MARION TOWNSHIP STORMWATER MANAGEMENT ORDINANCE
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ORDINANCE NO. 2002 - ____

AN ORDINANCE OF THE TOWNSHIP OF MARION, BERKS COUNTY, PENNSYLVANIA, CREATING STORMWATER MANAGEMENT REGULATIONS WITHIN CERTAIN STORMWATER MANAGEMENT DISTRICTS, REQUIRING DRAINAGE PLANS FOR REGULATED ACTIVITIES, PROVIDING FOR INSPECTIONS, FEES AND MAINTENANCE RESPONSIBILITIES, AND IMPOSING PENALTIES FOR A VIOLATION OF THE ORDINANCE.

Be It Enacted and Ordained by the Township of Marion, Berks County, Pennsylvania, and it is hereby enacted and ordained by the authority of the same as follows:

ARTICLE I- GENERAL PROVISIONS

Section 101. Statement of Findings

The governing body of the Municipality 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 Municipality and all the people of the Commonwealth, their resources, and the environment.

Section 102. Purpose

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

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

B. Utilize and preserve the existing natural drainage systems.

C. Encourage recharge of groundwater where appropriate and prevent degradation of groundwater quality.

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

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

F. Provide proper maintenance of all permanent stormwater management facilities that are constructed in the Municipality.

G. Provide performance standards and design criteria for watershed-wide stormwater management and planning.

Section 103. Statutory Authority

The Municipality is empowered to regulate land use activities that affect runoff by the authority of the Act of October 4, 1978 32 P.S., P.L. 864 (Act 167) Section 680.1 et seq., as amended, the "Stormwater Management Act", and the Second Class Township Code.

Section 104. Applicability

This Ordinance shall apply to those areas of the Municipality that are located within the Tulpehocken Creek Watershed, as delineated in Appendix D which is hereby adopted as part of this ordinance.

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 sedimentation control during construction activities are specifically not regulated by this Ordinance, but shall continue to be regulated under existing laws and ordinances.

This Ordinance contains only the 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.) shall continue to be regulated by the applicable Municipal Ordinances or at the municipal engineer's discretion.

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

A. Land development.
B. Subdivision.
C. Construction of new or additional impervious or semi-pervious surfaces (driveways, parking lots, etc.).
D. Construction of new buildings or additions to existing buildings.
E. Diversion or piping of any natural or man-made stream channel.
F. Installation of Stormwater Management Facilities or appurtenances thereto.

Section 105. Repealer

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

Section 106. Severability

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

Section 107. Compatibility With Other Ordinance Requirements

Approvals issued 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, rule, act, or ordinance.

ARTICLE II-DEFINITIONS

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

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

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

C. The word "person" includes an individual, firm, association, organization, partnership, trust, company, corporation, or any other similar entity.

D. The words "shall" and "must" 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 Activities - The work of producing crops and raising livestock including tillage, plowing, disking, harrowing, pasturing 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 or developer who has filed an application for approval to engage in any Regulated Activities as defined in Section 104 of this Ordinance.

BMP (Best Management Practice) - Stormwater structures, facilities and techniques to control, maintain or improve the quantity and quality of surface runoff.

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

Cistern - An underground reservoir or tank for storing rainwater.

Conservation District - The Berks (Lebanon and Lancaster) County Conservation District(s).

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

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

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

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

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

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

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.

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

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

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

Drainage Permit - A permit issued by the Municipal governing body after the drainage plan has been approved. Said permit is issued prior to or with the final Municipal approval.

Drainage Plan - The documentation of the stormwater management system, if any, to be used for a given Development Site, the contents of which are established in Section 403.

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

Erosion - The movement of soil particles by the action of water, wind, ice, 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.

Flood - A general but temporary condition of partial or complete inundation of normally dry land areas from the overflow of streams, rivers, and other waters of this Commonwealth.

Floodplain - Any land area susceptible to inundation by water from any natural source or delineated by applicable 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 (PaDEP) Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by PaDEP).

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 high-water and the top of a dam, levee, tank, basin, or diversion ridge. The space is required as a safety margin in a pond or basin.

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

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

Groundwater Recharge - Replenishment of existing natural underground water supplies.

Impervious Surface - A surface that prevents the percolation of water into the ground.

Impoundment - A retention or detention basin designed to retain 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, seepage trench).

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

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

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

Main Stem (Main Channel) - Any stream segment or other runoff conveyance facility used as a reach in the Tulpehocken Creek hydrologic model.

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.
Municipality - Marion Township, Berks County, Pennsylvania.

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

NRCS - Natural Resource Conservation Service (previously SCS).

Open Channel - A drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and 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.

Parking Lot Storage - Involves the use of impervious parking areas as temporary impoundments with controlled release rates during rainstorms.

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

Penn State Runoff Model (calibrated) - The computer-based hydrologic modeling technique adapted to the Tulpehocken Creek watershed for the Act 167 Plan. The model has been "calibrated" to reflect actual recorded flow values by adjoining key model input parameters.

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

Planning Commission - The planning commission of Marion Township, Berks County, Pennsylvania

PMF - Probable Maximum Flood - The flood that may be expected from the most severe combination of critical meteorologic 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).

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

Regulated Activities - Actions or proposed actions that have an impact on stormwater runoff and that are specified in Section 104 of this Ordinance.

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.

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.

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.

Rooftop Detention - Temporary ponding and gradual release of stormwater falling directly onto flat roof surfaces by incorporating controlled-flow roof drains into building designs.

Runoff - Any part of precipitation that flows over the land surface.

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.

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

Soil Group, Hydrologic - A classification of soils by the Natural Resources Conservation Service, formerly the Soil Conservation Service, into four runoff potential groups. The groups range from A soils, which are very permeable and produce little runoff, to D soils, which are not very permeable and produce much more runoff.

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.

Storage Indication Method - A reservoir routing procedure based on solution of the continuity equation (inflow minus outflow equals the change in storage) with outflow defined as a function of storage volume and depth.
Storm Frequency - The number of times that a given storm "event" occurs or is exceeded on the average in a stated period of years. See "Return Period".

Storm Sewer - A system of pipes and/or open channels that convey intercepted runoff and stormwater from other sources, but excludes domestic sewage and industrial wastes.

Stormwater - The total amount of precipitation reaching the ground surface.

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 Plan - The plan for managing stormwater runoff in the Tulpehocken Creek Watershed adopted by Berks County as required by the Act of October 4, 1978, P.L. 864, (Act 167), and known as the "Tulpehocken Creek Watershed Action Act 167 Stormwater Management Plan.

Stormwater Management Site Plan - The plan prepared by the Developer or his representative indicating how stormwater runoff will be managed at the particular site of interest according to this Ordinance.

Stream Enclosure - A bridge, culvert or other structure in excess of 100 feet in length upstream to downstream which encloses a regulated water of this Commonwealth.

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

Subdivision - 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.

Timber Operations - See Forest Management.

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

Watercourse - A stream of water; river; brook; creek; or a channel or ditch for water, whether natural or manmade.

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-STORMWATER MANAGEMENT

Section 301. General Requirements

A. All regulated activities in Tulpehocken Creek Watershed which do not fall under the exemption criteria shown in Section 402 shall submit a Drainage Plan consistent with the Tulpehocken Creek Watershed Stormwater Management Plan to the Municipality for review. This criteria shall apply to the total proposed development even if development is to take place in stages. Impervious cover shall include, but not be limited to, any roof, parking or driveway areas and any new streets and sidewalks. Any areas designed to initially be gravel or crushed stone shall be assumed to be impervious for the purposes of comparison to the exemption criteria.

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

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

D. Areas of existing diffused drainage discharge shall be subject to any applicable discharge criteria in the general direction of existing discharge, whether proposed to be concentrated or maintained as diffused drainage areas, except as otherwise provided by this ordinance. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the 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.

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

the easement. Also, maintenance, including mowing of vegetation within the easement shall be required, except as approved by the appropriate governing authority.

F. 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 PaDEP through the Joint Permit Application process, or, where deemed appropriate by PaDEP, through the General Permit process.

G. 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 PaDEP through the Joint Permit Application process, or, where deemed appropriate by PaDEP, the General Permit process. When there is a question whether wetlands may be involved, it is the responsibility of the Developer or his agent to show that the land in question cannot be classified as wetlands, otherwise approval to work in the area must be obtained from PaDEP.

H. Any Stormwater Management Facilities regulated by this Ordinance that would be located on State highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation (PaDOT).

I. 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.

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

Section 302. Stormwater Management Districts

A. Tulpehocken Creek Watershed has been divided into stormwater management districts as shown on the Watershed Map in Appendix D.

In addition to the requirements specified below, the ground water recharge (Section 306), water quality (Section 307), and streambank erosion (Section 308) requirements shall be implemented.

Standards for managing runoff from each subarea in the Tulpehocken Creek Watershed for the 2, 5, 10, 25, and 100-year design storms are shown below. Development sites located in each of the A, B, or C Districts must control post-development runoff rates to pre-development runoff rates for the design storms as follows:

District	Design Storm Post-Development	Design Storm Pre-Development
A	2-year 5-year 10-year 25-year	1-year 5-year 10-year 25-year
B1	2-year 5-year 10-year 25- year	1-year 2-year 5-year 10-year

B2	2-year 5-year 10-year 25- year 100-year	1-year 2-year 5-year 10-year 100-year
C	2-year 5-year	1-year 2-year

EXPLANATION OF DISTRICT C: Development sites which can discharge directly to the Tulpehocken Creek main channel or major tributaries or indirectly to the main channel through an existing stormwater drainage system (i.e., storm sewer or tributary) may do so without control of post-development peak rate of runoff greater than the 5-year storm. Sites in District C will still have to comply with the groundwater recharge criteria (Ord. Section 306), the water quality criteria (Ord. Section 307), and streambank erosion criteria (Section 308). If the post-development runoff is intended to be conveyed by an existing stormwater drainage system to the main channel, assurance must be provided that such system has adequate capacity to convey the increased peak flows or will be provided with improvements to furnish the required capacity. When adequate capacity of downstream system does not exist and will not be provided through improvements, the post-development peak rate of runoff must be controlled to the pre-development peak rate as required in District A provisions (i.e.,10-year post-development flows to 10 pre-development flows) for the specified design storms.

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 on the Stormwater Management District Watershed Map (Ordinance Appendix D) and Section 302, of the Ordinance.

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

C. Sites Located in More Than 1 District - For a proposed Development Site located within two or more stormwater management district category subareas, the peak discharge rate from any subarea shall be the pre-development peak discharge for that subarea as indicated in Section 302. 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. Off-Site Areas - Off-site Areas that drain through a proposed Development Site are not subject to release rate criteria when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the Development Site.

E. Site Areas - Where the 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. "No Harm" Option - For any proposed Development Site not located in a provisional direct discharge district, the Developer has the option of using a less restrictive Runoff control (including no detention) if the developer can prove that "no harm" would be caused by discharging at a higher runoff rate than that specified by the Plan. The "no harm" option is used when a developer can prove that the post-development hydrographs can match pre-development hydrographs, or if it can be proved that the post-development conditions will not cause increases in peaks at all points downstream. Proof of "no harm" would have to be shown based upon the following "Downstream Impact Evaluation" which shall include a "downstream hydraulic capacity analysis" consistent with Section 303H to determine if adequate hydraulic capacity exists. The land Developer shall submit to the Municipality this evaluation of the impacts due to increased downstream stormwater flows in the watershed.

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

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

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

4. Developer-proposed Runoff controls which would generate increased peak flow rates at storm drainage problem areas would, by definition, be precluded from successful attempts to prove "no-harm", except in conjunction with proposed capacity improvements for the problem areas consistent with Section 303.H.

5. A financial distress shall not constitute grounds for granting a no-harm exemption.

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

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

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

1. Natural or man-made channels or swales must be able to convey the increased Runoff associated with a 2-year return period event within their banks at velocities consistent with protection of the channels from erosion. Acceptable velocities shall be based upon criteria included in the DEP *Erosion and Sediment Pollution Control Program Manual.*

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

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

H. Regional Detention Alternatives - For certain areas within the study area, it may be more cost-effective to provide one control facility for more than one Development Site than to provide an individual control facility for each Development Site. The initiative and funding for any regional Runoff control alternatives are the responsibility of prospective developers. The design of any regional control basins must incorporate reasonable development of the entire upstream watershed. The peak outflow of a regional basin would be determined on a case-by-case basis using the hydrologic model of the watershed consistent with protection of the downstream watershed areas. "Hydrologic model" refers to the calibrated model as developed for the Stormwater Management Plan.

I. Hardship Option - The development of the plan and its standards and criteria was designed to maintain existing peak flows throughout the Tulpehocken Creek watershed as the watershed becomes developed. There may be certain instances, however, where the standards and criteria established are too restrictive for a particular landowner or Developer. The existing drainage network in some areas may be capable of safely transporting slight increases in flows without causing a problem or increasing flows elsewhere. If a Developer or homeowner may not be able to possibly meet the stormwater standards due to lot conditions or if conformance would become a hardship to an owner, the hardship option may be applied. The landowner would have to plead his/her case to the Township Supervisors with the final determination made by the Township. Any landowners pleading the "hardship option" will assume all liabilities that may arise due to exercising this option.

Section 304. Design Criteria for Stormwater Management Facilities

A. Any Stormwater facility located on State highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation (PaDOT).

B. Any Stormwater Management Facility (i.e., detention basin) designed to store runoff and requiring a berm or earthen embankment required or regulated by this ordinance shall be designed to provide an emergency spillway to handle flow up to and including the 100-year post-development conditions. The height of

embankment must be set as to provide a minimum 1.0 foot of freeboard above the maximum pool elevation computed when the facility functions for the 100-year post-development inflow. Should any Stormwater Management Facility require a dam safety permit under PaDEP Chapter 105, the facility shall be designed in accordance with Chapter 105 and meet the regulations of Chapter 105 concerning dam safety which may be required to pass storms larger than 100-year event.

C. Any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures), and any work involving wetlands as directed in PaDEP Chapter 105 regulations (as amended or replaced from time to time by PaDEP), shall be designed in accordance with Chapter 105 and will require a permit from PaDEP. Any other Drainage Conveyance Facility that does not fall under Chapter 105 regulations must be able to convey, without damage to the drainage structure or roadway, runoff from the 25-year design storm with a minimum 1.0 foot of freeboard measured below the lowest point along the top of the roadway. Any facility that constitutes a dam as defined in PaDEP chapter 105 regulations may require a permit under dam safety regulations. Any facility located within a PaDOT right of way must meet PaDOT minimum design standards and permit submission requirements.

D. Any Drainage Conveyance Facility and/or channel that does not fall under Chapter 105 Regulations, must be able to convey, without damage to the drainage structure or roadway, Runoff from the 10-year design storm. Conveyance facilities to or exiting from Stormwater Management Facilities (i.e., detention basins) shall be designed to convey the design flow to or from that structure. Roadway crossings located within designated Floodplain areas must be able to convey runoff from a 100-year design storm. Any facility located within a PaDOT right-of-way must meet PaDOT minimum design standards and permit submission requirements.

E. Storm Sewers must be able to convey post-development runoff from a 10-year design storm without surcharging inlets, where appropriate.

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

G. The design of all Stormwater Management Facilities shall incorporate sound engineering principles and practices. The Municipality shall reserve the right to disapprove any design that would result in the occupancy or continuation of an adverse hydrologic or hydraulic condition within the watershed.

Section 305. Calculation Methodology

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

A. Any Stormwater runoff calculations shall use generally accepted calculation technique that is based on the NRCS soil cover complex method. Table 305-1 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.

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

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

C. For the purposes of pre-development flow rate determination, undeveloped land shall be considered as "meadow" in good condition, unless the natural ground cover generates a lower curve number or Rational 'C' value (i.e., forest), as listed in Table B-2 or B-3 in Appendix B of this document.

D. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times-of-concentration for overland flow and return periods from the Design Storm Curves from PA Department of Transportation Design Rainfall Curves (1986) (Figures B-2). Times-of-concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of Urban Hydrology for Small Watersheds, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times-of-concentration for channel and pipe flow shall be computed using Manning's equation.

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

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

G. Where uniform flow is anticipated, the Manning equation shall be used for hydraulic computations, and to determine the capacity of open channels, pipes, and storm sewers. Values for Manning's roughness coefficient (n) shall be consistent with Table B-4 in Appendix B of the Ordinance.

Outlet structures for Stormwater Management Facilities shall be designed to meet the performance standards of this Ordinance using any generally accepted hydraulic analysis technique or method.

H. The design of any Stormwater detention facilities intended to meet the performance standards of this Ordinance shall be verified by routing the design storm hydrograph through these facilities using the Storage-Indication Method. For drainage areas greater than 200 acres in size, the design storm hydrograph shall be computed using a calculation method that produces a full hydrograph. The Municipality may approve the use of any generally accepted full hydrograph approximation technique that shall use a total Runoff volume that is consistent with the volume from a method that produces a full hydrograph.

TABLE 305-1
Acceptable Computation Methodologies For Stormwater Management Plans

METHOD	METHOD DEVELOPED BY	APPLICABILITY
TR-20 (or commercial computer package based on TR-20)	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary.
TR-55 (or commercial computer package based on TR-55)	USDA NRCS	Applicable for land development plans within limitations described in TR-55.
HEC-1	US Army Corps of Engineers	Applicable where use of full hydrology computer model is desirable or necessary
PSRM	Penn State University	Applicable where use of a hydrologic computer model is desirable or necessary; simpler than TR-20 or HEC-1.
Rational Method (or commercial computer package based on Rational Method)	Emil Kuichling (1989)	For sites less than 200 acres, or as approved by the Municipality and/or Municipal Engineer.
Other Methods	Varies	Other computation metholodologies and/or Municipal Engineer.

Section 306. Erosion and Sedimentation Requirements

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

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

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

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

Section 307. Ground Water Recharge (Infiltration/Recharge/Retention)

A. The ability to retain and maximize the ground water recharge capacity of the area being developed is encouraged. Design of the infiltration/recharge Stormwater Management Facilities 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 measures are encouraged, particularly in hydrologic soil groups A and B and should be utilized wherever feasible. Soils used for the construction of basins shall have low-erodibility factors ("K" factors).

B. 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 48 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 Owner's professional designer.

2. Infiltration BMPs receiving only roof runoff may be placed in soils having a minimum depth of 24 inches between the bottom of the facility and the limiting zone.

3. The size of the recharge facility shall be based upon the following equation:

$$Rev = [(S)\ (Rv)\ (A)] / 12$$

Where:

Rev	=	Recharge Volume (acre-feet)
S	=	Soil specific recharge factor (inches)
Rv	=	Volumetric runoff coefficient
A	=	Site area contributing to the recharge facility (acres)

and:

$$Rv = 0.05 + 0.009\ (I)$$

Where:

I = percent impervious area

and:

S shall be obtained based upon hydrologic soil group based upon the table below:

Hydrologic Soil Group	Soil Specific Recharge Factor (S)
A	0.38 inches
B	0.25 inches
C	0.13 inches
D	0.06 inches

If more than one hydrologic soil group (HSG) is present at a site, a composite recharge volume shall be computed based upon the proportion of total site area within each HSG.

3. The recharge volume provided at the site shall be directed to the most permeable HSG available.

4. The recharge facility shall be capable of completely infiltrating the impounded water within 48 hours.

5. The recharge facility shall be capable of completely infiltrating the impounded water within 48 hours.

C. 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 to determine appropriate percolation rate and/or hydraulic conductivity

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

D. Extreme caution shall be exercised where infiltration is proposed in geologically susceptible areas such as strip mine or limestone areas. Extreme caution shall also be exercised where salt or chloride would be a pollutant since soils do little to filter this pollutant and it may contaminate the groundwater. 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 basin will be located in an area underlain by limestone, a geological evaluation of the proposed location shall be conducted to determine susceptibility to sinkhole formations. The design of all facilities over limestone formations shall include measures to prevent ground water contamination and, where necessary, sinkhole formation. The municipality will require the design and installation of an impermeable liner in detention and retention basins. A detailed hydrogeologic investigation may be required by the municipality or by the municipal engineer. .

The municipality will require the developer to provide safeguards within the Drainage Plan design preventing groundwater contamination where the groundwater is the source of drinking water supply.

It shall be the Developers responsibility to verify if the site is underlain by limestone. The following note shall be attached to all drainage plans and signed and sealed by the developers engineer/surveyor/landscape/architect/geologist:

"_____, certify that the proposed detention basin (circle one) is/is not underlain by limestone."

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

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

Section 308. Water Quality Requirements

A. In addition to the performance standards and design criteria requirements of Article III of this Ordinance, the land developer SHALL comply with the following water quality requirements of this Article unless otherwise exempted by provisions of this Ordinance.

For water quality, the objective is to detain the post-development 2-year, 24-hour design storm to the pre-development 1-year flow using the SCS Type II distribution. Additionally, provisions shall be made such as adding a small orifice at the bottom of

the outlet structure so that the post-development 1-year storm takes a minimum of 24 hours to drain from the facility from a point where the maximum volume of water from the 1-year storm is captured. (i.e., the maximum water surface elevation is achieved in the facility. At the same time, the objective is not to attenuate the larger storms. This can be accomplished by configuration of the outlet structure not to control the larger storms, or by a bypass or channel to divert only the 2-year flood into the basin or divert flows in excess of the 2-year storm away from the basin.

Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility). The design of the facility shall consider and minimize the chances of clogging and sedimentation potential. Orifices smaller than 3 inches diameter are not recommended. However, if the Design Engineer can provide proof that the smaller orifices are protected from clogging by use of trash racks, etc., smaller orifices may be permitted.

B. To accomplish A. above, the land developer MAY submit original and innovative designs to the Municipal Engineer for review and approval. Such designs may achieve the water quality objectives through a combination of BMPs (Best Management Practices).

C. In selecting the appropriate BMPs or combinations thereof, the land developer SHALL consider the following:

1. Total contributing area.
2. Permeability and infiltration rate of the site soils.
3. Slope and depth to bedrock.
4. Seasonal high water table.
5. Proximity to building foundations and well heads.
6. Erodibility of soils.
7. Land availability and configuration of the topography.

D. The following additional factors SHOULD be considered when evaluating the suitability of BMPs used to control water quality at a given Development Site:

1. Peak Discharge and required volume control.
2. Stream bank erosion.
3. Efficiency of the BMPs to mitigate potential water quality problems.
4. The volume of runoff that will be effectively treated.
5. The nature of the pollutant being removed.
6. Maintenance requirements.
7. Creation/protection of aquatic and wildlife habitat.
8. Recreational value.

Enhancement of aesthetic and property value.

Section 309. Stream Bank Erosion Requirements

Applying the water quality criteria in Section 308 above will also help the stream bank erosion problem. Thus, detaining the 2-year postdevelopment storm to the one-year predevelopment storm and detaining the 1-year post-development storm a minimum of 24 hours would therefore minimize the number of storms causing stream bank erosion. This is the same management criteria that has been recognized to also improve the water quality from Stormwater runoff.

ARTICLE IV-DRAINAGE PLAN REQUIREMENTS

Section 401. General Requirements

For any of the activities regulated by this Ordinance, the preliminary or final approval of Subdivision and/or Land Development plans, the issuance of any building or occupancy permit, or the commencement of any land disturbance activity may not proceed until the Property Owner or Developer or his/her agent has received written approval of a Drainage Plan from the Municipality.

Section 402. Exemptions

Any Regulated Activity that meets the exception criteria in the following table is exempt from the provisions of this Ordinance. This criteria shall apply to the total development even if development is to take place in phases. The date of the municipal Ordinance adoption shall be the starting point from which to consider tracts as "parent tracts" in which future subdivisions and respective impervious area computations shall be cumulatively considered. An exemption shall not relieve the applicant from providing adequate Stormwater management to meet the purpose of this Ordinance; however, Drainage Plans will not have to be submitted to the municipality.

Stormwater Management Exemption Criteria

Total Parcel Size	Impervious Area Exemption (sq.ft.)
≤ 1/4 acre	2,500 sq. ft.
>1/4 to 1 acre	5,000 sq. ft.
>1 to 2 acres	10,000 sq. ft
> 2 to 5 acres	15,000 sq. ft.
>5 acres	20,000 sq. ft.

Exemptions shall be at discretion of Municipal Engineer upon review of site conditions, topography, soils and other factors as desired appropriate.

Section 403. Drainage Plan Contents

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

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

A. General

1. General description of project.

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

3. Complete hydrologic, hydraulic, and structural computations for all Stormwater Management Facilities.

B. Map(s) of the project area 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 Berks County (Lebanon/Lancaster). The contents of the maps(s) shall include, but not be limited to:

1. The location of the project relative to highways, municipalities or other identifiable landmarks.

2. Existing contours at intervals of two feet. In areas of steep slopes (greater than 15 percent), five-feet contour intervals may be used.

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

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

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

6. An overlay showing soil names and boundaries.

7. Proposed changes to the land surface and vegetative cover, including the type and amount of impervious area that would be added.

8. Proposed structures, roads, paved areas, and buildings.

9. Final contours at intervals of two feet. In areas of steep slopes (greater than 15 percent), five-feet contour intervals may be used.

10. The name of the development, the name and address of the owner of the property, and the name of the individual or firm preparing the plan.

11. The date of submission.

12. A graphic and written scale of one (1) inch equals no more than fifty (50) feet; for tracts of twenty (20) acres or more, the scale shall be one (1) inch equals no more than one hundred (100) feet.

13. A North arrow.

14. The total tract boundary and size with bearing and distance boundary description shall be prepared by a surveyor licensed to practice in the Commonwealth of Pennsylvania

15. Existing and proposed land use(s).

16. A key map showing all existing man-made features beyond the property boundary that would be affected by the project.

17. Horizontal and vertical profiles of all open channels, including hydraulic capacity.

18. Overland drainage paths.

19. A fifteen foot wide access easement around all Stormwater Management Facilities that would provide ingress to and egress from a public right-of-way.

20. A note on the plan indicating the location and responsibility for maintenance of Stormwater Management Facilities that would be located off-site. All off-site facilities shall meet the performance standards and design criteria specified in this Ordinance.

21. A construction detail of any improvements made to sinkholes and the location of all notes to be posted, as specified in this Ordinance.

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

23. The following signature block for the Municipal Engineer:

    (Municipal Engineer), on this date (date of signature), have reviewed and hereby certify that the Drainage Plan meets all design standards and criteria of the Tulpehocken Creek Watershed Act 167 Stormwater Management Ordinance."

24. The location of all erosion and sedimentation control facilities.

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 to be applied both during and after development.
d. Expected project time schedule.

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

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

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

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

D. Stormwater Management Facilities

1. All Stormwater Management Facilities must be located on a plan and described in detail.

2. When Groundwater Recharge methods such as seepage pits, beds or trenches are used, the locations of existing and proposed septic tank infiltration areas and wells must be shown.

3. All calculations, assumptions, and criteria used in the design of the Stormwater Management Facilities must be shown.

Section 404. Plan Submission

For all activities regulated by this Ordinance, the steps below shall be followed for submission. For any activities that require a PaDEP Joint Permit Application and regulated under Chapter 105 (Dam Safety and Waterway Management) or Chapter 106 (Floodplain Management) of PaDEP's Rules and Regulations, require a PaDOT Highway Occupancy Permit, or require any other permit under applicable state or federal regulations, the proof of application for said permit(s) shall be part of the plan. The plan shall be coordinated with the state and federal permit process.

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

B. Four (4) copies of the Drainage Plan shall be submitted.

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

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

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

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

Section 405. Drainage Plan Review

A. The Municipal Engineer shall review the Drainage Plan for consistency with the adopted Tulpehocken Creek Watershed Act 167 Stormwater Management Plan. The Municipality shall require receipt of a complete plan, as specified in this Ordinance.

B. The Municipal Engineer shall review the Drainage Plan for any submission or Land Development against the municipal subdivision and Land Development ordinance provisions not superseded by this Ordinance.

C. For activities regulated by this Ordinance, the Municipal Engineer shall notify the Municipality in writing, within 14 calendar days, whether the Drainage Plan is consistent with the Stormwater Management Plan. Should the Drainage Plan be determined to be consistent with the Stormwater Management Plan, the Municipal Engineer will forward an approval letter to the Developer with a copy to the Municipal Secretary.

D. Should the Drainage Plan be determined to be inconsistent with the Stormwater Management Plan, the Municipal Engineer will forward a disapproval letter to the Developer with a copy to the Municipal Secretary citing the reason(s) for the disapproval. Any disapproved Drainage Plans may be revised by the Developer and resubmitted consistent with this Ordinance.

E. For Regulated Activities specified in Sections 104.C and 104.D of this Ordinance, the Municipal Engineer shall notify the Municipal Building Permit Officer in writing, within a time frame consistent with the Municipal Building Code and/or Municipal Subdivision Ordinance, whether the Drainage Plan is consistent with the Stormwater Management Plan and forward a copy of the approval/disapproval letter to the Developer. Any disapproved Drainage Plan may be revised by the Developer and resubmitted consistent with this Ordinance.

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

G. The Municipality shall not approve any Subdivision or Land Development for Regulated Activities specified in Sections 104 of this Ordinance if the Drainage Plan has been found to be inconsistent with the Stormwater Management Plan, as determined by the Municipal Engineer. All required permits from PaDEP must be obtained prior to approval of any Subdivision or Land Development.

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

I. The Developer shall be responsible for completing record drawings of all Stormwater Management Facilities included in the approved Drainage Plan. The record drawings and an explanation of any discrepancies with the design plans shall be submitted to the Municipal Engineer for final approval. In no case shall the Municipality approve the record drawings until the Municipality receives a copy of an approved Declaration of Adequacy, Highway Occupancy Permit from the PaDOT District Office, and any applicable permits from PaDEP.

J. The issuance of a permit to construct the approved facilities shown on the Drainage Plan shall be valid for a period of five (5) years from the date of the Drainage Plan approval and/or the date of permit issuance, whichever is the latter. If Stormwater Management Facilities included in the approved Drainage Plan have not been satisfactorily constructed, or if constructed and record drawings of these facilities have not been approved within the five-year time period, the Municipality may consider the Drainage Plan disapproved and revoke any and all permits. Drainage Plans that are considered disapproved by the Municipality shall be resubmitted in accordance with Section 407 of this Ordinance.

Section 406. Modification of Plans

A modification to a submitted Drainage Plan for a Development Site that involves a change in Stormwater Management Facilities or techniques, or that involves the relocation or re-design of Stormwater Management Facilities, or that is necessary because soil or other conditions are not as stated on the Drainage Plan as determined by the Municipal Engineer, shall require a resubmission of the modified Drainage Plan consistent with Section 404 of this Ordinance and be subject to review as specified in Section 405 of this Ordinance.

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

Section 407. Resubmission of Disapproved Drainage Plans

A disapproved Drainage Plan may be resubmitted, with the revisions addressing the Municipal Engineer's concerns documented in writing addressed, to the Municipal Secretary in accordance with Section 404 of this Ordinance and distributed accordingly and be subject to review as specified in Section 405 of this Ordinance. The applicable Municipality Review Fee must accompany a resubmission of a disapproved Drainage Plan.

ARTICLE V-INSPECTIONS

Section 501. Schedule of Inspections

A. The Municipal Engineer or his municipal assignee shall inspect all phases of the installation of the permanent Stormwater Management Facilities as deemed appropriate by the Municipal Engineer.

B. During any stage of the work, if the Municipal Engineer determines that the permanent Stormwater Management Facilities are not being installed in accordance with the approved Stormwater Management Plan, the Municipality shall revoke any existing permits and issue a cease and desist stop work order until a revised Drainage Plan is submitted and approved, as specified in this Ordinance.

ARTICLE VI-FEES AND EXPENSES

Section 601. General

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

Section 602. Municipality Drainage Plan Review Fee

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

Section 603. Expenses Covered by Fees

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

A. Administrative Costs.

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

C. The site inspections.

D. The inspection of Stormwater Management Facilities and drainage improvements during construction.

E. The final inspection upon completion of the Stormwater Management Facilities and drainage improvements presented in the Drainage 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.

ARTICLE VII-MAINTENANCE RESPONSIBILITIES

Section 701. Performance Guarantee

The Applicant should provide a financial guarantee to the Municipality for the timely installation and proper construction of all Stormwater management controls as required

by the approved Stormwater plan and this ordinance equal to the full construction cost of the required controls.

Section 702. Maintenance Responsibilities

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

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

1. If a development consists of structures or lots which are to be separately owned and in which streets, sewers and other public improvements are to be dedicated to the municipality, Stormwater control facilities may also be dedicated to and maintained by the Municipality (the Municipality is not obligated to accept ownership).

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

C. The governing body, upon recommendation of the municipal engineer, shall make the final determination on the continuing maintenance responsibilities prior to final approval of the Stormwater Management Plan. The governing body reserves the right to accept the ownership and operating responsibility for any or all of the stormwater management controls.

Section 703. Maintenance Agreement for Privately Owned Stormwater Facilities

A. Prior to final approval of the site's Stormwater Management Plan, the property owner shall sign and record the maintenance agreement contained in Appendix A which is attached and made part hereof, covering all Stormwater control facilities that are to be privately owned.

B. Other items may be included in the agreement where determined necessary to guarantee the satisfactory maintenance of all facilities. The maintenance agreement shall be subject to the review and approval of the municipal solicitor and governing body.

Section 704. Municipal Stormwater Maintenance Fund

A. Persons installing Stormwater storage facilities shall be required to pay a specified amount to the Municipal Stormwater Maintenance Fund to help defray costs of periodic inspections and maintenance expenses. The amount of the deposit shall be determined as follows:

1. If the storage facility is to be privately owned and maintained, the deposit shall cover the cost of periodic inspections performed by the municipality for a period of ten (10) years, as estimated by the municipal engineer. After that period of time, inspections will be performed at the expense of the municipality.

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

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

B. If a storage facility is proposed that also serves as a recreation facility (e.g., ballfield, lake), the municipality may reduce or waive the amount of the maintenance fund deposit based upon the value of the land for public recreation purpose.

C. If at some future time a storage facility (whether publicly or privately owned) is eliminated due to the installation of storm sewers or other storage facility, the unused portion of the maintenance fund deposit will be applied to the cost of abandoning the facility and connecting to the storm sewer system or other facility. Any amount of the deposit remaining after the costs of abandonment are paid will be returned to the depositor.

ARTICLE VIII-ENFORCEMENT AND PENALTIES

Section 801. Right-of-Entry

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

Section 802. Notification

In the event that a person fails to comply with the requirements of this Ordinance, or fails to conform to the requirements of any permit issued hereunder, the municipality shall provide written notification of the violation. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of these violation(s). Failure to comply within the time specified shall subject such person to the penalty provisions of this Ordinance. All such penalties shall be deemed cumulative and resort by the municipality from pursuing any and all remedies. It shall be the responsibility of the Owner of the real property on which any Regulated Activity is proposed to occur, is occurring, or has occurred, to comply with the terms and conditions of this Ordinance.

Section 803. Enforcement

The governing body of the Municipality is hereby authorized and directed to enforce all of the provisions of this Ordinance. All inspections regarding compliance with the Drainage Plan shall be the responsibility of the municipal engineer or other consulting engineer as approved and designated by the Municipality.

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

B. Adherence to Approved Plan

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

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

1. Provide a certification of completion from an engineer, 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 Municipality, a final inspection shall be conducted by the municipal engineer or designated representative to certify compliance with this ordinance.

E. Prior to revocation or suspension of a permit, the governing body will schedule a hearing to discuss the non-compliance if there is no immediate danger to life, public health or property. The expense of a hearing shall be the owner's responsibility.

F. Suspension and Revocation of Permits

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

a. Non-compliance with or failure to implement any provision of the permit.

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

c. The creation of any condition or the commission of any act during construction or development which constitutes or creates a hazard or

nuisance, pollution or which endangers the life or property of others, or as outlined in this Ordinance.

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

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

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

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

G. Occupancy Permit

An occupancy permit shall not be issued unless the certification of completion pursuant to Section 803.C has been secured. The occupancy permit shall be required for each lot owner and/or Developer for all subdivisions and land development in the municipality.

Section 804. 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 805. Penalties

A. Anyone violating the provisions of this ordinance shall be guilty of a summary offense, and upon conviction shall be subject to a fine of not more than $1,000.00 for each violation, recoverable with costs, or imprisonment to the extent allowed by law, or both. Each day that the violation continues shall be a separate offense.

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

Section 806. Appeals

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

B. Any person aggrieved by any decision of the Municipality's governing body may appeal to the County Court of Common Pleas in the County where the activity has taken place within thirty (30) days of the municipal decision.

Section 807. Repealer

All Ordinances or parts of Ordinances inconsistent herewith are hereby repealed.

Section 808. Severability Clause

In any section, paragraph, subsection, clause or provision of this Ordinance shall be declared by a court of competent jurisdiction to be invalid, such decision shall not affect the validity of this Ordinance as whole, or any other part thereof.

Section 809. Effective Date

This Ordinance shall become effective five days after its adoption.

Section 810. Enactment

Enacted and ordained as an Ordinance of the Township of Marion this day of

, 2002.

Attest:

BOARD OF SUPERVISORS OF
THE TOWNSHIP OF MARION

_____
Marion Township Secretary

_____
Tony L. Brubaker, Chairman

_____
Harold E. Zechman, Supervisor

_____
Karl Swope, Supervisor

Ordinance Appendix A

STANDARD STORMWATER FACILITIES MAINTENANCE AND MONITORING AGREEMENT

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

WITNESSETH

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

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

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

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

WHEREAS, the Municipality requires, through the implementation of the _____ Watershed Stormwater Management Plan, that Stormwater Management Facilities as shown on the Plan be constructed and adequately maintained by the Landowner, his successors and assigns.

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

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

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

3. The Landowner, his successors and assigns, hereby grants permission to the Municipality, his authorized agents and employees, upon presentation of proper identification, to enter upon the Property at reasonable times, and to inspect the Stormwater Management Facilities whenever the Municipality deems necessary. The purpose of the inspection is to assure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structures, pond areas, access roads, etc. When inspections are conducted, the Municipality shall give the Landowner, his successors and assigns, copies of the inspection report with findings and evaluations. At a minimum, maintenance inspections shall be performed in accordance with the following schedule:

- Annually for the first 5 years after the construction of the stormwater facilities,

- Once every 2 years thereafter, or
- During or immediately upon the cessation of a 100 year or greater precipitation event.

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

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

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

7. The Landowner, his successors and assigns, will perform maintenance in accordance with the maintenance schedule for the Stormwater Management Facilities including sediment removal as outlined on the approved schedule and/or Subdivision/Land Management Plan.

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

9. The Landowner, his successors and assigns, shall indemnify the Municipality and his agents and employees against any and all damages, accidents, casualties, occurrences or claims which might arise or be asserted against the Municipality 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 is asserted against the Municipality, his agents or employees, the Municipality shall promptly notify the Landowner, his successors and assigns, and they shall defend, at their own expense, any suit based on such claim. If any judgment or claims against the Municipality, his agents or employees shall be allowed, the Landowner, his successors and assigns shall pay all costs and expenses in connection therewith.

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

This Agreement shall be recorded among the land records of Berks 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:

For the Municipality:

_____(SEAL)

For the Landowner:

_____(SEAL)

ATTEST:

_____
Marion Township,
County of Berks, 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___.

_____(SEAL)
NOTARY PUBLIC

ORDINANCE APPENDIX B

STORMWATER MANAGEMENT DESIGN CRITERIA

TABLE B-1
DESIGN STORM RAINFALL AMOUNT (INCHES)
Source: "Field Manual of Pennsylvania Department of Transportation"
STORM INTENSITY-DURATION-FREQUENCY CHARTS
P D T - I D F" May 1986.

FIGURE B-1
SCS RAINFALL DISTRIBUTION - S CURVE
Source: NRCS (SCS) TR-55

FIGURE B-2
PENNDOT STORM INTENSITY-DURATION-FREQUENCY CURVE
REGION 4
Source: "Field Manual of Pennsylvania Department of Transportation"
STORM INTENSITY-DURATION-FREQUENCY CHARTS
P D T - I D F" May 1986.

TABLE B-2
RUNOFF CURVE NUMBERS
Source: NRCS (SCS) TR-55

TABLE B-3
RATIONAL RUNOFF COEFFICIENTS
Source : New Jersey Department of Transportation (NJ DOT)

TABLE B-4
MANNING ROUGHNESS COEFFICIENTS

TABLE B-1
Design Storm Rainfall Amount (Inches)

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

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

Design Storm Frequency (yrs)	24 Hours Rainfall Amount (inches) Region 4
1	2.40
2	3.00
5	3.60
10	4.56
25	5.52
50	6.48
100	7.44

TABLE B-2
Runoff Curve Numbers (CN)
(From NRCS (SCS) TR-55)

LAND USE DESCRIPTION		HYDROLOGIC SOIL GROUP A	B	C	D
Open Space		44	65	77	82
Orchard		44	65	77	82
Meadow		30**	58	71	78
Agricultural		59	71	79	83
Forest		36**	60	73	79
Commercial	(85% Impervious)	89	92	94	95
Industrial	(72% Impervious)	81	88	91	93
Institutional (50% Impervious)		71	82	88	90
Residential					
Average Lot Size	% impervious				
1/8 acre or less*	65	77	85	90	92
1/8 - 1/3 acre	34	59	74	82	87
1/3 - 1 acre	23	53	69	80	85
1 - 4 acres	12	46	66	78	82
Farmstead		59	74	82	86
Smooth Surfaces (Concrete, Asphalt, Compacted Gravel or Bare Compacted Soil)		98	98	98	98
Loose Gravel		76	85	89	91
Water		98	98	98	98
Mining/Newly Graded Areas (Pervious Areas Only)		77	86	91	94

* Includes Multi-Family Housing unless justified lower density can be provided.
** Caution - CN values under 40 may produce erroneous modeling results.

Note: Existing site conditions of bare earth or fallow ground shall be considered as meadow when choosing a CN value.

TABLE B-3

RUNOFF COEFFICIENTS "C" FOR RATIONAL FORMULA

Soil Group	A			B			C			D		
Slope	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+	0-2%	2-6%	6%+
Land Use												
Cultivated Land	.14	.23	.34	.21	.32	.41	.27	.37	.48	.34	.45	.56
Fallowed Fields												
poor conditions	.12	.19	.29	.17	.25	.34	.23	.33	.40	.27	.35	.45
good conditions	.08	.13	.16	.11	.15	.21	.14	.19	.26	.18	.23	.31
Forest/Woodland	.08	.11	.14	.10	.14	.18	.12	.16	.20	.15	.20	.25
Grass Areas												
good conditions	.10	.16	.20	.14	.19	.26	.18	.22	.30	.21	.25	.35
average conditions	.12	.18	.22	.16	.21	.28	.20	.25	.34	.24	.29	.41
poor conditions	.14	.21	.30	.18	.28	.37	.25	.35	.44	.30	.40	.50
Impervious Areas	.90	.91	.92	.91	.92	.93	.92	.93	.94	.93	.94	.95
Weighted Residential												
Lot size 1/8 acre	.29	.33	.36	.31	.35	.40	.34	.38	.44	.36	.41	.48
Lot size 1/4 acre	.26	.30	.34	.29	.33	.38	.32	.36	.42	.34	.38	.46
Lot size 1/3 acre	.24	.28	.31	.26	.32	.35	.29	.35	.40	.32	.36	.45
Lot size 1/2 acre	.21	.25	.28	.24	.27	.32	.27	.31	.37	.30	.34	.43
Lot size 1 acre	.18	.23	.26	.21	.24	.30	.24	.29	.36	.28	.32	.41

NOTES

1. Higher values are applicable to denser soils and steep slopes.
2. Consideration should be given to future land use changes in the drainage area in selecting the "C" factor.
3. For drainage area containing several different types of ground cover, a weighted value of "C" factor shall be used.
4. In special situations where sinkholes, stripped abandoned mines, etc. exist, careful evaluation shall be given to the selection of a suitable runoff factor with consideration given to possible reclamation of the land in the future.

TABLE B-4
MANNING ROUGHNESS COEFFICIENTS

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

Surface Description	n
Dense Growth	0.4 - 0.5
Pasture	0.3 - 0.4
Lawns	0.2 - 0.3
Bluegrass Sod	0.2 - 0.5
Short Grass Prarie	0.1 - 0.2
Sparse Vegetation	0.05 - 0.13
Bare Clay - Loam Soil (eroded)	0.01 - 0.03
Concrete/Asphalt - very shallow depths (less than 1/4 inch)	0.10 - 0.15
- small depths (1/4 inch to several inches)	0.05 - 0.10
Fallow (no residue)	0.05
Cultivated Soils	
Residue Cover Less Than or = 20%	0.06
Residue Cover Greater Than 20%	0.17
Grass	
Dense Grasses	0.24
Bermuda Grass	0.41
Range (natural)	0.13
Woods (Light Underbrush)	0.40

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

Reach Description	n
Natural stream, clean, straight, no rifts or pools	0.03
Natural stream, clean, winding, some pools or shoals	0.04
Natural stream, winding, pools, shoals, stony with some weeds	0.05
Natural stream, sluggish deep pools and weeds	0.07
Natural stream or swale, very weedy or with timber underbrush	0.10
Concrete pipe, culvert or channel	0.012
Corrugated metal pipe	0.012-0.027*

*depending upon type, coating and diameter

ORDINANCE APPENDIX C
SAMPLE DRAINAGE PLAN APPLICATION

(To be attached to the "land subdivision plan or development plan review application or "minor land subdivision plan review application")

Application is hereby made for review of the Stormwater Management and Erosion and Sedimentation Control Plan and related data as submitted herewith in accordance with the Marion Township Stormwater Management and Earth Disturbance Ordinance.

Final Plan Preliminary Plan Sketch Plan

Date of Submission Submission No.

1. Name of subdivision or development

2. Name of applicant Telephone No.

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

Officer 1

Officer 2

Address

Zip

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

3. Name of property owner Telephone No.

Address

Zip

4. Name of engineer or surveyor Telephone No.

Address

Zip

5. Type of subdivision or development proposed:

____	Single-Family Lots	Townhouses	Commercial (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 Development	Other (_____)	

6. Lineal feet of new road proposed? L.F.

7. Area of proposed and existing impervious area on entire tract.

a. Existing (to remain) _____ S.F. _____% of Property
b. Proposed _____ S.F. _____% of Property

8. Stormwater

a. Does the peak rate of runoff from proposed conditions exceed that flow 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 submission and/or district meet the release rate criteria for the applicable subarea?

d. Number of subarea(s) from Ordinance Appendix D of the Tulpehocken Creek Watershed Stormwater Management Plan.

Type of proposed runoff control

Does the proposed stormwater control criteria meet the requirement/guidelines of the Stormwater Ordinances?

If not, what variances/waivers are requested?

Reasons

Does the plan meet the requirements of Article III of the Stormwater Ordinances?

If not, what variances/waivers are requested?

Reasons Why

Was TR-55, June 1986 utilized in determining the time of concentration?

What hydrologic method was used in the stormwater computations?

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

k. Is a construction schedule or staging attached?

l. Is a recommended maintenance program attached?

9. Erosion and Sediment Pollution Control (E&S):

   a. Has the stormwater management and E&S plan, supporting documentation and narrative been submitted to the County conservation District?

   b. Total area of earth disturbance S.F.

10. Wetlands

   a. Have the wetlands been delineated by someone trained in wetland delineation?

   b. Have the wetland lines been verified by a state or federal permitting authority?

c. Have the wetland lines been surveyed?

Total acreage of wetland within the property

e. Total acreage of wetland disturbed

f. Supporting documentation

11. Filing

Has the required fee been submitted?

Amount

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

c. Name of individual who will be making the inspections

d. General comments about stormwater management at development

CERTIFICATE OF OWNERSHIP
AND ACKNOWLEDGMENT OF APPLICATION:

COMMONWEALTH OF PENNSYLVANIA

COUNTY OF_____SS

On this the _____ day of _____, 20_____, before me, the undersigned officer, personally appeared _____who being duly sworn, according to law, deposes and says that _____owners of the property described in this application and that the application was made with _____ _____ knowledge and/or direction and does hereby agree with the said application and to the submission of the same.

_____ _____

Property Owner(s)

My Commission Expires 20
Notary Public

THE UNDERSIGNED HEREBY CERTIFIES THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF THE INFORMATION AND STATEMENTS GIVEN ABOVE ARE TRUE AND CORRECT.

SIGNATURE OF APPLICANT

//

(Information Below This Line To Be Completed By The Municipality)

_____ Township/Borough/City official submission receipt:

Date complete application received _____Plan Number

Fees _____ date fees paid _____ received by

Official submission receipt date

Received by

Township/Borough/City

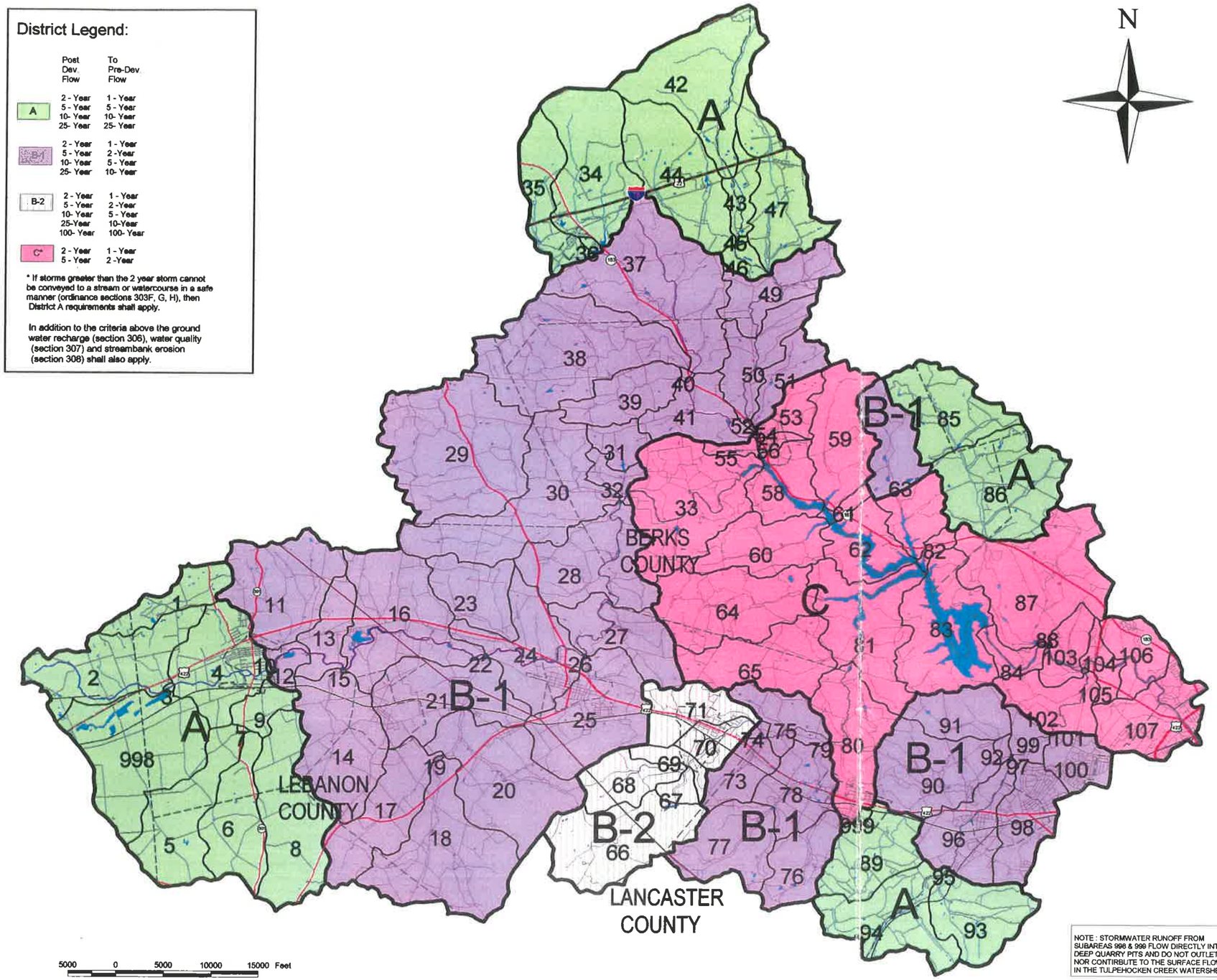
APPENDIX D -
STORMWATER MANAGEMENT DISTRICT WATERSHED MAP

District Legend:

	Post Dev. Flow	To Pre-Dev. Flow
A	2 - Year 5 - Year 10- Year 25- Year	1 - Year 5 - Year 10- Year 25- Year
B-1	2 - Year 5 - Year 10- Year 25- Year	1 - Year 2 -Year 5 - Year 10- Year
B-2	2 - Year 5 - Year 10- Year 25-Year 100- Year	1 - Year 2 -Year 5 - Year 10-Year 100- Year
C*	2 - Year 5 - Year	1 - Year 2 -Year

* If storms greater than the 2 year storm cannot be conveyed to a stream or watercourse in a safe manner (ordinance sections 303F, G, H), then District A requirements shall apply.

In addition to the criteria above the ground water recharge (section 306), water quality (section 307) and streambank erosion (section 308) shall also apply.



NOTE : STORMWATER RUNOFF FROM SUBAREAS 998 & 999 FLOW DIRECTLY INTO DEEP QUARRY PITS AND DO NOT OUTLET NOR CONTRIBUTE TO THE SURFACE FLOWS IN THE TULPEHOCKEN CREEK WATERSHED.

Management Districts

Tulpehocken Creek Watershed
Berks, Lancaster and Lebanon Counties, PA

ACT 167
Stormwater Management Plan
Phase II

Appendix D

Map Legend

- Watershed Boundary
- Municipal Boundary
- County Boundary
- Streams
- Lakes
- Subareas
- Interstate Roads
- US Traffic Routes
- PA Traffic Routes
- State Routes
- Township Roads
- Local Roads
- Railroads

Prepared For:

Berks County Planning Commission
Berks County Services Center
633 Court Street, 14th Floor
Reading, Pennsylvania 19601 - 3591
Telephone: (610) 478-6300

Notes:

Portions of these maps were generated from existing data sources as listed below. This existing data was utilized for base mapping purposes and is shown on the maps for spatial reference only. This data did not enter into any computations or affect the reliability of the hydrologic analysis. Borton-Lawson Engineering has found some inaccuracies in some of this data and has corrected the data in locations where these discrepancies were obvious, however, it was not a part of this Act 167 Plan to correct all the base data.

Data Sources:
Roads - PennDOT
Streams, Lakes - PennDOT
Municipal Boundaries - PennDOT

BORTON • LAWSON ENGINEERING
613 Baltimore Drive
Suite 300
Wilkes-Barre, PA 18702-7903
Telephone : (570) 821-1999 Fax : (570) 821-1990
World Wide Web : http://www.borton-lawson.com

Prepared By: KC	Checked By: TJD
Project Number 98514.00	Date: November 2000