ARTICLE 937
Stormwater Management Standards

937.01 GENERAL REQUIREMENTS.

(a) For all regulated activities, unless preparation of an SWM Site Plan is specifically exempted in Section 937.02:

(1) Preparation and implementation of an approved SWM Site Plan is required.

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

(b) SWM Site Plans approved by the Municipality, in accordance with Section 938.06, shall be on site throughout the duration of the regulated activity.

(c) The Municipality may, after consultation with DEP, approve measures for meeting the state water quality requirements other than those in this Ordinance, provided that they meet the minimum requirements of, and do not conflict with, State law including, but not limited to, the Clean Streams Law. The Municipality shall maintain a record of consultations with DEP pursuant to this paragraph.

(d) For all regulated earth disturbance activities, erosion and sediment control BMPs shall be designed, implemented, operated, and maintained during the regulated earth disturbance activities, i.e., during construction, to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code and the Clean Streams Law. Various BMPs and their design standards are listed in the Erosion and Sediment Pollution Control Program Manual (E&S Manual) 2, No. 363-2134-008 (April 15, 2000), as amended and updated.

(e) For all regulated activities, implementation of the volume controls in Section 937.03. is required, unless specifically exempted under Section 937.01(c), or exempted by an approved modification request as specified in Section 938.03(b).

(f) Impervious Areas:

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

A. Less than 500 square feet of impervious surface equals a fee in lieu of the provision of stormwater management facilities (Fee in lieu to be determined by client).

B. Regulated activities between 500 square feet may use a small projects guide that does not require an applicant to hire an engineer nor subject to a technical review.

C. Regulated activities greater than 2,000 square feet are required to submit a stormwater management plan and will also require engineering and technical reviews.

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

(3) For projects that add impervious area to a parcel, the total impervious area on the parcel is subject to the requirements of this Ordinance; except that the volume controls in Section 937.03 and the peak rate controls of Section 937.04 do not need to be retrofitted to existing impervious areas that are not being altered by the proposed regulated activity.

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

(h) All regulated activities shall include such measures as necessary to:

(1) Protect health, safety, and property;

(2) Meet the water quality goals of this Ordinance, as stated in Section 935.03. Purpose, by implementing measures to:

A. Minimize disturbance to floodplains, wetlands, wooded areas, and existing vegetation.

B. Maintain or extend riparian buffers.

C. Avoid erosive flow conditions in natural flow pathways.

D. Minimize thermal impacts to waters of this Commonwealth.

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

F. Minimize soil disturbance and compaction. Topsoil, if removed, shall be replaced to a minimum depth equal to its depth prior to removal or four (4) inches, whichever is greater. (Additional topsoil may be needed for vegetation other than sod.)

(3) To the maximum extent practicable, incorporate the techniques for Low Impact Development Practices described in the Pennsylvania Stormwater Best Management Practices Manual (BMP Manual). **If methods other than green infrastructure and LID methods are proposed to achieve the volume and rate controls required under this Ordinance, the SWM Site Plan must include a detailed justification demonstrating that the use of LID and green infrastructure is not practicable.**

(i) The design of all facilities in areas of carbonate geology or karst topography shall include an evaluation of measures to minimize adverse effects, including hydro-geologic studies if required by the Municipality.

(j) Infiltration BMPs shall be spread out, made as shallow as practicable, and located to maximize use of natural on-site infiltration features while still meeting the other requirements of this Ordinance. In addition, infiltration BMPs shall include pre-treatment BMPs where appropriate.

(k) All natural streams, channels, swales, drainage systems and/or areas of surface water concentration shall be maintained in their existing condition unless an alteration is approved by the Municipality. All encroachment activities shall comply with the requirements of PA DEP 25 PA Code Chapter 105 (Water Obstructions and Encroachments), Rules and Regulations of PA DEP. Any approvals or permits issued do not relieve compliance as referenced in Section 935.08, Compatibility with Other Permit and Ordinance Requirements.

(l) All storage facilities shall completely drain both the volume control and rate control capacities over a period of time not less than 24 hours and not more than 72 hours from the end of the design storm. However, any designed infiltration at such facilities is exempt from the minimum 24-hour standard, i.e., may infiltrate in a shorter period of time, so long as none of the stormwater flowing into the infiltration facility is discharged directly into the surface waters of the Commonwealth. (Inordinately rapid infiltration rates may indicate the presence of large fractures or other conditions for which an additional soil buffer may be required.)

(m) All stormwater management facilities (excluding individual residential underground infiltration facilities) are considered structures and must comply with building setback requirements. The outside toe of slope of the embankment in a fill condition or the top of embankment in a cut condition shall be considered as the point that must meet the setback requirements. Individual residential underground infiltration facilities shall be a minimum of ten (10) feet from the property line. Discharge of controlled flows can be no closer to an adjacent property than two (2) times the length of the required discharge rip-rap apron. This requirement applies to discharge aprons that do not outlet to a defined waterway or an existing storm sewer. Minimum distance is ten (10) feet.

(n) Normally dry, open top, storage facilities should completely drain both the volume control and rate control capacities over a period of time not less than 24 hours and not more than 72 hours from the end of the design storm.

~~(n)~~(o) The design storm volumes and precipitation intensities to be used in the analysis of discharge or runoff shall be obtained from the Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2, Version 3.0, U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland. NOAA's Atlas 14 can be accessed at: http://hdsc.nws.noaa.gov/hdsc/pfds/.

~~(o)~~(p) For all regulated activities, SWM BMPs shall be designed, implemented, operated, and maintained to meet the purposes and requirements of this Ordinance and to meet all requirements under Title 25 of the Pennsylvania Code, the Clean Streams Law, and the Storm Water Management Act.

~~(p)~~(q) Various BMPs and their design standards are listed in the BMP Manual.

~~(q)~~(r) All work shall be in accordance with the Municipality's Construction and Material Specifications.
(Ord. 32-2011. Passed 10-4-11.)

937.02 EXEMPTIONS.

Any Regulated Activity that meets the following exemption criteria is exempt from the part(s) of this Ordinance as specified herein. However, the requirements of the Ordinance shall otherwise remain in effect. The criteria for exemption in this Section apply to the total development proposed, including instances in which the development is proposed to take place in phases. The date of enactment of this Ordinance shall be the starting point from which future development and the respective proposed impervious surface computations shall be cumulatively considered and regulated. Exemption shall not relieve an applicant from implementing such measures as necessary to meet the intent of this Ordinance, or compliance with any NPDES Permit requirements.

(a) Regulated activities that create DIAs equal to or less than 1,000 square feet are exempt from the peak rate control and the SWM Site Plan preparation requirements of this Ordinance.

(b) Regulated activities that create DIAs greater than 1,000 square feet and equal to or less than 5,000 square feet are exempt only from the peak rate control requirement of this Ordinance.

(c) Agricultural activity is exempt from the rate control and SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of 25 Pa. Code 102.

(d) Forest management and timber operations are exempt from the rate control and SWM Site Plan preparation requirements of this Ordinance provided the activities are performed according to the requirements of 25 PA Code 102.

(e) Domestic gardening and landscaping are exempt from specific approval and permitting under this Ordinance so long as those activities are associated with one, and only one, dwelling unit and the activities comply with all other applicable ordinances and statutes.

(f) Exemptions from certain provisions of this Ordinance shall not relieve the applicant from the requirements in Sections 937.01(d) through (n).

(g) The Municipality may deny or revoke any exemption pursuant to this Section at any time for any project that the Municipality determines poses a threat to public health, safety, property or the environment.

(h) For all Regulated Activities that are exempt from the SWM Site Plan preparation, the applicant shall submit a plan and calculations in sufficient detail to show the existing conditions and proposed improvements.

(Ord. 32-2011. Passed 10-4-11.)

937.03 STORMWATER MANAGEMENT DISTRICTS.

(a) The City of York has been divided into release rate areas as shown in Appendix C.

(b) Description of stormwater management districts - two types of stormwater management districts may be applicable to the City of York, namely the Release Rate Districts and Provisional No Detention Districts as described below:

(1) Release Rate Districts - Rate districts differ in the extent to which post-development runoff must be controlled. Within a given district, the post-development peak rate of storm runoff must be controlled to the stated percentage of the pre-development peak rate of storm runoff in order to protect downstream watershed areas.

(2) Provisional No Detention Districts - These watershed areas may discharge post-development peak runoff without detention without adversely affecting the total watershed peak flow. In certain instances, however, the "local" runoff conveyance facilties, which transport runoff from the site to the main channel, may not have adequate capacity to safely transport increased peak flows associated with no detention for a proposed development. In those instances, the developer shall either use a 100% release rate control or provide increased capacity of downstream drainage elements to convey increased peak flows consistent with Section 937.07(d). In determining if adequate capacity exists in the local watershed drainage network, the developer must assume that the entire local watershed is developed per current zoning and that all new development would use the runoff controls specified in this Ordinance. Similarly, any capacity improvements must be designed to convey runoff from development of all areas tributary to the improvements consistent with the capacity criteria specified in Section 937.07(f).

(3) When a project or land disturbance activity is located in more than one stormwater management district, stormwater may not be transferred from a district with stricter stormwater management criteria to a district with less strict criteria, unless the need for such a transfer is identified in the regional water quality management plan Act 167 Study. In any district, infiltration and volume regulations dictated in Section 937.04 will be required.

CODORUS - DISTRICT 1

District ID	**Regulated Storm Frequency**	**Percentage of Pre-Developed Peak Flow Rate to Determine Allowable Post-Developed Release Rate**
District 1	2	100% 2-Year
District 1	5	100% 5-Year
District 1	10	100% 10-Year
District 1	25	100% 25-Year
District 1	50	100% 50-Year
District 1	100	100% 100-Year

* The intention of this Table is to reduce the runoff rate.
(Ord. 32-2011. Passed 10-4-11.)

937.04 VOLUME CONTROLS.

The **green infrastructure and** low impact development practices provided in the BMP Manual shall be utilized for all regulated activities to the maximum extent practicable. Water volume controls shall be implemented using the Design Storm Method in subsection (a) or the Simplified Method in subsection (b) below. For regulated activity areas equal or less than one (1) acre that do not require hydrologic routing to design the stormwater facilities, this Ordinance establishes no preference for either methodology; therefore, the applicant may select either methodology on the basis of economic considerations, the intrinsic limitations on applicability of the analytical procedures associated with each methodology, and other factors.

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

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

(2) For modeling purposes:

A. Existing (pre-development) non-forested pervious areas must be considered meadow **in good condition**.

B. For computation of pre-development runoff volume, twenty percent (20%) of existing impervious areas, when present, shall be considered meadow.

(b) The Simplified Method (CG-2 in the BMP Manual) provided below is independent of site conditions and should be used if the Design Storm Method is not followed. This method is not applicable to regulated activities greater than one ~~(1) acre~~ **½ acre** or for projects that require design of stormwater storage facilities.

For new impervious surfaces:

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

(2) At least the first one (1) inch of runoff from new impervious surfaces shall be permanently removed from the runoff flow, i.e., it shall not be released into the surface waters of this Commonwealth. Removal options for the first one (1) inch of runoff include reuse, evaporation, transpiration, and infiltration.

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

(4) This method is exempt from the requirements of Section 937.05.

(Ord. 32-2011. Passed 10-4-11.)

937.05 RATE CONTROLS.

(a) For computation of pre-development peak discharge rates, twenty percent (20%) of the existing impervious area of a project site, when present, shall be considered meadow.

(b) Post-development discharge rates shall not exceed the pre-development discharge rates provided in Section 937.03(b)(3) for the 1-, 2-, 5-, 10-, 25-, 50-, and 100-year 24-hour storms. If it is shown that the peak rates of discharge indicated by the post-development analysis are less than or equal to the peak rates of discharge indicated by the pre-development analysis for 1-, 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storms, then the requirements of this section have been met. Otherwise, the applicant shall provide additional controls as necessary to satisfy the peak rate of discharge requirement.

(Ord. 32-2011. Passed 10-4-11.)

937.06 STORMWATER MANAGEMENT FACILITIES FOR PENNSYLVANIA DEPARTMENT OF TRANSPORTATION AND PENNSYLVANIA TURNPIKE COMMISSION ROADWAYS AND ASSOCIATED FACILITIES.

(a) For the purposes of the Act 167 Stormwater Management (Plan) elements, contained within the York County Integrated Water Resources Plan, and this Ordinance, design policy pertaining to stormwater management facilities for Pennsylvania Department of Transportation (PennDOT) and Pennsylvania Turnpike Commission (PTC) roadways and associated facilities is provided in Section 13.7 (Antidegradation and Post Construction Stormwater Management Policy) of PennDOT Publication No. 13M, Design Manual Part 2 (August 2009), as developed, updated, and amended in consultation with the Pennsylvania Department of Environmental Resources (DEP). As stated in DM-2.13.7.D (Act 167 and Municipal Ordinances), PennDOT and PTC roadways and associated facilities shall be consistent with Act 167 Plans. Dm-2.13.7.B (Policy on Antidegradation and Post Construction Stormwater Management) was developed as a cooperative effort between PennDOT and DEP. DM-2.13.7.C (Project Categories) discusses the anticipated impact on the quality, volume, and rate of stormwater runoff.

(b) Where standards in the Act 167 elements of the IWRP and this Ordinance are impractical, PennDOT or the PTC may request assistance from DEP, in consultation with the Municipality and County, to develop an alternative strategy for meeting State water quality requirements and the goals and objectives of the Act 167 elements within the IWRP.

(c) For the purposes of the Act 167 elements in the IWRP and this Ordinance, road maintenance activities are regulated under 25 PA Code Chapter 102.
(Ord. 32-2011. Passed 10-4-11.)

937.07 DESIGN CRITERIA.

(a) Sites located in more than One District - for a proposed development site located within two or more stormwater management district category subareas, the peak discharge rate from any subarea shall meet the discharge requirements for that subarea as indicated in Section 937.03. The calculated peak discharges shall apply regardless of whether the grading plan changes the drainage area by subarea.

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

(c) On-Site Areas - On- Site Areas proposed to remain undisturbed as part of the Regulated Activity, including previously developed areas, that are not within the drainage area of any proposed BMPs shall be considered as existing conditions, without considering any reductions in cover type.

(d) "Downstream Hydraulic Capacity Analysis" - Any existing downstream hydraulic capacity analysis shall be conducted in accordance with this Ordinance.

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

(2) If any private facility is found to be undersized, the applicant shall be responsible for updating the facility in coordination with the Regulated Activity.

(3) If any public facility is found to be undersized or inadequate, the applicant shall work with the Municipality on upgrading the facility in coordination with the Regulated Activity.

(e) 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.

(f) Capacity Improvements of Local Drainage Networks - In certain instances, primarily within the provisional no detention areas, local drainage conditions may dictate more stringent levels of runoff control than those based upon protection of the entire watershed. In these instances, if the developer could prove that it would be feasible to provide capacity improvements to relieve the capacity deficiency in the local drainage network, then the capacity improvements could be provided by the developer in lieu of runoff controls on the development site. Any capacity improvements would be designed based upon development of all areas tributary to the proposed improvement and the capacity criteria specified in Section 937.08. In addition, all new development upstream of a proposed capacity improvement shall be assumed to implement the applicable runoff controls consistent with this Ordinance except that all new development within the entire subarea(s) within which the proposed development site is located shall be assumed to implement the developer's proposed discharge control, if any.

(g) Capacity improvements may also be provided as necessary to implement any regional or subregional detention alternatives.

(h) Where the potential for groundwater and/or surface water contamination exists, based on the proposed use of the Regulated Activity, safeguards shall be incorporated into the site.

(1) For industrial or commercial sites where it is possible that toxic or hazardous substances may come into contact with stormwater runoff, pretreatment of the first-flush (first 1/2 inch) runoff over areas where industrial and commercial operations take place shall be provided. Pretreatment shall include means for separating light and heavy toxic and hazardous substances from the stormwater before the stormwater is conveyed to the general stormwater management facility(ies).

(2) Infiltration systems may be used to handle runoff from commercial or industrial working or parking areas only after the first-flush stormwater from these areas has been pretreated for removal of toxic and hazardous substances.

(i) Roof drains and sump pumps shall discharge to infiltration or vegetative BMPs and to the maximum extent practicable satisfy the criteria for DIAs.
(Ord. 32-2011. Passed 10-4-11.)

937.08 REGULATIONS GOVERNING 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 (PennDOT).

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

(c) Any stormwater management facility located within the vicinity of a Floodplain shall be subject to approval in accordance with PA DEP 25 PA Code Chapter 105 (Floodplain Management) of PA DEP's Rules and Regulations.

(d) All earthmoving activities must be reviewed and approved by the York County Conservation District prior to commencing work.

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

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

(g) 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.

(h) 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, maintaining of vegetation in a natural state within the easement shall be required, except as approved by the appropriate governing authority.

(i) 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 PA DEP through the Joint Permit Application process, or, where deemed appropriate by PA DEP, through the General Permit process.

(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.

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

(1) No watersheds within the Municipality are listed as Exceptional Value and/or High Quality Watersheds.

(Ord. 32-2011. Passed 10-4-11.)

937.09 CALCULATION METHODOLOGY.

(a) Stormwater runoff from all development sites shall be calculated using the Rational Method, Modified Rational Method, or a Soil Cover Complex methodology.

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

(2) The Municipality may allow the use of the Rational Method or Modified Rational Method to estimate peak discharges from drainage areas that contain less than 200 acres.

(3) All calculations consistent with this Ordinance using the Soil Cover Complex method shall us the appropriate design rainfall depths. If a hydrologic computer model such as PSRM or HEC-RAS is used for stormwater runoff calculations, then the duration of rainfall shall be 24 hours. The SCS Rainfall Type II curve shall be used for the rainfall distribution.

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

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

(6) Runoff Curve Numbers (CN) for both existing and proposed conditions to be used in the Soil Cover Complex method shall be obtained from Table 1.

(7) Runoff coefficients (c) for both existing and proposed conditions for use in the Rational Method shall be obtained from Table 2.

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

(9) 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 either manual methods or computerized routing. Routing shall be based upon the modified PULS method; other routing methodologies shall be subject to the approval of the Municipal Engineer.

(10) The stormwater collection system shall be designed using the peak discharge computed using the Rational Formula.

(b) Design Standards - Water Carrying Facilities.

(1) All storm sewer pipes, streets, and inlets (excluding detention and retention basin outfall structures) shall be designed for a 10-year storm event. Sole access structures (culverts and bridges) shall be designed to convey the 25-year flood without overtopping the roadway.

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

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

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

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

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

(3) Inlets shall be placed on both sides of the street at low spots and at the upper side of street intersections to prevent stormwater from crossing an intersection. Other devices such as high efficiency grates or perforated pipe may be required if conditions warrant. All inlets at low points along the roadway shall have a 10" curb reveal and shall be equipped with pavement base drain extending 50 feet in either direction, parallel to the centerline of the roadway.

(4) In all cases where drainage is picked up by means of a headwall, the pipe shall be designed as a culvert. Inlet and outlet conditions shall be analyzed. The minimum diameter of culvert shall be 18 inches. The procedure contained in Hydraulic Engineer Circulars No. 5 and No. 13, as prepared by the U. S. Department of Transportation, Federal Highway Administration, Washington, D.C., shall be used for the design of culverts. All culverts shall include concrete headwalls and endwalls.

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

(6) Manholes, inlets, headwalls, and endwalls shall conform to the requirements of the PennDOT Publication 408, as modified by the adopted Municipal Standards.

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

(8) Existing natural or man-made channels or swales must be able to convey proposed 100-year return period runoff without creating any hazard to persons or property.

(9) Stormwater runoff on roadways (i.e. gutter spread, lane encroachment, etc.) shall be controlled in accordance with PennDOT Publications 13M, "Design Manual, Part 2" and 584, "Drainage Manual".

(c) Design Standards - Detention and Retention Basins.

(1) Permanent Detention and Retention Basins shall be designed to meet the following standards:

A. Outlet Control Structures - Outlet control shall be accomplished utilizing (6" diameter or 6" maximum) perforations arranged vertically to provide for positive control of stormwater runoff. Outlet controls shall also provide for modification off the orifice to a smaller diameter through the use of removable plates.

B. Discharge Dispersion - Discharges from piping outlets of management facilities shall be provided with a concrete "level spreader" to convert point discharge back to simulated sheet flow. The length of the level spreader shall be equal to 10 times the outlet pipe diameter (e.g., an 18" discharge pipe would require a 15" wide level spreader).

C. Minimum Bottom Slope - All detention basins shall have a minimum bottom slope of two percent (2%) unless infiltration facilities are provided.

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

E. The minimum top width of all basin embankments shall be 8 feet.

F. The maximum permitted side slopes for detention or retention basins shall be 4 horizontal to 1 vertical. In order to obtain a waiver for slopes steeper than 4:1, the plan must include a planting schedule to stabilize the embankments. The proposed vegetation shall be low maintenance varieties.

G. 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, 24 hour design storm at post-development conditions, assuming the principal outlet structure to be clogged. The height of embankment must be set as to provide a minimum 1 foot of freeboard above the maximum elevation computed for the clogged orifice condition. Should any stormwater management facility require a dam safety permit under PA DEP 25 PA Code Chapter 105, the facility shall be designed in accordance with PA DEP 25 PA Code Chapter 105 and meet the regulations of PA DEP 25 PA Code Chapter 105 concerning dam safety which may be required to pass storms larger than 100-year event.

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

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

J. Fencing. Any above-ground stormwater management detention/retention facility, that is designed to store at least a two foot (2') depth of runoff, shall be subject to the following fencing requirements:

1. Stormwater facility must be completely surrounded by a chain link fence of not less than four (4) feet in height. Alternative fences and barriers may be permitted upon request to and approval by the Municipality.
2. All gates or doors opening through such enclosure shall be equipped with a self-closing and self-latching device for keeping the gate or door securely closed at all times, when not in actual use.

K. All outlet structures and emergency spillways shall include a satisfactory means of energy dissipation at its outlet to assure conveyance and flow without endangering the safety and integrity of the basin and the downstream drainage area.

L. A concentrated discharge of stormwater to an adjacent property shall be within a natural drainage way or watercourse, or an easement shall be required.

M. Easement - Plans showing outlet control structures shall contain an easement dedication as follows: "An easement is hereby granted to the City of York to access and modify the basin outlet control device at the expense of the Developer so as to function within design parameters."

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

(Ord. 32-2011. Passed 10-4-11.)

937.10 CARBONATE GEOLOGY.

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

(1) No stormwater management facility will be placed in, over, or immediately adjacent to the following features:

A. Closer than 100 feet from sinkholes
B. Closer than 100 feet from closed depressions
C. Closer than 100 feet from caverns, intermittent lakes, or ephemeral streams
D. Closer than 50 feet from lineaments in carbonate areas
E. Closer than 50 feet from fracture traces
F. Closer than 25 feet from bedrock pinnacles (surface or subsurface)

(2) Stormwater resulting from regulated activities shall not be discharged into sinkholes.

(3) If the developer can prove through analysis that the project site is an area underlain by carbonate geology, and such geologic conditions may result in sinkhole formations, then the project site is exempt from recharge requirements as described in Section 937.04, Volume Control. However, the project site shall still be required to meet all other standards found in this Ordinance.

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

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

(6) 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:

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

B. Provide field test throughout the area proposed for development to determine appropriate percolation rate and/or hydraulic conductivity. At least one (1) infiltration test must be included in each soil group and at least one (1) infiltration test must be conducted for each five (5) lots proposed for development. Infiltration tests must be taken at the location and depth of all proposed infiltration structures.

C. Design infiltration structure for required storm volume based on all available data.

(7) Extreme caution shall be exercised where infiltration is proposed in geologically susceptible areas such as strip mine or limestone areas. It is also extremely important that the design professional evaluate the possibility of groundwater contamination from the proposed infiltration/recharge facility and recommend a hydrogeologic 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 carbonate formations shall include measures to prevent ground water contamination and, where necessary, sinkhole formation. The infiltration requirement in the High Quality/Exceptional Waters shall be subject to the Department's Chapter 93 and Anti-degradation Regulations. A detailed hydrogeologic investigation may be required by the Municipality and where appropriate, the Municipality may require the installation of an impermeable liner in detention basins.

(Ord. 32-2011. Passed 10-4-11.)

937.11 EROSION AND SEDIMENTATION CONTROL REQUIREMENTS.

(a) As required in Section 937.01(d), whenever the vegetation and topography are to be disturbed, such activity must be in conformance with PA DEP 25 PA Code Chapter 105, Rules and Regulations, Part I, Subpart C, protection of natural Resources, Article II, Water Resources, Chapter 102, "Erosion Control", and in accordance with the York County Conservation District.

(b) If the State NPDES regulation (Chapter 102) thresholds requiring a written erosion and sedimentation plan do not apply, the applicant is still required to provide suitable erosion and sedimentation best management practices to prevent an illicit discharge caused by erosion during a precipitation event.

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

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

(~~c~~)(d) Fencing for sedimentation basins or traps must comply with Section 937.09(c)(1).J.

(~~d~~)(e) The developer shall demonstrate that the post-development hydrograph flows during erosion and sedimentation control phase are less than or equal to the pre-development hydrograph flows to assure the rate and volume of runoff leaving the site is controlled for the 2-, 5-, and 10-year frequency storms. All calculation methodology shall be in accordance with Sections 937.03 through Section 937.10.
(Ord. 32-2011. Passed 10-4-11.)