SOUTH LEBANON TOWNSHIP
STORMWATER MANAGEMENT
ORDINANCE

ORDINANCE NO. 332
SOUTH LEBANON TOWNSHIP
LEBANON, COUNTY, PENNSYLVANIA

Adopted at a Public Meeting held on
January 22, 2013
SOUTH LEBANON TOWNSHIP

ORDINANCE NUMBER 332

An Ordinance repealing Ordinance Number 269 (Storm Water Management Ordinance) and adopting a new Storm Water Management Ordinance regulating Storm Water Management within South Lebanon Township.

BE IT ORDAINED AND ENACTED by the Board of Supervisors of South Lebanon Township, and it is hereby ordained and enacted by the authority of the same as follows:
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SOUTH LEBANON TOWNSHIP
STORMWATER MANAGEMENT ORDINANCE

ARTICLE I
GENERAL PROVISIONS

Section 101. Statement of Findings

The South Lebanon Township Board of Supervisors finds that:

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

B. A comprehensive program of stormwater management, including reasonable regulation of development and activities causing accelerated erosion, is fundamental to the public health, safety, welfare, and the protection of the people of the Township and all the people of the Commonwealth, their resources, and the environment.

C. A stormwater management plan shall be required for any regulated activity as defined by Section 104 at both the preliminary and final submittal stages. As an integral part of the Final Stormwater Management Plan, erosion and sediment pollution control measures shall be included and accompanied by an approval letter from the Lebanon County Conservation District.

D. Inadequate maintenance of stormwater facilities contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, 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 pollution of water resources.

E. Reasonable regulation of connections and discharges to municipal separate stormsewer systems is fundamental to the public health, safety, and welfare and the protection of people of the Commonwealth, their resources, and the environment.

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

G. Federal and state regulations require certain municipalities to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES). Permittees are required to enact, implement, and enforce a prohibition of non-stormwater discharges to the permittee’s regulated small municipal separate stormsewer systems (MS4s).
H. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).

Section 102. Purpose

The purpose of this Ordinance is to promote health, safety, and welfare within South Lebanon Township by minimizing the damages described in Section 101.A of this Ordinance through provisions designed to:

A. Manage accelerated runoff and erosion and sediment problems at their source by regulating activities that cause these problems.

B. Utilize and preserve the existing natural drainage systems as much as possible.

C. Maintain existing flows and quality of streams and watercourses in the Township and the Commonwealth.

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

E. Provide proper operation and maintenance of all stormwater management best management practices (SWM BMPs) that are constructed in the Township.

F. Provide procedures, performance standards and design criteria for stormwater management and planning.

G. Provide standards to meet NPDES permit requirements.

H. 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.

I. Maintain groundwater recharge to prevent degradation of surface and groundwater quality and to otherwise protect water resources.

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

K. Manage stormwater runoff close to the source.

Section 103. Statutory Authority

Section 104. Applicability

Any landowner or any person engaged in the alteration or development of land that may affect stormwater runoff characteristics shall implement such measures consistent with the provisions of this Ordinance.

Areas of South Lebanon Township not delineated in Appendix C (i.e. not located within either the Cocalico Creek or Tulpehocken Creek Watershed) shall still be governed by this Ordinance, except that all regulated activities, as defined below, shall meet the stormwater management regulations mandated for the residual areas.

This Ordinance shall only apply to permanent stormwater management facilities constructed as part of any of the Regulated Activities listed in this Section. Stormwater management and erosion and sediment pollution control during construction activities are specifically not regulated by this Ordinance and shall continue to be regulated under existing laws and ordinances.

This Ordinance contains stormwater management performance standards and design criteria that are necessary or desirable from a watershed-wide perspective. Local stormwater management design criteria (e.g., inlet spacing, inlet type, collection system design and details, outlet structure design, etc.) have been incorporated into the Ordinance to create a comprehensive guide.

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

1. Land development.
2. Subdivision.
3. Construction of new or additional impervious or semi-pervious surfaces (driveways, parking lots, etc.).
4. Construction of new buildings or additions to existing buildings.
5. Diversion or piping of any natural or man-made stream channel.
6. Installation of stormwater management facilities or appurtenances thereto.

All activities related to proper operation and maintenance of approved stormwater management BMPs and all activities that may contribute non-stormwater discharges to a regulated small MS4 are subject to regulation by this Ordinance.

Section 105. General Requirements

For any of the activities regulated by this Ordinance, the final approval of subdivision and/or land development plans, the issuance of any building occupancy permit, or the commencement of any land disturbance activity may not proceed until the Property Owner or Developer or his/her agent has received written approval of a Stormwater Management Site Plan from the Township or its designee.
Section 106. Repealer

Any other ordinance, ordinance provisions, or regulation of the Township inconsistent with any of the provisions of this Ordinance is hereby repealed to the extent of the inconsistency only.

Section 107. Severability

Should a court of competent jurisdiction declare 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 Ordinance Requirements

Approvals issued and actions taken pursuant to this Ordinance do not relieve the Applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, law, rule, act, or ordinance. Whenever there is a difference between the minimal applicable standards specified herein and those included in other applicable regulations the more stringent regulation shall apply.

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 Township purporting to validate such a violation.
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 word "person" includes an individual, firm, association, organization, partnership, trust, company, corporation, or any other similar entity and the members of such partnership or association and the officers of such corporation.

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

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

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


Agricultural 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.

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

Applicant – A landowner, developer, or other person who has filed an application to the Township for approval to engage in any regulated activity, as defined in Section 104 of this Ordinance, at a project site in the Township.

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 "nonstructural." In this Ordinance, nonstructural 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.

Bridge - For the purpose of this Ordinance, a bridge is defined as a stormwater conveyance structure with an effective span or diameter exceeding six feet.

Carbonate Geology - Limestone or dolomite bedrock. Also see Karst.

Chapter 102 - Chapter 102 of the regulations of DEP, 25 Pa. Code Sect. 102.1 et seq.

Chapter 105 - Chapter 105 of the regulations of DEP, 25 Pa. Code Sect. 105.1 et seq.


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. The Lebanon County Conservation District is the local delegated Conservation District in South Lebanon Township, Lebanon County.

Conveyance - The ability of a pipe, culvert, swale or similar facility to carry the peak flow from the design storm.

Culvert - A structure with appurtenant works which carries a stream or stormwater runoff under or through an embankment or fill.

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

DEP - The Pennsylvania Department of Environmental Protection.

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 and Storm Frequency.

Designee - The agent of the South Lebanon Township Board of Supervisors and/or agent of the Board of Supervisors involved with the administration, review or enforcement of any provisions of this Ordinance by contract or memorandum of understanding.
*Detention Basin* – An impoundment structure designed to manage stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate.

*Developer* – A person, partnership, association, corporation, or other entity, or any responsible person therein or agent thereof, that undertakes any Regulated Activity of this Ordinance.

*Development Site* – The specific tract of land for which a Regulated Activity is proposed. Also see Project Site.

*Disappearing Stream* – A stream in an area underlain by limestone or dolomite which flows underground for a portion of its length.

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

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

*Drainage Conveyance Facility* – A Stormwater Management Facility designed to transmit stormwater runoff and shall include streams, channels, swales, pipes, conduits, culverts, storm sewers, etc.

*Drainage Easement* – A right granted by a landowner to a grantee, allowing the use of private land for stormwater management purposes.

*Earth Disturbance* – Any activity including, but not limited to, construction, mining, timber harvesting and grubbing which alters, disturbs, and exposes the existing land surface.

*Earth Disturbance Activity* – A construction or other human activity which alters, disturbs, and exposes 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. Earth disturbance activity is subject to regulation under 25 Pa. Code 92, 25 Pa. Code 102, or the Clean Streams Law.

*Erosion* – The natural process by which the surface of the land is worn away by water, wind, ice, chemical action, or other natural forces.

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

*Existing Conditions* – The initial condition of a project site prior to the proposed construction. If the initial condition of the site is undeveloped land, the land use shall be considered as "meadow" unless the natural land cover is proven to generate lower curve numbers or Rational "C" value, such as forested lands. For the purpose of this Ordinance, the existing condition shall be considered the dominant land cover during the 5-year period immediately preceding a proposed regulated activity.

*FEMA* – the Federal Emergency Management Agency.
Flood – A general but temporary condition of partial or complete inundation of normally dry land areas from the overflow of streams, rivers, and other waters of this Commonwealth.

Floodplain – The lands adjoining a river or stream that have been or may be expected to be inundated by flood waters in a 100-year frequency flood. Any land area susceptible to inundation by water from any natural source or delineated by applicable, FEMA, Department of Housing and Urban Development, Federal Insurance Administration Flood Hazard Boundary – Mapped as being a special flood hazard area. Also included are areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania Department of Environmental Protection (DEP) Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by DEP).


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

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

Freeboard – A vertical distance between the elevation of the design highwater and the top of a dam, levee, tank, basin, or diversion ridge. The space is required as a safety margin in a pond or basin.

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

Grassed Waterway – A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to conduct surface water from cropland.

Groundwater Recharge – Replenishment of existing natural underground water supplies.

Hydrograph – A graph showing the rate of flow (discharge) versus time past a specific point in a river, channel or other natural or man-made stormwater conveyance facility. The rate of flow is typically expressed in cubic meters or cubic feet per second (cms or cfs).

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\textsuperscript{3,4}).

**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, driveways, parking lots, additional indoor living spaces, patios, garages, storage sheds and similar structures, and any new streets or sidewalks.

**Impoundment** – A retention or detention basin designed to retain stormwater runoff or detain stormwater runoff and release it at a controlled rate.

**Infiltration Structures** – A structure designed to direct runoff into the ground (e.g., French drains, seepage pits, and seepage trenches).

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

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

**Land Development** – Any of the following activities:

1. 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, whether proposed initially or cumulatively, or a single nonresidential buildings on a lot or lots regardless of occupants or tenure, 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;

2. any subdivision of land.

3. development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

**Landowner** – The legal or beneficial owner or owners of land including the holder of an option or contract to purchase (whether or not such option or contract is subject to any condition), a lessee if he is authorized under the lease to exercise the rights of the landowner, or other person having a proprietary interest in land.

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

**Lineament** – A fracture on the order of 10’s of kilometers long usually extending to the basement below sedimentary rock.
Main Stem (Main Channel) – Any stream segment or other runoff conveyance facility used as a reach in the Tulpehocken and Cocalico Creek hydrologic models.

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

MPC – The Pennsylvania Municipalities Planning Code, Act of July 1, 1967, P.L. 805, No. 247, as reenacted and amended, 53 P.S. Section 10101 et seq., and as may be amended in the future.

Municipality – South Lebanon Township, Lebanon County, PA.

Natural Drainageway – An existing channel for water runoff that was formed by natural forces.

NPDES – The U.S. EPA’s “National Pollution Discharge Elimination System”, which regulates point discharges (discrete conveyances such as pipes or man-made ditches).

NRCS – USDA Natural Resources Conservation Service (previously SCS).

Occupancy Permit – A certificate issued by the building code official appointed to issue such certificates after the building code official inspects a building or structure and finds no violation of the provisions of the code or other laws that are enforced by the building code official.

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

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

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

Owner/Landowner – Any party holding legal and/or equitable title to real property being developed and affected by this Ordinance, including that party’s successors and assigns.

PaDOT – The Pennsylvania Department of Transportation or any agency successor thereto.

Parent Tract – All contiguous land held in single and separate ownership, regardless of whether (i) such land is divided into one or more lots, parcels, purparts or tracts; (ii) such land was acquired by the landowner at different times or by different deeds, devise, partition or otherwise; or (iii) such land is bisected by public or private streets or rights-of-way, which was held by the landowner or his predecessor in title on the effective date of this Ordinance.

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

Pervious Area – Any area not defined as impervious.

Pipe – A culvert, closed conduit, or similar structure (including appurtenances) that conveys stormwater.
Plan – The stormwater management and erosion and sediment pollution control plans and narratives.

Planning Commission — The planning commission of South Lebanon Township.

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

Project Site – The specific area of land where any Regulated Activities in the Township are planned, conducted, or maintained. Also see Development Site.

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

Regulated Activity— Any earth disturbance activity or any activity that involves the alteration or development of land in a manner that may affect stormwater runoff.


Regulated Small MS4 – Any small MS4 that is covered by the federal Phase II stormwater program, either through automatic nationwide designation under 40 CFR § 122.32(a)(1) (via the Urbanized Area criteria) or by designation on a case-by-case basis by DEP pursuant to 40 CFR § 122.32.(a)(2). “Regulated small MS4s” are a sub-set of “small MS4s.” Also see Small MS4.

Release Rate – The percentage of pre-development peak rate of runoff from a site or subarea to which the post development peak rate of runoff must be reduced to protect downstream areas.

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

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

Return Period – The average interval, in years, within which a storm event of a given magnitude can be expected to recur. For example, the 25-year return period rainfall would be expected to recur on the average of once every twenty-five 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). Also see Design Storm and Storm Frequency.

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

Runoff – Any part of precipitation that flows over the land surface.
SCS – U.S. Department of Agriculture, Soil Conservation Service (now known as NRCS).

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

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

Sediment Pollution – The placement, discharge or any other introduction of sediment into the waters of the Commonwealth occurring from the failure to design, construct, implement or maintain control measures and control facilities in accordance with the requirements of this Ordinance.

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

Seepage Pit/Seepage Trench – An area of excavated earth filled with loose stone or similar coarse material, into which surface water is directed for infiltration into the ground.

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

Small Municipal Separate Storm Sewer System (MS4) – All separate storm sewers that are:

1. Owned or operated by the United States, a State, city, town, township, borough, county, parish, district, association, or 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.

2. Not defined as “large” or “medium” municipal separate storm sewer systems pursuant to 40 CFR § 122.26(b)(4) and (7), or designated under 40 CFR § 122.26(a)(1)(v).

3. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospitals or prison complexes, and highways and other thoroughfares.

Soil-Cover Complex Method – A method of runoff computation developed by the NRCS that is based on relating soil type and land use/cover to a runoff parameter called Curve Number (CN).

Spillway – A depression in the embankment of a pond or basin which is used to pass peak discharge greater than the maximum design storm controlled by the pond.

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

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

Storm Frequency – The number of times that a given storm "event" occurs or is exceeded on the average in a stated period of years. Also see Design Storm and "Return Period."
Storm Sewer – A system of pipes and/or open channels that convey intercepted runoff and stormwater from other sources, but excludes domestic sewage and industrial wastes.

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

Stormwater Management Act – Act of October 4, 1978, P.L. 864, No. 167, as amended 32 P.S. Section 680.1 et seq., and as may be amended in the future.

Stormwater Management Best Management Practices – Is abbreviated as BMPs or SWM BMPs throughout this Ordinance. Also see Best Management Practice (BMP).

Stormwater Management District – A watershed subarea in which specific stormwater attenuation rates are required based on Act 167 watershed plan objectives.

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 structures.

Stormwater Management Permit – A permit issued by the Township after the stormwater management site plan has been approved. Said permit is issued prior to or with the final Township approval.

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.

Subarea – The smallest drainage unit of a watershed for which stormwater management criteria have been established in the Stormwater Management Plan.

Subdivision – The division or re-division of a lot, tract, or parcel of land by any means into two or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, transfer of ownership, or building or lot development: Provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten acres, not involving any new street or easement of access or any residential dwellings, shall be exempt.


Swale – A low lying stretch of land which gathers or carries surface water runoff.

Substantial Completion – The stage in the progress of the project where the project or designated portion is sufficiently complete in accordance with the plans and specifications so that the Owner can occupy or utilize the final work project for its intended use.

Time-of-Concentration (Tc) – The time for surface runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. This time is the combined total of overland flow time and flow time in pipes or channels, if any.
Township – South Lebanon Township, Lebanon County, Pennsylvania.

USDA – United States Department of Agriculture

Watercourse – A stream of water; river; brook; creek; or a channel or ditch for water, whether natural or artificial, with perennial or intermittent flow.

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

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

Wetland – Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, ferns, and similar areas.
ARTICLE III
DESIGN CRITERIA FOR STORMWATER MANAGEMENT FACILITIES

Section 301. General Requirements

A. For all regulated earth disturbance activities, erosion and sediment control BMPs shall be designed, implemented, operated, and maintained during the regulated earth disturbance activities (e.g., during construction) to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code 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)\(^2\), No. 363-2134-008 (April 15, 2000), as amended and updated.

B. Stormwater flows onto adjacent property shall not be created, increased, decreased, relocated, or otherwise altered without written notification of the adjacent property owner(s) by the developer. Such stormwater flows shall be subject to the requirements of this Ordinance.

C. Stormwater drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by SWM BMPs or open channels consistent with this Ordinance.

D. 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 and downstream easements shall be established to provide drainage paths for concentrated discharge. Maximum use shall be made of the existing on-site natural and man-made stormwater management facilities.

E. For all regulated activities, SWM BMPs shall be 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 Stormwater Management Act.

F. Various BMPs and their design standards are listed in the Pennsylvania Stormwater Best Management Practices Manual (BMP Manual)\(^1\).

G. For all regulated activities, unless preparation of an SWM Site Plan is specifically exempted in Section 402:

1. Preparation and implementation of an approved Land Development and/or SWM Site Plan is required.

2. No regulated activities shall commence until the Township issues written approval of an SWM Site Plan, which demonstrates compliance with the requirements of this Ordinance.

3. The Township Engineer shall determine if a land development plan or SWM Site Plan is required or if a SWM Site Plan exemption is warranted.
H. SWM Site Plans approved by the Township shall be on site throughout the duration of the regulated activity.

I. The Township 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.

J. 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 304 and the peak rate controls of Section 302 do not need to be applied to existing impervious areas that are not being altered by the proposed regulated activity. In all drainage areas where disturbance is taking place and new impervious surface is added, up to 50% of the existing impervious area may be utilized in the pre-development coverage calculation.

K. 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. To the maximum extent practicable, incorporate the techniques for Low Impact Development Practices described in the BMP Manual.¹
L. The design of all facilities over karst shall include an evaluation of measures to minimize adverse effects, such as sinkholes and groundwater contamination.

M. 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.

N. Normally dry, open top, storage facilities should completely drain both the volume control and rate control capacities over a period of time not less than 24 and not more than 48 hours from the end of the design storm.

O. Those proposing Regulated Activities which do not fall under the exemption criteria provided at §402 shall submit a Land Development Plan or SWM Site Plan consistent with this Ordinance to the Township for review. In applying the exemption criteria set forth at §402, the total proposed development is to be calculated, even if the development is to take place in stages. For the purposes of the exemption, Impervious Surface shall include, but not be limited to, any roof, parking or driveway areas and any new streets and sidewalks. Any areas designed to be gravel or crushed stone shall be assumed to be impervious for the purposes of the exemption criteria at §402.

P. Any stormwater management facilities regulated by this Ordinance that would be located in or adjacent to waters of the Commonwealth or wetlands shall be subject to approval by DEP through the Joint Permit Application process, or, where deemed appropriate by DEP, the General Permit process. When there is a question whether wetlands may be involved, it is the responsibility of the 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 DEP.

Q. Roof drains shall not be connected to streets, sanitary or storm sewers or roadside ditches to promote overland flow and infiltration/percolation of stormwater. When it is more advantageous to connect directly to streets or storm sewers, then it shall be permitted on a case by case basis by the Township.

R. Stormwater management facilities, which involve a State Highway, shall be subject to the approval of the PaDOT.

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

T. Where a development site is traversed by watercourses other than permanent streams, drainage easements shall be provided conforming to the line of such watercourses. The terms of the easement shall prohibit excavation, the placing of fill or structures, and any alterations that may adversely affect the flow of stormwater within any portion of the easement. Also, maintenance, including mowing of vegetation within the easement shall be required, except as approved by the appropriate governing authority.
U. The PA Code, Title 25, Chapter 105, Rules and Regulations, apply to the construction, modification, operation or maintenance of both existing and proposed water obstructions and encroachments throughout the watershed, including work in wetlands. Inquiries on permit requirements or other concerns shall be addressed to DEP’s Regional Office. Permit requirements or inquiring on dam safety should be addressed to the DEP, Bureau of Waterways Engineering – Harrisburg. Mailing Address: PA Department of Environmental Protection, Bureau of Waterways Engineering, PO Box 8460, Harrisburg, PA 17105-8460. Onsite Address: 400 Market Street, 3rd Floor Rachel Carson State Office Building, Harrisburg, PA 17101.

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

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

X. Match Pre-existing Hydrograph

Developers and/or landowners are encouraged to provide infiltration facilities or utilize other techniques which will allow the post-development hydrograph to match the pre-existing hydrograph, along all parts of the hydrograph, for the site. This option is most feasible for small subdivisions in areas of non-carbonate geology. “Groundwater Recharge” and “Water Quality” volumes as given in Sections 304 and 305 can be used as part of this option.

Section 302. Stormwater Management Districts

A. South Lebanon Township has been divided into stormwater management districts to facilitate control of stormwater runoff appropriately for the watershed, instead of individual site-specific design. Therefore, the Township has developed separate standards and design criteria for each studied watershed or subwatershed, as recommended by Act 167, the Pennsylvania Stormwater Management Act and developed within the individual watershed plans. Stormwater management districts are illustrated within Appendix C and are listed as follows:

1. Tulpehocken (District A)
2. Cocalico
3. South Lebanon Residual
### Table III-1

<table>
<thead>
<tr>
<th>Post-Dev. Design Storm Frequency in Years</th>
<th>Tulpehocken Creek (Dist. A)</th>
<th>Cocalico Creek</th>
<th>S. Lebanon Twp. Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>Post Development shall be 50% or less of the Pre-Development Rate</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td></td>
<td>5</td>
</tr>
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<td>25</td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>100</td>
<td>100</td>
<td>for all storm events</td>
<td>100</td>
</tr>
</tbody>
</table>

**Section 303. Stormwater Management District Implementation Provisions (Performance Standards)**

A. General – Post-development rates of runoff from any regulated activity shall meet the peak release rates of runoff prior to development for the design storms specified in Table III-1 above.

B. District Boundaries – The boundaries of the Stormwater Management Districts are shown on an official map that is available for inspections at the Township office. A copy of the official map at a reduced scale is included in the Ordinance Appendix C. The exact location of the Stormwater Management District boundaries as they apply to a given development site shall be determined by mapping the boundaries using the two-foot topographic contours (or most accurate data required) provided as part of the SWM Site Plan.

C. Sites Located in More Than 1 District – For a proposed development site located within two or more stormwater management districts, the peak discharge rate from any subarea shall be the pre-development peak discharge for that stormwater management district as indicated in Table III-1. The calculated peak discharges shall apply regardless of whether the grading plan changes the drainage area by subarea. An exception to the above may be granted if discharges from multiple subareas recombine in proximity to the site. In this case, peak discharge in any direction may be a 100% release rate provided that the overall site discharge meets the weighted average release rate.

D. Stormwater runoff shall not be transferred from one watershed to another unless they are sub-watersheds of a common watershed which join together within the perimeter of the Development Site, or the effect of the transfer does not alter the peak discharge (in conformance with the requirements of the Act 167 Plan) onto adjacent lands, or drainage easements from the affected landowners are provided.

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

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

F. Stormwater Conveyance Corridor Protection (riparian Corridor Preservation and vegetation) – Runoff from developed areas of the site, including but not limited to areas of impervious surface, shall be managed through a series of riparian corridor vegetation facilities whenever possible. This will be accomplished in a manner satisfactory to the Township utilizing guidelines presented in the BMP Manual and the priority goal of the riparian vegetation will be the reduction of thermal impacts on stormwater runoff associated with impervious areas, with a secondary goal being the protection of capacity of existing stormwater conveyance channels. These goals will be achieved through the use of design criteria in Article III of this Ordinance and shall be in addition to any other Township ordinance provisions.

G. Sub-Regional (Combined Site) Storage

Runoff can be managed regionally by one or more developers, either on-site or off-site. The design and release rate shall be consistent with this Ordinance. “Groundwater Recharge” and “Water Quality” volumes as described in Sections 304 and 305 will be a part of this option.

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

Section 304. Volume Reduction Requirements (Groundwater Recharge)

A. Provisions for stormwater volume reductions are required for areas being developed. Design of the SWM BMP’s shall give consideration to providing ground water recharge to compensate for the reduction in the percolation that occurs when the ground surface is paved and roofed over. These ground water recharge measures are required wherever feasible. Soils used for the construction of basins shall have low-erodibility factors ("K" factors).

B. The low impact development practices provided in the Pennsylvania Stormwater BMP Manual shall be utilized for all regulated activities to the maximum extent practicable. Water volume controls shall be implemented using the Design Storm Method in Subsection 1 or the Alternate Method in Subsection 2 below.

1. The Design Storm Method (CG-1 in the Pennsylvania Stormwater BMP Manual) is applicable to any size of regulated activity. See Appendix G for Design Storm Method Worksheets 1-5, which shall be used to perform the required calculations. This method requires detailed modeling based on site conditions.

   a. Do not increase the post-development total runoff volume to surface waters of the Commonwealth for all storms equal to or less than the 2-year 24-hour duration precipitation.

   b. For modeling purposes:
1) Existing (pre-development) nonforested pervious areas must be considered meadow in good condition.

2) 20% of existing impervious area, when present, shall be considered meadow in good condition in the model for existing conditions.

c. If site conditions prevent total removal of the 2-year volume increase to surface waters of the Commonwealth after all feasible BMP options are considered, the Alternate Method shall be applied (see subsection 2 below).

2. The Alternate Method provided below should only be used where the volume control requirements of the Design Storm Method are not attainable. See Appendix G for Worksheets 7 & 8, which shall be used to perform the required calculations.

a. Stormwater facilities shall capture at least the first 2 inches of runoff from all new impervious surfaces.

b. At least the 1-first 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.

c. Wherever possible, infiltration facilities should be designed to accommodate infiltration of the entire permanently removed runoff; however, in all cases at least the first one-half (1/2) inch of the permanently removed runoff should be infiltrated.


   • Step 1: Provide General Site information (Worksheet 1).

   • Step 2: Identify sensitive natural resources, and if applicable, identify which areas will be protected (Worksheet 2).

   • Step 3: Incorporate Non-structural BMPs into the stormwater design. Quantify the volume benefits of Non-structural BMPs (Worksheet 3).

   Proceed to Design Storm Method.

b. For Design Storm Method:

   • Step 4: Estimate the increased volume of runoff for the 2-year storm event, using the Soil Cover Complex Curve Number method. Combining Curve
Numbers for land areas proposed for development with Curve Numbers for areas unaffected by the proposed development into a single weighted curve number is NOT acceptable. Runoff volume should be calculated based on land use and soil types (Worksheet 4).

- **Step 5**: Design and incorporate Structural and Non-Structural BMPs that provide volume control for the 2-year volume increase indicated on Worksheet 4. Provide calculations and documentation to support the volume estimate provided by BMPs. For Non-structural BMPs, provide Non-structural BMP checklists to demonstrate that BMPs are appropriate. Indicate the volume reduction provided by BMPs (Worksheet 5). **Note**: if the designer is unable to incorporate the 2-year volume increase after all feasible BMP options have been considered, the designer proceeds to the Alternate Method described below.

- **Step 6**: Provide detailed routing analysis to demonstrate peak rate control for the 1-year through 100-year storm events. This routing should consider the benefits of BMPs. Provide additional detention capacity if needed. **Note**: there are no exemptions from the peak rate analysis except as permitted under §402.

Proceed to Water Quality Calculations (Step 7), See Section 305.

c. For **Alternate Method**:

- **Step 4**: Capture the first 2 inches of runoff from all contributing impervious surfaces. The first 1-inch of runoff should be permanently removed and not be released to the Surface Waters of the Commonwealth. The other 1 inch of runoff should be detained. Compute Runoff Volumes using Worksheet 7.

- **Step 5**: Design and incorporate Structural and Non-Structural BMPs that provide permanent removal for the PRV and extended detention. The removal options for PRV include reuse, evaporation, transpiration, and infiltration. Infiltration for the first 0.5 inch is encouraged. Documentation to support the computations for volumes can be provided using Worksheet 8. For Non-structural BMPs, checklists can be used to demonstrate that selected BMPs are appropriate. Indicate the volume reduction provided by BMPs on Worksheet 8.

- **Step 6**: Provide detailed routing analysis to demonstrate peak rate control for the 1-year through 100-year storm events. This routing should consider the benefits of BMPs. **Note**: there are no exemptions from the peak rate analysis except as permitted under §402.

Proceed to Water Quality Calculations (Step 7), See Section 305.
4. To comply with subsections 1 or 2 above, the land developer MAY submit original and innovative designs to the Township Engineer for review and approval. Such designs may achieve the objectives through a combination of BMPs.

C. Infiltration BMPs shall meet the following minimum requirements:

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

   a. A minimum depth of 24 inches between the bottom of the facility and the seasonal high water table and/or bedrock (limiting zones).

   b. An infiltration and/or percolation rate sufficient to accept the additional stormwater load and drain completely as determined by field tests conducted by the developer’s/landowner’s professional designer.

2. The recharge volume provided at the site shall be directed to the most permeable hydrologic soil group (HSG) available.

3. The recharge facility shall be capable of completely infiltrating the impounded water within 48 hours subsequent to any storm event.

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

2. Provide field test(s) to determine appropriate percolation rate and/or hydraulic conductivity. Percolation testing shall be performed at the intended location and elevation of infiltration facility.

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

E. Extreme caution shall be exercised where infiltration is proposed in geologically susceptible areas such as limestone areas. Extreme caution shall also be exercised where salt or chloride would be a pollutant since soils do little to filter this pollutant and it may contaminate the groundwater. 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 justification study be performed if necessary. Whenever a SWM BMP 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 SWM BMPs over limestone formations shall include measures to prevent ground water contamination and, where necessary, instability resulting from sinkhole formation. The Township may require the installation of an impermeable liner in SWM basins. A detailed hydrogeologic investigation may be required by the Township.
1. The Township may require the developer to provide safeguards against groundwater contamination for uses which may cause groundwater contamination, should there be a mishap or spill.

2. It shall be the developer’s responsibility to verify if the site is underlain by limestone. The following note shall be attached to all SWM Site Plans and signed and sealed by the developer’s engineer/surveyor/landscape/architect/geologist:

   [Signature], certify that the proposed detention basin (circle one) is/is not underlain by limestone.

F. If the Developer's professional consultant can prove through analysis that the development site is located in an area underlain by carbonate geology, and such geologic conditions would likely result in sinkhole formations, then the site may be exempted from groundwater recharge requirements. However, the development site shall be required to meet all other hydrologic and water quality management standards as mandated by this Ordinance.

G. Where pervious pavement is proposed for parking lots, recreational facilities, non-dedicated streets, or other areas, pavement construction specifications shall be noted on the plan.

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

Section 305. Water Quality Requirements

A. Water Quality Calculations:

- **Step 7:** Determine if the stormwater management design complies with either the *Design Storm Method* or the *Alternate Method*. If volume compliance is achieved under either of these methods, proceed to Step 8. If compliance is not achieved, proceed to Step 10.

- **Step 8:** Determine if at least 90% of the disturbed site area is controlled by a BMP (maximum disturbed, uncontrolled area of 10%). To be considered “controlled” by a BMP, the disturbed area must either drain to a structural BMP (or series of BMPs) or be offset by a preventive BMP, such as reduced imperviousness or landscape restoration. If at least 90% of the disturbed area is controlled, proceed to Step 9; else proceed to Step 11.

- **Step 9:** Total Suspended Solids (TSS) and Total Phosphorus (TP) requirements are considered met. Demonstrate use of specific nitrate prevention/reduction BMPs (Worksheet 10 in Appendix G). If the required BMPs (2 primary or 4 secondary or 1 primary and 2 secondary) are proposed within the stormwater management plan, then the water quality requirement for nitrate is achieved. If the required BMPs are not proposed, proceed to Step 10.
• **Step 10:** If volume control is not met using either the *Design Storm Method* or *Alternate Method*, demonstrate use of specific BMPs for pollutant prevention. Worksheet 11 in Appendix G.

• **Step 11:** Estimate pollutant load from disturbed areas of the site, excluding preventive measures (if proposed). Worksheet 12 in Appendix G.

• **Step 12:** Calculate pollutant load reductions with the proposed structural BMPs. Worksheet 13 in Appendix G. If target load reductions are achieved for TSS, TP, and nitrate, then the water quality requirements are met.

**Section 306. Retention and Detention Basins**

A. Any stormwater management facility designed to store stormwater runoff and requiring a berm or earthen embankment (i.e., detention or retention basin) shall be designed to provide an emergency spillway to handle the 100-year post-development peak flow rate tributary to the basin. The use of inlets and pipes are prohibited for the emergency spillway. The height of embankment must be set as to provide a minimum 1.0-foot of freeboard above the maximum pool elevation computed when the entire 100-year peak flow passes through the spillway. Rain gardens, with a maximum water depth of 12 inches, shall be exempt from this requirement. However, criteria for design and construction of stormwater management facilities are not the same criteria that are used in the permitting of dams under the DEP Dam Safety Program. Depending upon the physical characteristics of a dam, a dam permit may be required and the design will have to meet the provisions of PA Code, Title 25, Chapter 105. Depending on the physical characteristics of a dam, the design could require that anywhere from a 100-year to a Probable Maximum Flood (PMF) storm event be considered. The following minimums shall be required:

B. The maximum water depth shall not exceed six (6) feet, unless a modification is approved by Township officials upon recommendation of the Township Engineer. If a modification is granted, it may require provisions for fencing around the basin and a structural design of the basin embankment.

C. The minimum top width of all dams/embankments/berms shall be five (5) feet for impoundments draining five (5) acres or less and a minimum of eight (8) feet wide for impoundments with drainage areas exceeding five (5) acres.

D. Basins shall be designed in accordance with Soil Conservation Practices to accommodate sediment during construction.

E. The interior side slopes of the impoundment area shall not be greater than five (5) horizontal to one (1) vertical, unless a perimeter fence is provided. In no case shall the interior side slopes exceed three (3) horizontal to one (1) vertical.

F. Percolation rates may be used in Township approved areas to offset discharge rates as groundwater recharge. Percolation tests shall be performed at the site for each soil type.
G. All basins shall be structurally sound and shall be constructed of sound and durable materials. The completed structure and the foundation of all basins shall be stable under all probable conditions of operation. An emergency spillway shall be provided for the basin and shall be capable of discharging the 100-year peak rate of runoff which enters the basin after development, in a manner which will not damage the integrity of the facility and will not create a downstream hazard. Where practical, the emergency spillway shall be constructed in undisturbed ground. An easement for inspection and repair shall be provided when the conveyance structure crosses property boundaries. The Township may also require downstream drainage easements from the basin emergency spillway.

H. All basins that exclude Groundwater Recharge and/or Water Quality storage shall be designed to drain within twenty-four (24) hours following the end of the design rainfall. All basins that include Groundwater Recharge and/or Water Quality storage shall be designed to drain to the level of the required Groundwater Recharge and/or Water Quality storage volume within twenty-four (24) hours following the end of the design rainfall.

I. A cutoff trench of relatively impervious material shall be provided within all basin embankments.

J. All discharge control devices with appurtenances (except discharge pipes) shall be made of reinforced concrete and stainless or hot dip galvanized steel. Bolts/fasteners are to be stainless or galvanized steel. Discharge pipes shall conform to the requirements of Section 307.C below.

K. Concrete or welded galvanized steel anti-seep collar shall be placed around all basin discharge pipes to increase the seepage length along the pipe by 15% within the saturated zone of the pipe based on a 4:1 phreatic line. The connection of the anti-seep collar to the discharge pipe shall be completely watertight.

L. Basin principal spillway outlet structures shall consist of stainless steel orifice plates (and mounting hardware), galvanized or reinforced concrete riser and discharge pipe, and welded structural steel inlet grates (with a bituminous coating). Smooth lined corrugated polyethylene pipe may be used for discharge piping. The use of PVC pipe is prohibited for basin discharge piping except for small applications. Principle spillways with riser pipes where the designed water depth is deeper than 0.4 times the diameter of the riser, the riser shall have an anti-vortex device to prevent reduced capacity of the riser. (Example, if the top of an 18” riser is 100.00, the riser shall have an anti-vortex device if the water is higher than 100.00 + [(18” * 0.4)/12] = 100.60). Materials used for design shall be specified on the plans.

M. Low flow channels shall be provided from each water carrying facility to the outlet structure for all basins that do not include Groundwater Recharge and/or Water Quality storage. Low flow channels shall be one (1) percent minimum slope and shall be designed to enable ease of maintenance. Basins that include Groundwater Recharge and/or Water Quality storage shall not be required to have a low flow channel.

N. Design storms for the computation of retention basins (where approved) volumes shall be based upon a 24-hour storm with 100 year return period (a storm with a 1% chance of occurrence each year).
O. The effect on downstream areas if the basin embankment fails shall be considered in the design of all basins. Where possible, the basin shall be designed to minimize the potential damage caused by such failure of the embankment.

P. Vertical pipes, inlets and other surface water receiving structures shall be installed with trash racks.

Q. Stormwater Management basins shall not cross property lines.

R. Soils used for the construction of basins shall have low erodibility factors where K factor ≤ 0.37.

S. Minimum floor elevations for all structures that would be affected by a basin, other temporary impoundments, or open conveyance system where ponding may occur shall be at least two (2) feet above the one hundred (100) year water surface elevation. If basement or underground facilities are proposed, detailed calculations addressing the effects of stormwater ponding to the structure and water proofing and/or flood proofing design information shall be submitted for approval.

T. SWM BMPs including basins, channels, pipes, culverts, etc. not located within a public right-of-way shall be contained in and centered within an easement not less than 20 feet in width. Easements shall follow property boundaries where possible.

U. In areas of carbonate geology, retention and detention basins shall:

1. Be located at least one hundred (100) feet from the rim of sinkholes or closed depressions, and

2. Be located a minimum of one hundred (100) feet from disappearing streams; and

3. Be located at least fifty (50) feet from lineaments or fracture traces; and

4. Be located no closer than twenty-five (25) feet from any surface or identified subsurface pinnacles; and

5. Not discharge into a sinkhole; and

6. Be lined with an impermeable liner when deemed appropriate by the Township Engineer.

Section 307. Pipes and Conveyance Facilities

A. All storm sewer pipes and culverts (excluding detention and retention basin outfall structures), gutters and swales conveying water originating only from within the boundaries of the Development Site shall be designed for a twenty-five (25) year storm event. All storm sewer pipes and culverts (excluding detention and retention basin outfall structures) conveying water originating from offsite shall be designed for a fifty (50) year storm event. Drainage easements shall be provided to contain and convey the
one-hundred (100) year frequency flood throughout the Development Site. Easements shall begin at the furthest upstream property line of the proposed Development Site in a watershed. Bridges shall be designed to convey the one-hundred (100) year storm event.

B. All storm sewer pipes and culverts shall be laid to a minimum depth of six (6) inches from finished subgrade to the crown of pipe in paved areas and one (1) foot from finished grade to the crown of pipe in grassed areas. Pipes shall be bedded and backfilled with fine graded, highly compactible soil or stone.

C. Storm sewer pipes other than those used as roof drains, detention basin underdrains, and street subbase underdrains, shall have a minimum diameter of fifteen (15) inches and be made of reinforced concrete pipe, corrugated galvanized metal pipe, smooth lined corrugated polyethylene pipe, or approved equivalent. Where installation conditions merit, structural calculations that address the actual design requirements will be required.

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

E. Headwalls and endwalls shall be used where stormwater runoff enters or leaves the storm sewer horizontally from a natural or manmade channel. PaDOT Type “DW” headwalls and endwalls shall be utilized. Galvanized metal flared end sections are also acceptable, but Polyethylene flared end sections are prohibited for Township dedicated facilities only. All headwalls and endwalls, for pipes larger than 8 inch diameter, shall be protected from child entry by placing removable stainless steel bars (and mounting hardware), spaced eight inches (8") apart, across the openings.

F. A concentrated discharge of stormwater to an adjacent property shall be within an existing watercourse or otherwise an easement shall be required. Pipe outlets shall also be provided with erosion resistant material or energy dissipaters to calm the anticipated velocity and discharge of stormwater.

G. All storm sewer crossings of streets shall be perpendicular to the street centerline or within thirty degrees (30°) of perpendicular. Vertical and horizontal isolation conflicts with other utilities shall be avoided. Storm sewers within a street shall not cross underneath a curb, especially at curb radii locations.

H. Manning “n” values used for design of pipes and culverts shall be in accordance with Appendix B7.

Section 308. Inlets and Manholes

A. An inlet or manhole is required at every change in horizontal and vertical direction of storm pipe. Tee joints, elbows and wyes are prohibited.

B. Inlets shall be located along the curb line and are not permitted along the arc of an intersection. When possible inlets shall be located away from the side lot property to avoid conflicts with driveways. Flow depths for twenty-five (25) year storm shall not
exceed three (3) inches in a roadside swale or gutter-flow condition. All new streets with curbs shall be designed to maintain a maximum flow depth of three (3) inches for slant and vertical curbs, and two (2) inches for rolled curbs; or the maximum allowable spread of water shall be one-half (1/2) of a through travel lane, whichever is less. The efficiency of storm inlets shall be supported with calculations based on the FHWA HEC-22.

C. Inlets shall be depressed two inches (2") below proposed finished grades.

D. Manholes may be substituted for inlets at locations where inlets are not necessary.

E. Inlet capacities shall be per the most restrictive prevailing manufacturer design information. The manufacturer used for design shall be specified on the plans.

F. All inlets in paved areas shall have bicycle safe grates.

G. All inlets over four (4) feet in depth shall be provided with steps for accessibility. Inlets shall be placed along the curb line or edge of paving.

H. Inlets shall be concrete and the inlets and grates shall meet design loads.

Section 309. Channels

A. Channels and swales with bare soils are not permissible. All channels and swales shall have a ground cover, or have a paved or concrete surface up to the twenty-five (25) year storm depths. Channels and swales shall be proven to be stable for both the initial and permanent linings.

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

C. Energy dissipaters shall be placed at the outlets of all storm sewer pipes, culverts, and bridges where flow velocities exceed maximum permitted channel velocities as specified below:

1. Three (3) feet per second where only sparse vegetation can be established and maintained because of shade or soil condition.

2. Four (4) feet per second where normal growing conditions exist and vegetation is to be established by seeding.

3. Five (5) feet per second where a dense, vigorous sod can be quickly established or where water can be temporarily diverted during establishment of vegetation. Netting and mulch or the equivalent methods for establishing vegetation shall be used.

4. Six (6) feet per second where there exists a well-established sod of good quality.
D. The following conditions shall be met for all swales:

1. Swales shall be designed using Manning’s equation. Vegetated swales shall be designed based upon accepted “n” factors for the anticipated degree of vegetative retardance. The maximum allowable velocity for an established grass swale is four (4) feet per second.

2. The “n” factors to be used for paved or rip-rap swales or gutters shall be based upon accepted engineering design practices as approved by the Township, a list of acceptable “n” factors appears in Appendix B8.

3. Swales shall be designed with six inches (6") of freeboard above the twenty-five (25) year storm depth.

4. Swale side slopes shall be 2:1 minimum. Side slopes for grass covered swales which will be mowed shall be 3:1 minimum.

5. All swales shall be designed to concentrate low flows to minimize siltation and meandering.

6. All vegetated swales shall have a minimum slope of one (1) percent unless approved by the Township Engineer.

7. Swales shall be centered within a minimum twenty-foot (20’) wide easement.

Section 310. Streets

A. The depths of flow across a street intersection shall not exceed one and one-half (1 ½) inches for the twenty-five (25) year storm.

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

Section 311. Calculation Methodology

Stormwater runoff from all development sites shall be calculated using either the rational method or a soil-cover-complex methodology, or other method acceptable to the Township or its designee.

A. Stormwater runoff calculations shall use a generally accepted calculation methodology that is based on the NRCS Soil-Cover Complex method. However, the Township may allow the use of the Rational Method to estimate peak discharges from drainage areas that contain less than 10 acres, or as approved by the Township Engineer. Table III-2 summarizes acceptable computation methods. 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.
B. If the NRCS Soil-Cover-Complex Method (i.e. SCS Method) is used, stormwater runoff shall be based on the 24-hour rainfall depths shown in Table III-3. If the SCS Method is used, Antecedent Moisture Condition 1 may be used in areas of carbonate geology upon approval by the Township Engineer. Antecedent Moisture Condition 2 shall be used for all other areas.

**Table III-2**

**Accepted Runoff Computation Methodologies**

<table>
<thead>
<tr>
<th>Method</th>
<th>Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR-55, USDA Soil Conservation Service</td>
<td>Acceptable for all watersheds Preferred for watersheds &gt; 20 acres</td>
</tr>
<tr>
<td>Rational Method</td>
<td>Acceptable for small watersheds and residential underground infiltration systems. Recommended for watersheds &lt; 10 acres</td>
</tr>
<tr>
<td>VTPSUHM, Virginia Tech/Penn State Urban Hydrology Model</td>
<td>Acceptable for watersheds within limitations described in VTPSUHM</td>
</tr>
<tr>
<td>TR-20, USDA Soil Conservation Service</td>
<td>Acceptable for all watersheds, especially where full hydrologic computer model is desired</td>
</tr>
<tr>
<td>HEC-1 U.S. Army Corps of Engineers</td>
<td>Acceptable for all watersheds, especially where full hydrologic computer model is desired</td>
</tr>
</tbody>
</table>

**Table III-3**

**24-Hour Rainfall Depths within District (Inches)**

<table>
<thead>
<tr>
<th>Design Storm Frequency in Years</th>
<th>Tulpehocken Creek</th>
<th>Cocalico Creek</th>
<th>South Lebanon Twp. Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2.40</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>2</td>
<td>3.00</td>
<td>3.1</td>
<td>3.0</td>
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<tr>
<td>5</td>
<td>3.60</td>
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</tr>
<tr>
<td>10</td>
<td>4.56</td>
<td>5.0</td>
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</tr>
<tr>
<td>25</td>
<td>5.52</td>
<td>5.5</td>
<td>5.3</td>
</tr>
<tr>
<td>50</td>
<td>6.48</td>
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</tr>
<tr>
<td>100</td>
<td>7.44</td>
<td>7.0</td>
<td>6.7</td>
</tr>
</tbody>
</table>

C. If the Rational Method is used, the PaDOT Storm Intensity – Duration – Frequency Chart (PDT-IDF), dated May 1986 shall be used to determine the rainfall intensity in inches per hour. See chart in Appendix B1. Region 4 shall apply to all lands within the Township. Where stormwater runoff hydrographs are produced using the Rational Method, the
provided storage volume shall be verified with a critical duration analysis that investigates similar storm occurrences with extended durations and applicable intensities to determine the anticipated maximum elevation to occur in the storage facility for each required storm event.

D. Runoff calculations shall include a hydrologic and hydraulic analysis indicating volume and velocities of flow and the grades, sizes, and capacities of water carrying structures, sediment basins, retention and detention structures and sufficient design information to construct such facilities. Runoff calculations shall also indicate both pre-development and post-development rates for peak discharge of stormwater runoff from the Development Site.

E. For the purpose of calculating pre-development peak discharges, all runoff coefficients, both on-site and off-site, shall be based on actual land use assuming summer or good land conditions. Up to 50% of existing impervious surface area may be used in the calculation of Curve Number or Rational Coefficient. Runoff coefficients for off-site discharges used to design facilities shall be based on actual land use assuming winter or poor land conditions.

F. Criteria and assumptions to be used in the determination of stormwater runoff and design of management facilities are as follows:

1. Rational Method Runoff Coefficients and SCS Runoff Curve Numbers shall be based on the information contained in Appendices B2 and B3. If the actual land use is not listed in these Appendices, runoff coefficients and curve numbers shall be chosen from other published documentation, and a copy of said documentation must be submitted with the stormwater management report.

2. Times of concentration shall be based on the following design parameters:

   a. Sheet flow: The maximum length for each reach of sheet or overland flow before shallow concentrated or open channel flow develops is one hundred (100) feet and shall be justifiable based on the actual conditions at each site. Sheet flow shall be determined using the methodology presented in Chapter 3 of the NRCS Technical Release 55 (TR-55).

   b. Shallow concentrated flow: Travel time shall be determined using TR-55 based calculations.

   c. Open Channel flows: At points where sheet and shallow concentrated flows concentrate in field depressions, swales, gutters, curbs, or pipe collection systems, the travel times shall be based upon Manning's Equation and/or acceptable engineering design standards as determined by the Township Engineer.

3. Storm sewer pipes, culverts, gutters, inlets, outlets and swales shall conform to the requirements of the PaDOT Design Manual, Part 2, Highway Design, in effect at the time the design is submitted, or as otherwise modified by the Township, including the requirements listed in Table III-4 below:
Table III-4

<table>
<thead>
<tr>
<th>Facility</th>
<th>Minimum Post Development Peak Discharge Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pipes, Gutters, Swales, Culverts, and Cross Drains</td>
<td></td>
</tr>
<tr>
<td>a. Conveying water from within the Development Site:</td>
<td>Twenty-five (25) Year Storm</td>
</tr>
<tr>
<td>b. Conveying water originating from offsite:</td>
<td>Fifty (50) Year Storm</td>
</tr>
<tr>
<td>c. Drainage Easements and Bridges:</td>
<td>One hundred (100) Year Storm</td>
</tr>
</tbody>
</table>

Section 312. Best Management Practices (BMPs)

A. Goals and Objectives

1. Preserve existing natural features, especially those which store, infiltrate or filter water runoff.

2. Infiltrate rainfall to recharge the ground water table.

3. Use physical (structural) and biological or vegetative (non-structural) filtration of water runoff to reduce pollutants and remove sediment.

4. Moderate water runoff velocities to minimize erosion and damage to downstream aquatic habitat.

5. Maximize collection and treatment of small storm event (first flush) stormwater runoff which contains the highest concentration of pollutants.

B. Design Criteria

1. The following site factors should be considered in selecting and designing the appropriate BMPs:

   a. Total contributing area.

   b. Permeability and infiltration rate of the site soils.

   c. Slope and depth to bedrock

   d. Seasonal high water table.

   e. Proximity to building foundations and well heads.

   f. Erodibility of soils.
g. Land availability and configuration of the topography.

2. The following factors should be evaluated when determining the suitability of BMPs for a development site:

a. Peak discharge and required volume control.

b. Stream bank erosion

c. Efficiency of the BMPs to mitigate potential water quality problems.

d. The volume of the pollutant being removed

e. The nature of the pollutant being removed

f. Maintenance requirements

g. Creation/protection of aquatic and wildlife habitat

h. Recreational value

i. Enhancement of aesthetic and property value

C. Examples

1. Ponds (Basins) are enhancements to conventional detention basins, usually containing a pool of water to perform the BMP function of capturing pollutants to improve the water quality of the discharge. Specific pond types and guidelines are:

a. Wet Retention Pond.

A permanent pool of standing water, normally containing a perimeter aquatic bench of 6" to 18" in depth, where pollutants are removed through sedimentation and plant absorption.

b. Extended Detention Pond.

A basin to temporarily hold stormwater for an extended period of time to facilitate physical settling of pollutants. These facilities may be normally dry, contain a shallow marsh, have a small wetpool, and often contain a combination of these features. Extended detention ponds usually include a vegetated forebay that is baffled from the main basin with a rip rap mound, a small size outlet for the water quality storm discharge, a primary outlet for large storm events and a benched basin for varying water depths.

c. Multiple Pond.
A pond system containing a series of two (2) or more pools or cells to create a longer pollutant removal pathway.

d. Rain Garden.

An excavated shallow (maximum ponding depth of 12") surface depression planted with specially selected native vegetation to treat and capture runoff.

2. Wetlands may be constructed to contain an environment of shallow marsh where pollutants can be removed through a combination of settling, absorption, retention, plant uptake and biological decomposition. Wetland designs are best suited for larger watersheds and must be accompanied by a landscaping plan which specifies plan species, planting arrangement, bed preparation and operation/maintenance requirements. Additionally, wetlands shall be planted with three (3) or more plant species for diversity and survival, plus at least fifty (50) percent of the wetland area must be planted and maintained in plant cover. Specific wetland types and guidelines are:

a. Shallow Wetlands

These systems are configured with several varying levels of marsh areas, containing a meandering water pathway from the forebay to a micropool at the outlet. Water depths usually range from 6" to 18".

b. Pocket Wetlands.

Wetlands for small location where a seasonal high water table is needed to help sustain the water elevations.

3. Infiltration systems are designed to capture stormwater runoff and infiltrate it into the ground. These systems are best adapted for small drainage areas and effectively reduce runoff volume, remove many pollutants, recharge the groundwater and contribute to maintaining stream baseflows. Specific infiltration systems types and guidelines are:

a. Infiltration Trench.

Shallow excavations that are lined with geotextile fabric and filled with stone to create an underground water reservoir which gradually percolates into the surrounding subsoil. Infiltration trenches are especially useful for connection to roof drains. Larger trenches will require an under drain to a stormwater conveyance system.

b. Infiltration Basin.
A large, open depression (basin) which collects stormwater for percolation. The basin surface should be vegetated with deep rooted plants to enhance infiltration. Soils, slope, geology, and hydrogeology may restrict use of these basins.

c. Porous Pavement.

Low traffic or overflow parking areas may be designed with porous pavement, a porous asphalt layer which permits runoff to drain into an underground stone area where it can infiltrate into the subsoil.

d. Depressed Pervious Area.

These facilities are useful for capturing runoff within a parking lot island. They are designed lower than the surrounding areas, contain permeable soils with a filtration system or a beehive drain and often contain an underdrain for excess runoff. Plants, shrubs and trees enhance performance and aesthetics. Contributing parking areas require curb cuts, curbs with weep holes or similar design to facilitate runoff discharge to the pervious area.

4. Filtering systems are effective for filtering sediment and other pollutants from runoff by passing it through sand, soil, sand/soil mix, vegetation, a structural filter or any combination thereof. Filtered runoff is then infiltrated or drained to other on-site facilities. These systems may be integrated into landscaped areas and parking islands where plantings will add aesthetic enhancements. Specific filtering systems types and guidelines are:

a. Sand Filter.

An underground chamber or bed with sand designed to filter pollutants as water drains through it, with an underdrain system for discharge of the filtered water to a stormwater conveyance system

b. Bioretention system

These designs utilize a mixture of sand and permeable soil underneath a planted, landscaped depression to collect and treat surface water runoff. Bioretention areas are especially advantageous for parking lot islands and snow storage location.

c. Riparian Buffer Strip.

Along streams, wetlands and lakes, an area of land which is vegetated with a combination of trees, shrubs and herbaceous plants. This land strip is designed to protect the water resource by filtering pollutants, improving the habitat and cooling the waterways by shading. The riparian buffer strip shall include 100 year flood plain, or be a minimum of twenty five (25) feet wide from the edge of the normal water level, whichever is greater.
d. Vegetated Filter Strip.

These BMPs are characterized by grass or low growing vegetation on a uniformly sloped area which is designed to intercept sheet flow water runoff between an impervious surface and the stormwater conveyance facilities. Vegetated filter strips reduce water velocities and trap sediment and pollutants. They require good vegetation and soil permeability and should be avoided on steep slopes. They are best used along small parking lots, should be a minimum of twenty (20) feet wide in the direction of water flow, and normally are designed equal in size to the impervious area draining to the filter strip.

e. Vegetated Swale.

A broad, shallow, low gradient swale with a dense stand of medium height vegetation which is designed to trap pollutants and promote infiltration.

f. Water Quality Inlet.

Underground boxlike structure, such as an oil/grit separator, which is used to remove sediment and hydrocarbons from water runoff originating from parking lots and heavy traffic areas with the potential for petroleum discharges. These facilities are used close to the source of the runoff and currently include other products such as Stormceptor and Vortechnics.

5. Open channels convey, filter and percolate stormwater runoff. They are often used as an alternative to, or component of, a storm sewer system. Specific open channel types and guidelines are:

a. Grass Swale.

Grass swales filter pollutants as stormwater runoff is drained to other areas. These facilities are best combined with other BMPs and may include check dams or minor depressions storage to reduce water velocity and encourage infiltration. An underbedding of mixed sand and soil with a pipe or stone underdrain will improve the use of infiltration and ground water recharge.

b. Lined Channel.

Rip rap, concrete or other erosions resistant material may be used to line a channel to prevent scouring and degradation of a water carrying channel.

Section 313. Erosion and Sediment Pollution Control

The following principles shall be applied to the Erosion and Sediment Pollution Control Plan and construction schedule to minimize soil erosion and sedimentation:
A. Stripping of vegetation, grading, or other soil disturbance shall be done in a manner which will minimize soil erosion.

B. Whenever feasible, natural vegetation shall be retained and protected.

C. The extent of the disturbed area and the duration of its exposure shall be kept to a minimum, within practical limits.

D. Either temporary seeding, mulching, or other suitable stabilization measures shall be used to protect exposed critical areas during construction.

E. Drainage provisions shall accommodate the stormwater runoff both during and after construction.

F. Erosion and sediment pollution control facilities shall be installed prior to any on-site grading.

Section 314. Floodplain Delineation.

Floodplain areas shall be established and preserved as provided below:

A. A one hundred (100) year floodplain shall be established for all watercourses and shall be delineated by one of the following methods.

1. Reference to a FEMA issued Flood Insurance Rate Map (FIRM).

2. Reference to the Township’s Official Zoning Map.

3. Reference to a floodplain delineation report prepared by an agency of the County, State, or U.S. Government.

4. Reference to a floodplain delineation report prepared by an individual registered in the Commonwealth of Pennsylvania to perform such duties.

B. Whenever a floodplain is located within or along a lot, the Recorded Plan (where a regulated activity constitutes a subdivision or land development) or SWM Site Plan (where a regulated activity does not constitute a subdivision or land development) shall include: the boundary of the 100-year floodplain, along with the 100-year flood elevations and dimensions from the centerline of the watercourse; and a plan note indicating that construction or development within the floodplain shall be in strict accordance with Township Ordinance No. 331 regulating floodplain development. Floodplains not delineated on a FEMA issued FIRM or the Township’s Official Zoning Map shall be described with metes and bounds.

C. The inclusion of floodplain within lots in order to meet minimum lot area and/or yard requirements is allowed provided each such lot contains sufficient area exclusive of the floodplain for buildings and, when applicable, on lot sewage disposal systems and
replacement drain field areas unless otherwise specified in the Township Zoning Ordinance.

Section 315. Catch Basin Markings.

All new catch basins located in Township right-of-way must be marked with high performance preformed thermoplastic markings. Two layer combination with blue/white contrast. Bottom thermoplastic is blue with top layer white. Markings to say "NO DUMPING!" on first line and "INTO STORM DRAIN" on second line. Specify Pre-mark® PLUS storm drain marking, or equal. Size shall be twenty-nine (29) inches by five (5) inches.
ARTICLE IV
STORMWATER MANAGEMENT (SWM) SITE PLAN REQUIREMENTS

Section 401. General Requirements

A. For any of the activities regulated by this Ordinance, the preliminary or final approval of subdivision and/or land development plans, the issuance of any building or occupancy permit, or the commencement of any land disturbance activity may not proceed until the Property Owner or Developer or his/her agent has received written approval of a SWM Site Plan from the Township.

B. All Stormwater Management Site Plans shall be designed and certified by individuals registered in the Commonwealth of Pennsylvania and qualified to perform such duties based on education and training in hydrology and hydraulics.

Section 402. Exemptions

A. Any regulated activity that meets the exemption criteria listed herein is exempt from the SWM Site Plan preparation and processing requirements of this Ordinance. These criteria shall apply to the total parent tract property and development, even if development is to take place in phases. Parent tracts shall be properties as existing on the effective date of this Ordinance, unless specified otherwise, and shall provide the basis for individual or cumulative impervious area computations. Exemptions relieve the property owner from SWM Site Plan submission, but not from providing adequate stormwater management to meet the purpose of this Ordinance and protect adjoining properties.

SWM Site Plan exemptions include the following:

1. Lot additions, land exchanges, subdivision of existing buildings and other minor subdivision activity which does not involve any new building lots.

2. Agricultural activities such as growing crops, plowing fields, gardening, etc. are exempt from the SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of PA Code, Title 25, Chapter 102. Construction of new buildings or impervious areas is not considered an agricultural activity.

3. Regulated activities that result in cumulative earth disturbances less than 5,000 square feet and impervious area enlargements less than 2,500 square feet are exempt from the requirements in Sections 303, 304, 305, and Article IV of this ordinance.

4. 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 102.
5. Building expansion, impervious area enlargement, and development of existing lots, provided that no subdivision of new lots or land development for new principal uses is involved, the cumulative earth disturbance is less than one acre and the following criteria are satisfied:

<table>
<thead>
<tr>
<th>Total Parcel Size*</th>
<th>Minimum Impervious Exemption***</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Distance**</td>
</tr>
<tr>
<td>&lt; 1/2 Acre</td>
<td>10 Feet</td>
</tr>
<tr>
<td>1/2 - 1 Acre</td>
<td>20 Feet</td>
</tr>
<tr>
<td>1.01 - 2 Acres</td>
<td>40 Feet</td>
</tr>
<tr>
<td>2.01 - 5 Acres</td>
<td>50 Feet</td>
</tr>
<tr>
<td>&gt; 5 Acres</td>
<td>100 Feet</td>
</tr>
</tbody>
</table>

* Parent tract or original parcel size, prior to any subdivision, as of this Ordinance date.

** Minimum distance between proposed impervious areas and the downslope property line(s).

*** Individual or cumulative total impervious area, after the effective date of this Ordinance.

6. Single family residential lots may be exempted from the mandatory design and installation of certain stormwater management facilities when the lot improvements (house, driveway, regrading, etc.) on the proposed subdivision plan document to the satisfaction of the Township Engineer that the lot improvements will not result in detrimental stormwater discharges within the lot(s) or upon adjoining lands, roads, waterways or other areas. Exemption may be granted by the Board of Supervisors provided all of the following criteria are satisfied:

a. The subdivision plan meets all of the criteria for a minor subdivision; and

b. The minimum lot area shall be two (2) acres; and

c. The slope of the lot shall not exceed 4% in the lot improvement area and slopes in excess of 8% shall not exist within fifty (50) feet of the lot improvement area; and

d. Streams, waterways and ecologically sensitive areas shall not exist within one hundred feet (100') of the lot improvement area; and

e. The proposed lot improvements shall be a minimum of fifty feet (50') from the side and rear lot lines, unless site conditions or other requirements necessitate greater setback; and

f. The maximum impervious coverage shall not exceed 15,000 square feet; and
g. Plan notes shall document that the soils within the lot improvement area in the hydrologic soil group A, B or C, as published in the current edition of TR-55, Urban Hydrology for Small Watersheds and listed within the Appendix; and

h. Stormwater discharges shall not endanger or potentially damage the lot improvements, adjoining lands, roads or otherwise pose a threat to the health, safety or welfare of the public; and

i. No unique or adverse lot conditions shall exist which warrant refusal of the exemption request; and

j. The exemption request shall be submitted in writing with the subdivision application and shall address all the criteria cited herein; and

k. Subdivision plans shall be accompanied by standard application and inspection fees to assure evaluation of lot(s) for compliance with the exemption criteria at the design, construction and inspection stages; and

l. Subdivision plans containing any lots which have received stormwater management design and installation exemptions in accordance with these provisions shall contain a prominent plan note explaining the exemption and the lot development restrictions applications thereto; and

7. Any lot receiving a SWM Site Plan exemption and subsequently found to be developed, or under no development, contrary to these exemption provisions or otherwise evidencing a stormwater runoff problem shall forthwith be subject to the following:

a. Corrective actions shall be taken in the lot development to eliminate the noncompliance.

b. Submission of a revised subdivision, SWM Site Plan, or land development plan shall be required, depicting necessary stormwater management facilities, in accordance with standard plan processing procedures.


9. The Township may deny or revoke any exemption pursuant to this Section at any time for any project that the Township believes may pose a threat to public health and safety or the environment.
Section 403. SWM Site Plan Contents

All activities regulated by Section 104 of this ordinance and governed by the Act 167 Plan shall require a SWM Site Plan. The SWM Site Plan shall consist of all applicable calculations, maps, and plans. A note on the plans shall refer to the associated computations and Erosion and Sediment Control Pollution Control plan by title and date. The cover sheet of the computations and erosion and sediment pollution control plan shall refer to the associated plans by title and date. All SWM Site Plan materials shall be submitted to the Township in a format that is clear, concise, legible, neat, and well organized. Incomplete submissions shall be returned to the Applicant within 7 days, along with a statement that the submission is incomplete, and stating the deficiencies found. Otherwise, the application shall be deemed accepted for filing as of the date of submission. Acceptance shall not, however, constitute a waiver of any deficiencies or irregularities.

The following items shall be addressed by or included with the SWM Site Plan:

A. General

1. General description of project.

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

3. Complete hydrologic, hydraulic, and structural design computations and documentation for all stormwater management facilities as specified in this Ordinance, or as otherwise necessary to demonstrate that the maximum practicable measures have been taken to meet the requirements of this Ordinance, including the recommendations and general requirements in Section 301.

4. Plans shall be legible in every detail.

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

6. The Township 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 Township may either disapprove the submission and require a resubmission, or in the case of minor deficiencies, the Township may accept submission of modifications.

7. 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.

8. A determination of site conditions in accordance with the BMP Manual\(^1\). 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.
B. Drawings or map(s) of the project area shall be drawn at a scale no larger than 1” = 50’. General site layout plans which will not be used for construction detail may be drawn at a scale of one inch equals one hundred feet (100’). The Plan shall be submitted on 24-inch x 36-inch sheets and shall be prepared in a form that meets the requirements for recording at the Offices of the Recorder of Deeds of Lebanon County. These drawings shall be in conformance with the applicable Subdivision and Land Development regulations. The contents of the maps(s) shall include, but not be limited to:

1. Project location map at a minimum of 1” = 2,000’ showing the project site property line, limits of development, streets, street names, and bodies of water within 1,000’ of the project boundary.

2. Existing and proposed property boundaries. The total Development Site boundary and size with distances marked to the nearest foot and bearings to the nearest degree. In the case of a Land Development on a large tract, the property does not need to be shown in entirely at the full drawing scale. The entire tract is required to be shown in the site location map.

3. Clearly demonstrate existing and proposed drainage patterns by showing existing and proposed elevation contours at maximum intervals of two feet within the project limits and a minimum of 50 feet beyond the project limits, or as may be required by the Township Engineer. In areas of steep slopes (greater than 20 percent), five-foot contour intervals may be used. Show spot elevations at high and low points and critical areas which can not be interpolated between contours. Indicate the location and elevation of the benchmark. Provide the date existing topography was surveyed and the method of survey (aerial or field).

4. Existing streams, lakes, ponds, or other bodies of water within the project area as well as existing and proposed one hundred (100) year flood elevations and finished floor elevations for all proposed buildings. Show FEMA information where applicable.

5. Other physical features including flood hazard boundaries, sinkholes, rock outcroppings, streams, existing drainage courses, areas of natural vegetation to be preserved, and the total extent of the upstream area draining through the site.

6. Outlines of existing and proposed drainage areas and subareas and the paths for calculating the times of concentration (alternate is to show this information in the Design Narrative).

7. The locations of all-existing and proposed utilities, sanitary sewers, and water lines within 50 feet of property lines.

8. An overlay showing soil names and boundaries as shown in the Soil Survey of Lebanon County. Provide a table listing the following information for the applicable on-site soil types.
   a. Soil map symbol (Soil name abbreviation)
   b. Soil name, applicable building site restrictions (Soil Survey Table 7)
   c. Applicable sanitary facilities restrictions (Soil Survey Table 8)
d. Applicable construction materials restrictions (Soil Survey Table 9)

e. Applicable water management restrictions (Soil Survey Table 10)

f. Hydrologic group, flooding and high water information (Soil Survey Table 15)

9. Proposed improvements and existing features including all structures, storm drainage facilities, roads, paved areas, and buildings. Provide a drawing legend of the existing and proposed features as well as the type and the amount of impervious area that is to be added.

10. The name of the development, sheet titles, drawing numbers, index, the name, address and telephone number of the owner of the property, and the name, address and telephone number of the individual(s) or firm preparing the plan.

11. The date of the plan submission and date of latest plan revision.

12. A North arrow, graphic scale, and a written scale.

13. Names of the landowners adjacent to the property.

14. Existing and proposed land use(s).

15. Horizontal and vertical profiles of all open channels, including hydraulic capacity. Profiles of stormwater piping systems using a horizontal scale the same as the plan and a vertical scale 1/10th of the horizontal scale. Identify pipe materials, sizes, lengths, slopes, and inverts. Identify pertinent elevations for inlets, manholes, and all other profiled facilities.

16. A note on the Plan indicating the location and responsibility for maintenance of stormwater management facilities that would be located off-site. All off-site facilities shall meet the performance standards and design criteria specified in the Ordinance.

17. A statement, signed by the landowner, acknowledging the stormwater management system to be a permanent fixture that can be altered or removed only after approval of a revised plan by the Township.

18. Construction details, sections, and specifications of facilities with sufficient information and dimensions for construction interpretation, which will provide the constructor enough information to meet the requirements of this Ordinance. Provide a note which states the materials and details specified shall not be altered during construction without written approval by the Township.

19. A minimum 20 foot wide stormwater easement around all stormwater management facilities to reserve the easement area for drainage purposes and to provide ingress and egress from a public right-of-way. Identify stormwater easements and facilities to be dedicated to the Township. Describe maintenance responsibilities and the responsible party(ies). Provide a note prohibiting easement areas from being
obstructed with trees, shrubbery, and structures. Provide a plan note allowing County and Township Officials access to easement areas for inspection, installation, or correction of stormwater facilities.

20. Limits of phases and a narrative of the construction sequence.

21. The following signature block for the South Lebanon Township Engineer:

(Township Engineer), on this date (date of signature), has reviewed and hereby certifies that the SWM Site Plan meets all design standards and criteria of South Lebanon Township Ordinance No. 332

22. The location of all erosion and sediment pollution control facilities required by DEP Chapter 102.

23. Expected project time schedule.

24. Locations of existing and proposed on-lot wastewater facilities and water supply wells.

25. 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.


27. The Standard Stormwater Notes from Appendix E and E&SPC Guidelines from Appendix F shall be shown on the SWM Site Plan.

C. Supplemental Information

1. A written description of the following information shall be submitted.
   a. The overall stormwater management concept for the project.
   b. Stormwater runoff computations as specified in this Ordinance.
   c. Stormwater management techniques and best management practices to be applied both during and after development.

2. An erosion and sediment pollution control plan, including all reviews and approvals by the Lebanon County Conservation District and/or DEP.

3. In areas of carbonate geology, a geologic assessment prepared by a qualified professional with recommendations to mitigate the effects of stormwater runoff and infiltration on sinkholes as specified in this Ordinance.
4. The effect of the project (in terms of runoff volumes and peak flows) on adjacent properties, aquatic features, and on any existing Township stormwater collection system that may receive runoff from the Development Site shall be evaluated.

5. Drainage area maps with outlines of existing and proposed drainage areas and subareas and the paths for calculating the times of concentration (alternate is to show this information in the Plan). Off-site drainage areas may be shown on USGS maps at a scale of 1" = 2000' or less.

6. For development areas subject to flooding, a flood study shall be provided that addresses the requirements of Section 314 of this Ordinance as well as the Floodplain Management Sections of the Township’s Zoning Ordinance and Subdivision and Land Development Ordinance.

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

8. The Design Narrative shall be signed and sealed by a Registered Professional qualified to perform such duties.

9. Plan and profile drawings of all SWM BMPs, including drainage structures, pipes, open channels, and swales.

D. Stormwater Management Facilities

1. All stormwater management facilities must be located on a plan and described in detail. The volumes of stormwater detention required shall be noted on the plan, as well as approximate dimensions of the proposed facility.

2. Plans for Groundwater recharge facilities must show the locations of existing septic tank infiltration areas and wells. A minimum fifty (50) foot separation from On Lot Disposal System (OLDS) infiltration areas is required. Infiltration rates shall be based upon percolation and probe tests conducted at the site of the proposed facility.

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.

4. A plan note shall be added to grant County and Township officials and employees thereof the right of access to the property for inspection of a stormwater BMP and, in the event of default by the developer, installation of the stormwater management facilities.

5. Maintenance & ownership provisions.

Section 404. SWM Site Plan Submission

For the purpose of complying with this Ordinance, the steps listed below shall be followed for SWM Site Plan submission. For any activities that require a DEP Joint Permit Application and
regulated under Chapter 105 or Chapter 106 of DEP's Rules and Regulations, require a PaDOT Highway Occupancy Permit, or require any other permit under applicable state or federal regulations, permit approval shall be a condition of the SWM Site Plan approval.

A. Any Developer proposing to engage in a Regulated Activity, as defined by this Ordinance, shall submit four (4) copies of the SWM Site Plan to the Township.

B. Distribution of the SWM Site Plan will be as follows:

1. Two (2) copies to South Lebanon Township accompanied by the requisite Township Review Fee, as specified in this Ordinance.

2. One (1) copy to the Township Engineer(s).

3. One (1) copy to the Lebanon County Planning Department.

4. One (1) copy to the Lebanon County Conservation District

Section 405. SWM Site Plan Review

A. The Township Engineer shall review the SWM Site Plan for consistency with this Ordinance. The Township shall require receipt of a complete plan, as specified in this Ordinance.

B. The Township Engineer shall review the SWM Site Plan or land development for any submission against the Township’s Subdivision and Land Development Ordinance for all provisions not superseded by this Ordinance.

C. For activities regulated by this Ordinance, the Township Engineer shall notify the Township in writing whether the SWM Site Plan is consistent with the Act 167 Stormwater Management Plan and this Ordinance. Should the SWM Site Plan be determined to be consistent with the Act 167 Stormwater Management Plan and this Ordinance, the Township Engineer will forward a letter recommending approval to the Township and copy the developer or the developer’s consultant.

D. Should the SWM Site Plan be determined to be inconsistent with the Act 167 Stormwater Management Plan and this Ordinance, the Township Engineer will forward a review letter recommending revisions to or disapproval of the plan to the Township with a copy to the developer or developer’s consultant citing the inconsistencies. Any disapproved SWM Site Plans may be revised by the Developer and resubmitted consistent with this Ordinance.

E. For Regulated Activities requiring a DEP Joint Permit Application, the Township Engineer (upon request of the applicant or applicant’s agent) shall notify DEP whether the SWM Site Plan is consistent with the Act 167 Stormwater Management Plan and this Ordinance and forward a copy of the review letter to the Township and the developer or the developer’s consultant. DEP may consider the Township Engineer's review comments in determining whether to issue a permit.

F. For Regulated Activities requiring a DEP National Pollutant Discharge Elimination System Permit Application, the Township Engineer (upon request of the applicant or
applicant’s agent) shall notify DEP whether the SWM Site Plan is consistent with the Act 167 Stormwater Management Plan and this Ordinance and forward a copy of the review letter to the Township and the developer or the developer’s consultant.

G. The Township shall not approve any subdivision, land development, or SWM Site Plan for Regulated Activities specified in Section 104 of this Ordinance if the SWM Site Plan has been found to be inconsistent with this Ordinance or the Act 167 Stormwater Management Plan, as determined by the Township Engineer. All required permits from DEP must be obtained prior to approval of any subdivision or land development.

H. The Township shall not issue a building permit for any Regulated Activity specified in Section 104 of this Ordinance if the SWM Site Plan has been found to be inconsistent with the Act 167 Stormwater Management Plan or this Ordinance, as determined by the Township Engineer, or without considering the comments of the Township Engineer. All required permits from DEP must be obtained prior to issuance of a building permit.

I. The Developer shall maintain a copy of the SWM Site Plan at the project site during construction, as record drawings. Any discrepancies with the original design that warrants changes to the SWM Site Plan shall be submitted to the Township Engineer for review.

J. The Township shall notify the applicant in writing within 45 days of submission whether the SWM Site Plan is approved, disapproved, or inconsistent with this Ordinance. 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 other statute, regulation, or ordinance, the applicant will be so notified by the Township.

K. If the Township disapproves the SWM Site Plan, the Township will state the reasons for the disapproval in writing. The Township also may approve the SWM Site Plan with conditions and, if so, shall provide the acceptable conditions for approval in writing.

Section 406. Modification of Approved SWM Site Plans

A modification to an approved SWM Site Plan that involves 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 Township Engineer shall require a resubmission of the modified SWM Site Plan in accordance with the provisions of this Ordinance.

A modification to an already approved SWM Site Plan shall be submitted to the Township, accompanied by the applicable review fee.

Section 407. Resubmission of Disapproved SWM Site Plans

A disapproved SWM Site Plan may be resubmitted, with the revisions addressing the Township’s concerns, to the Township in accordance with this Article. The applicable review fee must accompany a resubmission of a disapproved SWM Site Plan.
Section 408. Authorization to Construct and Validity

The Township’s approval of an SWM Site 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 Township may specify a term of validity shorter than 5 years in the approval for any specific SWM Site Plan. Terms of validity shall commence on the date the subdivision and/or land development plan is recorded or the date when the Township Supervisors approve and sign the SWM Site Plan if no subdivision or land development plan applies. If an approved SWM Site Plan is not completed according to Article IV of this Ordinance within the term of validity, then the Township may consider the SWM Site Plan disapproved and may revoke any and all permits. SWM Site Plans that are considered disapproved by the Township shall be resubmitted in accordance with Article IV of this Ordinance.

Section 409. As-Builts, Completion Certificate, and Final Inspection

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

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

C. After receipt of the completion certification from the applicant’s qualified professional, the Township may conduct a final inspection.

D. Projects which disturb less than one acre shall be exempt from requirement for submission of an as-built plan unless, in the opinion of the Township Engineer, as-built conditions vary from the approved plan such that an as-built plan is warranted.

E. An as-built plan shall contain the following stormwater related information:

1. Actual location of floodplain by elevation and dimension from property line.

2. Actual location and cross section of swales and accompanying easements.

3. Actual horizontal and vertical location of SWM BMPs, including type and size of storm drainage pipes.

4. For all storage SWM BMPs (e.g. stormwater basins, rain gardens and infiltration facilities), the following information shall be provided:
a. As-built elevation contours of the SWM BMP as applicable, or the horizontal and vertical dimensions of underground facilities to include depth from ground surface to top of facility.

b. Verification of materials used in construction (e.g. geotextile materials).

c. As-built outlet structure details, including type, size, and inverts of discharge pipes.

d. As-built elevations for embankments and emergency spillways.

e. A table showing the stage/storage/discharge information for the constructed conditions.

f. A table providing a comparison of the approved design versus the as-built discharge rates.

Section 410. Modification of Ordinance Facilities

A modification which involves a change in stormwater management methods, facilities or techniques, or that involves the relocation or re-design of stormwater management facilities, or which is necessary because soil or other conditions are not as stated on the approved plan, shall require a resubmission in accordance with the plan requirements as set forth in Section 404 of this Ordinance.


A. The provisions of this Ordinance are intended as minimum standards for the protection of the public health, safety, and welfare. The Township reserves the right to modify or to extend them conditionally in individual cases as may be necessary in the public interest; provided, however, that such variation shall not have the effect of nullifying the intent and purpose of this Ordinance, and that the applicant shows that to the satisfaction of the Township that the applicable regulation is unreasonable, or will cause undue hardship, or that an alternative proposal will allow for equal or better results. The list of such modifications shall be listed on the plan.

B. In granting waivers/modifications, the Township may impose such conditions as will, in its judgment, secure substantially the objectives of the standards and requirements of this Ordinance.
ARTICLE V
INSPECTIONS

Section 501. Schedule of Inspections

A. The Township Engineer or a designated inspector under the Township Engineer’s direct supervision, in conformance with Section 801, shall inspect all phases of the installation of the SWM BMPs as deemed appropriate by the Township Engineer.

B. During any stage of the work, if the Township Engineer determines that the SWM BMPs are not being installed in accordance with the approved SWM Site Plan, the Township shall provide written notification to the owner(s)/developer(s) and the contractor(s) indicating the deficiencies and require that the deficiencies be corrected within 30 days (or longer as may be required). If the deficiencies are not corrected within the specified period of time, the Township may:

1. Revoke any existing permits until a revised SWM Site Plan is submitted and approved, as specified in this Ordinance.

2. Utilize financial security posted by the owner(s)/developer(s) as part of the developer’s agreement to install any unfinished facilities or remedy any improperly constructed facilities.

3. Pursue other legal remedies pursuant to Article VIII of this Ordinance.
ARTICLE VI
FEES AND EXPENSES

Section 601. General

A Township review fee shall be established by resolution of the Township to defray review costs incurred by the Township and the Township Engineer. All fees including engineering and reasonable attorneys’ fees incurred relative to the review, approval and administration of stormwater management plans and related improvements shall be paid by the Applicant.

Section 602. Township SWM Site Plan Review Fee

The Township shall establish a Review Fee Schedule by resolution of the South Lebanon Township Board of Supervisors based on the size of the Regulated Activity and based on the Township’s costs for reviewing SWM Site Plans. The Township shall periodically update the Review Fee Schedule to ensure that review costs are adequately reimbursed.

Section 603. Expenses Covered by Fees

The Township may include all costs incurred in the review fee charged to an applicant. The review fee may include, but not be limited to, costs for the following:

A. Administrative/clerical processing.
B. The review of the SWM Site Plan by the Township and the Township Engineer.

The following items may incur additional fees beyond the initial Township Review Fees:

C. Attendance at meetings.
D. The inspection of SWM BMPs and related improvements during construction.
E. The final inspection upon completion of the SWM BMPs and related improvements presented in the subdivision, land development, or SWM Site Plan.
F. Any additional work required to enforce any permit provisions regulated by this Ordinance, correct violations, and assure proper completion of stipulated remedial actions.

Section 604. Performance Guarantee

A. A performance guarantee (e.g. bond, letter of credit, or restrictive escrow account) for site related improvements, including SWM BMPs, shall be supplied by the Developer in conjunction with the subdivision/land development approval, or in conjunction with the SWM Site Plan approval. The applicant shall provide the performance guarantee to the Township to ensure the timely installation and proper construction of all stormwater management facilities and/or stormwater BMPs as required by the approved SWM Site Plan and this Ordinance in accordance with provisions of sections 509, 510, and 511 of the Pennsylvania Municipalities Planning Code.

B. SWM Site Plans not requiring subdivision or land development plan approval and
disturbing less than one acre shall be exempt from the requirement to provide a performance guarantee. However, neither a building permit nor an occupancy permit will be issued until the site is inspected and certified as complete by the Township Engineer.

C. At the completion of the project, and as a prerequisite for the final release of the performance guarantee, the owner/developer or his representatives shall:

1. Provide a certificate of final completion letter from an engineer, landscape architect, surveyor or other qualified person verifying that all permanent facilities have been constructed according to the plans and specifications and approved revisions thereto.

2. Provide a set of as-built (record) drawings.

D. After receipt of the certification by the Township, a final inspection shall be conducted by the Township Engineer or designated inspector under the Township Engineer’s direct supervision to certify compliance with this Ordinance.
ARTICLE VII
OPERATION AND MAINTENANCE RESPONSIBILITIES

Section 701. Applicability

For the purpose of this section, drainage courses, swales, stormwater inlets, pipes, conduits, detention and retention basins, subsurface storage structures, and other stormwater management facilities shall be included under the term “SWM BMPs.”

Section 702. Operation and Maintenance (O&M) Responsibilities

A. The Final Plan shall reflect and/or be accompanied by supporting documentation identifying the ownership and method of administering and maintaining all permanent SWM BMPs.

B. The SWM Site Plan for the development site shall contain an operation and maintenance plan for review by the Township Engineer. The operation and maintenance plan shall outline required routine maintenance actions and schedules necessary to insure proper operation of the facility(ies).

C. The SWM Site Plan for the development site shall establish responsibilities for the continuing operating and maintenance of all proposed SWM BMPs, consistent with the following principals:

1. If a development consists of structures such as streets, sewers and other public improvements which are to be dedicated to the Township, SWM BMPs may also be dedicated to and maintained by the Township. However, if the Township accepts dedication of streets, the Township is under no obligation to accept dedication of SWM BMPs located outside of the public right-of-way.

2. If a development site is to be maintained in a single ownership or if sewers and other public improvements are to be privately owned and maintained, then the ownership and maintenance of SWM BMPs shall be the responsibility of the owner, lessee, or private management entity (e.g. homeowners association or other parties of interest). Facilities owned and maintained by a private entity shall be in accordance with the terms of an agreement, declaration of easement or other legally binding documentation approved in form by the Township. The agreement, declaration of easement or other legally binding documentation shall provide that the Township has the right to:

   a. Inspect the facilities at any time.

   b. Require the private entity to take corrective measures and assign the private entity reasonable time periods for any necessary action.

   c. Authorize maintenance to be done and lien all cost of the work against the properties of the private entity responsible for maintenance.

D. The Board of Supervisors, upon recommendation of the Township Engineer, shall make the final determination on the continuing maintenance responsibilities prior to final approval of the SWM Site Plan. The Board of Supervisors reserves the right to accept
the ownership and operating responsibility for any or all of the stormwater management controls.

E. Maintenance of SWM BMPs shall include, but not be limited to, the following:

1. Liming and fertilizing vegetated channels and other areas in accordance with soil test recommendations.

2. Reestablishment of vegetation by seeding and mulching or sodding of scoured areas or areas where vegetation has not been successfully established.

3. Mowing as necessary to maintain adequate strands of grass and to control weeds. Chemical weed control may be used if federal, state, and local laws and regulations are met.

4. Removal of silt from all permanent structures which trap silt and sediment in order to keep the material from building up in grassed waterways, pipes, detention basins, infiltration structures, or other SWM BMP’s, and thus reducing their capacity to convey or store water.

5. Regular inspection of the areas in question to assure proper implementation of SWM BMP’s, maintenance and care.

6. All pipes, swales and detention facilities shall be kept free of any debris or other obstructions and original design condition.

7. Replacement or repair of damaged structural SWM BMPs or components of such SWM BMPs.

Section 703. Operation & Maintenance Agreement

A. Prior to final approval of the site's SWM Site Plan, subdivision plan, or land development plan, the property owner shall sign and record the operation and maintenance (O&M) agreement contained in Appendix D which is attached and made part hereof, covering all stormwater control facilities that are to be privately owned.

1. The owner, successor and assigns shall operate and maintain all facilities in accordance with the approved schedule(s) in the O&M Plan.

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

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

4. The O&M Agreement shall be recorded in the Land Records of the County and be deemed a covenant running with the land and binding on all successors and assigns of the landowner.
B. Other items may be included in the agreement where determined necessary to guarantee the satisfactory maintenance of all facilities. The O&M agreement shall be subject to the review and approval of the Township Solicitor and Board of Supervisors.

C. 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 Township may perform the services required and charge the owner appropriate fees. Nonpayment of fees may result in a lien against the property.

Section 704. Maintenance of Existing Facilities / BMPs

A. SWM BMPs existing on the effective date of this ordinance on individual lots which have not been accepted by the Township or for which maintenance responsibility has not been assumed by a private entity such as a homeowners’ association shall be maintained by the individual property owners. Such maintenance shall include at a minimum those items set forth in Section 702 above. If the Township determines at any time that any permanent stormwater management facility has been eliminated, altered, blocked through the erection of structures or the deposit of material, or improperly maintained, the condition constitutes a nuisance and shall notify the property owner of corrective measures which are required, and provide for a reasonable period of time, not to exceed 30 days, within which the property owner shall take such corrective action. If the property owner does not take the required corrective action, the Township may either perform the work, or contract for the performance of the work and bill the property owner for the cost of the work plus a penalty of 10% of the cost of the work. If the property owner does not pay such bill within 30 days, the Township may file a municipal claim against the property upon which the work was performed in accordance with the applicable laws.

B. No person shall modify, remove, fill, landscape or alter stormwater management facilities which have been installed on a property unless a SWM Site Plan has been approved to permit such modification, removal, filling, landscaping or alteration. No person shall place any structure, fill landscaping or vegetation into a stormwater management facility or within a drainage easement, which will limit or alter the functioning of the facility or easement in any manner.

Section 705. Responsibilities of Developers and Landowners

A. The Township shall make the final determination on the continuing maintenance responsibilities prior to final approval of the SWM Site Plan. The Township may require a dedication of such facilities as part of the requirements for approval of the SWM Site Plan. Such a requirement is not an indication that the Township will accept the facilities. The Township 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. The Township may take enforcement action against the landowner or his or her successors and assigns for any failure to satisfy the provisions of this Ordinance.
ARTICLE VIII
ENFORCEMENT AND PENALTIES

Section 801. Right-of-Entry

Upon presentation of proper credentials, duly authorized representatives of the Township may enter at reasonable times upon any property within the Township to investigate or ascertain the condition of the subject property in regard to any aspect regulated by this Ordinance.

Section 802. Post-Construction SWM BMPs Schedule of Inspections

SWM BMPs should be inspected by the landowner, or the owner's designee (including the Township for dedicated and owned facilities), according to the following list of minimum frequencies:

A. Annually for the first 5 years following construction.
B. Once every 3 years thereafter.
C. During or immediately after the cessation of a 10-year or greater storm.

Section 803. Notification

In the event that a person fails to comply with the requirements of this Ordinance, or fails to conform to the requirements of any permit issued hereunder, the Township shall provide written notification of the violation. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of these violation(s). Failure to comply within the time specified shall subject such person to the penalty provisions of this Ordinance. All such penalties shall be deemed cumulative and shall not preclude by the Township from pursuing any and all remedies.

Section 804. Enforcement

The Board of Supervisors is hereby authorized and directed to enforce all of the provisions of this Ordinance. All inspections regarding compliance with the Stormwater Management Site Plan shall be the responsibility of the Township Engineer or other qualified persons designated by the Township.

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

B. It shall be unlawful for any person, firm or corporation to undertake any regulated activity under Section 104 on any property except as provided for in the approved SWM Site Plan and pursuant to the requirements of this Ordinance. It shall be unlawful to alter or remove any control structure required by the SWM Site Plan pursuant to this
Ordinance or to allow the property to remain in a condition which does not conform to the approved SWM Site Plan.

C. Occupancy Permit

A building occupancy permit shall not be issued by the Township unless the landowner/developer or his representative provides a certificate of substantial completion letter from a qualified professional verifying that all permanent SWM BMP facilities associated with such building have been substantially completed according to the plans and specifications and approved revisions thereto. The Township Engineer shall also verify substantial completion in writing prior to issuance of an occupancy permit. The building occupancy permit shall be required for each lot owner and/or developer for all subdivisions and land development in the Township that involve the construction of a new structure intended for human occupation.

D. Prior to revocation or suspension of a permit, the Board of Supervisors will schedule a hearing to discuss the non-compliance if there is no immediate danger to life, public health or property.

E. Suspension and revocation of Permits

1. Any permit issued under this ordinance may be suspended or revoked by the Board of Supervisors for:
   a. Non-compliance with or failure to implement any provision of an approved SWM Site Plan or O&M Agreement.
   b. A violation of any provision of this Ordinance or any other applicable law, ordinance, rule or regulation relating to the project.
   c. The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or nuisance, pollution or which endangers the life or property of others.

2. A suspended permit shall be reinstated by the Board of Supervisors when:
   a. The Township Engineer or his designee has inspected and approved the corrections to the stormwater management and erosion and sediment pollution control measure(s) that caused the suspension, or the elimination of the hazard or nuisance, and/or;
   b. The Board of Supervisors is satisfied that the violation of the ordinance, law, or rule and regulation has been corrected.

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

4. A permit that has been revoked by the Board of Supervisors cannot be reinstated. The applicant may apply for a new permit under the procedures outlined in this Ordinance.

F. 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 402.

G. Inspections regarding compliance with the SWM Site Plan are a responsibility of the Township.

Section 805. Public Nuisance

A. The violation of any provision of this ordinance is hereby deemed a Public Nuisance.

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

Section 806. Penalties

A. Anyone violating the provisions of this Ordinance shall be guilty of a civil offense, and upon conviction before a magisterial judge shall be subject to a fine in an amount not to exceed $1,000.00. Each day that the violation continues shall be a separate offense and penalties shall be cumulative.

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

C. Any person found liable in a civil proceeding or subject to equitable relief or mandamus shall also be liable in addition to any fines, penalties and costs for the reasonable legal fees and other expenses incurred by the Township in prosecution of the proceeding to its completion including any appellate proceeding.

Section 807. Appeals

A. Any person aggrieved by any action of the Township or its designee, relevant to the provisions of this Ordinance, may appeal to the Board of Supervisors within thirty (30) days of that action.

B. Any person aggrieved by any decision of the Board of Supervisors, relevant to the provisions of this Ordinance, may appeal to the Lebanon County Court of Common Pleas within thirty (30) days of the Township decision.
ARTICLE IX
PROHIBITIONS

Section 901. 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 the regulated municipal separate storm sewer (MS4) or to enter the waters of this Commonwealth is prohibited.

B. No person shall allow, or cause to allow, discharges into the regulated MS4, or discharges into waters of this Commonwealth, which are not composed entirely of stormwater, except (1) as provided in Subsection C below and (2) discharges allowed under a state or federal permit.

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

<table>
<thead>
<tr>
<th>Discharges from firefighting activities</th>
<th>Flows from riparian habitats and wetlands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Potable water sources including water line flushing</td>
<td>Uncontaminated water from foundations or from footing drains</td>
</tr>
<tr>
<td>Irrigation drainage</td>
<td>Lawn watering</td>
</tr>
<tr>
<td>Air conditioning condensate</td>
<td>Dechlorinated swimming pool discharges</td>
</tr>
<tr>
<td>Springs</td>
<td>Uncontaminated groundwater</td>
</tr>
<tr>
<td>Water from crawl space pumps</td>
<td>Water from individual residential car washing</td>
</tr>
<tr>
<td>Basement sump pumps, pumping groundwater only</td>
<td></td>
</tr>
<tr>
<td>Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used</td>
<td>Routine external building wash down (which does not use detergents or other compounds)</td>
</tr>
<tr>
<td>Diverted stream flows</td>
<td></td>
</tr>
</tbody>
</table>

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

Section 902. Roof Drains and Sump Pumps

Roof drains and sump pumps shall discharge to infiltration or vegetative BMPs.
Section 903. Alteration of SWM BMPs

No person shall modify, remove, fill, landscape, or alter any SWM BMPs, facilities, areas, or structures without the written approval of the Township, the Lebanon County Conservation District, and DEP (if DEP permit(s) applies).
ARTICLE X
REFERENCES


This Ordinance repeals Ordinance Number 269 in its entirety.

This Ordinance shall become effective in five (5) days of its enactment.

Adopted this 22nd day of January, 2013.

ATTEST:

Curtis E. Klupe
Secretary

BOARD OF SUPERVISORS

BY: Robert J. Arnold
Chairman

BY: [Signature]
Vice-Chairman

BY: Stephen J. Knauss
Member
APPENDIX A

STORMWATER MANAGEMENT SITE PLAN APPLICATION

(To be attached to the "land subdivision plan, land development plan, stormwater management site plan, or minor land subdivision plan submission")

Application is hereby made for review of the Stormwater Management Site Plan and related data as submitted herewith in accordance with the South Lebanon Township Stormwater Management Ordinance.

_______________________________ Preliminary Plan ___________________ SWM Site Plan (Check One)

Date of Submission ___________________ Submission No.__________________________

1. Name of subdivision or development_____________________________________________________________________

2. Name of applicant _______________________________ Telephone No.__________________________

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

   ___________________________________________ Officer 1

   ___________________________________________ Officer 2

   Address__________________________________________________________

   ________________________________

   Applicants interest in subdivision or development
   (if other than property owner, give owners name and address)

3. Name of property owner _______________________________ Telephone No._____________________

   Address________________________________________________________

   ________________________________

4. Name of engineer, surveyor, or landscape architect____________________________________________________

   Telephone No.____________________________________________________

   Address________________________________________________________

   ________________________________

Date of site inspection by Plan Designer______________________________________________________________
5. Type of subdivision or development proposed:
   ___ Single-Family Lots ___ Townhouses ___ Commercial (Multi-Lot)
   ___ Two Family Lots ___ Garden Apartments ___ Commercial (One-Lot)
   ___ Multi-Family Lots ___ Mobile-Home Park ___ Industrial (Multi-Lot)
   ___ Cluster Type Lots ___ Campground ___ Industrial (One-Lot)
   ___ Planned Residential ___ Institutional ___ Other


7. Area of proposed and existing impervious surfaces on entire tract.
   a. Existing (to remain) __________ S.F. __________ % of Property
   b. Proposed __________ S.F. __________ % of Property

8. Stormwater
   a. Does the peak rate of runoff from proposed conditions exceed that flow which occurred
      for pre-development conditions for the designated design storm?____
   b. Design storm utilized (on-site conveyance systems) (24 hr.)____________________
      No. of Subarea______________________________
      Watershed Name______________________________
      Explain:____________________________________
   c. Does the design achieve the release rate criteria for the applicable subarea?________
   d. Number of subarea(s) from Ordinance Appendix C situated in the Tulpehocken Creek
      and Cocalico Creek Watersheds.______________________________
   e. Type of proposed runoff control______________________________
   f. Does the plan meet all the requirements of the Stormwater Ordinance?________________
      If not, what waivers are requested?______________________________
      Reasons Why______________________________
   g. Was TR-55, June 1986 utilized in determining the time of concentration?____________
h. What hydrologic method was used in the stormwater computations?

i. Is a hydraulic routing through the stormwater control structure submitted?

j. Is a construction schedule or staging attached?

k. Is an operation and maintenance (O&M) plan attached?

l. Who will have ultimate maintenance responsibility of the Stormwater Control Facilities?

9. Erosion and Sediment Pollution Control (E&S):
   a. Has the stormwater management and E&S plan, supporting documentation and narrative been submitted to the Lebanon County Conservation District?
   
   b. Total area of earth disturbance

10. Wetlands
   a. Have the wetlands been delineated by someone trained in wetland delineation?
   
   b. Have the wetland lines been verified by a state or federal permitting authority?
   
   c. Have the wetland lines been surveyed?
   
   d. Total acreage of wetland within the property
   
   e. Total acreage of wetland disturbed
   
   f. Supporting documentation

11. Filing
   a. Has the required fee been submitted?

       Amount

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

   c. Name of individual who will be making the inspections

12. General comments about stormwater management at development:

       ________________________________________________________________

       ________________________________________________________________
## APPENDIX B-1

**PENN DOT REGION 4 - STORM INTENSITY-DURATION-FREQUENCY CHART**

<table>
<thead>
<tr>
<th>Storm Event</th>
<th>1-Yr</th>
<th>2-Yr</th>
<th>5-Yr</th>
<th>10-Yr</th>
<th>25-Yr</th>
<th>50-Yr</th>
<th>100-Yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time of Concentration (Minutes)</td>
<td>1.50</td>
<td>1.25</td>
<td>1.00</td>
<td>1.50</td>
<td>1.25</td>
<td>1.00</td>
<td>1.50</td>
</tr>
<tr>
<td>Rainfall Intensity (inches/Hour)</td>
<td>1.50</td>
<td>1.25</td>
<td>1.00</td>
<td>1.50</td>
<td>1.25</td>
<td>1.00</td>
<td>1.50</td>
</tr>
</tbody>
</table>

### Notes:
- The chart provides rainfall intensity information for various storm events and time durations.
- The data is organized in a table format for easy reference.
- The chart is intended for use in stormwater management to plan for appropriate drainage systems.

---

South Lebanon Township – Stormwater Management Ordinance  Page B-1
## APPENDIX B-2

**RUNOFF COEFFICIENTS “C” FOR RATIONAL FORMULA**

<table>
<thead>
<tr>
<th>Soil Group</th>
<th>A 0-2%</th>
<th>B 2-6%</th>
<th>C 6%+</th>
<th>D 0-2%</th>
<th>E 2-6%</th>
<th>F 6%+</th>
<th>G 0-2%</th>
<th>H 2-6%</th>
<th>I 6%+</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Slope</strong></td>
<td>0-2%</td>
<td>2-6%</td>
<td>6%+</td>
<td>0-2%</td>
<td>2-6%</td>
<td>6%+</td>
<td>0-2%</td>
<td>2-6%</td>
<td>6%+</td>
</tr>
<tr>
<td><strong>Land Use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winter Conditions</td>
<td>0.14</td>
<td>0.23</td>
<td>0.34</td>
<td>0.21</td>
<td>0.32</td>
<td>0.41</td>
<td>0.27</td>
<td>0.37</td>
<td>0.48</td>
</tr>
<tr>
<td>Summer Conditions</td>
<td>0.10</td>
<td>0.16</td>
<td>0.22</td>
<td>0.14</td>
<td>0.20</td>
<td>0.28</td>
<td>0.19</td>
<td>0.26</td>
<td>0.33</td>
</tr>
<tr>
<td>Fallowed Fields</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor Conditions</td>
<td>0.12</td>
<td>0.19</td>
<td>0.28</td>
<td>0.17</td>
<td>0.25</td>
<td>0.34</td>
<td>0.23</td>
<td>0.33</td>
<td>0.40</td>
</tr>
<tr>
<td>Good Conditions</td>
<td>0.08</td>
<td>0.13</td>
<td>0.16</td>
<td>0.11</td>
<td>0.15</td>
<td>0.21</td>
<td>0.14</td>
<td>0.19</td>
<td>0.26</td>
</tr>
<tr>
<td>Forest/Woodland</td>
<td>0.08</td>
<td>0.11</td>
<td>0.14</td>
<td>0.10</td>
<td>0.14</td>
<td>0.18</td>
<td>0.12</td>
<td>0.16</td>
<td>0.20</td>
</tr>
<tr>
<td>Grass Areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Good Conditions</td>
<td>0.10</td>
<td>0.16</td>
<td>0.20</td>
<td>0.14</td>
<td>0.19</td>
<td>0.26</td>
<td>0.18</td>
<td>0.22</td>
<td>0.30</td>
</tr>
<tr>
<td>Average Conditions</td>
<td>0.12</td>
<td>0.18</td>
<td>0.22</td>
<td>0.16</td>
<td>0.21</td>
<td>0.28</td>
<td>0.20</td>
<td>0.25</td>
<td>0.34</td>
</tr>
<tr>
<td>Poor Conditions</td>
<td>0.14</td>
<td>0.21</td>
<td>0.30</td>
<td>0.18</td>
<td>0.28</td>
<td>0.37</td>
<td>0.25</td>
<td>0.35</td>
<td>0.44</td>
</tr>
<tr>
<td>Impervious Areas</td>
<td>0.90</td>
<td>0.91</td>
<td>0.92</td>
<td>0.91</td>
<td>0.92</td>
<td>0.93</td>
<td>0.92</td>
<td>0.93</td>
<td>0.94</td>
</tr>
<tr>
<td>Weighted Residential</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lot Size 1/8 acre</td>
<td>0.29</td>
<td>0.33</td>
<td>0.36</td>
<td>0.31</td>
<td>0.35</td>
<td>0.40</td>
<td>0.34</td>
<td>0.38</td>
<td>0.44</td>
</tr>
<tr>
<td>Lot Size 1/4 acre</td>
<td>0.26</td>
<td>0.30</td>
<td>0.34</td>
<td>0.29</td>
<td>0.33</td>
<td>0.38</td>
<td>0.32</td>
<td>0.36</td>
<td>0.42</td>
</tr>
<tr>
<td>Lot Size 1/3 acre</td>
<td>0.24</td>
<td>0.28</td>
<td>0.31</td>
<td>0.26</td>
<td>0.32</td>
<td>0.35</td>
<td>0.29</td>
<td>0.33</td>
<td>0.40</td>
</tr>
<tr>
<td>Lot Size 1/2 acre</td>
<td>0.21</td>
<td>0.25</td>
<td>0.28</td>
<td>0.24</td>
<td>0.27</td>
<td>0.32</td>
<td>0.27</td>
<td>0.31</td>
<td>0.37</td>
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<tr>
<td>Lot Size 1 acre</td>
<td>0.18</td>
<td>0.23</td>
<td>0.26</td>
<td>0.21</td>
<td>0.24</td>
<td>0.30</td>
<td>0.24</td>
<td>0.29</td>
<td>0.36</td>
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</table>
# APPENDIX B-3

**RUNOFF CURVE NUMBERS “CN” FOR SCS METHOD**

<table>
<thead>
<tr>
<th>Soil Group</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-2%</td>
<td>2-6%</td>
<td>6%+</td>
<td>0-2%</td>
</tr>
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<td><strong>Slope</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td><strong>Land Use</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cultivated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Winter Conditions</td>
<td>48</td>
<td>60</td>
<td>65</td>
<td>62</td>
</tr>
<tr>
<td>Summer Conditions</td>
<td>35</td>
<td>51</td>
<td>61</td>
<td>48</td>
</tr>
<tr>
<td>Fallowed Fields</td>
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<td>Poor Conditions</td>
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<td>54</td>
<td>76</td>
<td>56</td>
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<td>Good Conditions</td>
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<td>44</td>
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<td>Forest/Woodland</td>
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</tr>
<tr>
<td>Grass Areas</td>
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<tr>
<td>Good Conditions</td>
<td>35</td>
<td>39</td>
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<tr>
<td>Average Conditions</td>
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<td>52</td>
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<tr>
<td>Poor Conditions</td>
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<td><strong>Weighted Residential</strong></td>
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<td>Lot Size 1/8 acre</td>
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<td>75</td>
<td>77</td>
<td>74</td>
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<td>Lot Size 1/4 acre</td>
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<td>67</td>
<td>66</td>
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<tr>
<td>Lot Size 1/3 acre</td>
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<td>59</td>
<td>65</td>
<td>64</td>
</tr>
<tr>
<td>Lot Size 1/2 acre</td>
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<td>57</td>
<td>63</td>
<td>62</td>
</tr>
<tr>
<td>Lot Size 1 acre</td>
<td>51</td>
<td>55</td>
<td>62</td>
<td>61</td>
</tr>
<tr>
<td>PIPE MATERIAL</td>
<td>MANNING’S “n”</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------------------</td>
<td>---------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helical corrugated steel / aluminum 2 2/3 X 1/2 corrugations</td>
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</tr>
<tr>
<td>Diameter (inches)</td>
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</tr>
<tr>
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<td>21</td>
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<tr>
<td>Reinforced Concrete</td>
<td>0.013</td>
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<tr>
<td>Smooth Lined Corrugated Polyethylene All Diameters</td>
<td>0.012</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
APPENDIX B-5

MANNING ROUGHNESS COEFFICIENTS

Roughness Coefficients (Manning’s “n”) For Overland / Sheet Flow
(From U.S. Army Corps of Engineers & NRCS TR-55)

<table>
<thead>
<tr>
<th>Surface Description</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dense Growth</td>
<td>0.4 - 0.5</td>
</tr>
<tr>
<td>Pasture</td>
<td>0.3 - 0.4</td>
</tr>
<tr>
<td>Lawns</td>
<td>0.2 - 0.3</td>
</tr>
<tr>
<td>Bluegrass Sod</td>
<td>0.2 - 0.5</td>
</tr>
<tr>
<td>Short Grass Prairie</td>
<td>0.1 - 0.2</td>
</tr>
<tr>
<td>Sparse Vegetation</td>
<td>0.05 - 0.13</td>
</tr>
<tr>
<td>Bare Clay – Loam Soil (eroded)</td>
<td>0.01 - 0.03</td>
</tr>
<tr>
<td>Concrete/Asphalt – very shallow depths</td>
<td>0.10 - 0.15</td>
</tr>
<tr>
<td>(less than 1/4 inch)</td>
<td></td>
</tr>
<tr>
<td>- small depths</td>
<td></td>
</tr>
<tr>
<td>(1/4 inch to several inches)</td>
<td>0.05 - 0.10</td>
</tr>
<tr>
<td>Fallow (no residue)</td>
<td>0.05</td>
</tr>
<tr>
<td>Cultivated Soils</td>
<td></td>
</tr>
<tr>
<td>Residue Cover Less Than or = 20%</td>
<td>0.06</td>
</tr>
<tr>
<td>Residue Cover Greater Than 20%</td>
<td>0.17</td>
</tr>
<tr>
<td>Grass</td>
<td></td>
</tr>
<tr>
<td>Dense Grasses</td>
<td>0.24</td>
</tr>
<tr>
<td>Bermuda Grass</td>
<td>0.41</td>
</tr>
<tr>
<td>Range (natural)</td>
<td>0.13</td>
</tr>
<tr>
<td>Woods (Light Underbrush)</td>
<td>0.40</td>
</tr>
<tr>
<td>Rip-Rap 3&quot;</td>
<td>0.025</td>
</tr>
<tr>
<td>Rip-Rap 6&quot;</td>
<td>0.025</td>
</tr>
<tr>
<td>Rip-Rap 9&quot;</td>
<td>0.03</td>
</tr>
<tr>
<td>Rip-Rap 12&quot;</td>
<td>0.03</td>
</tr>
<tr>
<td>Rip-Rap 15&quot;</td>
<td>0.035</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Reach Description</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural stream, clean, straight, no riffs or pools</td>
<td>0.03</td>
</tr>
<tr>
<td>Natural stream, clean, winding, some pools or shoals</td>
<td>0.04</td>
</tr>
<tr>
<td>Natural stream, winding, pools, shoals, stony with some weeds</td>
<td>0.05</td>
</tr>
<tr>
<td>Natural stream, sluggish deep pools and weeds</td>
<td>0.07</td>
</tr>
<tr>
<td>Natural stream or swale, very weedy or with timber underbrush</td>
<td>0.10</td>
</tr>
<tr>
<td>Concrete pipe, culvert or channel</td>
<td>0.012</td>
</tr>
<tr>
<td>Corrugated metal pipe</td>
<td>0.012-0.027*</td>
</tr>
</tbody>
</table>

*depending upon type, coating and diameter
APPENDIX D

SOUTH LEBANON TOWNSHIP - STORMWATER MANAGEMENT
BEST MANAGEMENT PRACTICES (BMP)
OPERATION AND MAINTENANCE (O&M) AGREEMENT

THIS AGREEMENT, made and entered into this _________ day of _________, 20__, by
and between ______ [name of owner/equitable owner] _______, (hereinafter the “Landowner”), and
South Lebanon Township, Lebanon County; Pennsylvania, (hereinafter “Township”);

WITNESSETH

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

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

WHEREAS, the Subdivision/Land Development/Stormwater Management (SWM) Site
Plan (hereinafter “Plan”) for ______ [name of owner/equitable owner] ______ which is expressly made
a part hereof, as approved or to be approved by the Township, provides for management of
stormwater within the confines of the Property; and

WHEREAS, the SWM BMP Operation and Maintenance (O&M) Plan approved by the
Township (hereinafter referred to as the “O&M Plan”) for the property identified herein, which
is attached hereto as Exhibit A and made part hereof, as approved by the Township, provides for
management of stormwater within the confines of the Property through the use of BMPs; and

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

WHEREAS, the Township requires, that stormwater management facilities as shown on
the Plan be constructed and adequately maintained by the Landowner, his successors and
assigns; and

WHEREAS, the Township requires, through the implementation of the SWM Site Plan,
that SWM BMPs as required by said SWM Site Plan and the Township Stormwater Management
Ordinance be constructed and adequately operated and maintained by the Landowner, his
successors, and assigns.
NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein, and the following terms and conditions, the parties hereto agree as follows:

1. The stormwater management BMPs shall be constructed by the Landowner, his successors and assigns, in accordance with the terms, conditions and specifications identified in the subdivision/land development/SWM Site Plan.

2. The Landowner, his successors and assigns, shall operate and maintain the stormwater management BMPs as shown on the subdivision/land development/SWM Site Plan in good working condition in accordance with the specific operation and maintenance requirements noted in the approved O&M Plan.

3. The Landowner, his successors and assigns, hereby grants permission to the Township, his authorized agents and employees, upon presentation of proper identification, to enter upon the Property at reasonable times, and to inspect the SWM BMPs whenever the Township deems necessary. Whenever possible, the Township shall notify the Landowner prior to entering the Property. The purpose of the inspection is to assure safe and proper functioning of the SWM BMPs. The inspection shall cover the entire facilities, pipes, berms, outlet structures, pond areas, access roads, etc. When inspections are conducted, the Township shall give the Landowner, his successors and assigns, copies of the inspection report with findings and evaluations. At a minimum, this agreement grants the Township the right to perform inspections in accordance with the following schedule:
   - Annually for the first 5 years after the construction of the stormwater facilities,
   - Once every 3 years thereafter, or
   - During or immediately upon the cessation of a 10 year or greater precipitation event.

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

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

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

7. The Landowner, his successors and assigns, will perform maintenance in accordance with the maintenance schedule for the SWM BMPs including sediment removal as outlined on the approved schedule and/or Subdivision/Land Development/SWM Site Plan.
8. 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 or his successors' and assigns' failure to perform such work, the Landowner, his successors and assigns, shall reimburse the Township upon demand, within 10 days of receipt of invoice thereof, for all costs incurred by the Township hereunder. If not paid within said 10-day period, the Township may enter a lien against the property in the amount of such costs, or may proceed to recover his costs through proceedings in equity or at law as authorized under the provisions of the Second Class Township Code.

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

10. In the event a claim or action is asserted against the Township, its agents or employees, the Township shall promptly notify the Landowner, his successors and assigns, and they shall defend, at their own expense, any suit based on such claim or action. If any judgment, decree or claim against the Township, its agents or employees shall be granted, the Landowner, his successors and assigns shall pay all costs and expenses in connection with said judgment, decree or claim including any attorney fees, costs and expenses incurred in the defense of the Township.

11. In the advent of an emergency or the occurrence of special or unusual circumstances or situations, the Township may enter the Property, if the Landowner is not immediately available, without notification or identification, to inspect and perform necessary maintenance and repairs, if needed, when the health, safety or welfare of the citizens is at jeopardy. However, the Township shall notify the landowner of any inspection, maintenance, or repair undertaken within 5 days of the activity. The Landowner shall reimburse the Township for any associated costs.

12. The intent and purpose of this Agreement is to ensure the proper maintenance of the onsite BMPs by the Landowner; provided, however, that this Agreement shall not be deemed to create or affect any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.

13. The Landowner, its executors, administrators, assigns, and other successors in interests, shall release and hold harmless the Township from all damages, accidents, casualties, occurrences, or claims which might arise or be asserted against said Township employees and representatives from the construction, presence, existence, or maintenance of the BMP(s) by the Landowner or Township.

14. The Landowner shall reimburse the Township for any expense in the review, preparation, revision and recording of this Agreement.
This Agreement shall be recorded among the land records of Lebanon County, Pennsylvania and shall constitute a covenant running with the Property and/or equitable servitude, and shall be binding on the Landowner, his administrators, executors, assigns, heirs and any other successors in interests, in perpetuity.

ATTEST:

WITNESS the following signatures and seals:

(SEAL) For the Township:

(SEAL) For the Landowner:

ATTEST:

South Lebanon Township, County of Lebanon, Pennsylvania

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

GIVEN UNDER MY HAND THIS ______ day of ______________, 20___.

________________________

NOTARY PUBLIC

(SEAL)
APPENDIX E

SOUTH LEBANON TOWNSHIP
STANDARD STORMWATER MANAGEMENT NOTES

Use all applicable notes and supplement or revise where necessary for clarification:

1. All stormwater management facilities shown on this plan shall be constructed by the developer in accordance with the design, conditions, and specifications identified on this plan. Ownership and maintenance shall be the responsibility of the landowner, his successors and assigns, unless specifically identified otherwise herein.

2. Stormwater management facilities shall be maintained in good working condition so that they are performing their design function, in a manner acceptable to the Township, as required by the South Lebanon Township Stormwater Management Ordinance. Maintenance shall include performing routine maintenance and repair or replacement of damaged facilities, vegetation or stormwater areas to conditions as shown on the approved plan and in accordance with the South Lebanon Township Stormwater Management Ordinance.

3. Any drainage and utility easements shown on the plan shall be constructed, owned and maintained in accordance with the approved plan and shall be referenced within the property deed.

4. Runoff from the lot improvements shall be directed to the stormwater management facilities. Stormwater runoff from existing natural swales and/or other existing drainage conveyors shall not be directed towards or intercepted by the stormwater management facilities.

5. Township and County Officials and their agents or employees have the right of access for inspection and, in cases of construction default, construction of the stormwater management facilities.

6. After stormwater management facilities installation is completed, contact South Lebanon Township at (717) 274-0481 for inspection by the Township Engineer. No occupancy permitted until stormwater management facilities have been installed and approved through inspection by the Township Engineer.

*If facilities such as new streets with storm sewers and related structures are intended for ownership and maintenance by the Township, a Homeowner’s Association, or similar ownership entity, additional notes are required to document ownership and maintenance responsibilities.*

STORMWATER EXEMPTIONS

Use the following note instead of the six (6) standard stormwater notes provided above:

Lot(s) #______ has (have) been exempted from the mandatory design and installation of stormwater management facilities, based upon satisfaction of the exemption criteria provided in Section 402 of the South Lebanon Township Stormwater Management Ordinance. No occupancy is permitted until lot(s) #______ has (have) been inspected and approved by the Township Engineer to verify that construction and development has been completed in accordance with this plan and the Section 402 exemption criteria.
APPENDIX F

EROSION AND SEDIMENT POLLUTION CONTROL GUIDELINES

INTRODUCTION

Pennsylvania law requires an Erosion and Sediment Pollution Control (E&SPC) plan be developed and implemented for all earthmoving activities. The following guidelines are to be incorporated into an E&SPC plan for projects that do not have an existing plan. The guidelines alone do not constitute a complete plan. The E&SPC plan must be fully developed and site specific in accordance with Pennsylvania Department of Environmental Protection Chapter 102 rules and regulations. Additional information regarding E&SPC development and Chapter 102 regulations may be obtained from the County Conservation District.

PROCEDURE

The following list of E&SPC guidelines shall be used as standard subdivision and land development plan notes on all plans. Major subdivision and land development plans also require site specific E&SPC design sheets and details.

GUIDELINES

1. A logical construction sequence shall be developed that includes the installation of E&SPC facilities, and Best Management Practices (BMP's), before earthmoving may commence.

2. E&SPC facilities and BMP's shall be correctly installed and maintained. Maintenance information and construction details may be obtained from the County Conservation District.

3. Earth disturbance shall take place within a defined limit of disturbance and immediately prior to construction.

4. Development plans shall preserve salient natural features, minimize land cuts and fills and conform to the general topography. Plans shall be designed and implemented so as to create the least potential for erosion and to adequately contain the volume and reduce the velocity of the surface water runoff.

5. Natural vegetation shall be retained, protected and supplemented prior to and during construction.

6. Topsoil shall be removed from construction areas and stockpiled for final grading and seedbed preparation. Downslope areas of any stockpiles, construction of borrow areas shall be protected with correctly installed and maintained silt fence, straw bales or sediment traps prior to any earth disturbance in order to minimize sediment laden runoff.

7. All cuts and fills shall be brought to final grade early in the construction sequence, and stabilized immediately with seed and mulch.
8. Only driveway excavations that can be stabilized with a crushed stone base that same day shall be completed.

9. Current regulations state: (a) Upon completion of an earth disturbance activity or any stage of phase of any activity, the site shall be immediately seeded, mulched or otherwise protected from accelerated erosion and sedimentation. (b) Erosion and sediment control BMP's shall be implemented and maintained until the permanent stabilization is completed. (c) For an earth disturbance activity or any stage or phase of an activity to be considered permanently stabilized, the disturbed areas shall be covered with one of the following: (1) A minimum uniform 70% perennial vegetative cover, with a density capable of resisting accelerated erosion and sedimentation. (2) An acceptable BMP which permanently minimizes accelerated erosion and sedimentation.

10. The Penn State *Erosion Control & Conservation Planting on Noncropland guide or Agronomy guide* shall be consulted for permanent and temporary seeding and mulching types and rates. Straw mulch shall be applied at a rate of at least 3 tons per acre or 5 bales per 1000 square feet. Slopes steeper than 3:1 shall be correctly lined with appropriate turf reinforcement matting. Other helpful publications include *Turfgrass Establishment* (special circular 163), *Turfgrass Seed and Seed Mixtures* (extension circular 391), and *Principles of Turfgrass Irrigation* (special circular 158). The publications referenced are available from the Penn State Extension Office.

11. All recycling and disposal of construction waste shall be in accordance with local and state rules and regulations for waste management. Construction waste includes but is not limited to: Excess soil and rock, building materials, concrete and concrete wash water, sanitary waste and any other materials that could adversely impact surface or ground water quality.
APPENDIX G

WORKSHEETS FOR COMPUTING EXPECTED POLLUTANT LOADS FROM SPECIFIC LAND USES

Worksheet 1: General Site Information

INSTRUCTIONS: Fill out Worksheet 1 for each watershed

Date:

Project Name:

Municipality:

County:

Total Area (acres):

Major River Basin:

http://www.pawaterplan.dep.state.pa.us/StateWaterPlan/docroot/default.aspx

Watershed:

Sub-Basin:

Nearest Surface Water(s) to Receive Runoff:

Chapter 93 – Designated Water Use:


Impaired according to Category 4 or 5 of the Integrated Water Quality Monitoring and Assessment Report?

http://www.portal.state.pa.us/portal/server.pt/community/water_quality_standards/10558/integrated_water_quality_report_-_2010/682562

Yes □ No □

List Causes of Impairment:

Is there an established TMDL that applies?

Total Maximum Daily Loads (TMDLS)

http://www.dep.state.pa.us/watermanagement_apps/tmdl/

http://www.epa.gov/reg3wasp/tmdl/pa_tmdl/index.htm

Is project subject to, or part of:

Municipal Separate Storm Sewer System (MS4) Requirements?

http://www.portal.state.pa.us/portal/server.pt/community/stormwater_management/10628/npdes_ms4%20information/689119

Existing or planned drinking water supply?

If yes, distance from proposed discharge (miles):

Approved Act 167 Plan?

http://www.portal.state.pa.us/portal/server.pt?open=514&objID=654325&mode=2

Existing River Conservation Plan?

http://www.dcnr.state.pa.us/bcr/rivers/riversconservation/registry/
Worksheet 2: Sensitive Natural Resources

INSTRUCTIONS

1. Provide Sensitive Resources Map according to non-structural BMP 5.4.1 in Chapter 5. This map should identify wetlands, woodlands, natural drainage ways, steep slopes, and other sensitive natural areas.

2. Summarize the existing extent of each sensitive resource in the Existing Sensitive Resources Table (below, using Acres). If none present, insert 0.

3. Summarize Total Protected Area as defined under BMPs in Chapter 5.

4. Do not count any area twice. For example, an area that is both a floodplain and a wetland may only be considered once.

<table>
<thead>
<tr>
<th>EXISTING NATURAL SENSITIVE RESOURCE</th>
<th>MAPPED?</th>
<th>TOTAL AREA (Ac.)</th>
<th>PROTECTED AREA (Ac.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waterbodies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Floodplains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riparian Areas</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wetlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodlands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Drainage Ways</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steep Slopes, 15% - 25%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steep Slopes, over 25%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL EXISTING:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## PROTECTED AREA

1. Area of Protected Sensitive/Special Value Features (see WS 2) ____ Acre
2. Area of Riparian Forest Buffer Protection ____ Acre
3. Area of Minimum Disturbance/Reduced Grading ____ Acre

**TOTAL ____ Acre**

![Diagram](This is the area that requires stormwater management)

## VOLUME CREDITS

3. Minimum Soil Compaction (See Chapter 8, page 22 – SW BMP Manual)

   - **Lawn**
     - Ft² x 1/4" x 1/12 = Ft³
   - **Meadow**
     - Ft² x 1/3" x 1/12 = Ft³

3.3 Protect Existing Trees (See Chapter 8, page 23 – SW BMP Manual)

   **For Trees within 100 feet of impervious area:**
   - **Tree Canopy**
     - Ft² x 1/2" x 1/12 = Ft³

5.1 Disconnect Roof of Leaders to Vegetated Areas (See Chapter 8 page 25 – SW BMP Manual)

   **For runoff directed to areas protected under 5.8.1 and 5.8.2**
   - **Roof Area**
     - Ft² x 1/3" x 1/12 = Ft³
   - **For all other disconnected roof areas**
     - Ft² x 1/4" x 1/12 = Ft³

5.2 Disconnect Non-Roof impervious to Vegetated Areas (See Chapter 8, page 28 – SW BMP Manual)

   **For Runoff directed to areas protected under 5.8.1 and 5.8.2**
   - **Impervious Area**
     - Ft² x 1/3" x 1/12 = Ft³
   - **For all other disconnected roof areas**
     - Ft² x 1/4" x 1/12 = Ft³

**TOTAL NON-STRUCTURAL VOLUME CREDIT** ________ ft³

*For use on Worksheet 5*
## Worksheet 4: Change in Runoff Volume for 2-YR Storm Event

**PROJECT:**

**Drainage Area:** ___________________________

**2-Year Rainfall:** __________ in

**Total Site Area:** __________ acres

**Protected Site Area:** __________ acres

**Managed Area:** __________ acres

### Existing Conditions:

<table>
<thead>
<tr>
<th>Cover Type/Condition</th>
<th>Soil Type</th>
<th>Area (sf)</th>
<th>Area (ac)</th>
<th>CN</th>
<th>S</th>
<th>la (0.2&quot;S)</th>
<th>Q Runof (in)</th>
<th>Runoff Volume (ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woodland</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meadow</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impervious</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL:</strong></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Developed Conditions

<table>
<thead>
<tr>
<th>Cover Type/Condition</th>
<th>Soil Type</th>
<th>Area (sf)</th>
<th>Area (ac)</th>
<th>CN</th>
<th>S</th>
<th>la (0.2&quot;S)</th>
<th>Q Runof (in)</th>
<th>Runoff Volume (ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>TOTAL:</strong></td>
<td></td>
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</tr>
</tbody>
</table>

### 2-Year Volume Increase (ft³):

2-Year Volume Increase = Developed Conditions Runoff Volume – Existing Conditions Runoff Volume

1. Runoff (in) = \( Q = \frac{(P \times 0.2S)}{(P+0.8S)} \) where
   - \( P \) = 2-Year Rainfall (in)
   - \( S = \frac{1000}{CN} - 10 \)

2. Runoff Volume (CF) = \( Q \times Area \times \frac{1}{12} \)
   - \( Q \) = Runoff (in)
   - Area = Land use area (sq. ft)

**Note:** Runoff Volume must be calculated for EACH land use type/condition and HSGI. The use of a weighted CN value for volume calculations is not acceptable.
### Worksheet 5: Structural BMP Volume Credits

**PROJECT:** 

**SUB-BASIN:**

**Required Control Volume (ft³) — from Worksheet 4:**  

**Non-structural Volume Credit (ft³) — from Worksheet 3:**  
(maximum is 25% of required volume)

**Structural Volume Reqmt (ft³)**  
(Required Control Volume minus Non-structural Credit)

<table>
<thead>
<tr>
<th>Proposed BMP</th>
<th>Area (ft³)</th>
<th>Volume Reduction Permanently Removed (ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4.1 Porous Pavement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.2 Infiltration Basin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.3 Infiltration Bed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.4 Infiltration Trench</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.5 Rain Garden/Bioretention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.6 Dry Well / Seepage Pit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.7 Constructed Filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.8 Vegetated Swale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.9 Vegetated Filter Strip</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.10 Berm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5.1 Vegetated Roof</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.5.2 Capture and Re-use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.6.1 Constructed Wetlands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.6.2 Wet Pond / Retention Basin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.7.1 Riparian Buffer/Riparian Forest Buffer Restoration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.7.2 Landscape Restoration / Reforestation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.7.3 Soil Amendment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.8.1 Level Spreader</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.8.2 Special Storage Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Structural Volume (ft³):**  

**Structural Volume Requirement (ft³):**  

**DIFFERENCE**
WORKSHEET 7: CALCULATION OF RUNOFF VOLUMES (PRV and EDV) FOR CG-2 ONLY

PROJECT: ________________________

DRAINAGE AREA: ________________________

| Total Site Area: | ___ acres |
| Protected Site Area: | ___ acres |
| Managed Area: | ___ acres |
| Total Impervious Area | ___ acres |

2 Inch Runoff - Multiply Total Impervious Area by 2 Inch

<table>
<thead>
<tr>
<th>Cover Type</th>
<th>Area (ac)</th>
<th>Runoff Capture Volume (ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roof</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pavement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Impervious</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Inch Rainfall -

<table>
<thead>
<tr>
<th>Cover Type</th>
<th>Area (sf)</th>
<th>Area (ac)</th>
<th>Runoff (ln)</th>
<th>Runoff Volumes (ft³)</th>
</tr>
</thead>
<tbody>
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<tr>
<td>TOTAL:</td>
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</tr>
</tbody>
</table>

1. Total Runoff Capture Volume (ft³) = Total Impervious Area (ft²) x 2 inch x 1/12

2. PRV (ft³) = Total Impervious Area (ft²) x 1 inch x 1/12

3. EDV (ft³) = Total Impervious Area (ft²) x 1 inch x 1/12

Water quality volume requirements for land areas with existing cover consisting of meadow, brush, wood-grass combination, or woods proposed for conversion to any other non-equivalent type of pervious cover shall be sized for one-half (1/2) the volume required for impervious surfaces as mentioned in this worksheet and calculated in items 1 through 3 above.
**WORKSHEET 8: STRUCTURAL BMP VOLUME CREDITS**

**PROJECT:**

**SUB-BASIN:**

Required Control Volume (ft³) - from Worksheet 7:

Non-structural Volume Credit (ft³) - from Worksheet 3:

Structural Volume Reqmt (ft³)

*(Required Control Volume minus Non-structural Credit)*

<table>
<thead>
<tr>
<th>Proposed BMP*</th>
<th>Area (ft²)</th>
<th>Storage Volume (ft³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.4.1 Porous Pavement</td>
<td></td>
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<tr>
<td>6.4.2 Infiltration Basin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.3 Infiltration Bed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.4 Infiltration Trench</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.5 Rain Garden/Bioretention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.6 Dry Well / Seepage Pit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.7 Constructed Filter</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.8 Vegetated Swale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.4.9 Vegetated Filter Strip</td>
<td></td>
<td></td>
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<tr>
<td>6.4.10 Berm</td>
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</tr>
<tr>
<td>6.5.1 Vegetated Roof</td>
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<tr>
<td>6.5.2 Capture and Re-use</td>
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<tr>
<td>6.6.1 Constructed Wetlands</td>
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<td></td>
</tr>
<tr>
<td>6.6.2 Wet Pond / Retention Basin</td>
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<td></td>
</tr>
<tr>
<td>6.6.3 Dry Extended Detention Basin</td>
<td></td>
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</tr>
<tr>
<td>6.6.4 Water Quality Filters</td>
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<tr>
<td>6.7.1 Riparian Buffer Restoration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.7.2 Landscape Restoration / Reforestation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.7.3 Soil Amendment</td>
<td></td>
<td></td>
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<tr>
<td>6.8.1 Level Spreader</td>
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<tr>
<td>6.8.2 Special Storage Areas</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
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</tr>
</tbody>
</table>

Total Structural Volume (ft³):

Structural Volume Requirement (ft³):

DIFFERENCE

---

South Lebanon Township – Stormwater Management Ordinance  
Page G-7
Does the site design incorporate the following BMPs to address nitrate pollution? A summary "yes" rating is achieved if at least 2 Primary BMPs for nitrate are provided across the site or 4 secondary BMPs for nitrate are provided across the site (or the

**PRIMARY BMPs FOR NITRATE:**

<table>
<thead>
<tr>
<th>Primary BMP</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS BMP 5.4.2 - Protect / Conserve / Enhance Riparian Buffers</td>
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<td></td>
</tr>
<tr>
<td>NS BMP 5.5.4 - Cluster Uses at Each Site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS BMP 5.6.1 - Minimize Total Disturbed Area</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS BMP 5.6.3 - Re-Vegetate / Re-Forest Disturbed Areas (Native Species)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS BMP 5.9.1 - Street Sweeping / Vacuuming</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.7.1 - Riparian Buffer Restoration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.7.2 - Landscape Restoration</td>
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<td></td>
</tr>
</tbody>
</table>

**SECONDARY BMPs FOR NITRATE:**

<table>
<thead>
<tr>
<th>Secondary BMP</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS BMP 5.4.1 - Protect Sensitive / Special Value Features</td>
<td></td>
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</tr>
<tr>
<td>NS BMP 5.4.3 - Protect / Utilize Natural Drainage Features</td>
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<tr>
<td>NS BMP 5.6.2 - Minimize Soil Compaction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.4.5 - Rain Garden / Bioretention</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.4.8 - Vegetated Swale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.4.9 - Vegetated Filter Strip</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.6.1 - Constructed Wetland</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.7.1 - Riparian Buffer Restoration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.7.2 - Landscape Restoration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.7.3 - Soils Amendment/Restoration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Does the site design incorporate the following BMPs to address nitrate pollution? A summary "yes" rating is achieved if at least 2 Primary BMPs are provided across the site. "Provided across the site" is taken to mean that the specifications for that BMP set forward in Chapters 5 and 6 are satisfied.

<table>
<thead>
<tr>
<th>BMPs for Pollution Prevention:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS BMP 5.4.1 – Protect Sensitive/Special Value Features</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS BMP 5.4.2 – Protect/Conserv/Enhance Riparian Buffers</td>
<td></td>
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</tr>
<tr>
<td>NS BMP 5.4.3 – Protect/Utilize Natural Flow Pathways in Overall Stormwater Planning and Design</td>
<td></td>
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</tr>
<tr>
<td>NS BMP 5.5.1 – Cluster Uses at Each Site; Build on the Smallest Area Possible</td>
<td></td>
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<tr>
<td>NS BMP 5.6.1 – Minimize Total Disturbed Area – Grading</td>
<td></td>
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</tr>
<tr>
<td>NS BMP 5.6.2 – Minimize Soil Compaction in Disturbed Areas</td>
<td></td>
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<tr>
<td>NS BMP 5.6.3 – Re-Vegetate/Re-Forest Disturbed Areas (Native Species)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NS BMP 5.7.1 – Reduce Street Imperviousness</td>
<td></td>
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</tr>
<tr>
<td>NS BMP 5.7.2 – Reduce Parking Imperviousness</td>
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<tr>
<td>NS BMP 5.8.1 – Rooftop Disconnection</td>
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</tr>
<tr>
<td>NS BMP 5.8.2 – Disconnection from Storm Sewers</td>
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</tr>
<tr>
<td>NS BMP 5.9.15 – Street Sweeping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.7.1 – Riparian Buffer Restoration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.7.2 – Landscape Restoration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural BMP 6.7.3 – Soils Amendment and Restoration</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Total Disturbed Areas:

<table>
<thead>
<tr>
<th>Land Cover Classification</th>
<th>TSS EMC (mg/l)</th>
<th>TP EMC (mg/l)</th>
<th>Nitrato-Nitrite EMC (mg/l as N)</th>
<th>Cover (Acres)</th>
<th>Runoff Volume (AF)</th>
<th>TSS** (LBS)</th>
<th>TP** (LBS)</th>
<th>NO₃ (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest</td>
<td>39</td>
<td>0.15</td>
<td>0.17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meadow</td>
<td>47</td>
<td>0.19</td>
<td>0.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Fertilized Planting Area</td>
<td>55</td>
<td>1.34</td>
<td>0.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Native Planting Area</td>
<td>55</td>
<td>0.40</td>
<td>0.33</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lawn, Low-Input</td>
<td>180</td>
<td>0.40</td>
<td>0.44</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lawn, High-Input</td>
<td>180</td>
<td>2.22</td>
<td>1.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Golf Course Fairway/Green</td>
<td>305</td>
<td>1.07</td>
<td>1.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grasped Athletic Field</td>
<td>200</td>
<td>1.07</td>
<td>1.01</td>
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<tr>
<td>Impervious Surfaces</td>
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</tr>
<tr>
<td>Rooftop</td>
<td>21</td>
<td>0.13</td>
<td>0.32</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>High Traffic Street/Highway</td>
<td>261</td>
<td>0.40</td>
<td>0.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium Traffic Street</td>
<td>113</td>
<td>0.33</td>
<td>0.58</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Traffic/Residential Street</td>
<td>88</td>
<td>0.36</td>
<td>0.47</td>
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<td></td>
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<tr>
<td>Res. Driveway, Play Courts, etc.</td>
<td>60</td>
<td>0.48</td>
<td>0.47</td>
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<tr>
<td>High Traffic Parking Lot</td>
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<td>0.39</td>
<td>0.60</td>
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<tr>
<td>Low Traffic Parking Lot</td>
<td>58</td>
<td>0.15</td>
<td>0.39</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**TOTAL LOAD**

<table>
<thead>
<tr>
<th>REQUIRED REDUCTION (%)</th>
<th>85%</th>
<th>85%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>REQUIRED REDUCTION (LBS)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Pollutant Load = [EMC, mg/l] X [Volume, AF] X [2.7, Unit Conversion]*

**TSS and TP calculations only required for projects not meeting CG1/CG2 or not controlling less than 90% of the disturbed area.
*Fill this worksheet out for each BMP type with different pollutant removal efficiencies. Sum pollutant reduction achieved for all BMP types on final sheet.

BMP Type: ____________________________

**Disturbed Area Controlled by this BMP's (AC)**

Disturbed Area Controlled by this BMPs:

<table>
<thead>
<tr>
<th>Land Cover Classification</th>
<th>TSS EMC (mg/l)</th>
<th>TP EMC (mg/l)</th>
<th>Nitrate-Nitrite EMC (mg/l as N)</th>
<th>Cover (Acres)</th>
<th>Runoff Volume (AF)</th>
<th>TSS** (LBS)</th>
<th>TP** (LBS)</th>
<th>NO3 (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest</td>
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<td>1.01</td>
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<tr>
<td><strong>Previous Surfaces</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High Traffic Parking Lot</td>
<td>120</td>
<td>0.39</td>
<td>0.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low Traffic Parking Lot</td>
<td>58</td>
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<td>0.36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL LOAD TO THIS BMP TYPE**

<table>
<thead>
<tr>
<th>Pollutant Removal Efficiencies from Appendix A, Stormwater Manual (%)</th>
<th>85%</th>
<th>85%</th>
<th>50%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pollutant Reduction Achieved by this BMP Type (LBS)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pollutant Reduction Achieved by all BMP Types (LBS)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Required Reduction from WS12 (LBS)</td>
<td></td>
</tr>
</tbody>
</table>

*Pollutant Load = [EMC, mg/l] x [Volume, AF] x [2.7, Unit Conversion]

**TSS and TP calculations only required for projects not meeting CG1/CG2 or not controlling less than 90% of the disturbed area