

Chapter 186 Soil Erosion and Sedimentation Control

[HISTORY: Adopted by the Township Council of the Township of Middletown 7-26-2004 by Ord. No. 654. Amendments noted where applicable.]

GENERAL REFERENCES

Construction codes — See Ch. 89.

Stormwater management — See Ch. 198.

Subdivision and land development — See Ch. 210.

§ 186-1 Purpose.

- A. The purpose of this chapter is to regulate the modification of natural terrain and the alteration of stormwater runoff by providing for certain soil erosion and sediment control management measures within the Township in order to protect the public health, safety and welfare of the general public. It is the intent of this chapter to implement the current Title 25, Rules and Regulations, Part 1, Department of Environmental Protection, Subpart C, Protection of Natural Resources, Article II Water Resources, Chapter 102, Erosion Control.
- B. In addition to the requirements of this chapter, there is a Department of Environmental Protection requirement for a NPDES permit (National Pollutant Discharge Elimination System). Persons proposing earth disturbance activities which disturb five or more acres, or an earth disturbance on any portion, part, or during any stage of, a larger common plan of development or sale that involves five or more acres of earth disturbance over the life of the project, or persons proposing earth disturbance activities with a point source discharge to surface waters of the commonwealth that disturb from one to less than five acres, or an earth disturbance on any portion, part, or during any stage of, a larger common plan of development or sale that involves one to less than five acres of disturbance with a point source discharge to surface waters of the commonwealth over the life of the project, must apply for the general NPDES permit for stormwater discharges associated with construction activities. A point source is defined as any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, well, discrete fissure, or container from which pollutants are or may be discharged.

§ 186-2 Applicability.

- A. Any person engaging in activities which disturb the nature topography and vegetation of their land or the land of others shall submit a soil erosion and sedimentation control plan to the Township for review and approval, and ensure compliance with § 275-198A through F, if applicable.
[Amended 9-10-2018 by Ord. No. 795]
- B. The following activities are specifically included under this chapter, which shall be known and may be cited as the Middletown Township "Soil Erosion and Sedimentation Control Regulations."
 - (1) Alteration of any existing grade or ground cover as a result of excavation, paving, filling, stripping, clearing, and the like over 1,000 square feet.
 - (2) Disturbance of natural overland or subsurface flow of stormwater by diversion, blockage, or alteration of flow rate by grading operations.
 - (3) Obstruction of the natural drainage of land by the construction of dams, retaining walls, ditches, culverts, bridges or other structures.

§ 186-3 Exemptions.

The following activities are specifically exempt from this chapter:

- A. Use of land for gardening primarily for home consumption.

- B. Agricultural use of lands in accordance with a farm conservation plan approved by the Delaware County Conservation District.
- C. Individual lot grading permits shall not be required if the finally approved and recorded subdivision and land development plan contains an approved grading plan for the entire tract to be developed, and if in the opinion of the Township Engineer, the proposed development of the individual lots does not sufficiently deviate from the overall grading plan. If the Township Engineer determines that an individual lot grading permit is required because of change in ownership or other circumstances, the applicant shall comply with the provisions of this chapter.
- D. In all cases where a proposed activity does not require a permit under this chapter, the landowner shall at all times comply with the applicable provisions of this chapter and the soil erosion and sedimentation control provisions. All bare earth shall be promptly seeded, sodded or otherwise stabilized and effectively protected from soil erosion.

§ 186-4 General.

- A. The permittee, who shall be the landowner of record identified in the application, shall be responsible for any property damage or personal injury which occurs in the performance of any activity under this chapter, even if the activity requires no permit. Escrow shall be posted, in accordance with a resolution adopted by the Township, from time to time, to ensure completion of any activity.
- B. No person, firm, corporation or entity shall modify, fill, excavate, pave, grade or regrade or otherwise disturb land within the Township, in any manner as to endanger or damage public or private property, or to cause physical damage or personal injury. All precautions shall be taken to prevent any damage to adjoining streets, sidewalks, buildings and other structures which could be caused by settling, cracking, soil erosion or sediment deposition.
- C. The management and the control of accelerated soil erosion on the site, both during and upon completion of the disturbances associated with grading, a proposed subdivision and/or land development, shall be accomplished in accordance with the standards and criteria of this chapter. The design of any temporary or permanent facilities and structures and the utilization of any natural drainage systems shall be in full compliance with these provisions.
- D. No person, firm, corporation or entity shall fail to adequately maintain in good operating order any drainage facility on his premises. All watercourses, drainage ditches, culverts, drain pipes and drainage structures shall be kept open and free flowing at all times.
- E. A landowner or developer shall be responsible for the maintenance of all disturbed areas, soil erosion and sedimentation control devices, drainage facilities, stormwater management structures, and other related structures during and after construction is completed.
- F. All graded surfaces shall be seeded, sodded, planted or otherwise protected from erosion within 20 days, weather permitting, and shall be watered, tended and maintained until growth is well established. The disturbed area and duration of exposure shall be kept within the identified limits of disturbance.
- G. Adequate provisions shall be made for dust control as determined by the Township Engineer.
- H. Any landowner and any person engaged in the alteration or development of land which may affect stormwater runoff characteristics shall implement such measures as are reasonably necessary to prevent injury to health, safety, or other property. These measures shall include such actions and are required:
 - (1) To insure that the maximum rate of stormwater runoff is not greater after development than prior to development activities; and
 - (2) To manage the quantity, velocity, quality and direction of the resulting stormwater runoff in a manner which otherwise adequately protects health and property from possible injury.

§ 186-5 Soil erosion and sedimentation control standards.

- A. Soil erosion and sedimentation control plans shall be submitted for all subdivisions, land developments and/or any other regulated land disturbance activity within the Township. The Township or its designated representative shall ensure and enforce compliance with the appropriate standards.
- B. Measures used to control soil erosion and reduce sedimentation shall as a minimum meet the latest revised standards, specifications and/or regulations of the Commonwealth of Pennsylvania, Department of Environmental Protection in its Soil Erosion and Sedimentation Control Manual.
- C. Any land disturbance activity whether subdivision, land development and/or other project shall be conducted only in compliance with the following principles:
- (1) There shall be no increase in or redirection of discharge of sediment or other solid materials from the site as a result of stormwater runoff; and any increase shall be deemed a violation of this chapter.
 - (2) Erosion and sedimentation control devices, such as temporary vegetation and mulch, temporary earthen berms, interceptor dikes, ditches, diversion terraces, rock filter berms, crushed stone tire scrubbers, silt basins, silt fences, and the like, appropriate to the scale of operations, shall be installed concurrent with earthmoving activities and whenever any situation is created which would contribute to increased soil erosion.
 - (3) Earthmoving operations shall be minimized where possible and practicable to preserve desirable natural features and the topography of the site. No cut or fill shall be steeper than 3:1 and should be blended into the existing topography.
 - (4) Stripping of vegetation, regrading or other development shall be done in such a way that will minimize soil erosion.
 - (5) To the maximum extent practicable, mature, healthy trees of at least 12 inches in caliper and other significant existing vegetation shall be retained and protected. Such trees shall not be removed, except as provided on the approved plan accompanying the land disturbance activity. The filling of soil more than five inches over the roots of trees to be preserved is prohibited. (The roots are presumed to extend out from the tree as far as the branches of the tree extend outward.)
 - (6) Land disturbance shall be limited to the actual construction site and an access strip. The amount of disturbed area and the duration of exposure shall be kept to a minimum. Disturbed areas shall be stabilized with vegetation, mulch, erosion control fabric, and the like, as soon as possible after earthmoving procedures.
 - (7) Provisions shall be made to effectively accommodate the increased runoff caused by changed soil and surface conditions during and after development. Water runoff shall be minimized and retained on-site wherever possible to facilitate groundwater recharge.
 - (8) Temporary vegetation and/or mulching shall be used to protect critical areas during development ("Critical areas" shall be construed to mean those portions of a site which are extremely vulnerable to soil erosion.)
 - (9) The permanent final vegetation and structural soil erosion control and drainage measures shall be installed as soon as practical in the development in accordance with the approved plans.
 - (10) Sediment in the runoff water shall be trapped until the disturbed area is stabilized by the use of debris and sediment basins, silt fences or other approved measures. Sediment deposits in basins, silt fences, and the like, shall be removed at periodic intervals during the construction period.
 - (11) Soils and rock or geologic formations with water supply potential shall be protected from contamination by surface water or other source or disruption caused by construction activity. Prior to any work, protective procedures shall be developed and submitted to the Township Engineer for review and approval.
 - (12) A soil erosion and sedimentation control permit shall be obtained as required from the Pennsylvania Department of Environmental Protection for all developments in which more than one acre will be disturbed.

D. The following practices shall be required for all subdivisions, land developments and/or other regulated land disturbance activity, unless the Township determines that they are not applicable.

- (1) Silt fences shall be utilized in lieu of straw bale silt barriers and shall be securely anchored in place.
- (2) Approved silt fences or silt traps shall be placed at all inlets, headwalls, basin outlets and similar drainage structures during the construction period in order to prevent sediment from entering any watercourse, storm drainage system, or other areas downstream.
- (3) Temporary on-lot berms shall be required during construction. The top width of the berms shall be a minimum of three feet in width, with side slopes of 3:1 maximum.
- (4) Crushed stone tire scrubbers shall be placed at all entrances to construction areas immediately at the time of commencement of construction. Tire scrubbers shall be of sufficient width and length to prevent the transportation of sediment off of the construction site.
- (5) Temporary and permanent seeding and mulch specifications shall be noted on all plans. The specifications shall include lime and fertilizer rates of application, as well as other provisions regarding procedures and materials. The Township shall require hydro-seeding of all graded areas associated with street construction and stormwater management basins. Seeding and mulch must be done within 20 days of disturbance, unless otherwise specified.
- (6) During roadway grading, interceptor dikes shall be installed on all roadway subgrades with slopes in excess of 5% to prevent soil erosion of the subgrade. The interceptor dikes shall divert runoff through silt traps or silt fences.
- (7) The crushed stone base course for driveways, roadways and parking areas shall be applied as soon as possible after grading procedures, in order to prevent soil erosion of the subgrade.
- (8) Drainage swales and ditches, and all slopes greater than 4:1 shall be protected against erosive velocities with soil erosion control measures such as erosion control fabric and other material as approved by the Township.
- (9) Energy dissipaters and/or stilling basins shall be installed at the outlet end of all storm drainage facilities.
- (10) All road rights-of-way and stormwater management basins shall be hydro-seeded within seven days of final grading.

§ 186-6 Soil erosion and sedimentation control plan.

A. General requirements for subdivisions and/or land developments. For all subdivisions and/or land developments, a soil erosion and sediment control plan and report shall be submitted containing but not limited to the information required below. For any other regulated land disturbance activity, see Subsection B below. The determination of the need for additional information shall be made by the Township Engineer after conducting a review of the following:

- (1) A map depicting the total watershed. A USGS Quadrangle Map is suitable as the source for such a map. However, the watershed area must be highlighted or otherwise distinguished from other areas outside the watershed.
- (2) Maps and drawings showing all existing and proposed drainage facilities affecting the subject property.
- (3) A plan of the site, at a scale of no less than one inch equals 50 feet, prepared by a registered engineer or surveyor and including the following:
 - (a) All existing topographic features with a contour interval of at least two feet.
 - (b) Boundary survey information.
 - (c) Location and description of all vegetative and land cover characteristics.
 - (d) All existing utilities.

- (e) Soil types.
 - (f) All existing natural or man-made features as more fully required in Chapter 210, Subdivision and Land Development.
 - (g) All proposed improvements, including but not limited to proposed buildings, driveways, swimming pools, stormwater drainage systems, sewage disposal systems, wells, stormwater management facilities, grading, soil erosion and sedimentation controls and procedures, and the like.
 - (h) Profiles of all proposed sewers, including elevations, sizes, slopes and materials, at a scale of no less than one inch equals 50 feet horizontal and one inch equals five feet vertical.
 - (i) Staging of earthmoving activities and program of operation.
 - (j) Locations, dimensions and design details required for the construction of all facilities.
 - (k) All soil erosion and sedimentation control measures, temporary as well as permanent, and sufficient detail in order to clearly indicate effectiveness of the plan.
 - (l) Project specifications relative to stormwater control, soil erosion and sedimentation.
 - (m) When major control facilities, such as detention/retention basins, are planned, soil structures and characteristics shall be investigated and analyzed. Plans and data shall be prepared and submitted by a licensed professional engineer or geologist with experience and education in soil mechanics. These submissions should consider and offer design solutions for frost heave potential, shrink-swell potential, soil bearing strength, water infiltration, soil settling characteristics, suitability of existing soils for placement of fill, fill and backfilling procedures and soil treatment techniques as required to protect the improvements or structures.
- (4) The design computations for the stormwater drainage systems including storm drain pipes and inlets, runoff control measures, and culverts and drainage channels.
- (5) A narrative report of the project stating the proposed and engineering assumptions and calculations for control measures and facilities. The following information shall be included:
- (a) General description of the project.
 - (b) General description of accelerated runoff control plan.
 - (c) General description of soil erosion and sedimentation control plan.
 - (d) Expected project time schedule, including anticipated start and completion dates.
 - (e) The stormwater characteristics of the project as related to its location within the watershed(s).
 - (f) On-site detention methods.
 - (g) Methodology and basis of design computations.
 - (h) Brief description of soils and their characteristics.
- (6) The soil erosion and sedimentation control plan shall comply with all other applicable provisions of this chapter and any other applicable Township ordinances, codes or regulations.
- B. General requirements for any other regulated land disturbance activity.
- (1)

An area plan or plans describing existing and proposed features of the area surrounding the site of the work, including topography, existing vegetation, watercourses, man-made features, the affected watersheds and other pertinent natural features.

- (2) A topographical survey plan of the site, at a suitable scale of no less than one inch equals 50 feet, and contour interval of no more than two feet, prepared by a registered engineer or surveyor, also including a boundary line survey, the location and description of vegetative cover, soil types and any other pertinent existing natural or man-made features.
- (3) An improvements plan at the same scale as the topographic survey plan showing and describing all changes to the site including cuts, fills, structures, paving, utilities, all erosion and sedimentation controls, stormwater management facilities, details, procedures, etc. (This information may be combined with the topographic survey plan, provided the combined plan is clear and legible.)
- (4) A time schedule indicating the anticipated starting and completion dates of the development sequence, and the time of exposure of each area prior to the completion of effective erosion and sediment control measures.
- (5) Special requirements. The Township may require any additional information when the area of a site to be disturbed exceeds one acre, or when smaller sites are environmentally sensitive because of the presence of watercourses, steep slopes, woodland and the like.
- (6) All plans required pursuant to this chapter shall be prepared and sealed by a registered engineer, land surveyor or landscape architect licensed in the Commonwealth of Pennsylvania.

§ 186-7 Approvals from regulating agencies.

All requirements of the Pennsylvania Department of Transportation, Pennsylvania Department of Environmental Protection and/or the USDA Natural Resources Conservation Service and the Delaware County Soil Conservation Service, with regards to erosion and sediment control, shall be followed, and evidence of approvals by those agencies shall be submitted to the Township.

§ 186-8 Soil erosion and sedimentation control maintenance and responsibilities.

- A. Whenever sedimentation is caused by stripping vegetation, regrading or other development, it shall be the responsibility of the person causing such sedimentation to remove the accumulated sediment from all adjoining or downstream properties, surfaces, drainage systems, watercourses and roadways and to repair any damage at his expense as quickly as possible.
- B. All necessary soil erosion and sedimentation control measures installed under this chapter, shall be adequately maintained by the landowner or developer during and after completion of the approved plan.

§ 186-9 Stormwater management requirements.

In addition to the soil erosion and sedimentation control regulations of this chapter, any land disturbance activity whether subdivision, land development and/or other project shall also comply with Chapter 198, Stormwater Management. In the event of a conflict or inconsistency between the requirements of this chapter and Chapter 198, regarding stormwater management, the requirements of Chapter 198 shall control.

§ 186-10 Application for permit.

- A. Any person, firm or corporation proposing to engage in an activity requiring a permit hereunder shall apply for a permit by written application on a form furnished by the Township.
- B.

A separate application shall be required for each grading permit. Three copies of the proposed plan, including specifications and timing schedules, shall be submitted with each application for a permit. One of the copies, at the discretion of the Township, shall be submitted to the Delaware County Conservation District for comment and review.

- C. The application for a permit shall be accompanied by a permit fee, which shall be established by Township resolution, as adopted by Township Council from time to time.
- D. Before any permit is granted, the applicant shall post an escrow account with the Township. The exact sum shall be determined by Township resolution. For larger tracts of land, an escrow agreement shall be signed by the applicant and approved by the Township Manager and/or Engineer, the condition of which shall be a full and complete compliance with this chapter, and all terms of the permit. Among other items, the escrow account shall be used for the repayment of the costs incurred by the Township for inspections, to reestablish the erosion, sediment and stormwater control features, and to repair any damage done to adjacent properties. Once the escrow account is 50% depleted, it shall be replenished to the original amount.
- E. The permit shall be valid for the time period indicated on the permit, or two years, whichever is less. The applicant may request the permit period be extended by giving 30 days written notice to the Township prior to expiration of the permit. At this time, the Township shall review the status of the permit and shall decide whether or not to grant or deny the extension.

§ 186-11 Inspections.

All earthwork and materials shall be subject to inspection for conformity with the terms of this chapter and Chapter 210, Subdivision and Land Development.

- A. The Township may inspect any earth disturbing or water flow alteration activities covered by this chapter on a random basis to assure full compliance with the soil erosion and sedimentation control plans on file in the Township.
- B. During inspections, if it is found that the soil or other conditions are not as stated or shown in the application and plans approved or the work is not proceeding in accord with the plans, the Township may refuse to approve further work and revoke and or all permits and/or agreements until approval is obtained for a revised soil erosion and sedimentation control plan conforming to existing conditions.
- C. If, at any stage of the work, the Township shall determine by inspection that the nature of the work is such that further work as authorized by an existing permit is likely to endanger property, streets, or create hazardous conditions, the Township may require as a condition to allowing the work to be done that such reasonable safety precautions shall be implemented by the permittee as the Township considers advisable to avoid such likelihood of danger.
- D. No person shall interfere with or obstruct the ingress or egress to or from any such site or premises by an authorized representative or agent of the Township engaged in the inspection of work for compliance with the approved plans.
- E. All plans must be kept on the site during construction and through to inspection.
- F. A final inspection shall be conducted by the Township Engineer to certify compliance with this chapter. Compliance with this chapter and/or Chapter 210, Subdivision and Land Development, shall be necessary before issuance of an occupancy permit.
- G. For any work authorized by the Township under this chapter that remains uncompleted, the permittee may request a temporary certificate of occupancy from the Township. If approved, the temporary certificate shall contain a written list of uncompleted items and is valid for no more than 30 days from the date of issuance. In addition, the permittee shall post additional escrow with the Township sufficient to satisfy the cost of completing the uncompleted items listed on the temporary certificate. No permanent certificate of occupancy shall be issued until all of the uncompleted items have been completed. In the event that the permittee fails to satisfy the uncompleted items within the time stated on the temporary certificate, the Township, may, in addition to any other remedies available to it in law or equity, draw upon said escrow funds and cause the outstanding items to be completed.

§ 186-12 Costs of inspection.

All applicants shall bear all costs of inspections required hereunder. Such costs shall be deducted from the escrow account as established under § 186-10D above. The costs of inspections shall be charged at the rate established by Township resolution, adopted by Township Council from time to time, or actual costs incurred. The Township shall have the right to seek outside consultants to provide independent inspections, plan review and inspection reports.

§ 186-13 Waivers.

For applications not involving subdivision or land development review and approval, one or more provisions of this chapter may be modified by the Township Council, upon recommendation of the Township Engineer, if the literal enforcement of the provisions will exact undue hardship because of peculiar conditions pertaining to the land in question, provided such modification will not be contrary to the public interest and that the purpose and intent of this chapter is observed.

- A. All requests for a modification shall be in writing. The request shall state in full the grounds and facts of unreasonableness or hardship on which the request is based, the provision or provisions of this chapter involved and the minimum modification necessary.
- B. The Township shall keep a written record of all action on all requests for modifications.
- C. In granting any modification, the Township Council shall prescribe any conditions that they deem necessary to or desirable for the public interest. In making their findings, the Township Council shall take into account the nature of the proposed use of land and the existing use of land in the vicinity, the probable effect of the proposed subdivision and/or upon traffic conditions, fire, police protection and other utilities and services in the vicinity. No modification shall be granted unless the Township Council finds:
 - (1) That there are special circumstances or conditions affecting said property such that the strict application of the provisions of this chapter would deprive the applicant of the reasonable use of the land.
 - (2) That the modification is necessary for the preservation and enjoyment of a substantial property right of the applicant.
 - (3) That the granting of the modification will not be detrimental to the public welfare or injurious to other property in the area in which said property is situated.

§ 186-14 Violations and penalties.

Any person, firm or corporation violating any provisions of this chapter shall, upon summary conviction before any Magisterial District Judge, be fined an amount not exceeding \$500 and costs of prosecution, and in default thereof, may be imprisoned in the county jail for a term of not more than 30 days. Each and every day in which any person, firm or corporation shall be in violation of this chapter shall constitute a separate offense.

Chapter 198 Stormwater Management

Article III Stormwater Management**§ 198-9 General requirements.**

- A. Applicants proposing regulated activities in the Township which do not fall under the exemption criteria shown in § 198-6 shall submit a stormwater management site plan consistent with this chapter and the applicable watershed stormwater management plan to the Township for review. The stormwater management criteria of this chapter shall apply to the total proposed development even if development is to take place in stages.
- B. No regulated activity within the Township shall commence until the Township issues approval of a SWM plan, which demonstrates compliance with the requirements of this chapter. "Regulated earth disturbance" is defined to mean any activity involving earth disturbance subject to regulation under 25 Pa. Code Chapter 92,^[1] 25 Pa. Code Chapter 102, or the Clean Streams Law.^[2]
- (1) For any site where there is no known drainage problem downstream with proposed regulated earth disturbance equal to or greater than one acre where, after a close evaluation of alternative site designs, it proves to be impracticable to meet the mandatory minimum volume and infiltration control standards of this chapter onsite, the Township may approve measures other than those in this chapter after consultation with and evaluation by PADEP that the alternate site design meets State water quality requirements and does not conflict with State law, including, but not limited to, the Clean Streams Law.
- (2) For any site where there is no known drainage problem downstream with proposed regulated earth disturbance that is less than one acre where, after a close evaluation of alternative site designs, it proves to be impracticable to meet any one or more of the mandatory minimum standards of this chapter onsite, the Township may approve measures other than those in this chapter.
- [1] *Editor's Note: Chapter 92 of Title 25 of the Pennsylvania Code was reserved 10-8-2010, effective 10-9-2010. It was replaced by Chapter 92a, National Pollutant Discharge Elimination System (NPDES) Permitting, Monitoring and Compliance.*
- [2] *Editor's Note: See 35 P.S. § 691.1 et seq.*
- C. The applicant is required to design the site to minimize surface discharge of stormwater and the creation of impervious surfaces in order to maintain, as much as possible, the natural hydrologic regime.
- D. The SWM site plan must be designed consistent with the sequencing provisions of § 198-12 to ensure maintenance of the natural hydrologic regime, to promote infiltration, and to protect groundwater and surface water quality and quantity. The SWM site plan designer must proceed sequentially in accordance with Article III of this chapter.
- E. Stormwater drainage systems shall be designed in order to preserve natural flow conditions to the maximum extent practicable.
- F. Existing drainage discharge onto adjacent property shall not be altered in any manner without obtaining a drainage easement from affected downstream property owners and providing the facilities to safely convey the flow, and a maintenance access agreement with the affected property owner(s). Such discharge shall be subject to any applicable discharge criteria specified in this chapter and still must meet the requirements of Act 167.^[3]
- [3] *Editor's Note: See 32 P.S. § 680.1 et seq.*
- G. Areas of existing diffused drainage discharge, whether proposed to be concentrated or maintained as diffused drainage areas, shall be subject to any applicable discharge criteria in the general direction of existing discharge, except as otherwise provided by this chapter. If diffused drainage discharge 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 impacts will result from the concentrated discharge.
- H. Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration trenches, etc., is encouraged where soil conditions permit in order to reduce the size or eliminate the need for detention facilities or other structural BMPs.
- I. All stormwater runoff from new development or redevelopment shall be pretreated for water quality prior to discharge to surface or groundwater. Rooftop runoff may go directly to an infiltration BMP or be evapotranspired.
- J. All regulated activities within the Township shall be designed, implemented, operated, and maintained to meet the purposes of this chapter, through these two elements:
- (1) Erosion and sediment control during earth disturbance activities (e.g., during construction); and
- (2) Water quality protection measures after completion of earth disturbance activities (i.e., after construction), including operations and maintenance.

- K. The BMPs shall be designed, implemented, and maintained to meet state water quality requirements and any other more stringent requirements as determined by the Township.
- L. Post-construction water quality protection shall be addressed as required by § 198-14.
- M. Operations and maintenance of permanent stormwater BMPs shall be addressed as required by Article VII.
- N. All BMPs used to meet the requirements of this chapter shall conform to the state water quality requirements and any more stringent requirements as set forth by the Township.
- O. Techniques described in Appendix E (Low Impact Development)^[4] of this chapter shall be considered because they reduce the costs of complying with the requirements of this chapter and the state water quality requirements.
[4] *Editor's Note: Appendix E is included as an attachment to this chapter.*
- P. In selecting the appropriate BMPs or combinations thereof, the applicant shall consider the following:
- (1) Total contributing drainage area.
 - (2) Permeability and infiltration rate of the site's soils.
 - (3) Slope and depth to bedrock.
 - (4) Seasonal high-water table.
 - (5) Proximity to building foundations and wellheads.
 - (6) Erodibility of soils.
 - (7) Land availability and configuration of the topography.
 - (8) Peak discharge and required volume control.
 - (9) Stream bank erosion.
 - (10) Efficiency of the BMPs to mitigate potential water quality problems.
 - (11) The volume of runoff that will be effectively treated.
 - (12) The nature of the pollutant being removed.
 - (13) Maintenance requirements.
 - (14) Creation/protection of aquatic and wildlife habitat.
 - (15) Recreational value.
 - (16) Enhancement of aesthetic and property values.
- Q. The design of all stormwater management facilities shall incorporate sound engineering principles and practices in a manner that does not aggravate existing stormwater problems. The Township reserves the right to disapprove any design that would result in construction in or continuation of a stormwater problem area.
- R. The applicant may meet the stormwater management criteria through off-site stormwater management measures as long as the proposed measures are in the same subwatershed as shown in Appendix A,^[5] and there is no known drainage problem downstream from the site.
[5] *Editor's Note: Appendix A is included as an attachment to this chapter.*
- S. Stormwater hotspots. Stormwater runoff from hotspots shall be pretreated prior to surface or groundwater infiltration to prevent pollutant runoff. Industrial sites referenced in 40 CFR 125 are examples of hotspots.
- (i) Below is a list of examples of hotspots:
 - (a) Vehicle salvage yards and recycling facilities.
 - (b) Vehicle fueling stations.

- (c) Vehicle service and maintenance facilities.
 - (d) Vehicle and equipment cleaning facilities.
 - (e) Fleet storage areas (bus, truck, etc.).
 - (f) Industrial sites based on Standard Industrial Classification Codes.
 - (g) Marinas (service and maintenance areas).
 - (h) Outdoor liquid container storage.
 - (i) Outdoor loading/unloading facilities.
 - (j) Public works storage areas.
 - (k) Facilities that generate or store hazardous materials.
 - (l) Commercial container nursery.
 - (m) Contaminated sites/brownfields.
 - (n) Other land uses and activities as designated by an appropriate review authority.
- (2) The following land uses and activities are not normally considered hotspots:
- (a) Residential streets and rural highways.
 - (b) Residential development.
 - (c) Institutional development.
 - (d) Office developments.
 - (e) Nonindustrial rooftops.
 - (f) Pervious areas, except golf courses and nurseries [which may need an integrated pest management (IPM) plan].
- (3) While streets and highways [average daily traffic volume (ADT) greater than 30,000] are not considered stormwater hotspots, it is important to ensure that highway stormwater management facilities are designed to adequately protect receiving streams and/or groundwater.
- (4) The Environmental Protection Agency's (EPA) NPDES stormwater program requires some industrial sites to prepare and implement a stormwater pollution prevention plan.
- T. The following standards for protection of down gradient properties from off-site conveyance must be accomplished. For any location where a new concentrated discharge of stormwater from any frequency rainfall event, up to and including the one-hundred-year, twenty-four-hour event, will flow onto a down gradient property, the following are required:
- (1) A drainage easement (or other legal agreement/approval) must be obtained for conveyance of discharges onto or through adjacent properties.
 - (2) The conveyance must be designed to avoid erosion, flooding, or other damage to the properties through which it is being conveyed.

§ 198-10 Permit requirements by other governmental entities.

The following permit requirements may apply to certain regulated earth disturbance activities and must be met prior to commencement of regulated earth disturbance activities, as applicable:

- A. All regulated earth disturbance activities subject to permit requirements by PADEP under regulations at Title 25 Pennsylvania Code Chapter 102.
- B. Work within natural drainage ways subject to permit by PADEP under Title 25 Pennsylvania Code Chapter 105.
- C. Any stormwater management facility that would be located in or adjacent to surface waters of the commonwealth, including wetlands, subject to permit by PADEP under Title 25 Pennsylvania Code Chapter 105.

- D. Any stormwater management facility that would be located on or discharging to a state highway right-of-way, or require access to or from a state highway shall be subject to approval by Penn DOT.
- E. Culverts, bridges, storm sewers, or any other facilities which must pass or convey flows from the tributary area and any facility which may constitute a dam subject to permit by PADEP under Title 25 Pennsylvania Code Chapter 105.

§ 198-11 Erosion and sediment control during regulated earth disturbance activities.

- A. No regulated earth disturbance activities within the Township shall commence until the Township receives an approval from the PADEP in compliance with Title 25 Chapter 102 of the Pennsylvania Code of an erosion and sediment control plan for construction activities if applicable.
- B. PADEP has regulations regarding an erosion and sediment control plan under Title 25 Pennsylvania Code Chapter 102.
- C. In addition, under Title 25 Pennsylvania Code Chapter 92,^[1] a PADEP "NPDES Construction Activities" permit is required for regulated earth disturbance activities.
 [1] *Editor's Note: Chapter 92 of Title 25 of the Pennsylvania Code was reserved 10-8-2010, effective 10-9-2010. It was replaced by Chapter 92a, National Pollutant Discharge Elimination System (NPDES) Permitting, Monitoring and Compliance.*
- D. Evidence of any necessary permit(s) for regulated earth disturbance activities from the appropriate PADEP regional office or County Conservation District must be provided to the Township. The issuance of an NPDES Construction Permit [or permit coverage under the statewide General Permit (PAG-2)] satisfies the requirements of § 198-21A.
- E. A copy of the erosion and sediment control plan and any required permit, as required by PADEP regulations, shall be available on the project site at all times.
- F. Additional erosion and sediment control design standards and criteria are recommended to be applied where infiltration BMPs are proposed. At a minimum, they shall include the following:
 - (1) Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase to maintain maximum infiltration capacity.
 - (2) Infiltration BMPs shall not be constructed nor receive runoff until the entire drainage area contributory to the infiltration BMP has achieved final stabilization.
- G. All work shall conform to the Middletown Township Erosion and Sediment Control Ordinance, Chapter 186.

§ 198-12 Nonstructural project design process (sequencing to minimize stormwater impacts).

The design of all regulated activities shall include the following to minimize stormwater impacts to reduce the surface discharge of stormwater, reduce the creation of unnecessary impervious surfaces, prevent the degradation of waters of the Commonwealth, and maintain as much as possible the natural hydrologic regime of the site.

- A. The applicant shall apply Low Impact Development (LID) methods such as those listed in Appendix E,^[1] provided that use of this method does not conflict with other local codes.
 [1] *Editor's Note: Appendix E is included as an attachment to this chapter.*
- B. The applicant shall demonstrate that the design process follows the sequence noted below. The goal of the sequence is to minimize the increases in stormwater runoff and impacts to water quality resulting from the proposed regulated activity:
 - (1) The following items in this subsection shall be addressed prior to development of other stormwater management site plan design elements:
 - (a) Prepare an existing resource and site analysis map (ERSAM) showing environmentally sensitive areas including, but not limited to, steep slopes, ponds, lakes, streams, wetlands, hydric soils, vernal pools, stream buffers, and hydrologic soil groups. Land development, any existing recharge areas, and other requirements outlined in the Township SALDO shall also be included.
 - (b) Establish a stream buffer according to § 198-14D.
 - (c) Prepare a draft project layout avoiding sensitive areas identified in § 198-12B(1)(a).
 - (d) Identify site-specific existing conditions drainage areas, discharge points, recharge areas, and hydrologic soil groups A and B (areas conducive to infiltration).
 - (e) Evaluate nonstructural stormwater management alternatives:

- [1] Minimize earth disturbance.
 - [2] Minimize impervious surfaces.
 - [3] Break up large impervious surfaces.
- (f) Determine into what management district the site falls (**Appendix A**),^[2] and conduct an existing conditions runoff analysis.
 [2] *Editor's Note: Appendix A is included as an attachment to this chapter.*
- (2) The following items in this subsection may be addressed in any order provided that all items in § 198-12B(1) have been completed.
- (a) Satisfy the infiltration objective (§ 198-13) and provide for stormwater pretreatment prior to infiltration.
 - (b) Provide for water quality protection in accordance with § 198-14 water quality requirements.
 - (c) Provide stream bank erosion protection in accordance with § 198-15 stream bank erosion requirements.
 - (d) Prepare final project design to maintain existing conditions drainage areas and discharge points, to minimize earth disturbance and impervious surfaces, and, to the maximum extent possible, to ensure that the remaining site development has no surface or point discharge.
 - (e) Conduct a proposed conditions runoff analysis based on the final design that meets the management district requirements (§ 198-16).
 - (f) Manage any remaining runoff prior to discharge through detention, bioretention, direct discharge, or other structural control.

§ 198-13 Infiltration volume requirements.

Providing for infiltration consistent with the natural hydrologic regime is required. Design of the infiltration facilities shall consider infiltration to compensate for the reduction in the recharge that occurs when the ground surface is disturbed or impervious surface is created. If it cannot be physically accomplished, then the design professional shall be responsible for demonstrating to the satisfaction of the Township that this cannot be physically accomplished on the site (e.g., shallow depth to bedrock or limiting zone, open voids, steep slopes, etc. If it can be physically accomplished, the volume of runoff to be infiltrated shall be determined from § 198-13A(2) depending on demonstrated site conditions, and shall be the greatest volume that can be physically infiltrated. For example:

Any applicant (developer or redeveloper) shall first attempt to infiltrate the volume required in § 198-13A(2)(a).

If the § 198-13A(2)(a) requirement cannot be physically accomplished, then the applicant is required to attempt to infiltrate the volume required in Section 198-13A(2)(b).

Finally, if the § 198-13A(2)(b) infiltration volume cannot be physically accomplished, the applicant must, at a minimum, infiltrate the volume required in § 198-13A(2)(c).

A. Infiltration BMPs shall meet the following minimum requirements:

- (1) Infiltration BMPs intended to receive runoff from developed or redeveloped areas shall be selected based on suitability of soils and site conditions and shall be constructed on soils that have the following characteristics:
 - (a) A minimum depth of 24 inches between the bottom of the BMP and the top of the limiting zone.
 - (b) An infiltration rate sufficient to accept the additional stormwater volume and dewater completely as determined by field tests conducted by the applicant's design professional.
 - (c) The infiltration facility shall be capable of completely draining the retention (infiltration) volume (R_e) within three days (72 hours) from the end of the design storm.
- (2) The size of the infiltration facility and R_e shall be based upon the following volume criteria:
 - (a) Modified Control Guideline One (MCG-1) of the Pennsylvania Stormwater Best Management Practices (PA BMP) Manual. The retention (infiltration) volume (R_e) to be captured and infiltrated shall be the net two-year, twenty-four-hour volume. The net volume is the difference between the post-development runoff volume and the predevelopment runoff volume. The post-development total runoff volume for all storms equal to or less than the two-year, twenty-four-hour duration precipitation shall not be increased. For modeling purposes, existing (predevelopment) nonforested pervious areas must be considered meadow in good condition or its equivalent, and 20% of existing impervious area, when present, shall be considered meadow in good condition.

[Amended 11-9-2015 by Ord. No. 761]

- (b) Infiltrating the entire Re_v volume in § 198-13A(2)(a)(above) may not be feasible on every site due to site-specific limitations such as shallow depth to bedrock or the water table. If it cannot be physically accomplished, then the following criteria from Modified Control Guideline Two (MCG-2) of the PA BMP Manual must be satisfied:

[1] At least the first one-inch of runoff from new or replacement impervious surfaces shall be infiltrated.

$$Re_v = 1 \text{ (Inch)} * \text{Impervious area (square feet)} \div 12 \text{ (Inches)} = \text{cubic feet (cf)}$$

An asterisk (*) in equations denotes multiplication.

- (c) Only if infiltrating the entire Re_v volume in Section 198-13.A.2.b (above) cannot be physically accomplished, then the following minimum criteria from Modified Control Guideline Two (MCG-2) of the PA BMP Manual must be satisfied:

[1] Wherever possible, infiltration facilities should be designed to accommodate infiltration of the entire water quality volume (WQv) (Section 198-14B); however, in all cases at least the first one-half inch of the WQv shall be infiltrated. The minimum infiltration volume (Re_v) required would, therefore, be computed as:

$$Re_v = I * \text{Impervious area (square feet)} \div 12 \text{ (Inches)} = \text{cubic feet (cf)}$$

An asterisk (*) in equations denotes multiplication.

Where:

I = The maximum equivalent infiltration amount (inches) that the site can physically accept or 0.50 inch, whichever is greater.

[2] The retention volume values derived from the methods in § 198-13A(2)(a), (b) or (c) is the minimum volume the applicant must control through an infiltration BMP facility. If site conditions preclude capture of runoff from portions of the impervious area, the infiltration volume for the remaining area should be increased an equivalent amount to offset the loss.

[3] In circumstances where it is demonstrated to the reasonable satisfaction of the Township Engineer that the minimum of 0.50 inch of infiltration requirement cannot be physically accomplished, the Township may approve an alternate stormwater volume control design, other than those described in this § 198-13A(2)(a), (b) or (c), after consultation with and evaluation by the Pennsylvania Department of Environmental Protection (PADEP) and confirmation that the alternative stormwater volume control design is consistent with the requirements of Chapter 102 of Title 25 of the Pennsylvania Code and meets the current PADEP design guidelines for managing runoff volume, where infiltration is not feasible.

[Added 11-9-2015 by Ord. No. 761]

- B. Soils. A detailed soils evaluation of the project site shall be required to determine the suitability of infiltration facilities. The evaluation shall be performed by a qualified design professional and at minimum address soil permeability, depth to bedrock, and subgrade stability. The general process for designing the infiltration BMP shall be:
- (1) Analyze hydrologic soil groups as well as natural and man-made features within the site to determine general areas of suitability for infiltration practices. In areas where development on fill material is under consideration, conduct geotechnical investigations of subgrade stability; infiltration may not be ruled out without conducting these tests.
 - (2) Provide field tests such as double ring infiltrometer or hydraulic conductivity tests (at the level of the proposed infiltration surface) to determine the appropriate hydraulic conductivity rate. Percolation tests are not recommended for design purposes.
 - (3) Design the infiltration structure for the required retention (Re_v) volume based on field determined capacity at the level of the proposed infiltration surface.
 - (4) If on-lot infiltration structures are proposed by the applicant's design professional, it must be demonstrated to the Township that the soils are conducive to infiltrate on the lots identified.
- C. Infiltration facilities should, to the greatest extent practicable, be located to avoid introducing contaminants via groundwater, and be in conformance with an approved source water protection assessment or source water protection plan.
- D. Roadway drainage systems should provide an opportunity to capture accidental spills. Road deicing material storage facilities shall be designed to avoid salt and chloride runoff from entering waterways and infiltration facilities. The qualified design professional shall evaluate the possibility of groundwater contamination from the proposed infiltration facility and perform a hydrogeologic justification study if necessary.
- E. The antidegradation analysis found in Chapter 93^[1] shall be applied in HQ or EV streams.

[1] Editor's Note: See 25 Pa. Code Chapter 93.

- F. An impermeable liner will be required in detention basins where the possibility of groundwater contamination exists. The Township may require a detailed hydrogeologic investigation.
- G. The applicant should provide safeguards against groundwater contamination for land uses that may cause groundwater contamination should there be a mishap or spill.

§ 198-14 Water quality requirements.

The applicant shall comply with the following water quality requirements of this article.

- A. To control post-construction stormwater impacts from regulated activities and conform to state water quality requirements, BMPs which replicate predevelopment stormwater infiltration and runoff conditions must be provided in the site design such that post-construction stormwater discharges do not degrade the physical, chemical, or biological characteristics of the receiving waters. This may be achieved by the following:
 - (1) Infiltration: replication of preconstruction stormwater infiltration conditions;
 - (2) Treatment: use of water quality treatment BMPs to provide filtering of chemical and physical pollutants from the stormwater runoff; and
 - (3) Stream bank and streambed protection: management of volume and rate of post-construction stormwater discharges to prevent physical degradation of receiving waters (e.g., from scouring).
- B. Developed areas shall provide adequate storage and treatment facilities necessary to capture and treat stormwater runoff. The infiltration volume computed under § 198-13 may be a component of the water quality volume if the applicant chooses to manage both components in a single facility. If the calculated water quality volume (WQv) is greater than the volume required to be infiltrated as described in § 198-13A(2), then the difference between the two volumes shall be treated for water quality by an acceptable stormwater management practice(s). The required water quality volume (WQv) is the storage capacity needed to capture and treat a portion of stormwater runoff from the developed areas of the site. To achieve this requirement, the following criterion is established:
 - (1) From Control Guideline (CG-1) in the PA BMP Manual, the water quality volume shall be the net two-year, twenty-four-hour volume. The net volume is the difference between the post-development runoff volume and the predevelopment runoff volume. The post-development total runoff volume for all storms equal to or less than the two-year, twenty-four-hour duration precipitation shall not be increased. For modelling purposes, existing (predevelopment) nonforested pervious areas must be considered meadow in good condition or its equivalent; and 20% of existing impervious area, when present, shall be considered meadow in good condition. [Amended 11-9-2015 by Ord. No. 761]
 - (2) This volume requirement can be managed by the permanent volume of a wet basin or the detained volume from other BMPs. Where appropriate, wet basins shall be utilized for water quality control and shall follow the guidelines of the PA BMP Manual referenced in Appendix G.^[1]
[1] Editor's Note: Appendix G is included as an attachment to this chapter.
 - (3) Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility). The design of the facility shall provide for protection from clogging and unwanted sedimentation.
- C. The temperature of receiving waters shall be protected through the use of BMPs that moderate temperature.
- D. If a perennial or intermittent stream passes through, or a waterbody (i.e., lake, pond, wetland) is present on the site, the applicant shall create a riparian buffer extending a minimum of 50 feet to 150 feet (subject to federal and state buffer policies and regulation), to either side of the top-of-bank of the channel, lake, or wetland. The buffer area shall be planted with native vegetation and maintained in a vegetated state (Refer to Appendix B, Pennsylvania Native Plant List, contained in the PA BMP Manual).
 - (1) The following provisions also apply to riparian buffers on lots in existence at the time of adoption of this chapter:
 - (a) If the applicable rear or side yard setback is less than 50 feet, the buffer width may be reduced within the setback to 25% of the setback or 25 feet, whichever is greater.
 - (b) If a stream traverses a site in a manner that significantly reduces the use of the site, the buffer may be reduced to 25 feet on either side with Township approval.
 - (2) Permitted uses within the buffer include the following, subject to Township approval and provided that they comply with all federal, state, and local regulations:
 - (a) Recreational trails. See Ordinance Appendix J, Riparian Buffer Trail Guidelines.^[2]
[2] Editor's Note: Appendix J is included as an attachment to this chapter.

- (b) Utility rights-of-way.
 - (c) Bridges.
 - (d) Roads and driveways only when no viable alternative alignment or location is feasible provided that such roads and driveways are aligned predominantly perpendicular to the contours.
 - (e) Other nondestructive recreational uses subject to Township approval.
- (3) Prohibited uses and activities shall be cuts, fills, soil/rock/mineral extraction and/or removal, removal of topsoil, structures and stormwater management facilities.
- E. If an existing buffer is legally prescribed (i.e., deed, covenant, easement, etc.) and it exceeds the requirements of this chapter, the existing buffer shall be maintained.

§ 198-15 Stream bank erosion requirements.

- A. In addition to controlling the water quality volume (in order to minimize the impact of stormwater runoff on downstream stream bank erosion), the primary requirement to control stream bank erosion is to design a BMP to detain the proposed conditions two-year, twenty-four-hour design storm to the existing conditions one-year flow using the SCS type II distribution. Additionally, provisions shall be made (such as adding a small orifice at the bottom of the outlet structure) to release the proposed conditions one-year storm for a minimum of 24 hours from a point in time when the maximum volume of water from the one-year storm is stored in a proposed BMP (i.e., the maximum water surface elevation is achieved in the facility). Release of water can begin at the start of the storm (i.e., the invert of the water quality orifice is at the invert of the facility).
- B. The minimum orifice size in the outlet structure to the BMP shall be three inches in diameter where possible, and a trash rack shall be installed to prevent clogging. On sites with small drainage areas contributing to this BMP that do not provide enough runoff volume to allow a twenty-four-hour attenuation with the three-inch orifice, the calculations shall be submitted showing this condition. When the calculated orifice size is below three inches, gravel filters (or other methods) are recommended to discharge low-flow rates subject to the Township Engineer's satisfaction. When filters are utilized, maintenance provisions shall be provided to ensure filters meet the design function. All facilities shall make use of measures to extend the flow path and increase the travel time of flows in the facility.

§ 198-16 Stormwater peak rate control.

- A. Each watershed has been divided into either stormwater management districts or release rate districts as shown on the release rate maps in Appendix A.^[1]
- (1) In addition to the watershed-specific requirements specified in Tables 198-16.1 and 198-16.2 below, the erosion and sedimentation control (§ 198-11), the nonstructural project design (§ 198-12), the infiltration (§ 198-13), the water quality (§ 198-14), and the stream bank erosion (§ 198-15) requirements shall be implemented.
 - (2) Standards for managing runoff from each subarea in a watershed for the two-, five-, ten-, twenty-five-, fifty-, and one-hundred-year design storms are shown in Tables 198-16.1 and 198-16.2. Development sites located in each of the management/release rate districts must control proposed conditions runoff rates to existing conditions runoff rates for the design storms in accordance with the tables.
 - (3) For all subareas set forth in Table 198-16.2, the proposed two-year peak rate storm condition shall be reduced at a minimum to the existing one-year storm condition.

[1] *Editor's Note: Appendix A is included as an attachment to this chapter.*

- B. General. Proposed conditions rates of runoff from any regulated activity shall not exceed the peak release rates of runoff from existing conditions for the design storms specified on the Stormwater Management District Watershed Map (Appendix A)^[2] and this section of the chapter.

[2] *Editor's Note: Appendix A is included as an attachment to this chapter.*

- C. District boundaries. The boundaries of the stormwater management districts are shown on an official map that is available for inspection at the Township and County Planning offices. A copy of the official map at a reduced scale is included in Appendix A.^[3] The exact location of the stormwater management district boundaries as they apply to a given development site shall be determined by mapping the boundaries using the two-foot topographic contours (or most accurate data required) provided as part of the SWM site plan.

[3] *Editor's Note: Appendix A is included as an attachment to this chapter.*

- D. Sites located in more than one district or watershed. For a proposed development site located within two or more stormwater management district subareas, the peak discharge rate from any subarea shall meet the management district criteria in which the

discharge is located. The natural hydrology of each respective subarea shall be maintained, and drainage shall not be redirected from one subarea to another. Under circumstances where the applicant shows this cannot be accomplished, a waiver is required by the Township.

**Table 198-16.1
Peak Rate Control Standards in the Chester/Ridley Creek Watersheds**

Proposed Condition Design Storm	Reduce to	Existing Condition Design Storm
Two-year		One-year
Five-year		Five-year
Ten-year		Ten-year
Twenty-five-year		Twenty-five-year
Fifty-year		Fifty-year
One-hundred-year		One-hundred-year

**Table 198-16.2
Control Criteria for Chester/Ridley Creek Watershed Stormwater Management Districts**

District	Control Criteria
100%	Post-development peak discharge for all design storms must be no greater than predevelopment peak discharges.
85%	Post-development peak discharge for all design storms must be no greater than 85% of the predevelopment peak discharges.
60%	Post-development peak discharge for all design storms must be no greater than 60% of the predevelopment peak discharges.
50%	Post-development peak discharge for all design storms must be no greater than 50% of the predevelopment peak discharges.

- E. Off-site areas. Off-site areas that drain through a proposed development site are not subject to release rate criteria when determining allowable peak runoff rates. On-site drainage facilities shall be designed to safely convey off-site flows through the development site.
- F. Site areas. Where the site area to be impacted by a proposed development activity differs significantly from the total site area, only the proposed impact area utilizing stormwater management measures shall be subject to the peak rate control standards noted above. Unimpacted areas for which the discharge point has not changed are not subject to the peak rate control standards.
- G. Hardship option for regulated activities less than one acre. There may be certain instances, where the peak rate criteria are too restrictive for a particular landowner or applicant. The existing drainage network in some areas may be capable of safely transporting slight increases in flows without causing a problem or increasing flows elsewhere. This must be demonstrated as per § 198-16H below in order for the hardship option to be considered. If an applicant or homeowner cannot meet the stormwater standards due to lot conditions or if conformance would become a hardship to an owner, the hardship option may be applied. The applicant would have to plead his/her case to the Township Council with the final determination made by the Township. Any landowners pleading the "hardship option" will assume all liabilities that may arise due to exercising this option. Cost or financial burden cannot be considered as a hardship. The applicant may consider off-site management controls as long as the stormwater management controls are within the same subwatershed.
- H. Downstream hydraulic capacity analysis. Any downstream capacity hydraulic analysis conducted in accordance with this chapter shall use the following criteria for determining adequacy for accepting increased peak flow rates:
 - (1) Natural or man-made channels or swales must be able to convey the increased runoff associated with a two-year storm event within their banks at velocities consistent with protection of the channels from erosion. Velocities shall be based upon criteria and methodologies acceptable to the Township.
 - (2) Natural or man-made channels or swales must be able to convey increased twenty-five-year storm event runoff without creating any increased hazard to persons or property.
 - (3) Culverts, bridges, storm sewers or any other hydraulic facilities which must pass or convey flows from the tributary area must be designed in accordance with PADEP Chapter 105 regulations (if applicable) and, at a minimum, pass the increased twenty-five-year storm event runoff.
 - (4) Water quality requirements defined in § 198-15 must be met.
 - (5) Post-construction peak rates shall not exceed the existing peak rates for the respective subarea.
- I. For redevelopment sites, one of the following minimum design parameters shall be accomplished, whichever is most appropriate for the given site conditions as determined by the Township Engineer:

[Added 11-9-2015 by Ord. No. 761]

- (1) Meet the full requirements specified by Table 198-16.1 for the Ridley Creek Watershed or Table 198-16.2 for the Chester Creek Watershed, as applicable to the site, and § 198-16A through H; or
- (2) Reduce the total impervious surface on the site by at least 20%; based upon a comparison of existing impervious surface to proposed impervious surface. In this case, calculations must be provided that show the peak rate has not increased.

§ 198-17 Calculation methodology.

A. Stormwater runoff from all development sites with a drainage area of greater than five acres shall be calculated using a generally accepted calculation technique that is based on the NRCS Soil Cover Complex Method. Table 198-17 summarizes acceptable computation methods. The method selected by the design professional shall be based on the individual limitations and suitability of each method for a particular site. The use of the Rational Method to estimate peak discharges for drainage areas greater than five acres shall be permitted only upon approval of the Township.

**Table 198-17
Acceptable Computation Methodologies for SWM Site Plan**

Method	Developed by	Applicability
TR-20 (or commercial computer package based on TR-20)	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary.
TR-55 (or commercial computer package based on TR-55)	USDA NRCS	Applicable for land development plans where limitations described in TR-55.
HEC-1/HEC-HMS	United States Army Corps of Engineers	Applicable where use of a full hydrologic computer model is desirable or necessary.
Rational Method (or commercial computer package based on Rational Method)	Emil Kuichling (1889)	For sites up to five acres, or as approved by the Township and/or Township Engineer.
Other methods	Varies	Other computation methodologies approved by the Township and/or Township Engineer.

B. All calculations consistent with this chapter using the Soil Cover Complex Method shall use the appropriate design rainfall depths for the various return period storms. Rainfall depths shall be according to NOAA Atlas 14 values consistent with a partial duration series. When stormwater calculations are performed for routing procedures or water quality functions, the duration of rainfall shall be 24 hours.

C. The following criteria shall be used for peak rate runoff calculations:

- (1) For development sites not considered redevelopment, the ground cover used in determining the existing conditions flow rates shall be as follows:
 - (a) Wooded sites shall use a ground cover of "woods in good condition." Portions of a site having more than one viable tree measuring a diameter at breast height (DBH) of six inches or greater per 1,500 square feet shall be considered wooded where such trees existed within three years of application.
 - (b) The undeveloped portion of the site including agriculture, bare earth, and fallow ground shall be considered as "meadow in good condition," unless the natural ground cover generates a lower curve (CN) number or Rational "c" value (i.e., woods) as listed in Appendix F of this chapter.^[1]
- (2) For redevelopment sites, the ground cover used in determining the existing conditions flow rates for the developed portion of the site shall be based upon actual land cover conditions.

[1] Editor's Note: Appendix F is included as an attachment to this chapter.

[Amended 11-9-2015 by Ord. No. 761]

D. All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times-of-concentration (duration) and storm events with rainfall intensities obtained from NOAA Atlas 14 partial duration series estimates, or the latest version of the Penn DOT Drainage Manual (PDM Publication 584). Times-of-concentration shall be calculated based on the methodology recommended in the respective model used. Times of concentration for channel and pipe flow shall be computed using Manning's equation.

E. Runoff curve numbers (CN) for both existing and proposed conditions to be used in the Soil Cover Complex Method shall be obtained from Appendix F of this chapter.^[2]

[2] Editor's Note: Appendix F is included as an attachment to this chapter.

- F. Runoff coefficients (c) for both existing and proposed conditions for use in the Rational Method shall be obtained from Appendix F of this chapter.^[3]
 [3] *Editor's Note: Appendix F is included as an attachment to this chapter.*
- G. Hydraulic computations to determine the capacity of pipes, culverts, and storm sewers shall be consistent with methods and computations contained in the Federal Highway Administration Hydraulic Design Series Number 5 (Publication No. FHWA-NHI-01-020 HDS No. 5). Hydraulic computations to determine the capacity of open channels shall be consistent with methods and computations contained in the Federal Highway Administration Hydraulic Engineering Circular Number 15 (Publication No. FHWA-NHI-05-114 HEC 15). Values for Manning's roughness coefficient (n) shall be consistent with Appendix F of the Ordinance.^[4]
 [4] *Editor's Note: Appendix F is included as an attachment to this chapter.*
- H. Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this chapter using any generally accepted hydraulic analysis technique or method.
- I. The design of any stormwater detention facilities intended to meet the performance standards of this chapter shall be verified by routing the design storm hydrograph through these facilities using an acceptable method. The design storm hydrograph shall be computed using a calculation method that produces a full hydrograph. The Township may approve the use of any generally accepted full hydrograph approximation technique that shall use a total runoff volume that is consistent with the volume from a method that produces a full hydrograph.

§ 198-18 Other requirements.

- A. All wet basin designs shall incorporate biologic controls consistent with the West Nile Guidance found in Appendix H^[1] or PADEP document 363-0300-001 "Design Criteria — Wetlands Replacement/Monitoring," or contact the Pennsylvania State Cooperative Wetland Center (www.wetlands.psu.edu/) or the Penn State Cooperative Extension Office (www.extension.psu.edu/extmap.html).
 [1] *Editor's Note: Appendix H is included as an attachment to this chapter.*
- B. Any stormwater basin required or regulated by this chapter designed to store runoff and requiring a berm or earthen embankment shall be designed to provide an emergency spillway to handle flow up to and including the one-hundred-year proposed conditions. The height of embankment must provide a minimum 1.0 foot of freeboard above the maximum pool elevation computed when the facility functions for the one-hundred-year proposed conditions inflow. Should any stormwater management facility require a dam safety permit under PADEP Chapter 105, the facility shall be designed in accordance with Chapter 105 and meet the regulations of Chapter 105 concerning dam safety. Chapter 105 may require the passing of storms larger than one-hundred-year event.
- C. Any drainage conveyance facility and/or channel not governed by Chapter 105 regulations must be able to convey, without damage to the drainage structure or roadway, runoff from the one-hundred-year storm event in the direction of natural flow without creating additional damage to any drainage structures, hereby structures or roadways.
- D. Conveyance facilities to or exiting from stormwater management facilities (i.e., detention basins) shall be designed to convey the design flow to or from the facility.
- E. Roadway crossings or structures located within designated floodplain areas must be able to convey runoff from a one-hundred-year design storm consistent with Federal Emergency Management Agency National Flood Insurance Program — Floodplain Management Requirements.
- F. Any facility located within a PennDOT right-of-way must meet PennDOT minimum design standards and permit submission requirements.
- G. Adequate erosion protection and energy dissipation shall be provided along all open channels and at all points of discharge. Design methods shall be consistent with the Federal Highway Administration Hydraulic Engineering Circular Number 11 (Publication No. FHWA-IP-89-016) and the PADEP Erosion and Sediment Pollution Control Program Manual (Publication No. 363-2134-008).
- H. Stormwater management design criteria are provided in Appendix F of this chapter which are intended as design guidelines, and the Township may, in circumstances deemed appropriate by the Township, in its sole discretion, permit reasonable alternatives to the design guidelines in Appendix F.
 [Added 11-9-2015 by Ord. No. 761]