

## ARTICLE X

### IMPROVEMENT STANDARDS

#### SECTION 1000 STANDARDS FOR MONUMENTS AND MARKERS

Generally all work shall conform to Standards put forth by the American Congress on Surveying and Mapping and the following minimum standards:

1. Monuments. Monuments shall be four (4) inches square at the surface, thirty (30) inches long and made of concrete, stone, or by setting a four (4) inch cast iron or steel pipe filled with concrete. Monuments shall be set at the intersection of lines forming angles in boundaries of the subdivision and at the intersection of public and private street right-of-way lines as follows
  - A. Monuments shall not be required for subdivisions with less than twenty (20) residential lots.
  - B. A minimum of two (2) monuments shall be required for subdivisions not meeting the criteria of section 1000.1.A, provided, however, that there is a clear line of sight between monuments. The Township reserves the right to require additional monuments at such places as maybe required by the Engineer to adequately establish horizontal control.
  - C. A minimum of three (3) monuments shall be required for subdivisions of 50 lots or more, provided, however, that there is a clear line of sight between monuments. The Township reserves the right to require additional monuments at such places as may be required by the Engineer to adequately establish horizontal control.
2. Markers. Markers shall be three-quarters of an inch (3/4") square or three-quarters of an inch (3/4") diameter, and fifteen (15) inches long. Markers shall be made of iron or steel bars. Markers shall be set:
  - A. At all lot corners except those monumented; and
  - B. Prior to the time of building permit issuance.

**SECTION 1001      STANDARDS FOR CURBS AND GUTTERS**

Construction of curbs and gutters within the Township shall conform to the following requirements:

1.    When Required. Whenever a proposed subdivision or land development shall have eight (8) or more lots or dwelling units per net acre included in the project, or where any project is immediately adjacent to or within one thousand (1,000) feet of any existing or recorded subdivision or land development located along the same side of a connecting street and having curbs, curbs shall be installed on lot frontages of the street. If curbs are to be installed, the pavement shall extend from curb to curb and shall not be less than thirty-two (32) feet wide.
  
2.    Construction. Curbs and gutters shall be constructed according to the standards set forth in the most recent edition or revision to PennDOT Specifications, Publication 408. The type of curbs or gutters shall be determined by the Township Engineer.

**SECTION 1002      STANDARDS FOR SIDEWALKS**

All construction of sidewalks within the Township shall conform to all of the following minimum requirements:

1.    Installation. Wherever a proposed subdivision or land development shall have four (4) or more lots or dwelling units per net acre or is immediately adjacent to or within one thousand (1,000) feet of any existing or recorded subdivision or land development located along the same side of a connecting street having sidewalks, sidewalks shall be installed on all lot frontages.
  - A.    Sidewalks shall be within the right-of-way of the street and shall extend in width outward from the curb toward the right-of-way.
  
  - B.    Sidewalks must be at least four (4) feet wide. In the vicinity of retail/professional centers, schools, recreation areas and other such facilities, sidewalks must be at least five (5) feet wide and located within the street right-of-way.
  
2.    Construction. Sidewalks shall be constructed of cement concrete according to the standards set forth in the most recent edition or revision of PennDOT Specifications, Publication 408.

## **SECTION 1003      STANDARDS FOR STORM WATER MANAGEMENT**

1. Scope. A Storm Water Management Plan shall be required for each subdivision or land development at both the preliminary and final plan submittal stage. As an integral part of the Storm Water Management Plan, erosion and sedimentation control measures shall be included. For the purposes of This Section of the Ordinance, any building expansion or construction which covers an area in excess of five thousand (5,000) square feet of impervious and/or stone area shall require a Storm Water Management Plan approved by the Township Engineer in accordance with the applicable regulations of This Section. The 5,000 square foot requirement applies to an individual large project, projects that exceed a cumulative total of 5,000 square feet after the effective date of This Ordinance, and any projects occurring after the 5,000 square foot level has been reached.
2. Waiver. Any request for waiver of a Storm Water Management Plan shall be reviewed on an individual site basis using the criteria contained in this Section. A waiver of these Standards may be granted by the Supervisors following consultation with the Township Engineer. A stormwater management plan shall not be required when development or earthmoving is not proposed as part of the subdivision or land development.
3. Content of Storm Water Management Plan.
  - A. A general description of the proposed project along with a narrative of the management proposal and conclusions describing the storm water management techniques, type of storage and conveyance facilities, and a comparison between pre-development and post-development runoff levels
  - B. Project location on a 7.5 minute U.S.G.S. Map or equivalent.
  - C. Topographic features of this site and adjacent lands that are considered to impact upon the storm water management plan design.
  - D. Runoff calculations for the entire watershed and related design computations necessary to substantiate the proposed temporary and permanent storm water management facilities.
  - E. Design and Specifications of temporary and permanent storm water management facilities.
  - F. Staging or Implementation Schedule for constructing the proposed storm water control system.
  - G. Maintenance and ownership provisions.

- H. The characteristics of the subsurface strata beneath any storm water facility. The potential for the development of sinkholes and other karst-related features shall be described.
  - I. Seal and signature of the registered engineer or surveyor responsible for the Storm Water Management Plan.
4. Design Standards. The design of all storm water management facilities shall incorporate sound engineering principles and practices. Any project occurring within the Monocacy River Watershed shall comply with all applicable requirements of the Monocacy River Stormwater Management Ordinance. The Township shall reserve the right to disapprove any design that would result in the creation or continuation of an adverse hydrologic or hydraulic condition within the watershed. Computations for determining storm water runoff and for the design of storm water management facilities for drainage areas greater than thirty (30) acres shall be based upon the soil-cover-complex method described in either TR-55, Urban Hydrology for Small Watersheds; the United States Department of Agriculture, Soil Conservation Service Engineering Field Manual; or the Soil Conservation Service National Engineering Handbook, Section 4. Drainage areas of twenty (20) acres or less shall be based upon the modified rational procedure as described in Recommended Hydrologic Procedures for Computing Urban Runoff from Small Watersheds in Pennsylvania, available from the Commonwealth of Pennsylvania, Department of Environmental Protection. Either method may be used for areas between twenty (20) and 30 acres. For each area or subarea analyzed, use the same analytical method for the pre-development and post-development conditions. The Township may require that computed existing runoff rates be reconciled with field observations and conditions. 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 Township Engineer.

The Storm Water Management Plan shall effectively demonstrate the control of post-development peak discharge rates to pre-development peak discharge rates based on the following standards:

- A. All pre-development calculations shall be based upon existing land uses except existing agricultural uses which shall be based on the following land use descriptions:
  - Cultivated Land, with Conservation Treatment
  - Pasture, Good Condition
  - Meadow, Good Condition
  - Farmstead

Any areas existing or designed to be either initially or ultimately gravel, shale, or crushed stone shall be assumed to be impervious. Pre-development storm water runoff shall be calculated for the two-year, five-year and ten-year storm events.

- B. Release rates from storage structures shall be based on the runoff from the two-year, five-year and ten-year pre-development storm events.
- C. Storage structures shall be designed such that the post development two-year, five-year and ten-year peak discharges will not exceed the pre-development two-year, five-year and ten-year peak discharges for the primary outlet structure.
- D. All storage structures shall be designed with emergency spillways. The minimum design capacity of the emergency spillways shall be the 25-year post-development peak discharge while maintaining a minimum 1.0 foot freeboard. Basins shall be kept in a maintainable condition with a minimum bottom slope of one (1) percent. Paved or concrete low flow channels are recommended in detention basins to completely drain them and to carry low flows from inflow culverts to the principal spillway. With low flow channels, the minimum bottom slope of the basin shall be one-half (0.5) percent.
- E. Culverts, pipes, and other water carrying structures shall be designed to handle the peak discharge from the ten-year post-development storm event. All culverts and pipes installed under Township roads or roads proposed for dedication to the Township shall be constructed of reinforced concrete.
- F. The Storm Water Management Plan shall include calculations indicating velocities of flow, grades, sizes, and capacities of water carrying structures, debris or sediment basins, and retention and detention structures and sufficient design information to construct such facilities.
- G. Storm water runoff calculations using the rational method shall be based on the following sixty (60) minute rainfall intensities:

<u>Design Storm Frequency</u> (years)	<u>Rainfall Intensity</u> (inches per hour)
2	1.28
5	1.89
10	2.29
25	2.78
50	3.17
100	3.53

Storm water runoff calculations using the soil-cover-complex method shall be based on the following twenty-four (24) hour storm event rainfall depths:

<u>Design Storm Frequency</u> (years)	<u>Rainfall</u> (inches)
2	2.9
5	3.8
10	4.8
25	5.1
50	5.9
100	6.4

H. Maximum permitted velocities are as follows:

1. Three (3) feet per second where only sparse vegetation can be established.
2. Four (4) feet per second under normal conditions where vegetation is to be established by seeding.
3. Five (5) feet per second where a dense, vigorous sod can be quickly established or where water can be temporarily diverted during establishment of vegetation.
4. Six (6) feet per second where well established sod is in existence.
5. For lined water carrying channels, the following velocities are required:
  - a. Six (6) inch rock rip-rap - Up to six (6) feet per second.
  - b. Nine (9) inch rock rip-rap - Up to eight (8) feet per second.
  - c. Asphalt - Up to seven (7) feet per second.
  - d. Durable bedrock - Up to eight (8) feet per second.
  - e. Twelve (12) inch rock rip-rap - Up to nine (9) feet per second.
  - f. Concrete or steel - Up to twelve (12) feet per second.
  - g. The normal maximum velocity of open channel flows shall not exceed ten (10) feet per second.

- I. Energy dissipators shall be placed at the outlets of all pipes where flow velocities exceed maximum permitted channel velocities.
  - J. Vertical pipes, inlets, and other surface water receiving structures shall be installed with trash racks.
  - K. Storm water runoff channels shall be designed and installed to avoid trapping excess sediment.
  - L. The use of subsurface retention, detention or infiltration BMP methods will be permitted only in areas where it has been proven that the soils have adequate percolation rates and that the underlying geology is not susceptible to solutioning (i.e. limestone). The design calculations shall include field testing results verifying the percolation rate and soil permeability, identification of the underlying bedrock and its depth, and a site analysis by a professional geologist licensed in the Commonwealth of Pennsylvania discussing the characteristics of the property and any recommendations for construction. A geologic evaluation to determine susceptibility to sinkhole formation shall also be required for detention or retention basins proposed to be located on lands underlain by limestone. The design of such facilities shall also include measures to prevent ground water contamination and, where necessary, sinkhole formation. The Township may require the installation of an impermeable liner in detention basins.
  - M. Proposed lots or buildings adjacent to basins and significant channels shall have a finished first floor elevation of two (2) feet above the one hundred (100) year storm event level calculated for these facilities. The plans shall explicitly indicate the minimum allowable finished first floor elevation for these lots or buildings.
5. Erosion and Sedimentation. Erosion and sedimentation control measures shall be in accordance with the applicable standards and specifications set forth in the latest edition of the DEP Erosion and Sediment Pollution Control Program Manual and all other aspects of DEP Chapter 102 regulations. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during construction, so as to maintain their infiltration capacity. Infiltration BMPs shall not be constructed nor receive runoff until the entire contributory drainage area to the infiltration BMP has been completely stabilized.
6. Ownership and Maintenance Program. Each Storm Water Management Plan shall contain provisions which clearly set forth the ownership and maintenance responsibility of all temporary and permanent storm water management facilities, and erosion and sedimentation control facilities, including:
- A. Description of temporary and permanent maintenance requirements.

- B. Identification of the responsible individual, corporation, association or other entity for ownership and maintenance of both temporary and permanent storm water management and erosion and sedimentation control facilities.
  - C. Establishment of suitable easements for access to all facilities.
  - D. The intent of these Regulations is to provide private ownership and maintenance of storm water management and erosion and sedimentation control facilities. The Board of Supervisors, upon recommendation of the Township Engineer, shall make the final determination as to the continuing maintenance responsibilities prior to final approval of the storm water management plan. The Board of Supervisors reserves the right to accept or reject ownership, operation and maintenance responsibility for any and all proposed stormwater management controls.
7. Basic Construction Criteria. Construction standards of storm water management and erosion control facilities shall be in accordance with the approved plans and accompanying specifications, if any. In addition, as-built drawings of all storm water detention, retention, collection and conveyance facilities shall be required in accordance with Section 700.8 of This Ordinance. The construction details and standards of the following publications in their most recent revision shall be acceptable:
- A. DEP Erosion and Sediment Pollution Control Program Manual and all other aspects of DEP Chapter 102 regulations; and
  - B. PennDOT, Publication 408, Specifications; and
  - C. PennDOT, RC Series, Roadway Construction Standards; and
  - D. Pennsylvania Handbook of Best Management Practices for Developing Areas, CH2M Hill, Spring, 1998 as amended.
8. Water Quality Requirements. In addition to the design standard requirements of This Section, the developer shall comply with the following water quality requirements unless otherwise exempted by the provisions of This Ordinance.
- A. Detain the one (1) year, twenty-four (24) hour design storm using the SCS Type II distribution. Provisions shall be made so that the 1-year storm takes a minimum of 24 hours to drain from the facility from a point where the maximum volume of water from the 1-year storm is captured. (i.e., the maximum water surface elevation is achieved in the facility.) Release of water can begin at the start of the storm. (i.e., the invert of the water quality orifice is at the invert of the facility.) The design of the facility shall consider and minimize the chances of clogging and sedimentation potential.

- B. Groundwater recharge is encouraged and should be examined as part of any stormwater management plan and incorporated into the overall design when illustrated to be feasible.
- C. To accomplish the objectives of water quality, the developer may submit original and innovative designs to the Township for review and approval. Such designs may achieve the objectives of water quality through a combination of BMPs (Best Management Practices).
- D. In selecting the appropriate BMPs or combinations thereof, the developer shall consider the following: total contributing area, permeability and infiltration rate of the soils, slope and depth to bedrock, seasonal high water table, proximity to building foundations and well heads, erodibility of soils, and land availability and configuration of the topography.
- E. The following additional factors shall be considered when evaluating the suitability of BMPs: peak discharge and required volume control, streambank erosion, efficiency to mitigate water quality problems, the volume of runoff to be effectively treated, nature of the pollutant(s) to be removed, maintenance requirements, creation/protection of aquatic and wildlife habitat, recreational value, and enhancement of aesthetics and property values.