

**Manor Township
Armstrong County**

Storm Water Management Ordinance

**MANOR TOWNSHIP
ARMSTRONG COUNTY, PENNSYLVANIA**

ORDINANCE NO. 2016-5

AN ORDINANCE OF THE TOWNSHIP OF MANOR ESTABLISHING REGULATIONS FOR THE PLANNING, DESIGN, REVIEW, CONTROL AND MANAGEMENT OF THE CONVEYANCE AND STORAGE OF SURFACE WATERS RESULTING FROM PRECIPITATION/STORM WATER RUN-OFF.

WHEREAS, the governing body of Manor Township (hereinafter referred to as the "Township") agrees with the General Assembly in that "surface waters resulting from precipitation" / "inadequately managed storm water run-off" is disruptive to the natural drainage system, is costly, and threatens public health and safety; and

WHEREAS, the governing body of the Township finds that inadequate management of accelerated run-off of storm water resulting from development, increases flood flows and velocities, contributes to erosion and sedimentation, over taxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control storm water, undermines flood plain management and flood control efforts in downstream communities, reduces ground water recharge, and threatens public health and safety; and

WHEREAS, the Board of Township Supervisors shall be responsible for approval and enforcement procedures as set forth by this Ordinance; and

WHEREAS, the Township desires to establish a Storm Water Maintenance Fund for the inspection of new Storm Water Management Facilities/Controls; and

WHEREAS, the Township may from time to time, review and amend the regulations set forth by this Ordinance.

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ARTICLE I
GENERAL PROVISIONS

Section 100 - Introduction

Storm water management consists of the planning, design, and control of the conveyance and storage of surface waters resulting from precipitation. Major objectives are the protection of water quality, the prevention of flooding and erosion, and the promotion of the natural recharge of ground water. The Pennsylvania Storm Water Management Act was enacted in 1978 to address these crucial issues. The intent of the Act is to encourage storm water run-off planning and management, with the program administered locally, consistent with the Commonwealth's duty as trustee of natural resources and the people's constitutional right to the preservation of the environment. The Act places major responsibility for managing storm water on the landowner or developer.

Section 101 – Short Title

This Ordinance shall be known, and may be cited as the Manor Township Storm Water Management Ordinance.

Section 102 – Statutory Authority

Primary authority: Manor Township is empowered to regulate these activities by the authority of the Act of October 4, 1978, 32 P.S., P.L. 864 (Act 167), 32 P.S. § 680.1 et seq., as amended, the "Storm Water Management Act," and the Second Class Township Code, 53 P.S. § 65101 et seq., as amended.

Section 103 – Statement of Findings

The General Assembly found that inadequately managed storm water run-off is disruptive to the natural drainage system, is costly, and threatens public health and safety. The governing body of the Township finds that:

- A. Inadequate management of accelerated run-off of storm water resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, over-taxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control storm water, undermines flood plain management and flood control efforts in downstream communities, reduces ground water recharge, and threatens public health and safety.
- B. A comprehensive program of storm water management, including reasonable regulation of development and activities causing accelerated run-off, is fundamental to the public health, safety, and welfare and the protection of the people of the Commonwealth, their resources and the environment.

Section 104 – Purpose

The purpose of this Ordinance is to promote health, safety, and welfare within Manor Township, Armstrong County, by minimizing the harms and maximizing the benefits to the citizens of Manor Township and surrounding communities through provisions intended to:

- A. To the extent practicable, meet legal water quality requirements under state law, including regulations at 25 Pa. Code Chapter 93 to protect, maintain, reclaim, and restore the existing and designated uses of the waters of the commonwealth.
- B. Manage accelerated runoff and erosion and sedimentation problems close to their source, by regulating activities that cause these problems.
- C. Preserve the natural drainage systems as much as possible.
- D. Maintain groundwater recharge, to prevent degradation of surface and groundwater quality, and to otherwise protect water resources.
- E. Maintain existing flows and quality of streams and watercourses.
- F. Preserve and restore the flood-carrying capacity of streams and prevent scour and erosion of stream banks and streambeds.
- G. Manage stormwater impacts close to the runoff source, with a minimum of structures and a maximum use of natural processes.
- H. Provide procedures, performance standards, and design criteria for stormwater planning and management.
- I. Provide proper operation and maintenance of all temporary and permanent stormwater management facilities and best management practices (BMPs) that are constructed and implemented.
- J. Provide standards to meet the NPDES permit requirements.

Section 105 – Applicability

- A. In Manor Township, all regulated activities and all activities that may affect stormwater runoff, including land development and earth disturbance activity, are subject to regulation by this Ordinance.
- B. Earth disturbance activities and associated stormwater management controls are also regulated under existing state law and other regulations. This Ordinance shall operate in coordination with those parallel requirements; the requirements of this Ordinance shall be no less restrictive in meeting the purposes of this Ordinance than state law.
- C. "Regulated activities" are any earth disturbance activities or any activities that involve the alteration or development of land in a manner that may affect stormwater runoff. "Regulated activities" include, but are not limited to, the following listed items:
 - a. Earth disturbance activities.
 - b. Land development.
 - c. Subdivision.
 - d. Construction of new or additional impervious or semi-pervious surfaces.
 - e. Construction of new buildings or additions to existing buildings.
 - f. Installation of stormwater management facilities or appurtenances thereto.
- D. See Section 106 of this Ordinance for exemption/modification criteria.

Section 106 – Exemptions

- A. Under no circumstance shall the applicant be exempt from implementing such measures as necessary to:
 - a. Protect health, safety, and property.
 - b. Meet special requirements for high quality (HQ) and exceptional value (EV) watersheds.
- B. The applicant must demonstrate that the following BMPs are being utilized to the maximum extent practicable to receive consideration for the exemptions:
 - a. Design around and limit disturbance of floodplains, wetlands, natural slopes over 15%, existing native vegetation, and other sensitive and special value features.
 - b. Maintain riparian and forested buffers.
 - c. Limit grading and maintain non-erosive flow conditions in natural flow paths.
 - d. Maintain existing tree canopies near impervious areas.
 - e. Minimize soil disturbance and reclaim disturbed areas with topsoil and vegetation.
 - f. Direct runoff to pervious areas.
- C. The applicant must demonstrate that the proposed development/additional impervious area will not adversely impact the following:
 - a. Capacities of existing drainage ways and storm sewer systems.
 - b. Velocities and erosion.
 - c. Quality of runoff if direct discharge is proposed.
 - d. Existing known problem areas.
 - e. Safe conveyance of the additional runoff.
 - f. Downstream property owners.
- D. An applicant proposing regulated activities may be eligible for exemption from rate control, volume control, or stormwater management site plan requirements in this Ordinance according to the following table:

Table 106.1 — Exemptions and Submission Requirements

New Impervious Area (square feet)	Applicant Must Provide
0 - <2,500	No Submission Required
2,500 - <5,000	Documentation of New Impervious Surfaces
5,000 and greater	Rate Controls, Volume Controls and SWM site Plan

NOTES:

- 1. New impervious area since the date of adoption of this Ordinance.
 - 2. Gravel in existing condition shall be considered pervious and gravel in proposed condition shall be considered impervious.
- E. Single-family residential activities are exempt from these requirements, provided the construction:
 - a. Complies with §201.G and Subsections A, B and C of this section; and
 - b. Driveways.
 - i. Runoff must discharge onto pervious surface with a gravel strip or other spreading device.
 - ii. No more than 1,000 square feet of paved surface may discharge to any one point as a concentrated discharge.

- iii. The length of flow on the pervious surface must exceed the length of flow on the paved surface.
 - c. The municipality can require more information or require mitigation of certain impacts through installation of stormwater management BMPs if there is a threat to property, health, or safety.
- F. An applicant proposing regulated activities, after demonstrating compliance with Subsections A, B and C of this section, may be exempted from various requirements of this Ordinance if documentation can be provided that a downstream man-made water body (i.e., reservoir, lake, or man-made wetlands) has been designed or modified to address the potential stormwater flooding impacts of the proposed development.
- G. The purpose this section is to ensure consistency of stormwater management planning between local ordinances and NPDES permitting (when required) and to ensure that the applicant has a single and clear set of stormwater management standards to which the applicant is subject. The municipality may accept alternative stormwater management controls under this section, provided that:
 - a. The municipality, in consultation with the PADEP (or delegated authority), determines that meeting the volume control requirements (see § 230-14) is not possible or places an undue hardship on the applicant.
 - b. The alternative controls are documented to be acceptable to PADEP (or delegated authority), for NPDES requirements pertaining to post construction stormwater management requirements.
 - c. The alternative controls are in compliance with all other sections of this Ordinance, including but not limited to §201.D and Subsections A, B and C of this section.
- H. Agricultural activities 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 Chapter 102.
- I. Forest management and timber operations are exempt from the rate and volume control requirement and SWM site plan preparation requirement of this Ordinance, provided the activities are performed according to the requirements of 25 Pa. Code Chapter 102.
- J. The municipality may deny or revoke any exemption pursuant to this section at any time for any project that the municipality believes may pose a threat to public health, safety, property or the environment.

Section 107 - Waivers

- A. The provisions of this Ordinance are the minimum standards for the protection of the public welfare.
- B. General requirements.
 - a. All waiver requests must meet the provisions of Subsections G and H of this section. Waivers shall not be issued from implementing such measures as necessary to:
 - i. Protect health, safety, and property.
 - ii. Meet special requirements for high quality (HQ) and exceptional value (EV) watersheds.
 - b. Municipalities will then consider waivers in accordance with §201.D.
- C. If an applicant demonstrates to the satisfaction of the governing body of the municipality that any mandatory provision of this Ordinance is unreasonable or causes unique or undue hardship as it applies to the proposed project, or that an alternate design may result in a superior result within the context of §§104 and 102 of this Ordinance, the governing body

of the municipality, upon obtaining the comments and recommendations of the Municipal Engineer, may grant a waiver or relief so that substantial justice may be done and the public interest is secured; provided that such waiver will not have the effect of nullifying the intent and purpose of this Ordinance.

- D. The applicant shall submit all requests for waivers in writing and shall include such requests as a part of the plan review and approval process. The applicant shall state in full the facts of unreasonableness or hardship on which the request is based, the provision or provisions of this Ordinance that are involved, and the minimum waiver or relief that is necessary. The applicant shall state how the requested waiver and how the applicant's proposal shall result in an equal or better means of complying with the intent or purpose and general principles of this Ordinance.
- E. The municipality shall keep a written record of all actions on waiver requests.
- F. All waiver requests must be accompanied by a fee set by resolution by Manor Township, the fee being designed to cover the administrative costs of reviewing the waiver request. The applicant shall also agree to reimburse the municipality for reasonable and necessary fees that may be incurred by the Municipal Engineer and Solicitor in any review of a waiver request.
- G. In granting waivers, the municipality may impose reasonable conditions that will, in its judgment, secure substantially the objectives of the standards or requirements that are to be modified.
- H. The municipality may grant applications for waivers when the following findings are made, as relevant:
 - a. That the waiver shall result in an equal or better means of complying with the intent of this Ordinance.
 - b. That the waiver is the minimum necessary to provide relief.
 - c. That the applicant is not requesting a waiver based on cost considerations.
 - d. That existing down gradient stormwater problems will not be exacerbated.
 - e. That increased flooding or ponding on off-site properties or roadways will not occur.
 - f. That potential icing conditions will not occur.
 - g. That increase of peak flow or volume from the site will not occur.
 - h. That erosive conditions due to increased peak flows or volume will not occur.
 - i. That adverse impact to water quality will not result.
 - j. That increased one-hundred-year floodplain levels will not result.
 - k. That increased or unusual municipal maintenance expenses will not result from the waiver.
 - l. That infiltration of runoff throughout the proposed site has been provided where practicable and predevelopment groundwater recharge protected.
 - m. That peak flow attenuation of runoff has been provided.
 - n. That long-term operation and maintenance activities are established.
 - o. That the receiving streams and/or water bodies will not be adversely impacted in flood carrying capacity, aquatic habitat, channel stability and erosion and sedimentation.

Section 108 – Repealer

Any Ordinance of the Township that is inconsistent with any of the provisions of this Ordinance is hereby repealed to the extent of the inconsistency only.

Section 109 – 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 110 – Compatibility with other Requirements

Approvals issued and actions taken pursuant to this Ordinance do not relieve the applicant of the responsibility to comply with or to secure required permits or approvals for activities regulated by any other applicable codes, laws, rules, statutes, or ordinances. To the extent that this Ordinance imposes more rigorous or stringent requirements for stormwater management, the specific requirements contained in this Ordinance shall be followed.

Section 111 – Duties of Developers

Any landowner or any person engaged in the alteration or development of land which may affect stormwater runoff characteristics shall, unless an exemption is granted, implement such measures as are required by this Ordinance to prevent injury to health, safety, or other property. Such measures also shall include actions as are required to manage the rate, volume, direction, and where practicable quality of resulting stormwater runoff in a manner which otherwise adequately protects health, property, and water quality.

Section 112 – Municipal Liability

- A. Neither the granting of any approval under this Ordinance, nor the compliance with the provisions of this Ordinance, or with any condition imposed by a municipal official hereunder, shall relieve any person from any responsibility for damage to persons or property resulting therefrom, or as otherwise imposed by law nor impose any liability upon the municipality for damages to persons or property.
- B. The granting of a permit which includes any stormwater management facilities shall not constitute a representation, guarantee or warranty of any kind by the municipality, or by an official or employee thereof, of the practicability or safety of any structure, use or other plan proposed, and shall create no liability upon or cause of action against such public body, official or employee for any damage that may result pursuant thereto.

ARTICLE II

STORMWATER MANAGEMENT PLANS

Section 201 – General Requirements

- A. For all regulated activities, unless specifically exempted in §106:
 - a. Preparation and implementation of an approved SWM site plan is required.
 - b. No regulated activities shall commence until the municipality issues written approval of a SWM site plan which demonstrates compliance with the requirements of this Ordinance.
 - c. The SWM site plan shall demonstrate that adequate capacity will be provided to meet the volume and rate control requirements, as described under §§202 and 203 of this Ordinance.
 - d. The SWM site plan approved by the municipality shall be on-site throughout the duration of the regulated activities.
- B. For all regulated earth disturbance activities, erosion and sediment control BMPs shall be designed, implemented, operated, and maintained during the regulated earth disturbance activities (e.g., during construction) to meet the purposes and requirements of this Ordinance and to meet all requirements under Act 167 and the regulations promulgated thereunder (including, but not limited to Title 25 of the Pennsylvania Code, Chapter 102, Erosion and Sediment Control). Various BMPs and their design standards are listed in the Erosion and Sediment Pollution Control Program Manual (E&S Manual), No. 363-2134-008 (April 15, 2000), as amended and updated.
- C. For all regulated activities, stormwater BMPs shall be designed, installed, 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 and the Clean Streams Law, conform to the state water quality requirements, meet all requirements under the Stormwater Management Act and any more stringent requirements as determined by the municipality.
- D. The municipality may, after consultation with PADEP and the Conservation District, 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.
- E. All regulated activities shall include, to the maximum extent practicable, measures to:
 - a. Protect health, safety, and property.
 - b. Meet the requirements of this Ordinance by implementing measures to:
 - i. Minimize disturbance to floodplains, wetlands, natural slopes, existing native vegetation and woodlands.
 - ii. Encourage the creation, maintenance and extension of riparian buffers and the protection existing forested buffers.
 - iii. Provide trees and woodlands adjacent to impervious areas whenever feasible.
 - iv. Minimize the creation of impervious surfaces and the degradation of waters of the commonwealth and promote groundwater recharge.

- v. Protect natural systems and processes (drainageways, vegetation, soils, and sensitive areas) and maintain, as much as possible, the natural hydrologic regime.
 - vi. Incorporate natural site elements (wetlands, stream corridors, mature forests) as design elements.
 - vii. Avoid erosive flow conditions in natural flow pathways.
 - viii. Minimize soil disturbance and soil compaction.
 - ix. Minimize thermal impacts to waters of the commonwealth.
 - x. Disconnect impervious surfaces by directing runoff to pervious areas, wherever possible and decentralize and manage stormwater at its source.
- F. Impervious areas.
- a. The measurement of impervious areas shall include all of the impervious areas in the total proposed development, even if development is to take place in stages.
 - b. For developments taking place in stages, the entire development plan must be used in determining conformance with this Ordinance.
- G. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the applicant 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.
- a. Applicant must obtain an easement for proposed concentrated flow across adjacent properties to a drainage way or public right-of-way.
 - b. Such stormwater flows shall be subject to the requirements of this Ordinance.
- H. 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.
- I. Where watercourses traverse a development site, drainage easements with a minimum width of 20 feet and which include the one-hundred-year water surface shall be provided conforming to the line of such watercourses. Excavation, the placing of fill or structures, and any alterations that may adversely affect the flow of stormwater within any portion of the drainage area shall be prohibited. Also, maintenance, including mowing of vegetation within the drainage area, may be required, except as approved by the appropriate governing authority.
- J. 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 drainage ways shall be subject to approval by PADEP under regulations at 25 Pa. Code Chapter 105 through the joint permit application process, or, where deemed appropriate by PADEP, through the general permit process.
- K. Any stormwater management facilities or any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures, etc.) that are regulated by this Ordinance, that will be located in or adjacent to waters of the commonwealth (including wetlands), shall be subject to approval by PADEP under regulations at 25 Pa. Code Chapter 105 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 applicant 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.

- L. 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.
- M. Any stormwater management facilities regulated by this Ordinance that will be located on, or discharged onto state highway rights-of-ways shall be subject to approval by the Pennsylvania Department of Transportation (PennDOT).
- N. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc., are encouraged, where soil conditions and geology permit, to reduce the size or eliminate the need for detention facilities.
- O. Infiltration BMPs should be dispersed throughout the site, 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.
- P. The design of facilities over karst topography shall include an evaluation and implementation of measures to minimize adverse effects.
- Q. Roof drains shall not be connected to streets, sanitary or storm sewers, or roadside ditches in order to promote overland flow and infiltration/percolation of stormwater where it is advantageous to do so. When it is more advantageous to connect directly to streets or storm sewers, then the municipality shall permit it on a case-by-case basis.
- R. Applicants are encouraged to use low-impact development practices to reduce the costs of complying with the requirements of this Ordinance and the state water quality requirements.
- S. When stormwater management facilities are proposed within 1,000 feet of a downstream municipality, the developer shall notify the downstream municipality and provide a copy of the SWM plan, if requested, for review and comment.

Section 202 – Volume Control

- 1. The low-impact development practices provided in the PA SWM BMP Manual shall be utilized for all regulated activities to the maximum extent practicable.
- 2. Stormwater runoff volume controls shall be implemented using the Design Storm Method or the Simplified Method, as defined below. For regulated activity areas equal or less than one acre that do not require hydrologic routing to design the stormwater facilities, this Ordinance establishes no preference for either method; therefore, the applicant may select either method 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 sized regulated activity. This method requires detailed modeling based on site conditions.
 - i. Do not increase the post-development total runoff volume when compared to the predevelopment total runoff volume for the two-year/twenty-four-hour storm event.
 - ii. For hydrologic modeling purposes.
 - 1. Existing non-forested pervious areas must be considered meadow (good condition) for predevelopment hydrologic calculations.
 - 2. Twenty percent of existing impervious area, when present within the proposed project site, shall be considered meadow (good condition) for predevelopment hydrologic calculations for redevelopment.
 - b. The Simplified Method (CG-2 in the BMP Manual) 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 acre or for projects that require detailed design of stormwater storage facilities. For new impervious surfaces:

- i.* Stormwater facilities shall capture at least the first two inches of runoff from all new impervious surfaces.
 - ii.* At least the first one inch of runoff from new impervious surfaces shall be permanently removed from the runoff flow, i.e., it shall not be released into surface waters of the commonwealth. Removal options include reuse, evaporation, transpiration, and infiltration.
 - iii.* Wherever possible, infiltration facilities should be designed to accommodate infiltration of the entire permanently removed runoff; however, in all cases, at least the first 0.5 inch of the permanently removed runoff should be infiltrated.
 - iv.* Actual field infiltration tests at the location of the proposed elevation of the stormwater BMPs are required. Infiltration test shall be conducted in accordance with the BMP Manual. Notification of the municipality shall be provided to allow witnessing of the testing.
3. The applicable worksheets from the BMP Manual must be used in calculations to establish volume control.

Section 203 – Sensitive areas; stormwater hotspots; rate controls.

- A. Sensitive areas and water-quality-sensitive developments as defined below which require special consideration with regard to stormwater management.
 - a. "Sensitive areas" are defined as those areas that, if developed, have the potential to endanger a water supply. These areas consist of the delineated one-year zone of contribution and direct upslope areas tributary to the water supply wells. Manor Township may update the sensitive area boundaries based on new research or studies as required.
 - b. Stormwater hotspots are defined as a land development project that has a high potential to endanger local water quality, and could potentially threaten groundwater reservoirs. The Municipal Engineer will determine what constitutes these classifications on a case-by-case basis. The PADEP wellhead protection contaminant source list shall be used as a guide in these determinations. Industrial manufacturing site and hazardous material storage areas must provide NPDES SIC codes.
- B. Performance standards.
 - a. The location of the boundaries of sensitive areas is set by drainage areas tributary to any public water supply. The exact location of these boundaries, as they apply to a given development site, shall be determined using mapping at a scale which accurately defines the limits of the sensitive area. If the project site is within the sensitive area (in whole or in part), two-foot contour interval mapping shall be provided to define the limits of the sensitive area. If the project site is adjacent to but within 500 linear feet of a defined sensitive area, a five-foot contour interval map defining the limits of the sensitive area shall be included in the stormwater management plan to document the site's location relative to the sensitive area.
 - b. Stormwater hotspots may be required to prepare and implement a stormwater pollution prevention plan and file notice of intent as required under the provision of the EPA Industrial Stormwater NPDES Permit Requirements.

- c. Stormwater hotspots must use an acceptable pretreatment BMP prior to volume control and/or rate control BMPs. Acceptable pretreatment BMPs for these developments include those based on filtering, settling, or chemical reaction processes such as coagulation.
- C. Rate controls. Lands contained within Armstrong County that have not had release rates established under an approved Act 167 Stormwater Management Plan.
 - a. Post-development discharge rates shall not exceed the predevelopment discharge rates for the two-, ten-, twenty-five-, fifty-year, and one-hundred-year storms.

Section 204 – Protected Watersheds

For any regulated activity within a protected watershed (high quality or exceptional value), the applicant shall meet requirements as contained in 25 Pa. Code Chapter 93 as required and applicable.

Section 205 – Design Criteria

- A. General design guidelines:
 - a. Stormwater shall not be transferred from one watershed to another, unless:
 - i. The watersheds are subwatersheds of a common watershed which join together within the perimeter of the property;
 - ii. The effect of the transfer does not alter the peak rate discharge onto adjacent lands; or
 - iii. Easements from the affected landowner(s) are provided.
 - b. Consideration shall be given to the relationship of the subject property to the drainage pattern of the watershed. A concentrated discharge of stormwater to an adjacent property shall be within an existing watercourse or confined in an easement or returned to a predevelopment flow-type condition.
 - c. Innovative stormwater BMPs and recharge facilities are encouraged (e.g., rooftop storage, dry wells, cisterns, recreation area ponding, diversion structures, porous pavements, holding tanks, infiltration systems, in-line storage in storm sewers, and grading patterns). They shall be located, designed, and constructed in accordance with the latest technical guidance published by PADEP, provided they are accompanied by detailed engineering plans and performance capabilities and supporting site-specific soils, geology, runoff and groundwater and infiltration rate data to verify proposed designs. Additional guidance from other sources may be accepted at the discretion of the Municipal Engineer (a preapplication meeting is suggested).
 - d. All existing and natural watercourses, channels, drainage systems and areas of surface water concentration shall be maintained in their existing condition unless an alteration is approved by the appropriate regulatory agency.
 - e. 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 continuation or exacerbation of a documented adverse hydrologic or hydraulic condition within the watershed, as identified in the plan.
 - f. The design and construction of multiple-use stormwater detention facilities are strongly encouraged. In addition to stormwater management, facilities should,

does not leave the property at a greater velocity or volume per second than before development commenced.

- i. The maximum release rate from a stormwater detention/retention facility shall be as follows:
 1. The post-development 25-year, twenty-four hour peak flow, shall be released at or less than the pre-development 2-year, twenty-four hour peak flow, creating slightly out-of-bank conditions in downstream drainage-ways.
 - ii. Outlet works shall be designed so as to store water and control runoff for all storms of frequency up to and including the one-hundred-year storm.
 - iii. Vertical riser pipes with trash racks and anti-vortex devices shall be provided in detention basins, unless an alternate design is approved by the Township.
 - iv. No outlet structure from a stormwater management facility, or swale, shall discharge directly onto a municipal or state roadway without approval from the municipality or PennDOT.
- e. Detention areas, where required to impede runoff, shall be designed to meet or exceed the following standards:
- i. Except where a permanent pond is approved by the Township Supervisors, detention areas shall be designed to drain completely.
 - ii. The height of the embankment shall be not more than 10 feet measured between the top of the embankment and the toe of the slope on the downstream side of the embankment. The level of water within the impoundment shall not exceed nine (9) feet measured between the lowest point in the impoundment area behind the embankment and the top of the emergency spillway.
 - iii. The area to be occupied by the embankment shall be cleared of all topsoil and organic materials prior to construction. The embankment shall be built up in layers not to exceed six inches in depth with equipment providing 95% compaction at optimum moisture conditions.
 - iv. The settled elevation of the top of the embankment at its lowest point shall be not less than one foot above the maximum water level to be impounded behind the embankment and not less than two feet above the elevation of the emergency spillway.
 - v. The surfaces of the embankment shall be planted in a mixture of perennial quick-catching grasses.
 - vi. The interior and exterior side slopes of the embankment shall not slope on either side less than one foot vertical rise for each two feet of horizontal run and not more than a total on both sides of one foot vertical rise for each five feet of horizontal run.
 - vii. The horizontal drain pipe passing through the embankment shall be reinforced concrete pipe or equivalent. Anti-seepage collars shall be placed in accordance with proper design procedures. The design and spacing of the collars shall be submitted for review.
 - viii. The top of the riser pipe to drain the pond shall be not less than three feet in height above the invert elevation of the horizontal pipe, shall be not less than four inches in diameter and shall be fitted with an anti-vortex device and a trash rack.

- ix. The emergency spillway shall be capable of passing the flow created by the one-hundred year storm.
 - x. The low edge of a parking area, curbed or not, may serve the purpose of an emergency spillway to pass the overflow from a stormwater detention area, provided that the embankment below the edge is well stabilized with planting materials and the angle of the slope will not encourage erosion, in the opinion of the Township and other reviewing agencies. Parking areas shall not be used to store stormwater.
 - xi. Unless specifically designed as a volume control facility, stone low-flow channels with underdrains shall be installed in all aboveground earthen detention facilities. Side slopes and channel slopes within the basin shall be 2% minimum.
- f. The invert of all stormwater management facilities and underground infiltration/storage facilities shall be located a minimum of two feet above the seasonal high groundwater table. The invert of stormwater facilities may be lowered if adequate subsurface drainage is provided. Flows from underdrains need not be accounted for in volume or rate control calculations.
 - g. Unless specifically designed as a volume control facility, all stormwater management facilities shall have a minimum slope of 2% extending radially out from the principal outlet structure. Facilities designed as water quality/infiltration BMPs may have a bottom slope of zero.
 - h. Landscaping and planting specifications must be provided for all stormwater management basins and be specific for each type of basin.
 - i. Minimal maintenance, saturation-tolerant vegetation must be provided in basins designed as water quality/infiltration BMPs.
 - i. Written design reports and calculations shall be submitted for review and approval by the Township. Routing calculations using modified PULS methodology shall be included to assure outflow rates are in conformance with the requirements of this Ordinance. Calculations for storm pipe sizing shall also be included using the rational method and Manning's formula for a ten-year storm unless conditions warrant otherwise using PennDOT intensity duration frequency curves from the Engineering Design Manual (latest edition).
 - j. The owner or developer shall enter into a legal agreement approved by the Township Solicitor which shall hold the Township harmless from any and all liability relating to storm drainage collection and its discharge during construction of the system and thereafter. The owner or developer shall secure, where necessary, off-site easements for storm drainage.
 - k. The costs of review and inspection by the Township Engineer of the stormwater management system as proposed by the developer shall be borne by the developer, whether or not the plan is ultimately approved. The Engineer shall review any changes as the developer may make in his plan for compliance with the Engineer's recommendations and shall advise the Board of Supervisors whether the revised plan is in compliance or not. The Board shall direct the Engineer to inspect an approved embankment during its various stages of construction and to point out to the contractor, the developer and Board any deviations from the design as approved.
 - l. Catch basins shall meet the Township standards and shall have inverts poured to allow self-cleaning. Catch basins shall be located no further apart than 300 feet, measured between catch basins on the same side of the street.

- m. Graded areas shall be stabilized with erosion-resisting plantings placed immediately after the completion of grading. Graded slopes produced by placing fill earth over the preexisting surface shall be keyed in accordance with sound geotechnical practices.
- n. Grades for embankments resulting from preparation of building lots or sites shall not exceed one foot vertical rise for every two feet of horizontal run for fill slopes or one foot vertical rise for every 1 1/2 feet horizontal run for slopes created by excavating in areas that have lain dormant for at least two years. Steeper slopes may be permitted in areas where, in the opinion of a professional engineer, as evidenced in a written report, concurred with by the Township Engineer, conditions are such as to allow slopes up to a maximum grade determined by the engineers.
- o. No grading shall occur within five feet of any subdivision or development plan boundary, except as is needed for the entrance of streets or to grade off land immediately adjacent to a street to the street's elevation.
- p. All persons, partnerships or corporations intending to excavate, fill or grade land in the Township shall be required to undertake all work in conformance with the requirements of this Ordinance and applicable regulations of Armstrong County.

Section 206 – Calculation Methodology

- A. All calculations shall be consistent with the guidelines set forth in the BMP Manual, as amended herein.
- B. Stormwater runoff from all development sites shall be calculated using either the Rational Method or the NRCS Rainfall-Runoff Methodology. Other methods shall be selected by the design professional based on the individual limitations and suitability of each method for a particular site and approved by the Municipal Engineer.
- C. Rainfall values.
 - a. Rational method. The Pennsylvania Department of Transportation Drainage Manual, Intensity- Duration-Frequency Curves, Publication 584, Chapter 7A, latest edition, shall be used in conjunction with the appropriate time of concentration and return period.
 - b. NRCS Rainfall-Runoff Method. The Natural Resources Conservation Service Type II, twenty-four hour rainfall distribution shall be used in conjunction with rainfall depths from NOAA Atlas 14. A copy of the rainfall data from NOAA Atlas 14 shall accompany the SWM report for review.
- D. Runoff volume.
 - a. Rational method. Not to be used to calculate runoff volume.
 - b. NRCS Rainfall-Runoff Method. This method shall be used to estimate the change in volume due to regulated activities. Combining curve numbers for land areas proposed for development with curve numbers for areas unaffected by the proposed development into a single weighted curve number is not acceptable.
- E. Peak flow rates.
 - a. Rational Method. This method may be used for design of conveyance facilities. Extreme caution should be used by the design professional if the watershed has more than one main drainage channel, if the watershed is divided so that hydrologic properties are significantly different in one versus the other, if the time of concentration exceeds 60 minutes, or if stormwater runoff volume is an important factor. The combination of Rational Method hydrographs based on timing shall be prohibited.

- b. NRCS Rainfall-Runoff Method.
 - i. This method is recommended for design of stormwater management facilities and where stormwater runoff volume must be taken into consideration. The following provides guidance on the model applicability:
 - 1. NRCS's TR-55: limited to 100 acres in size.
 - 2. NRCS's TR-20, WinTR-20, WinTR-55, HEC-HMS: no watershed size limitations.
 - 3. Other models as preapproved by the Municipal Engineer.
 - ii. The NRCS antecedent runoff condition II (ARC II, previously AMC II) must be used for all simulations. The use of continuous simulation models that vary the ARC are not permitted for stormwater management purposes.
 - iii. For comparison of peak flow rates, flows shall be rounded to a tenth of a cubic foot per second (cfs).
- F. Runoff coefficients.
 - a. Rational Method. Use Table B-1 (Appendix B).
 - b. NRCS Rainfall-Runoff Method. Use Table B-2 (Appendix B). Curve numbers (CN) should be rounded to tenths for use in hydrologic models as they are a design tool with statistical variability. For large sites, CNs should realistically be rounded to the nearest whole number.
 - c. For the purposes of predevelopment peak flow rate and volume determination, existing non-forested pervious areas conditions shall be considered as meadow (good condition).
 - d. For the purposes of predevelopment peak flow rate and volume determination, 20% of existing impervious area, when present, shall be considered meadow (good condition).
- G. Design storm.
 - a. All stormwater management facilities shall be verified by routing the proposed two-, ten-, twenty-five-, fifty-year, and one-hundred-year hydrographs through the facility using the storage indication method or modified puls method. The design storm hydrograph shall be computed using a calculation method that produces a full hydrograph.
 - b. The stormwater management and drainage system shall be designed to safely convey the post-development one-hundred-year storm event to stormwater detention facilities, for the purpose of meeting peak rate control.
 - c. All structures (culvert or bridges) proposed to convey runoff under a municipal road shall be designed to pass the twenty-five-year design storm with a minimum one foot of freeboard measured below the lowest point along the top of the roadway.
- H. Time of concentration.
 - a. The time of concentration is to represent the average condition that best reflects the hydrologic response of the area. The following time of concentration (Tc) computational methodologies shall be used unless another method is preapproved by the Municipal Engineer:

i. Predevelopment - NRCS's Lag Equation:

Time of concentration = Tc

$$Tc = \left(\frac{T}{0.6} \right) * 60 \text{ (minutes)}$$

$$T = \frac{l^{0.8}(S + 1)^{0.7}}{1900Y^5}$$

Where:

T = Lag time (hours)

l = Hydraulic length of watershed (feet)

Y = Average overland slope of watershed (percent)

S = Maximum retention in watershed as defined by: $S = [(1,000/CN) - 10]$

CN = NRCS curve number for watershed

- ii. Post-development; commercial, industrial, or other areas with large impervious areas (> 20% impervious area) - NRCS Segmental Method. The length of sheet flow shall be limited to 100 feet. Tc for channel and pipe flow shall be computed using Manning's equation.
 - iii. Post-development; residential, cluster, or other low-impact designs less than or equal to 20% impervious area - NRCS Lag Equation or NRCS Segmental Method.
- b. Additionally, the following provisions shall apply to calculations for time of concentration:
- i. The post-development Tc shall never be greater than the predevelopment Tc for any watershed or subwatershed. This includes when the designer has specifically used swales to reduce flow velocities. In the event that the designer believes that the post-development Tc is greater, it will still be set by default equal to the predevelopment Tc for modeling purposes.
 - ii. The minimum Tc for any watershed shall be five minutes.
 - iii. The designer may choose to assume a five-minute Tc for any post-development watershed or subwatershed without providing any computations.
 - iv. The designer must provide computations for all predevelopment Tc paths. A five-minute Tc cannot be assumed for predevelopment.
- I. Where uniform flow is anticipated, the Manning's equation shall be used for hydraulic computations and to determine the capacity of open channels, pipes, and storm sewers. The Manning's equation should not be used for analysis of pipes under pressure flow or for analysis of culverts. Manning's "n" values shall be obtained from PennDOT's Drainage Manual, Publication 584. Inlet control shall be checked at all inlet boxes to ensure the headwater depth during the ten-year design event is contained below the top of grate for each inlet box.
- J. The municipality has the authority to require that computed existing runoff rates be reconciled with field observations, conditions and site history. If the designer can substantiate, through actual physical calibration, that more appropriate runoff and time of concentration values should be utilized at a particular site, then appropriate variations may be made upon review and recommendation of the municipality.

Section 207 – Storm Water Management Site Plan and Report Requirements

207.1 Approval of Plan Required

For any activities regulated by this Ordinance and not eligible for the exemptions provided herein, the 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 applicant has received written approval of a Storm Water Management site plan from the Township.

207.2 Contents of Plan and Report

The SWM site plan and SWM report shall consist of all applicable calculations, maps and plans. All SWM site plan materials shall be submitted to the Township in a format that is clear, concise, legible, neat and well organized; otherwise, the SWM site plan shall be rejected. All other applicable local and county ordinances shall be followed in preparing the SWM site plan.

- A. SWM site plan shall include, but not be limited to:
- a. Plans shall be of one size and in a form that meets the requirements for recording in the Office of the Recorder of Deeds of Armstrong County.
 - i. Plans for tracts of less than 20 acres shall be drawn at a scale of one inch equals no more than 50 feet;
 - ii. Plans for tracts of 20 acres or more shall be drawn at a scale of one inch equals no more than 100 feet;
 - iii. Lettering shall be drawn to a size to be legible if the plans are reduced to half size.
 - b. The name of the development; name and location address of the property site; name, address and telephone number of the applicant/owner of the property, and name, address, telephone number, email address, and engineering seal of the individual preparing the SWM site plan.
 - c. The date of submission and dates of all revisions.
 - d. A graphical and written scale on all drawings and maps.
 - e. A north arrow on all drawings and maps.
 - f. A location map at a minimum scale of one inch equals 2,000 feet that illustrates the project location relative to highways, municipalities or other identifiable landmarks.
 - g. Metes and bounds description of the entire tract perimeter.
 - h. Existing and final contours at intervals:
 - i. Slopes less than 5%: no greater than one foot;
 - ii. Slopes between 5 and 15%: no greater than two feet;
 - iii. Steep slopes (greater than 15%): five-foot contour intervals may be used.
 - i. Perimeters of existing water bodies within the project area including stream banks, lakes, ponds, springs, field-delineated wetlands or other bodies of water, sinkholes, flood hazard boundaries (FEMA-delineated floodplains and floodways), areas of natural vegetation to be preserved, the total extent of the upstream area draining through the site, and overland drainage paths. In addition, any areas necessary to determine downstream impacts, where required for proposed stormwater management facilities, must be shown.

- j. The location of all existing and proposed utilities, on-lot wastewater facilities, water supply wells, sanitary sewers, and water lines on and within 50 feet of the property lines, including inlets, manholes, valves, meters, poles, chambers, junction boxes, and other utility system components.
- k. A key map showing all existing man-made features beyond the property boundary that may be affected by the project.
- l. Soil names and boundaries with identification of the hydraulic soil group classification, including rock outcroppings.
- m. Proposed impervious surfaces (structures, roads, paved areas and buildings), including plans and profiles of roads and paved areas and floor elevations of buildings.
- n. Existing and proposed land use(s).
- o. Horizontal alignment, vertical profiles, and cross sections of all open channels, pipes, swales and other BMPs where required by the Township Engineer.
- p. The location and clear identification of the nature of permanent stormwater BMPs.
- q. The location of all erosion and sedimentation control facilities, shown on a separate drawing from the SWM site plan (typically an E&S plan).
- r. A minimum twenty-foot wide access easement around all stormwater management facilities or facilities to be considered that would provide ingress to and egress from a public right-of-way.
- s. Construction details for all drainage and stormwater BMPs.
- t. Construction sequence.
- u. Identification of short-term and long-term ownership, operations and maintenance responsibilities.
- v. Notes and statements:
 - i. A statement, signed by the landowner, acknowledging that the stormwater BMPs are fixtures that cannot be altered or removed without prior approval from the Municipality.
 - ii. A statement referencing the Operation and Maintenance (O&M) Agreement and stating that the O&M Agreement is part of the SWM site plan.
 - iii. At the discretion of the Township Engineer, a note indicating that record drawings will be provided for all stormwater facilities prior to occupancy, or release of the surety bond.
 - iv. The following signature block for the registered professional preparing the stormwater management plan:

“I, _____, hereby certify that the Stormwater Management Plan meets all design standards and criteria of the Manor Township Stormwater Management Ordinance.

- v. The following signature block for the Municipal Engineer reviewing the Stormwater Management plan:

I, _____, have reviewed this Stormwater Management Plan in accordance with the Design Standards and Criteria of the Manor Township Stormwater Management Ordinance.

- B. SWM Report shall include, but not be limited to:
- a. General data including:
 - i. Project name.
 - ii. Projection location and address of the property site (if available).
 - iii. Name, address and telephone number of the applicant/owner of the property.
 - iv. Name, address, telephone number, email address and engineering seal of the individual preparing the SWM report.
 - v. Date of submission and any revisions.
 - b. Project description narrative that clearly discusses the project and provides the following information, where applicable:
 - i. Narrative:
 1. Statement of the regulated activity describing what is being proposed. Overall stormwater management concept with description of permanent techniques, including construction specifications and materials to be used for stormwater management facilities.
 2. Expected project schedule.
 3. Location map showing the project site and its location relative to its overall surroundings.
 4. Detailed description of the existing site conditions, including a site evaluation completed for projects proposed in areas of carbonate geology or karst topography, and other environmentally sensitive areas such as brownfields.
 5. A watershed map of the total site area, pre- and post-, which must be equal or have an explanation as to why they are not. This map must also show the time of concentration that is representative of site conditions for pre- and post-development areas.
 6. Total site impervious area.
 7. Total off-site areas.
 8. Number and description of stormwater management facilities.
 9. Type of development.
 10. Pre-development land use.
 11. Whether the site is located in a high quality or exceptional value watershed.
 12. Types of water quality and recharge systems used, if applicable.
 13. Complete hydrologic, hydraulic and structural computations for all stormwater management facilities.
 14. A written maintenance plan for all stormwater features, including detention facilities and other stormwater management facilities.
 15. Other pertinent information as required.
 - ii. Summary tables
 1. Predevelopment/existing conditions:
 - a. Hydrologic soil group (HSG) assumptions
 - b. Curve numbers (CN)
 - c. Time of concentration.
 - d. Runoff volume and peak rate of runoff for each storm interval.

2. Post-development/proposed conditions:
 - a. Hydrologic soil group (HSG) assumptions
 - b. Curve numbers (CN)
 - c. Time of concentration.
 - d. Runoff volume and peak rate of runoff for each storm interval.
 3. Detention facility (pond) routing analysis
 - a. Undetained areas that drain to the proposed stormwater facilities.
 - b. Runoff volume and peak rate as released from the proposed detention facility for each storm interval.
 4. Detention Facility (pond)
 - a. Maximum water surface elevation for each storm interval
 - b. Berm elevation
 - c. Emergency spillway elevation
 - d. Outlet Structure – Orifice and weir size and elevation.
 5. Water quality volume and depth requirements (where applicable).
- iii. Calculations
1. Complete hydrologic, hydraulic and structural computations, calculations, assumptions, and criteria for the design of all stormwater BMPs.
 2. Details of the berm embankment and outlet structure indicating the embankment top elevation, embankment side slopes, to width of all embankments, emergency spillway elevation, outlet structure dimensions, discharge barrel dimensions and slope as well as spacing of anti-seep collars.
 3. Design computations for the control structure (discharge barrel and outlet structure, etc.).
 4. A plot or table of the stage-storage (volume vs. elevation) and all supporting computations.
 5. Routing computations.
- iv. Drawings
1. Drainage area maps for all watersheds and inlets depicting the time of concentration path for both existing conditions and post-development conditions.
 2. All stormwater management facilities must be located on a plan and described in detail including easements and buffer boundaries.
- c. Reports that do not clearly contain the above information may be rejected for review by the municipality and will be returned to the applicant.
 - d. Description of, justification, and actual field results for infiltration testing with respect to the type of test and test location for the design of infiltration BMPs.
 - e. The effect of the project (in terms of runoff volumes, water quality, and peak flows) on surrounding properties and aquatic features and on any existing municipal stormwater collection system that may receive runoff from the project site.
 - f. Description of the proposed changes to the land surface and vegetative cover, including the type and amount of impervious area to be added.
 - g. Identification of short-term and long-term ownership, operation, and maintenance responsibilities, as well as schedules and costs for inspection and maintenance

activities for each permanent stormwater or drainage BMP, including provisions for permanent access and maintenance easements.

- C. Supplemental information to be provided prior to Final Approval of the SWM site plan, as requested by the Township:
- a. Signed and executed Operations and Maintenance Agreement (Appendix A).
 - b. Signed and executed easements, as required for all on-site and off-site work.
 - c. An erosion and sedimentation control plan.
 - d. Approval letter from the Armstrong Conservation District for those projects which require an NPDES permit.
 - e. Applicable permits from the Pennsylvania Department of Environmental Protection (PADEP) and Army Corps of Engineers (ACOE), for those project which require permits from the PADEP and/or the ACOE.
 - f. Soils investigation report, including boring logs, compaction requirements, and recommendation for construction of detention basins.
 - g. A Highway Occupancy Permit from the Pennsylvania Department of Transportation (Penn DOT) when utilization of a Penn DOT storm drainage system is proposed or when the proposed development would encroach onto a Penn DOT right-of-way.
 - h. Cost estimate of the proposed improvements.

ARTICLE III

PLAN SUBMISSION, REVIEW, AND MODIFICATION

Section 301 – Submission

- A. The applicant shall submit the SWM site plan and report for the regulated activity at least two weeks prior to the regularly scheduled Board of Supervisors meeting.
- B. Two copies of the SWM site plan and report shall be submitted and be distributed as follows:
 - a. One copy to the municipality accompanied by the requisite Review Fee Reimbursement Agreement, as specified in this Ordinance.
 - b. One copy to the Municipal Engineer.
- C. Additional copies shall be submitted as requested by the municipality or PADEP.

Section 302 – Review

- A. The Municipality may require receipt of a complete SWM site plan and report as specified in this Ordinance. The Municipality shall review the SWM site plan and report for consistency with the purpose, requirements and intent of this Ordinance.
- B. The Municipality shall not approve any SWM site plan or report that is deficient in meeting the requirements of this Ordinance. At its sole discretion and in accordance with this Ordinance, when a SWM site plan and report is found to be deficient, the municipality may disapprove the submission and require a resubmission, or in the case of minor deficiencies, the municipality may accept submission of modification.
- C. The municipality shall notify the applicant in writing within 45 calendar days of receipt of the report whether the SWM site plan and report is approved or disapproved.
- D. The Municipal Building Permit Office shall not issue a building permit for any regulated activity if the SWM site plan and report has been found to be inconsistent with this Ordinance, as determined by the Municipality. All required permits from the PADEP must be obtained prior to issuance of a building permit.

Section 303 – Modification of SWM site plan and report

A modification to a submitted SWM site plan and report for a development site that involves a change in stormwater management facilities or techniques, or that involves the relocation or redesign of stormwater management facilities, or that is necessary because of soil or other conditions are not as stated on the SWM site plan and report as determined by the municipality, may require a resubmission of the modified SWM site plan and report in accordance with this Ordinance.

Section 304 – Resubmission of disapproved SWM site plan and report

A disapproved SWM site plan and report may be resubmitted, with the revisions addressing the municipality's concerns documented in writing, to the municipality in accordance with this Ordinance.

Section 305 – Authorization to construct; term of validity

The municipality's approval of a SWM site plan and report authorizes the regulated activities contained within the SWM site plan and report for a maximum term of validity of five years following the date of approval. The municipality may specify a term of validity shorter than five years in the approval for any specific SWM site plan. Terms of validity shall commence on the date the municipality signs the approval for a SWM site plan. If stormwater management facilities included in the approved SWM site plan have not been constructed, or if a record drawing of these facilities has not been approved within this time, then the municipality may consider the SWM site plan disapproved and may revoke any and all permits or approvals.

Section 306 – Completion certificate; final inspection; as-built drawings

- A. At the discretion of the Township Engineer, the applicant may be required to provide record drawings of all stormwater BMPs included in the approved SWM site plan and report. The record drawings and an explanation of any discrepancies with the approved SWM site plan and report shall be submitted to the municipality as a prerequisite for release of the guarantee or issuance of an occupancy permit.
- B. The record drawing shall include a certification of completion signed by a qualified professional verifying that all permanent stormwater BMPs have been constructed according to the approved SWM site plan and report.
 - a. Drawings shall show all approved revisions and elevations and inverts to all manholes, inlets, pipes, and stormwater control facilities.
 - b. Submission shall include a comparison of the constructed stage-storage (volume vs. elevation) of all aboveground and below-ground stormwater storage facilities to the approved design.
- C. After receipt of the record drawing and certification of completion by the municipality, the municipality may conduct a final inspection.
- D. As-built drawings – Upon completion of the construction within a land development or construction of improvements in a subdivision, the applicant shall furnish the Township with the electronic file in PDF format of the plan. Such “as-built” drawings shall include the following items where applicable:
 - a. Scale, north arrow and date
 - b. Tract boundary and lot lines
 - c. Road access, public and private internal roads and walks
 - d. Plan view and vertical profiles of new public streets
 - e. Stormwater management to include:
 - i. Location of detention facilities, including measurements as required to verify as-built volume.
 - ii. Location of outflow structures, including measurements of controls.
 - iii. Location and size of emergency spillway(s).
 - iv. Location of all best management practices (BMPs), including, but not limited to sumps, vegetative swales, bioswales, ditches and sediment forebays.
 - f. Locations of drainage structures and pipes, including type and profile.
 - g. Utility easements, including sanitary sewer
 - h. Parking area and number of spaces
 - i. Location of all buildings

- j. Statement to the effect that all utilities are located within the proper rights-of-way for roads to be considered for acceptance by the Township.
- k. Landscaping
- l. Lighting, and
- m. Location of trash facilities.
- n. Seal of the Registered Professional who prepared the drawing(s).

Section 307 – Easement Agreements

- A. At the developer's option, the developer may grant to Manor Township an easement for drainage. The developer should consider granting the following easements:
 - a. Easements to accommodate existing drainageways.
 - b. Easements for planned infiltration facilities, drainage swales, and drainage facilities (inlets, manholes, pipes, etc.).
 - c. Easements where the tract is traversed by a watercourse, drainageway, channel or stream.
- B. In lieu of granting an easement to Manor Township for drainage, the developer shall enter into a legal agreement approved by the Solicitor, which shall hold the Township harmless from any and all liability relating to storm drainage collection and its discharge during construction of the stormwater system and thereafter.
- C. The owner or developer shall secure, where necessary, all off-site easements for storm drainage (i.e., downstream properties).
- D. All easement agreements will be recorded with a reference to the recorded development plan.

Section 308 – Scope of easements

- A. Where the developer grants an easement for a drainageway, drainage swale, watercourse, channel or stream, the easement should be a minimum of 20 feet wide and paralleling the center line of such drainageway, drainage swale, watercourse, channel or stream; and to the extent possible, such drainage easements should encompass the one-hundred-year floodplain.
- B. The Township of Manor may refuse acceptance of any easement that in the opinion of the Township Engineer is of insufficient width to allow for proper maintenance and servicing of the drainageway, drainage swale, watercourse, channel or stream.
- C. The Township of Manor may refuse acceptance of any easement that in the opinion of the Township Engineer does not provide for a means of ingress, regress and egress to the drainageway, drainage swale, watercourse, channel or stream.

ARTICLE IV
INSPECTIONS

Section 401 – Inspection requirements

- A. PADEP or its designees normally ensure compliance with any permits issued, including those for stormwater management. In addition to PADEP compliance programs, the municipality or their municipal assignee may inspect all phases of the installation of temporary or permanent stormwater management facilities.
- B. During any stage of earth disturbance activities, if the municipality determines that the stormwater management facilities are not being installed in accordance with the approved SWM site plan, the municipality shall revoke any existing permits or approvals until a revised SWM site plan is submitted and approved as specified in this Ordinance.
- C. If required by Manor Township, stormwater BMPs shall be inspected by a professional engineer registered in Pennsylvania according to the inspection schedule described on the SWM site plan for each BMP.
 - a. The municipality may require copies of the inspection reports, in a form as stipulated by the municipality.
 - b. If such inspections are not conducted or inspection reports not submitted as scheduled, the municipality, or their designee, may conduct such inspections and charge the owner appropriate fees. Nonpayment of fees may result in a lien against the property.
 - i. Prior to conducting such inspections, the municipality shall inform the owner of its intent to conduct such inspections. The owner shall be given 30 days to conduct required inspections and submit the required inspection reports to the municipality.

Section 402 – Right of Entry

- A. 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 implementation, condition, or operations and maintenance of the stormwater BMPs in regard to any aspect governed by this Ordinance.
- B. Stormwater BMP owners and operators shall allow persons working on behalf of the municipality ready access to all parts of the premises for the purposes of determining compliance with this Ordinance.
- C. Persons working on behalf of the municipality shall have the right to temporarily locate on any stormwater BMP in the municipality such devices, as are necessary, to conduct monitoring and/or sampling of the discharges from such stormwater BMP.
- A. Unreasonable delay, as determined by an authorized representative of the municipality, in allowing the municipality access to a stormwater BMP, is a violation of this Ordinance.

ARTICLE V

FEES, EXPENSES AND RECORDING REQUIREMENTS

Section 501 – Municipal review fee

The fee required by this Ordinance is the municipal review fee. The municipal review fee shall be established by the municipality from time to time by resolution of the Board of Supervisors to defray review costs incurred by the municipality and the Municipal Engineer. The applicant shall pay all fees.

Section 502 – Expenses covered by fees

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

- A. Administrative and clerical costs.
- B. Review of the SWM site plan and report by the municipality.
- C. Preconstruction meetings.
- D. Inspection of stormwater management facilities/BMPs and drainage improvements during construction.
- E. Final inspection upon completion of the stormwater management facilities/BMPs and drainage improvements presented in the SWM site plan.
- F. Any additional work required to enforce any permit provisions regulated by this Ordinance, correct violations, and assure proper completion of stipulated remedial actions.

Section 503 – Recording of plans and related documents

- A. The owner of any land upon which permanent BMPs will be placed, constructed, or implemented, as described in the SWM site plan, shall record the following documents in the Office of the Recorder of Deeds of Armstrong County, within 90 days of approval of the SWM site plan by the municipality:
 - a. The SWM site plan.
 - b. Operations and Maintenance (O&M) Agreement (Appendix A).
 - c. Easements under §301.7.
 - d. Riparian buffers.
- B. The municipality may suspend or revoke any approvals granted for the project site upon discovery of the failure of the owner to comply with this section.

ARTICLE VI

MAINTENANCE RESPONSIBILITIES

Section 601 – Responsibility for operation and maintenance.

- A. The SWM site plan and report for the project site shall describe the future operation and maintenance responsibilities of the stormwater facilities. The operation and maintenance description shall outline required routine maintenance actions and schedules necessary to ensure proper operation of the stormwater control facilities.
- B. The SWM site plan and report for the project site shall establish responsibilities for the continuing operation and maintenance of all proposed stormwater control facilities, consistent with the following principles:
 - a. If a development site is to be maintained in a single ownership (e.g., a commercial development) or if sewers and other public improvements are to be privately owned and maintained, then the ownership and maintenance of stormwater control facilities/BMPs shall be the responsibility of the owner or private management entity.
 - b. The municipality may take enforcement actions against an applicant for failure to satisfy any provision of this Ordinance.
- C. The municipality, upon recommendation of the Municipal Engineer, shall make the final determination on the continuing maintenance responsibilities prior to final approval of the SWM site plan and report.
- D. It shall be unlawful to alter or remove any permanent stormwater BMP required by an approved SWM site plan, or to allow the property to remain in a condition, which does not conform to an approved SWM site plan, unless the municipality grants an exception in writing.

Section 602 – Operation and maintenance agreements.

- A. Prior to final approval of the SWM site plan and report, the applicant shall sign the Operation and Maintenance (O&M) Agreement (Appendix A), or similar agreement, covering all stormwater control facilities that are to be privately owned. The Operation and Maintenance (O&M) Agreement shall be recorded with the SWM site plan and made a part hereto.
- B. Other items may be included in the Operation and Maintenance (O&M) Agreement where determined necessary to guarantee the satisfactory operation and maintenance of all BMP facilities. The Operation and Maintenance (O&M) Agreement shall be subject to the review and approval of the municipality and the Municipal Solicitor.
- C. The owner is responsible for operation and maintenance of the stormwater BMPs. If the owner fails to adhere to the Operation and Maintenance (O&M) Agreement, the municipality may perform the services required and charge the owner appropriate fees. Nonpayment of fees may result in a lien against the property.

ARTICLE VII

ENFORCEMENT; APPEALS

Section 701 – Notice of violation; failure to comply.

- A. In the event that a person fails to comply with the requirements of this Ordinance, an approved SWM site plan, or fails to conform to the requirements of any permit or approval 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).
- B. Failure to comply within the time specified shall subject such person to enforcement as set forth in this Ordinance. 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 702 – Availability of plan at project site; adherence to plan.

- A. The approved SWM site plan shall be on file at the project site throughout the duration of the construction activity. The municipality or their designee may make periodic inspections during construction.
- B. Adherence to approved SWM site plan.
 - a. It shall be unlawful for any person, firm, or corporation to undertake any regulated activity on any property except as provided for by an approved SWM site plan and pursuant to the requirements of this Ordinance.
 - b. It shall be unlawful to alter or remove any control structure required by the SWM site plan pursuant to this Ordinance.
 - c. It shall be unlawful to allow a property to remain in a condition that does not conform to an approved SWM site plan.

Section 703 – Violation deemed public nuisance

- A. A 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 704 – Suspension or revocation of permits and approvals.

- A. Any approval or permit issued by the municipality may be suspended or revoked for:
 - a. Noncompliance with or failure to implement any provision of the approved SWM Site Plan or Operation and Maintenance (O&M) Agreement.
 - b. A violation of any provision of this Ordinance or any other applicable law, ordinance, rule or regulation relating to the regulated activity.
 - c. The creation of any condition or the commission of any act, during the regulated activity which constitutes or creates a hazard or nuisance, pollution, or which endangers the life or property of others.

- B. A suspended approval or permit may be reinstated by the municipality when:
 - a. The municipality or their designee has inspected and approved the corrections to the violation(s) that caused the suspension.
 - b. The municipality is satisfied that the violation(s) has been corrected.
- C. The applicant may apply for a new approval under the provisions of this Ordinance if compliance has occurred within one year of the original application filing date.

Section 705 – Enforcement remedies

Where a violation of this Ordinance has occurred and remains uncured after notice from the municipality or its designee, the municipality may institute a legal action against the violator to restrain, prevent, abate, or enjoin the violation of this Ordinance or any stormwater management plan together with expenses and costs of suit, including attorney fees.

Section 706 – Appeals

Any person aggrieved by any action of the municipality or its designee, relevant to the provisions of this Ordinance, may appeal to the Court of Common Pleas of Armstrong County, Pennsylvania within 30 days of that action.

ARTICLE VIII

RESTRICTIONS AND PROHIBITIONS

Section 801 – Discharge and connection restrictions

- A. Any drain (including indoor drains and sinks), or conveyance, whether on the surface or underground, that allows any non-stormwater discharge, including sanitary sewage, process wastewater, and wash water to enter the municipality's separate storm sewer system or waters of the commonwealth is prohibited.
- B. Any drain or conveyance connected from a commercial or industrial land use to the municipality's separate storm sewer system, which has not been documented in plans, maps, or equivalent records, and approved by the municipality is prohibited.
- C. No person shall allow, or cause to allow, discharges into the municipality's separate storm sewer system or into surface waters of the commonwealth, which are not composed entirely of stormwater, except: as provided in Subsection D below; and discharges allowed under a state or federal permit.
- D. The following discharges are authorized unless they are determined to be significant contributors to pollution to the waters of the commonwealth:
 - a. Discharges from firefighting activities.
 - b. Potable water sources, including dechlorinated water line and fire hydrant flushings.
 - c. Irrigation drainage.
 - d. Air-conditioning condensate.
 - e. Springs.
 - f. Water from crawl space pumps.
 - g. Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed).
 - h. Flows from riparian habitats and wetlands.
 - i. Uncontaminated water from foundations or from footing drains.
 - j. Lawn watering.
 - k. Swimming pool discharges.
 - l. Uncontaminated groundwater.
 - m. Water from individual residential car washing.
 - n. Routine external building washdown.
- E. In the event that the municipality or PADEP determines that any of the discharges identified in Subsection D significantly contribute to pollution of waters of the commonwealth, or is so notified by PADEP, the municipality will notify the responsible person(s) to cease the discharge.
- F. Upon notice provided by the municipality or PADEP under Subsection E, the discharger will have a reasonable time, as determined by the municipality or PADEP, to cease the discharge, consistent with the degree of pollution caused by the discharge.
- G. Nothing in this section shall affect a discharger's responsibilities under commonwealth law.

Section 802 – Roof drains and sump pumps

Roof drains and sump pumps shall discharge to infiltration areas, vegetative BMPs, or pervious areas where reasonably practicable; otherwise, to the public storm sewer system.

Section 803 – Alteration of BMPs

- A. No person shall modify, remove, fill, landscape, or alter any existing stormwater BMP, facilities, areas, or structures unless it is part of an approved maintenance program, without the written approval of the municipality.
- B. No person shall place any structure, fill, landscaping, or vegetation into a stormwater BMP, facilities, areas, structures, or within a drainage easement which would limit or alter the functioning of the BMP without the written approval of the municipality.

ARTICLE IX

IMPROVEMENTS RESPONSIBILITIES

Section 901 – Improvements Guarantee

The Applicant shall provide a financial guarantee to the Township for the timely installation and proper construction of all storm water management facilities/controls as required by this Ordinance equal to one hundred ten (110) percent (%) of the total cost of construction of the required facilities/controls as per the PA Municipalities Planning Code, Act 247, Article V, Section 509 Completion of Improvements or Guarantee Thereof Prerequisite to Final Plat Approval and Section 511 Remedies to Effect Completion of Improvements, and Article V-A, Municipal Capital Improvement.

Section 902 – Municipal Storm Water Maintenance Fund

- A. If storm water facilities/controls are accepted by the Township for dedication, the Applicant/Developer/Property Owner may be required to pay a specified amount to the Township to be deposited in a Municipal Storm Water Maintenance Fund to help defray costs of periodic inspections and maintenance expenses. The amount of the deposit shall be determined as follows:

If the storm water management facility/control(s) are to be owned and maintained by the Township, 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 to the Township by the Applicant/Property Owner(s).

- B. If after ten (10) years, there is any amount remaining in the Municipal Storm Water Maintenance Fund less the cost of inspection over the previous ten (10) years, the unused portion of the Maintenance Fund deposit will be returned to the depositor upon written request.

ARTICLE X

INTERPRETATION AND DEFINITIONS

Section 1001 – Language Interpretations

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

- A. Words used in the present tense include the future tense; the singular number include 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 or occupied”.

Section 1002 – Definitions

As used in this Ordinance, the following terms shall have the meanings indicated:

ACCELERATED EROSION

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

AGRICULTURAL ACTIVITIES

Activities associated with agriculture such as agricultural cultivation, agricultural operation, and animal heavy use areas. This includes the work of producing crops, tillage, land clearing, plowing, disking, harrowing, planting, harvesting crops, or pasturing and raising of livestock and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

ALTERATION

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

APPLICANT

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

BEST MANAGEMENT PRACTICES (BMPs)

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

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 used for storing rainwater.

CONSERVATION DISTRICT

The Butler County Conservation District. The Butler County Conservation District has the authority under a delegation agreement executed with the Department of Environmental Protection to administer and enforce all or a portion of the regulations promulgated under 25 Pa. Code Chapter 102.

CULVERT

A structure with appurtenant works that carries a stream and/or stormwater runoff under or through an embankment or fill.

EMBANKMENT

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 twenty-five-year storm) and duration (e.g., 24 hours), used in the design and evaluation of stormwater management systems. Also see "return period."

DESIGNEE

The agent of this municipality and/or agent of the governing body involved with the administration, review or enforcement of any provisions of this chapter 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 VOLUME

The volume of runoff that is captured and released into waters of the commonwealth at a controlled rate.

DEVELOPER

A landowner, agent of such landowner or tenant with permission of such landowner, or any responsible person, who undertakes a subdivision, land development in accordance with Chapter 245, Subdivision and Land Development, of the Code of the Township of Connoquenessing, or that undertakes any regulated activity of this chapter.

DEVELOPMENT SITE (SITE)

The specific tract of land for which a regulated activity is proposed. Also see "project site."

DISTURBED AREA

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

DOWNSLOPE PROPERTY LINE

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

DRAINAGE CONVEYANCE FACILITY

A stormwater management facility designed to convey 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, drainage, or conveyance purposes.

DRAINAGEWAY

Any natural or artificial watercourse, trench, ditch, pipe, swale, channel, or similar depression into which surface water flows.

EARTH DISTURBANCE ACTIVITY

A construction or other human activity which disturbs the surface of the land, including, but not limited to, clearing and grubbing, grading, excavations, embankments, land development, agricultural plowing or tilling, timber harvesting activities, road maintenance activities, mineral extraction, and the moving, depositing, stockpiling, or storing of soil, rock or earth materials.

EROSION

The process of breaking down and carrying away of exposed ground surfaces by action of wind, water and temperature change.

EROSION AND SEDIMENT POLLUTION CONTROL PLAN

A plan which is designed to minimize accelerated erosion and sedimentation.

EXCEPTIONAL VALUE WATERS

Surface waters of high quality, which satisfies Pa. Code Title 25, Environmental Protection, Chapter 93, Water Quality Standards, § 93.4b(b) (relating to antidegradation).

EXISTING CONDITIONS

The initial condition of a project site prior to the proposed construction. If the initial condition of the site is undeveloped land and not forested, the land use shall be considered as "meadow" unless the natural land cover is documented to generate lower curve numbers or Rational "C" coefficient.

FEMA

The Federal Emergency Management Agency.

FLOOD

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

FLOOD FRINGE

The remaining portions of the one-hundred-year floodplain outside of the floodway boundary.

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. Included are lands adjoining a river or stream that have been or may be inundated by a one-hundred-year flood. 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 that are reasonably required to carry and discharge the one-hundred-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 one-hundred-year frequency floodway, it is assumed, absent evidence to the contrary, that the floodway extends from the stream to 50 feet landward from the top of the bank of the stream.

FOREST MANAGEMENT/TIMBER OPERATIONS

Planning and activities necessary for the management of forestland. 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 an embankment, levee, tank, basin, or diversion ridge. The space is required as a safety margin in a tank, 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.

GROUNDWATER RECHARGE

Replenishment of existing natural underground water supplies.

HEC-HMS MODEL CALIBRATED

(Hydrologic Engineering Center Hydrologic Modeling System) A computer-based hydrologic modeling technique adapted to the watershed(s) in Butler County for the Act 167 Plan. The model has been calibrated by adjusting key model input parameters.

HIGH-QUALITY WATERS

Surface water having quality which exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water by satisfying Pa. Code Title 25, Environmental Protection, Chapter 93, Water Quality Standards, § 93.4b(a).

HYDROLOGIC SOIL GROUP (HSG)

Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates. Soils are classified into one of four HSG (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged wetting. The Natural Resource Conservation Service (NRCS) of the U.S. Department of Agriculture defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of interest may be identified from a soil survey report from the local NRCS office or the County Conservation District.

IMPERVIOUS SURFACE (IMPERVIOUS AREA)

A surface that prevents the infiltration of water into the ground. "Impervious surface" (or areas) includes, but is not limited to, roofs, additional indoor living spaces, patios, garages, storage sheds and similar structures, parking or driveway areas, and any new streets and sidewalks. Any surface areas proposed to initially be gravel or crushed stone shall be assumed to be impervious surfaces.

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, etc.).

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 (DEVELOPMENT)

Any of the following activities:

- A. 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 residential or nonresidential buildings, whether proposed initially or cumulatively, or a single nonresidential building on a lot or lots, regardless of the number of occupants or tenure; or
- b. The division or allocation of land or space, whether initially or cumulatively, 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.
- c. A subdivision of land.

LOW-IMPACT DEVELOPMENT (LID)

An approach to land development that uses various land planning and design practices and technologies to simultaneously conserve and protect natural resource systems and reduce infrastructure costs. LID still allows land to be developed, but in a cost-effective manner that helps mitigate potential environmental impacts.

MAIN STEM (MAIN CHANNEL)

Any stream segment or other runoff conveyance facility used as a reach in the Butler County Act 167 watershed hydrologic model(s).

MANNING EQUATION (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

Manor Township, Armstrong County, Pennsylvania.

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)

The federal government's system for issuance of permits under the Clean Water Act, which is delegated to PADEP in Pennsylvania.

NOAA ATLAS 14

Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2, US Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland (2004). NOAA's Atlas 14 can be accessed at Internet address <http://hdsc.nws.noaa.gov/hdsc/pfds/>.

NONPOINT SOURCE POLLUTION

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

NRCS

Natural Resource Conservation Service [previously Soil Conservation Service (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 not under pressure.

OUTFALL

Point where water flows from a conduit, stream, or drain;
"Point source" as described in 40 CFR 122.2 at the point where the municipality's storm sewer system discharges to surface waters of the Commonwealth.

OUTLET

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

PADEP

The Pennsylvania Department of Environmental Protection.

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.

PERSON

An individual, partnership, public or private association or corporation, or a governmental unit, public utility or any other legal entity whatsoever which is recognized by law as the subject of rights and duties.

PERVIOUS AREA

Any area not defined as impervious.

PIPE

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

PLANNING COMMISSION

The Planning Commission of the Manor Township.

POINT SOURCE

Any discernible, confined, or discrete conveyance, including, but not limited to: any pipe, ditch, channel, tunnel, or conduit from which stormwater is or may be discharged, as defined in state regulations at 25 Pa. Code § 92a.2.[1]

PROJECT SITE

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

QUALIFIED PROFESSIONAL

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

RATIONAL FORMULA

A rainfall-runoff relation used to estimate peak flow.

REDEVELOPMENT

Earth disturbance activities on land which has previously been developed.

REGULATED ACTIVITIES

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

REGULATED EARTH DISTURBANCE ACTIVITY

Activity involving Earth Disturbance subject to regulation under 25 Pa. Code Chapter 92a, Chapter 102, or the Clean Streams Law.[2]

RELEASE RATE

The percentage of predevelopment peak rate of runoff from a site or subwatershed area to which the post-development peak rate of runoff must be reduced to protect downstream areas.

RELEASE RATE DISTRICT

Those subwatershed areas in which post-development flows must be reduced to a certain percentage of predevelopment flows as required to meet the plan requirements and the goals of Act 167.

RETENTION BASIN

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

RETENTION VOLUME/REMOVED RUNOFF

The volume of runoff that is captured and not released directly into the surface waters of this commonwealth during or after a storm event.

RETURN PERIOD

The average interval, in years, within which a storm event of a given magnitude can be expected to recur. For example, the twenty-five-year return period rainfall would be expected to recur on the average once every twenty-five years; or stated in another way, the probability of a twenty-five-year storm occurring in any one given year is 0.04 (i.e., a four-percent chance).

RIPARIAN BUFFER

A vegetated area bordering perennial and intermittent streams and wetlands, that serves as a protective filter to help protect streams/wetlands from the impacts of adjacent land uses.

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.

ROAD MAINTENANCE

Earth disturbance activities within the existing road right-of-way, such as grading and repairing existing unpaved road surfaces, cutting road banks, cleaning or clearing drainage ditches, and other similar activities. Road maintenance activities that do not disturb the subbase of a paved road (such as milling and overlays) are not considered earth disturbance activities.

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.

RUNOFF CAPTURE VOLUME

The volume of runoff that is captured (retained) and not released into surface waters of the commonwealth during or after a storm event.

SEDIMENT

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

SEDIMENT BASIN

A barrier, embankment, retention or detention basin located and designed to retain rock, sand, gravel, silt, or other material transported by stormwater runoff.

SEDIMENT POLLUTION

The placement, discharge, or any other introduction of sediment into waters of the commonwealth occurring from the failure to properly design, construct, implement or maintain control measures and control facilities in accordance with the requirements of this chapter.

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.

SEPARATE STORM SEWER SYSTEM

A conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) primarily used for collecting and conveying stormwater runoff.

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).

SPILLWAY (EMERGENCY)

A depression in the embankment of a pond or basin, or other overflow structure, that is used to pass peak discharges greater than the maximum design storm controlled by the pond or basin.

STATE WATER QUALITY REQUIREMENTS

The regulatory requirements to protect, maintain, reclaim, and restore water quality under Title 25 of that Pennsylvania Code and the Clean Streams Law.[3]

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 also "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

Runoff from the surface of the land resulting from precipitation, snow, or ice melt.

STORMWATER HOTSPOT

A land use or activity that generates higher concentrations of hydrocarbons, trace metals, or toxicants than are found in typical stormwater runoff.

STORMWATER MANAGEMENT FACILITIES

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

STORMWATER MANAGEMENT PLAN

The Butler County Stormwater Management Plan for managing stormwater runoff in Butler County as required by the Act of October 4, 1978, P.L. 864 (Act 167),[4] and known as the "Stormwater Management Act."

STORMWATER MANAGEMENT SITE PLAN (SWM SITE PLAN)

The plan prepared by the applicant or his representative indicating how stormwater runoff will be managed at the project site in accordance with this Ordinance.

STREAM ENCLOSURE

A bridge, culvert, or other structure in excess of 100 feet in length upstream to downstream which encloses regulated waters of the commonwealth.

SUBDIVISION

The division or redivision 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, partition by the court for distribution to heirs or devisees, 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 10 acres, not involving any new street or easement of access or any residential dwellings, shall be exempt.

SUBWATERSHED AREA

The smallest drainage unit of a watershed for which stormwater management criteria has been established in the stormwater management plan.

SWALE

A low-lying stretch of land that 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.

USDA The United States Department of Agriculture.

WATERCOURSE

A natural or man-made drainageway, which has a definite channel and flows in a definite direction, whether continuously or intermittently, including streams, rivers, creeks, channels, conduits, canals, drains, gullies, ravines and the like and which is certified by a registered surveyor or engineer as being a natural watercourse.

WATERS OF THE COMMONWEALTH

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

WATERSHED

Area drained by a river, watercourse, or other surface water, whether natural or artificial.

WETLAND

Those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs and similar areas. (The term includes but is not limited to wetland areas listed in the State Water Plan, the United States Forest Service Wetlands Inventory of Pennsylvania and a wetland area designated by a river basin commission. This definition is used by the United States Environmental Protection Agency and the United States Army Corps of Engineers.)




ARTICLE XI
ENACTMENT

Section 1101 – Effective Date

The provisions of this Ordinance shall be effective from and after June,
(month)
1, 2016.
(day) (year)

ORDAINED AND ENACTED by the Supervisors of Manor Township, Armstrong County,
Pennsylvania this June, 1, 2016.
(month) (day) (year)

MANOR TOWNSHIP SUPERVISORS

ATTEST: 
Secretary

APPENDIX A

OPERATION AND MAINTENANCE (O&M) AGREEMENT

STORMWATER MANAGEMENT BEST MANAGEMENT PRACTICES (SWM
BMPs)

THIS AGREEMENT, made and entered into this ____ day of _____, 20 ____, by and between _____, having an address of _____ (the "Landowner"), and the Township of Manor, Armstrong County, Pennsylvania, (the "Municipality");

WITNESSETH:

WHEREAS, the Landowner is the owner of certain real property as recorded by instrument in the Recorder of Deeds Office of Armstrong County, Pennsylvania, at Instrument No. _____, (the "Property").

WHEREAS, the Landowner has applied for and received approval from the Municipality to commence a Land Development on the Property; and

WHEREAS, the SWM Site Plan, as defined in the Township of Manor's Stormwater Management Ordinance No. 2016-5, codified in the Township of Manor Code of Ordinances (the "Ordinance") approved by the Municipality (hereinafter referred to as the "Plan") for the property identified herein, which is attached hereto as Appendix A and made part hereof, as approved by the Municipality, provides for management of stormwater within the confines of the Property through the use of BMPs (as defined in the Ordinance); and

WHEREAS, the Municipality, and the Landowner, his successors and assigns, agree that the health, safety, and welfare of the residents of the Municipality and the protection and maintenance of water and water runoff require that on-site SWM BMPs be constructed and maintained on the Property; and

WHEREAS, the Municipality requires, through the implementation of the SWM Site Plan, that stormwater BMPs as required by said Plan and the Ordinance be constructed and adequately operated and maintained by the Landowner, successors and assigns, so long as the property is developed pursuant to the Landowner's Land Development Plan.

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

1. The Landowner shall construct the BMPs in accordance with the plans and specifications identified in the SWM Site Plan.
2. The Landowner shall operate and maintain the BMPs as shown on the Plan in good working order in accordance with the specific maintenance requirements noted on the approved SWM Site Plan.

3. The Landowner hereby grants permission to the Municipality, its authorized agents, and employees, to enter upon the property, at reasonable times and upon presentation of proper credentials, to inspect the BMPs whenever necessary. Except in an emergency, the Municipality shall notify the Landowner prior to entering the property.
4. In the event the Landowner fails to operate and maintain the BMPs per paragraph 2, the Municipality or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMPs. 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.
5. 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, the Landowner shall reimburse the Municipality for all expenses (direct and indirect) incurred within 10 days of receipt of invoice from the Municipality.
6. The intent and purpose of this Agreement is to ensure the proper maintenance of the on-site BMPs by the Landowner, provided, however, that this Agreement shall not be deemed to create or effect any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.
7. The Landowner, its executors, administrators, assigns, and other successors in interests, shall release the Municipality from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against said employees and representatives from the construction, presence, existence, or maintenance of the BMPs by the Landowner or Municipality.
8. The Municipality may inspect the BMPs periodically to ensure their continued functioning.

This Agreement shall be recorded at the Office of the Recorder of Deeds of Armstrong 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, so long as the Property is developed pursuant to the Landowners Land Development Plan.

WITNESS the following signatures and seals:

ATTEST:

MANOR TOWNSHIP

Secretary

WITNESS:

LANDOWNER

COMMONWEALTH OF PENNSYLVANIA :
: ss.
COUNTY OF ARMSTRONG :

On this the ____ day of _____, A.D. 20____, before a NOTARY PUBLIC, the undersigned officer, personally appeared _____, who acknowledged himself to be the _____ of the TOWNSHIP OF MANOR and that he as such Manager, being authorized to do so, executed the foregoing instrument for the purposes therein contained by signing the name of the Township of MANOR by him as _____.

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

Notary Public

My commission expires:

COMMONWEALTH OF PENNSYLVANIA :
: ss.
COUNTY OF ARMSTRONG :

On this the ____ day of _____, A.D. 20____, before me a notary public the undersigned officer, personally appeared _____ known to me (or satisfactorily proven) to be the persons whose names are subscribed to the within instrument and acknowledged that they executed the same for the purposes therein contained.

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

Notary Public

My commission expires:

* NOTE: This Operation and Maintenance Agreement is subject to change at the discretion of the Township Solicitor.

APPENDIX B
STORMWATER MANAGEMENT DESIGN CRITERIA

H:\SEN\P\011\11325\Storm Water Management Ordinance\SWM ORDINANCE - 2016-5.docx

STORMWATER MANAGEMENT

Manor Township

Appendix B Stormwater Management Design Criteria

Table B-1 – Rational Method Runoff Coefficients

Hydraulic Soil Group	Storm	A			B			C			D		
		0-2%	2-6%	+6%	0-2%	2-6%	+6%	0-2%	2-6%	+6%	0-2%	2-6%	+6%
Slope Range													
Cultivated	<25 yr	0.08	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
Land	≥25 yr	0.14	0.08	0.22	0.16	0.21	0.28	0.2	0.25	0.34	0.24	0.29	0.41
Pasture	<25 yr	0.12	0.2	0.3	0.18	0.28	0.37	0.24	0.34	0.44	0.3	0.4	0.5
	≥25 yr	0.15	0.25	0.37	0.23	0.34	0.45	0.3	0.42	0.52	0.37	0.5	0.62
Meadow	<25 yr	0.10	0.16	0.25	0.14	0.22	0.3	0.2	0.28	0.36	0.24	0.3	0.4
	≥25 yr	0.14	0.22	0.3	0.2	0.28	0.37	0.26	0.35	0.44	0.3	0.4	0.5
Forest	<25 yr	0.05	0.08	0.11	0.08	0.11	0.14	0.1	0.13	0.16	0.12	0.16	0.2
	≥25 yr	0.08	0.11	0.14	0.1	0.14	0.18	0.12	0.16	0.2	0.15	0.2	0.25
Residential													
1/8 acre	<25 yr	0.25	0.28	0.31	0.27	0.3	0.35	0.3	0.33	0.38	0.33	0.36	0.42
	≥25 yr	0.33	0.37	0.4	0.35	0.39	0.44	0.38	0.42	0.49	0.41	0.45	0.54
1/4 acre	<25 yr	0.22	0.26	0.29	0.24	0.29	0.33	0.27	0.31	0.36	0.3	0.34	0.4
	≥25 yr	0.3	0.34	0.37	0.33	0.37	0.42	0.36	0.4	0.47	0.38	0.42	0.52
1/3 acre	<25 yr	0.19	0.23	0.26	0.22	0.26	0.3	0.25	0.29	0.34	0.28	0.32	0.39
	≥25 yr	0.28	0.32	0.35	0.3	0.35	0.39	0.33	0.38	0.45	0.36	0.4	0.5
1/2 acre	<25 yr	0.16	0.2	0.24	0.19	0.23	0.28	0.22	0.27	0.32	0.26	0.3	0.37
	≥25 yr	0.25	0.29	0.32	0.28	0.32	0.36	0.31	0.35	0.42	0.34	0.38	0.48
1 acre	<25 yr	0.14	0.19	0.22	0.17	0.21	0.26	0.2	0.25	0.31	0.24	0.29	0.35
	≥25 yr	0.22	0.26	0.29	0.24	0.28	0.34	0.28	0.32	0.4	0.31	0.35	0.46
Industrial	<25 yr	0.67	0.68	0.68	0.68	0.68	0.69	0.68	0.69	0.69	0.69	0.69	0.7
	≥25 yr	0.85	0.85	0.86	0.85	0.86	0.86	0.86	0.86	0.87	0.86	0.86	0.88
Commercial	<25 yr	0.71	0.71	0.72	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
	≥25 yr	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.9	0.89	0.89	0.9
Streets	<25 yr	0.7	0.71	0.72	0.71	0.72	0.74	0.72	0.73	0.76	0.73	0.75	0.78
	≥25 yr	0.76	0.77	0.79	0.8	0.82	0.84	0.84	0.85	0.89	0.89	0.91	0.95
Open Space	<25 yr	0.05	0.1	0.14	0.08	0.13	0.19	0.12	0.17	0.24	0.16	0.21	0.28
	≥25 yr	0.11	0.16	0.2	0.14	0.19	0.26	0.18	0.23	0.32	0.22	0.27	0.39
Parking or Impervious	<25 yr	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
	≥25 yr	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97

Source: Rawls, W.J., S.L. Long, and R.H. McCuen, 1981. Comparison of Urban Flood Frequency Procedures. Preliminary Draft Report prepared for the Soil Conservation Service, Beltsville, Maryland.

For simplification, a designer may use 0.3 for all pervious areas and 0.95 for all impervious areas.

Table B-2 – Runoff Curve Numbers [From NRCS (SCS) TR-55]

Runoff Curve Numbers for Urban Areas					
Cover Description		Curve Numbers for Hydrologic Soil Groups			
Cover Type and Hydrologic Condition	Average Percent Impervious Area	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, etc.):					
Poor condition (grass cover <50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover >75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc.		98	98	98	98
Streets and roads:					
Paved: curbed and storm sewers		98	98	98	98
Paved: open ditches		83	89	92	93
Gravel		76	85	89	91
Dirt		72	82	87	89
Urban districts:					
Commercial and business	85%	89	92	94	95
Industrial	72%	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less	65%	77	85	90	92
1/4 acre	38%	61	75	83	87
1/3 acre	30%	57	72	81	86
1/2 acre	25%	54	70	80	85
1 acre	20%	51	68	79	84
2 acres	12%	46	65	77	82

STORMWATER MANAGEMENT

Runoff Curve Numbers for Cultivated Agricultural Lands

Cover Description			Curve Numbers				
Cover Type	Treatment	Hydrologic Condition	A	B	C	D	
Fallow	Bare Soil	-	77	86	91	94	
	Crop residue cover (CR)	Poor	76	85	90	93	
		Good	74	83	88	90	
Row crops	Straight row (SR)	Poor	72	81	88	91	
		Good	67	78	85	89	
	SR + CR	Poor	71	80	87	90	
		Good	64	75	82	85	
	Contoured (C)	Poor	70	79	84	88	
		Good	65	75	82	86	
	C + CR	Poor	69	78	83	87	
		Good	64	74	81	85	
	Contoured and terraced (C and T)	Poor	66	74	80	82	
		Good	62	71	78	81	
	C and T + CR	Poor	65	73	79	81	
		Good	61	70	77	80	
	Small grain	SR	Poor	65	76	84	88
			Good	63	75	83	87
SR + CR		Poor	64	75	83	86	
		Good	60	72	80	84	
C		Poor	63	74	82	85	
		Good	61	73	81	84	
C + CR		Poor	62	73	81	84	
		Good	60	72	80	83	
C and T		Poor	61	72	79	82	
		Good	59	70	78	81	
C and T + CR		Poor	60	71	78	81	
		Good	58	69	77	80	
Close seeded or broadcast legumes or rotation meadow		SR	Poor	66	77	85	89
			Good	58	72	81	85
	C	Poor	64	75	83	85	
		Good	55	69	78	83	
	C and T	Poor	63	73	80	83	
		Good	51	67	76	80	

Runoff Curve Numbers for Other Agricultural Lands

Cover Description			Curve Numbers			
Cover Type	Treatment	Hydrologic Condition	A	B	C	D
Pasture, grassland, or range – continuous forage for grazing		Poor	68	79	86	89
		Fair	49	69	79	84
		Good	39	61	74	80
Meadow – continuous grass, protected from grazing and generally mowed for hay		-	30	58	71	78
Woods – grass combination (orchard or tree farm)		Poor	57	73	82	86
		Fair	43	65	76	82
		Good	32	58	72	79
Woods		Poor	45	66	77	83
		Fair	36	60	73	79
		Good	30	55	70	77
Farmsteads – buildings, lanes, driveways and surrounding lots		-	59	74	82	86