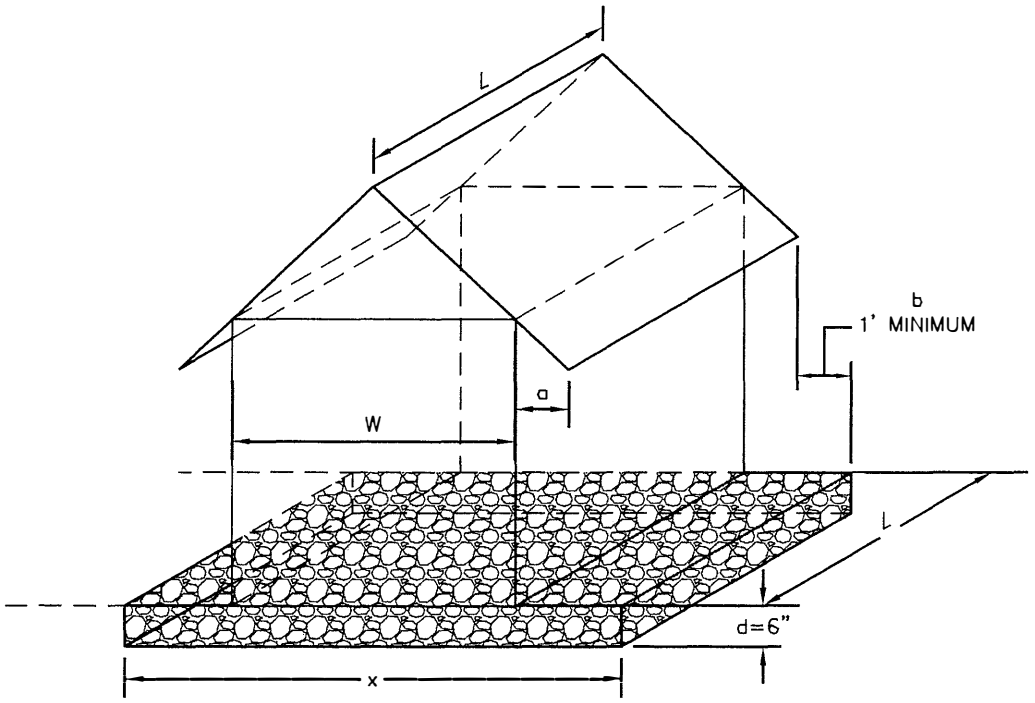
Required Pit Size

Pit Length (L) \ Pit Width (x)	1	2	3	4	5	6	7	8	9	10
10	8	16	24	32	40	48	56	64	72	80
15	12	24	36	48	60	72	84	96	108	120
20	16	32	48	64	80	96	112	128	144	160
25	20	40	60	80	100	120	140	160	180	-
30	24	48	72	96	120	144	168	192	-	-
35	28	56	84	112	140	168	196	-	-	-
40	32	64	96	128	160	192	-	-	-	-
45	36	72	108	144	180	-	-	-	-	-
50	40	80	120	160	-	-	-	-	-	-
55	44	88	132	176	-	-	-	-	-	-

NOTES

1. TRENCH MUST BE PROVIDED ON EACH SIDE OF STRUCTURE.
2. SIDE OF TRENCH TO BE WRAPPED IN CLASS 1 GEOTEXTILE.
3. TRENCH TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
4. TRENCH TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
5. TRENCH TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

STRUCTURES WITHOUT GUTTERS A



KEY

L = LENGTH OF STRUCTURE = LENGTH OF SEEPAGE BED (FT.)
W = WIDTH OF STRUCTURE (FT)
a = EAVE OVERHANG (FT)
b = DISTANCE FROM EAVE OVERHANG TO EDGE OF SEEPAGE BED (FT) = 1' MINIMUM
x = WIDTH OF SEEPAGE BED (FT)
x = W + 2 FT
d = DEPTH OF SEEPAGE BED = 6"

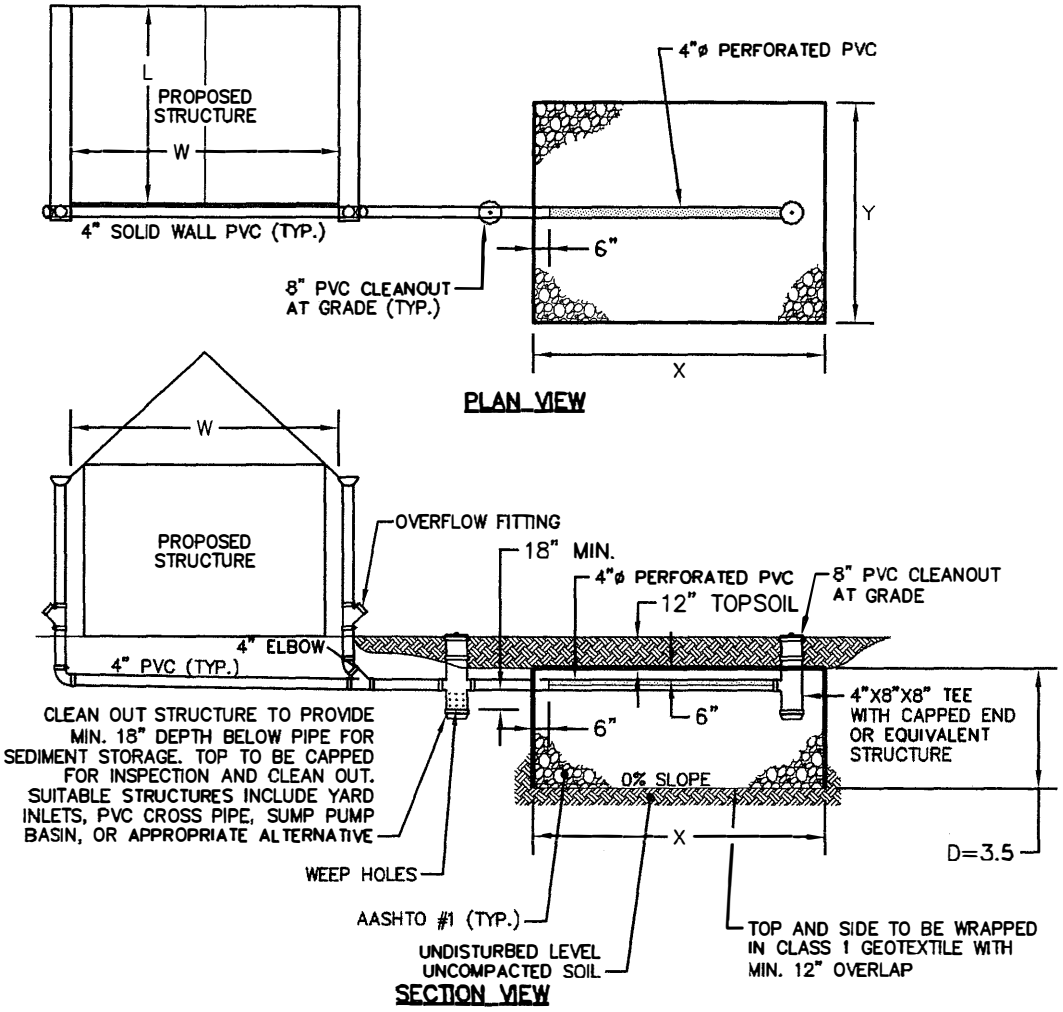
REQUIRED STORAGE VOLUME

Impervious Area (SF)	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Required Storage Volume Per Pit (CF)	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

NOTES

1.) SIDE OF BED TO BE WRAPPED IN CLASS 1 GEOTEXTILE.
2.) BED TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
3.) BED TO BE CONSTRUCTED AT 0 % SLOPE ON UNDISTURBED SOIL.
4.) BED TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

STRUCTURES WITHOUT GUTTERS B



REQUIRED STORAGE VOLUME

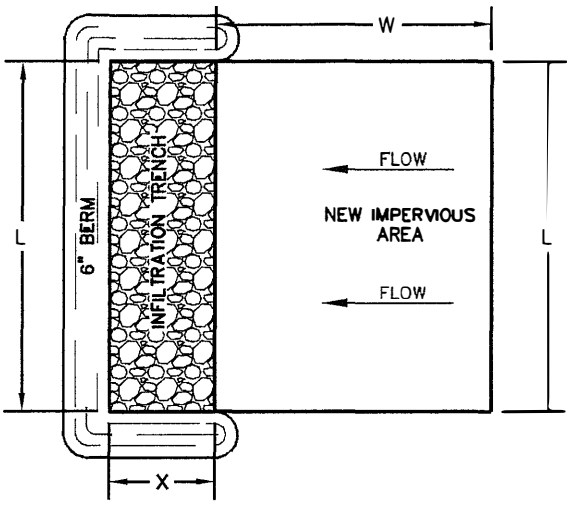
Impervious Area (SF)	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Required Storage Volume Per Pit (CF)	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

Required Pit Size

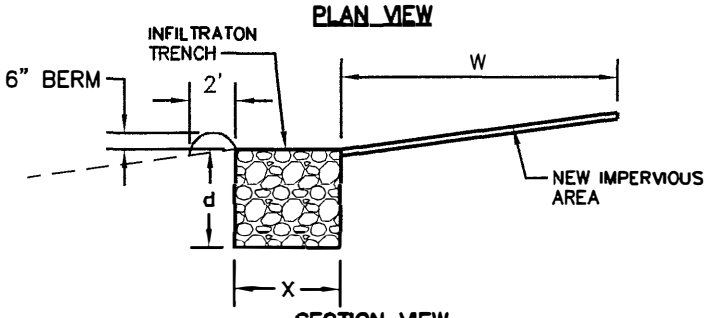
Pit Length (Y) \ Pit Width (x)	5	6	7	8	9	10	11	12	15	20
5	35	42	49	56	63	70	77	84	105	140
6	42	50	59	67	76	84	92	101	126	168
7	49	59	69	78	88	98	108	118	147	196
8	56	67	78	90	101	112	123	134	168	-
9	63	76	88	101	113	126	139	151	189	-
10	70	84	98	112	126	140	154	168	-	-
11	77	92	108	123	139	154	169	185	-	-
12	84	101	118	134	151	168	185	-	-	-
15	105	126	147	168	189	-	-	-	-	-
20	140	168	196	-	-	-	-	-	-	-

NOTES
1. BOTTOM OF BED ELEVATION TO BE 4.5' BELOW SURFACE TO ACCOUNT FOR 1' OF TOPSOIL OVER INFILTRATION BED.
2. PIPE TO BE APPROPRIATELY SIZED TO CARRY ROOF WATER. PVC PIPE SHALL HAVE A MIN. DIAMETER OF 4".
3. PIPING AND CLEANOUTS TO BE CENTERED WITHIN INFILTRATION BED.
4. BED TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.

STRUCTURES WITH GUTTERS



PLAN VIEW



SECTION VIEW

KEY

L = LENGTH OF NEW IMPERVIOUS SURFACE (FT) = LENGTH OF INFILTRATION TRENCH
W = WIDTH OF NEW IMPERVIOUS SURFACE TRENCH
X = WIDTH OF SEEPAGE TRENCH (FT)
d = DEPTH OF SEEPAGE TRENCH (FT) = 3'

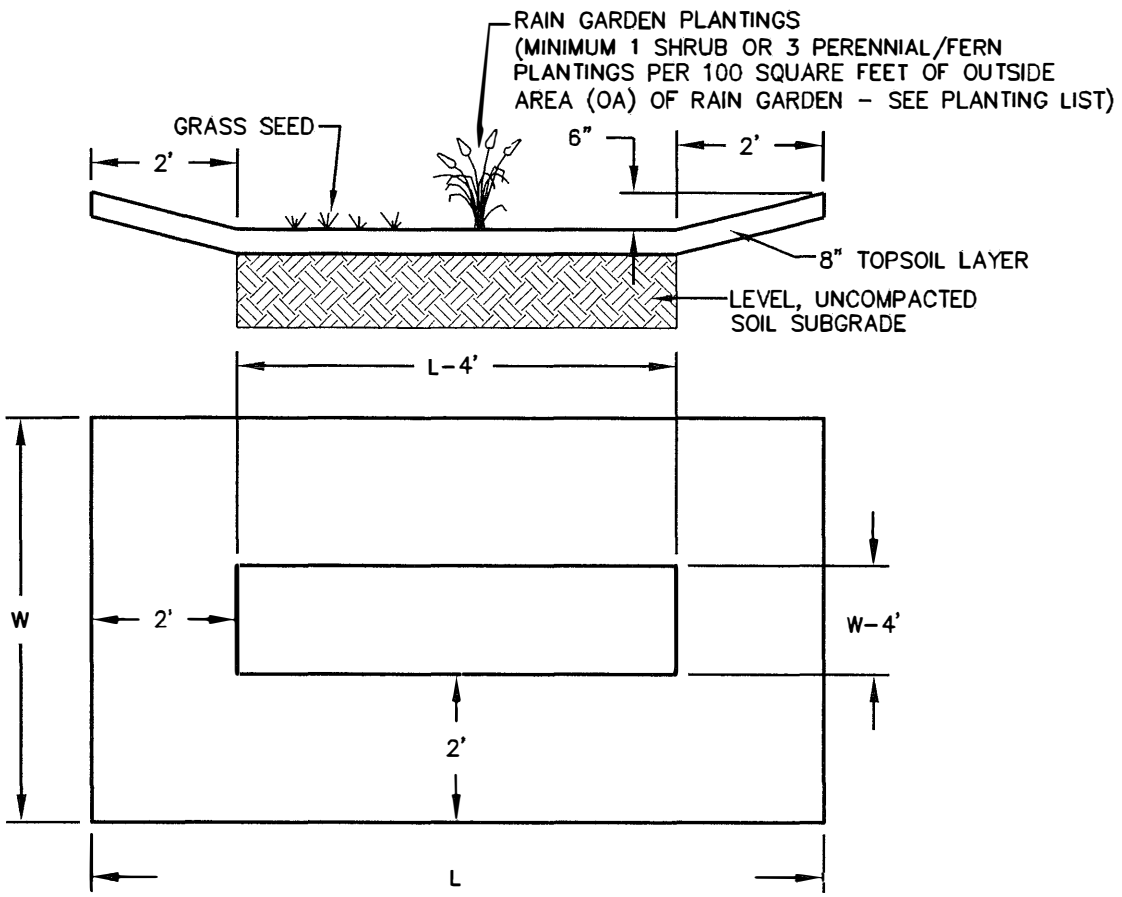
NOTES

1.) SIDE OF TRENCH TO BE WRAPPED IN PENNDOT CLASS 1 GEOTEXTILE.
2.) TRENCH TO BE FILLED WITH CLEAN STONE (3/4" MIN. SIZE).
3.) TRENCH TO BE CONSTRUCTED AT 0% SLOPE ON UNDISTURBED SOIL.
4.) TRENCH TO BE CHECKED REGULARLY TO MAINTAIN PROPER OPERATION.
5.) 6" BERM MAY BE REMOVED AS DEEMED APPROPRIATE BY THE MUNICIPALITY

Required Storage Volume

Impervious Area Width (Ft) - W	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Required Pit Width (Ft) - X	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5

AT GRADE IMPERVIOUS



REQUIRED STORAGE VOLUME

Impervious Area (SF)	500	600	700	800	900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000
Required Storage Volume of Rain Garden (CF)	42	50	58	67	75	83	92	100	108	117	125	133	142	150	158	167

Required Rain Garden Size

Length (L) \ Width (x)	**10**	**11**	**12**	**13**	**14**	**15**	**18**	**20**	**25**	**30**
10	34	38	42	46	50	54	66	74	94	114
11	38	43	47	52	56	61	74	83	106	128
12	42	47	52	57	62	67	82	92	117	142
13	46	52	57	63	68	74	90	101	129	156
14	50	56	62	68	74	80	98	110	140	170
15	54	61	67	74	80	87	106	119	152	-
18	66	74	82	90	98	106	130	146	186	-
20	74	83	92	101	110	119	146	164	-	-
25	94	106	117	129	140	152	186	-	-	-
30	114	128	142	156	170	-	-	-	-	-

RAIN GARDEN

Rain Garden Native Planting List

Perennials and Ferns:
Blue false indigo (Baptisia australis)
Blue flag iris (Iris versicolor)
Blue star (Amsonia tabernaemontana)
Blue vervain (Verbena hastata)
Boltonia (Boltonia asteroides)
Boneset (Eupatorium perfoliatum)
Bottlebrush grass (Hystrix patula)
Broomsedge (Andropogon virginicus)
Cardinal flower (Lobelia cardinalis)
Cinnamon fern (Osmunda cinnamomea)
Culvers root (Veronicastrum virginicum)
Golden ragwort (Senecio aureus)
Goldenrod (Solidago patula, S. rugosa)
Great blue lobelia (Lobelia siphlitica)
Green bullrush (Scirpus atrovirens)
Horsetail (Equisetum species)
Marsh marigold (Caltha palustris)
Mistflower (Eupatorium colestinum)
Monkey flower (Mimulus ringens)
New England aster (Aster novae-anglia)
New York aster (Aster novi-belgii)
Obedient plant (Physotegia virginiana)
Royal fern (Osmunda regalis)
Seedbox (Ludwigia alternifolia)
Sensitive fern (Onoclea sensibilis)
Sneezeweed (Helenium autumnale)
Soft rush (Juncus effusus)
Swamp milkweed (Asclepias incarnata)
Swamp rose mallow (Hibiscus moscheutos)
Swamp sunflower (Helianthus angustifolius)
Switchgrass (Panicum virgatum)
Threadleaf coreopsis (Coreopsis verticillata)
Tussock sedge (Carex stricta)
White turtlehead (Chelone glabra)
Woolgrass (Scirpus cyperinus)

Shrubs:
American beautyberry (Calicarpa americana)
Arrowwood (Viburnum dentatum)
Black chokeberry (Aronia melanocarpa)
Broad-leaved meadowsweet (Spirea latifolia)
Buttonbush (Cephalanthus occidentalis)
Elderberry (Sambucus canadensis)
Inkberry (Ilex glabra)
Narrow-leaved meadowsweet (Spirea alba)
Ninebark (Physocarpus opulifolius)
Possumhaw (Viburnum nudum)
Red-osier dogwood (Cornus sericea)
St. Johnswort (Hypericum densiflorum)
Silky dogwood (Cornus amomum)
Smooth alder (Alnus serrulata)
Spicebush (Lindera benzoin)
Swamp azalea (Rhododendron viscosum)
Swamp rose (Rosa palustris)
Sweet pepperbush (Clethra alnifolia)
Wild raisin (Viburnum cassinoides)
Winterberry (Ilex verticillata)
Virginia sweetspire (Itea virginica)

SWM Permit #:_____

Small Projects Guide - Sample Operation & Maintenance Plan

Construction:

1. Install erosion and sedimentation control facilities.
2. Stormwater Management Facility shall be installed before impervious areas are completed. If earthwork is involved during the construction of the impervious area, then extreme caution shall be taken so that sediment does not wash into the SWM Facility.
3. Mark the locations of the SWM facility.
4. Excavate the SWM Facility to the required depth. Contact municipality for inspection prior to filling. If standing water is encountered, a SWM Site Plan may need to be submitted; contact Municipal Engineer. All excavated materials shall be removed from the site or stabilized.

   For Stone Infiltration Structures

5. Line excavation with Geotextile.
6. Backfill SWM Facility with required stone. If required: Install piping, cleanouts and associated facilities as detailed.
7. If required: Close geotextile material over stone bedding.
8. If required: Place topsoil over trench.
9. Stabilize and seed all disturbed areas.

   For Rain Gardens

5. Place topsoil over excavated area.
6. Install plantings as shown on the plan.
7. Stabilize and seed all disturbed areas.

Maintenance:

1. The SWM Facility shall be checked regularly to ensure that no standing water exists in the facility 3 days after a rain event. If water is encountered, the facility may need to be modified. Notification of the municipality is required if facility is not functioning before any modifications are made.
2. Monitor the SWM facility to ensure that no sediment, grass clippings, leaves, and other similar accumulations occur on top of, and/or within, the SWM Facility.
3. Homeowner to submit an inspection report to the Township one year after construction and every 3rd year there afterwards.

I have read and agree to the above Operation and Maintenance Plan. I, as the property owner, am responsible for the proper construction and operation and maintenance for the SWM Facilities. If I fail to adhere to any of these tasks, the Township may perform the services required and charge the appropriate fees. Nonpayment of the fees may result in a lien against my property.

Applicant Name (Printed) Signature Date

Table 1

Runoff Curve Numbers

TABLE 1

Runoff Curve Numbers

[From NRCS (SCS) TR-55]

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

* Includes Multi-Family Housing unless justified lower density can be provided.

** Caution - CN values under 40 may produce erroneous modeling results.

NOTE: Site conditions of bare earth or fallow shall be considered as meadow when choosing a CN value for existing undeveloped conditions.

Table 2

Rational Runoff Coefficients

TABLE 2

RATIONAL RUNOFF COEFFICIENTS

By Hydrologic Soils Group and Overland Slope (%)

	A			B			C			D		
Land Use	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Cultivated Land	0.08 0.14	0.13 0.18	0.16 0.22	0.11 0.16	0.15 0.21	0.21 0.28	0.14 0.20	0.19 0.25	0.26 0.34	0.18 0.24	0.23 0.29	0.31 0.41
Pasture	0.12 0.15	0.20 0.25	0.30 0.37	0.18 0.23	0.28 0.34	0.37 0.45	0.24 0.30	0.34 0.42	0.44 0.52	0.30 0.37	0.40 0.50	0.50 0.62
Meadow	0.10 0.14	0.16 0.22	0.25 0.30	0.14 0.20	0.22 0.28	0.30 0.37	0.20 0.26	0.28 0.35	0.30 0.44	0.24 0.20	0.30 0.40	0.40 0.50
Forest	0.05 0.08	0.08 0.11	0.11 0.14	0.08 0.10	0.11 0.14	0.14 0.18	0.10 0.12	0.13 0.16	0.16 0.20	0.12 0.15	0.16 0.20	0.20 0.25
Residential Lot Size 1/8 Acre	0.25 0.33	0.28 0.37	0.31 0.40	0.27 0.35	0.30 0.39	0.25 0.44	0.30 0.38	0.33 0.42	0.38 0.49	0.33 0.41	0.36 0.43	0.42 0.34
Lot Size 1/4 Acre	0.22 0.30	0.26 0.34	0.29 0.37	0.24 0.33	0.29 0.37	0.33 0.42	0.27 0.36	0.31 0.40	0.36 0.47	0.30 0.38	0.34 0.42	0.40 0.52
Lot Size 1/3 Acre	0.19 0.28	0.23 0.32	0.26 0.35	0.22 0.30	0.26 0.35	0.30 0.39	0.25 0.33	0.29 0.38	0.34 0.45	0.28 0.36	0.32 0.40	0.39 0.50
Lot Size 1/2 Acre	0.16 0.25	0.20 0.29	0.24 0.32	0.19 0.28	0.23 0.32	0.28 0.36	0.22 0.31	0.27 0.35	0.32 0.42	0.26 0.34	0.30 0.38	0.37 0.48
Lot Size 1 Acre	0.14 0.22	0.19 0.26	0.22 0.29	0.17 0.24	0.21 0.28	0.26 0.34	0.20 0.28	0.25 0.32	0.31 0.40	0.24 0.21	0.29 0.35	0.31 0.46
Industrial	0.67 0.85	0.68 0.85	0.68 0.86	0.68 0.85	0.68 0.86	0.69 0.86	0.68 0.86	0.69 0.86	0.69 0.87	0.69 0.86	0.69 0.86	0.70 0.88
Commercial	0.71 0.88	0.71 0.88	0.72 0.89	0.71 0.80	0.72 0.82	0.72 0.84	0.72 0.84	0.72 0.85	0.72 0.89	0.72 0.89	0.72 0.91	0.72 0.95
Streets	0.70 0.76	0.71 0.77	0.71 0.79	0.71 0.80	0.72 0.82	0.74 0.84	0.72 0.84	0.73 0.85	0.76 0.89	0.73 0.89	0.75 0.91	0.78 0.95
Open Space	0.03 0.11	0.10 0.16	0.14 0.20	0.08 0.14	0.10 0.19	0.19 0.26	0.12 0.18	0.17 0.23	0.24 0.32	0.16 0.22	0.21 0.27	0.28 0.39
Parking	0.85 0.95	0.85 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

Runoff coefficient is for storm recurrence intervals less than 25 years.
Runoff coefficients for storm recurrence intervals 25 years or more.
Source: Rawls, W.J., S.L. Wong and 11.H. McCiien, 1981, "Comparison of Urban Flood Frequency Procedures", Preliminary Draft, U.S. Department of Agriculture, Soil Conservation Service, Baltimore, MD.

Table 3

Roughness Coefficients

TABLE 3

Roughness Coefficients (Manning's "n") for Overland Flow

(U.S. Army Corps of Engineers, HEC-1 Users Manual)

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

Roughness Coefficients (Manning's "n") for Sheet Flow

(U.S. Conservation Service Technical Release 55)

Surface Description	n
Smooth Surfaces (concrete, asphalt, gravel, or bare soil)	0.011
Fallow (no residue)	0.05
Cultivated Soils:	
Residue Cover Less Than 20%	0.06
Residue Cover Greater Than 20%	0.17
Grass:	
Short Prairie Grass	0.15
Dense Grasses	0.24
Bermuda Grass	0.41
Range (natural)	0.13
Woods:	
Light Underbrush	0.40
Dense Underbrush	0.80