ARTICLE 300

DRAINAGE AND STORM SEWERS

300.00 DRAINAGE AND STORM SEWERS

300.01 GENERAL REQUIREMENTS

I. **Required Drainage Systems.** The Planning Commission shall not recommend for approval any plat for subdivision which does not make adequate provision for storm or flood water runoff by use of channels or basins, based on:

1. 25-year frequency for storm drains with an overflow designed at a 50 year frequency.

2. The stormwater drainage system shall be designed to meet the requirements and standards stated in these subdivision regulations. An engineer shall submit a written certification that construction of the stormwater drainage system has met the requirements and standards of these subdivision regulations.

3. If the stormwater analysis shows stormwater detention is necessary, detention structures shall be designed in such a manner that the post-construction peak runoff rate of flow shall be equal to or less than the pre-construction peak runoff of flow rate for 2-year/24-hour and 10-year/24-hour storms. Additional measures may be considered by the Planning Commission or Officer in critical area watersheds.

   When an analysis indicates stormwater detention is necessary for an expansion to an existing subdivision that has no detention structures, a peak runoff reduction of 10% from the preexisting peak runoff rate of flow must be achieved. However, no reduction shall be required for the expansion beyond the peak runoff rate of flow that would occur from the parcel in its natural, undeveloped state.

   It is desirable that the stormwater detention structure have a maximum of a ten foot (10') total water depth. In addition, the stormwater detention system and structure shall be designed by an engineer. The stormwater detention system and structure shall be constructed to meet the requirements and standards of these subdivision regulations as well as the current edition of the United States Natural Resources manual for ponds.

   An engineer shall submit a written certification that the construction of the stormwater detention system and structure has met the requirements and standards of the subdivision regulations as well as the current edition of the United States Natural Resources manual for ponds.

   If a structure that exceeds a ten foot (10') total water depth is proposed, it shall be designed by an engineer with geotechnical experience and approved by the Planning Commission and shall be constructed to meet the requirements and standards of these subdivision regulations as well as the current edition of the United States Natural Resources manual for ponds.

   An engineer with geotechnical experience and approved by the Planning Commission shall submit a written certification that the construction of the stormwater detention system and structure that exceeds a ten-foot total water depth have met the requirements and standards of these subdivision regulations as well as the current edition of the United States Natural Resources manual for ponds.

4. The current edition of the West Virginia Department of Transportation Standard Specifications for Roads and Bridges and Supplemental Revisions is hereby referenced

for material and construction specifications for activities governed by this Article.

The current edition of the West Virginia Department of Transportation Drainage Manual is hereby referenced as the Storm Water Design Manual in its entirety with the following exceptions:

(i) All drainage design for piping shall meet 25-year storm requirements.

(ii) Minimum pipe sizes apply unless specifically approved by the Planning Commission or officer.

The current edition of the United States Natural Resources manual for ponds is hereby referenced for design of the storm water detention structure.

A stormwater management facility shall be constructed on a common area in the subdivision and shall be maintained by the developer until the common area becomes the responsibility of the homeowner's association. The stormwater management facility shall be set back a minimum distance equivalent to one-half (1/2) of the height of the stormwater management facility, but in no case shall be set back less than five feet (5') from the property line. The edge of the stormwater management facility is defined by the outside toe of the embankment.

Inlets shall be provided so that surface water is not carried across or around any intersection, or for more than 600 feet in the gutter. When calculations indicate that curb capacities are exceeded at a point, no further allowance shall be made for flow beyond that point, and basins shall be used to intercept flow at that point. Surface water drainage patterns shall be shown on the drainage plan for each lot.

The County Engineer shall review the stormwater drainage plans submitted by the engineer and must approve the plans prior to the Planning Commission granting major subdivision approval and prior to the start of construction. When the construction is completed, an engineer shall submit a final as-built drawing as outlined in Section 300.04(1)(D) in this ordinance and a certification that the drainage plan meets the requirements of this ordinance. The County Engineer shall perform a post-construction certification review at the completion of construction. Final plat approval shall not be granted until the County Engineer approves the construction of the stormwater drainage system and the certifications submitted by the engineer.

II. **Stormwater Analysis.** A stormwater analysis by an engineer shall be conducted to determine the accommodation of upstream drainage areas and the effect on downstream drainage areas.

300.02 NATURE OF STORM WATER FACILITIES

I. **Location**. The applicant may be required by the Planning Commission to carry away by pipe or open ditch any spring or surface water that may exist either previously to, or as a result of the subdivision. Such drainage facilities shall be in the road right-of-way where feasible, or in perpetual unobstructed easements of appropriate width, and shall be constructed in accordance with the construction standards and specifications. Junction boxes and/or drop inlets may be required, if warranted.

II. **Accessibility to Public Storm Sewers**. Where a public storm sewer is accessible, the applicant shall install storm sewer facilities, or if no outlets are within a reasonable distance, adequate provision shall be made for the disposal of storm waters, subject to the specifications of the Planning Commission.

If a future connection to a public storm sewer will be possible, because such a system is currently in the planning stages, the developer shall plan for future storm water disposal by a public utility system at the time the plat receives final approval. Provisions for such connection shall be incorporated by inclusion in the performance bond required for the subdivision plat.

III. **Accommodation of Upstream Drainage Areas**. A culvert or other drainage facility shall in each case be large enough to accommodate potential runoff from its entire upstream drainage area, whether inside or outside the subdivision. The developer or his engineer shall determine the necessary size of the facility, based on the provisions of the construction standards and specifications assuming conditions of maximum potential watershed development.

IV. **Effect on Downstream Drainage Areas**. The applicant and/or developer shall also study the effect of each subdivision on existing downstream drainage facilities outside the area of the subdivision. County drainage studies together with such other studies as shall be appropriate, shall serve as a guide to needed improvements. Where it is anticipated that the additional runoff incident to the development of the subdivision may overload an existing downstream drainage facility, the Planning Commission may withhold approval of the subdivision until provision has been made for the improvement of said potential condition in such sum as the Planning Commission shall determine. No subdivision shall be approved unless adequate drainage will be provided to an adequate drainage watercourse or facility as determined by the Planning Commission or Officer.

V. **Areas of Poor Drainage and Floodplain Areas.** Whenever a plat for a major subdivision is submitted for an area which is subject to flooding, the Planning Commission may approve such subdivision provided that the applicant fills the affected area of said subdivision to an elevation sufficient to place the elevation of streets above the FEMA 100-year base flood elevation or known flooding elevations.

The plat of such subdivision shall provide for an overflow zone along the bank of any stream or watercourse, in a width which shall be sufficient in times of high water to contain or move the water, and no fill shall be placed in the overflow zone, nor shall any structure be erected or placed therein. The boundaries of the overflow zone shall be subject to approval by the Planning Commission. Where the major subdivision lies partially or completely in the 100-year flood zone area, the plat shall include detailed information giving the location and elevation of proposed roads, public utilities and building sites, the Base Flood Elevation, and the delineation of the floodplain areas as depicted on the FEMA map.

Development of areas of extremely poor drainage shall be discouraged. The developer or his engineer shall design the subdivision so that drainage from undeveloped lots shall not be directed onto developed lots.

The Applicant shall comply with all requirements of the Putnam County Floodplain Management Program Ordinance.

VI. **Wetlands**. Developments which have a negative impact on wetlands shall be discouraged. The existence of wetlands shall be determined by the appropriate federal, state, or local agency.

VII. **Drainage Facilities**. All swales, ditches, culverts, and other instruments of drainage shall always remain open and clear of debris. Open stream channels will be maintained with landscaped banks and adequate width for maximum potential volume of flow. All rooftop drainage in a residential subdivision shall discharge directly on the ground and shall not be piped to the stormwater drainage system or a street.

300.03 DRAINAGE EASEMENTS

I. **General Requirements**. Where a subdivision is traversed by a watercourse, drainageway, channel, or stream, there shall be provided a storm water easement or drainage right-of-way conforming substantially to the lines of such watercourse, and of such width and construction or both as will be adequate for the purpose. Wherever possible, it is desirable that the drainage be maintained by an open channel with landscaped banks and adequate width reserved for discharge of the base flood.

II. **Drainage Easements.** Where topography or other conditions are such as to make impractical the inclusion of drainage facilities within road rights-of-way, perpetual unobstructed easements at least fifteen (15) feet in width for such drainage facilities shall be provided across property outside the road lines and with satisfactory access to the road. Easements shall be indicated on the plat. Drainage easements shall be carried from the road to a natural watercourse or to other drainage facilities. A ten (10) foot drainage easement for lot drainage shall be required on lot lines (5' on each side), when not being used as part of the subdivision drainage plan improvements.

1. When a proposed drainage system will carry water across private land outside the subdivision, appropriate drainage rights must be secured and indicated on the plat.
2. The applicant shall dedicate, either in fee or by drainage or conservation easement of land on both sides of existing watercourses, to a distance to be determined by the Planning Commission, which will be at a minimum the distance from the top of the slope of the stream bank to the center of the channel.
3. Low-lying lands along watercourses subject to flooding or overflowing during storm periods, whether included in areas for dedication, shall be preserved and retained in their natural state as drainage ways. Such land or lands subject to periodic flooding shall not be computed in determining the average density or for computing the area requirement of any lot.

300.04 STORM WATER MANAGEMENT AND EROSION CONTROL PLAN

A Storm Water Management and Erosion Control Plan shall be submitted. The plan shall include the following information:

1. Descriptive Information
   - A. Title Block with:
     - i. development name
     - ii. owner
     - iii. design firm
     - iv. authorized Registered Professional Engineer stamp, signature, and date
     - v. legend
     - vi. north arrow
     - vii. vicinity map
     - viii. scale
     - ix. sheet numbers
     - x. date
     - xi. revision numbers and dates
   - B. Topographical Features
     - i. original and proposed contours at intervals no greater than 2 vertical feet
     - ii. existing drainage components, i.e., streams, ponds, pipes, etc.
     - iii. property boundary lines
     - iv. existing streets, buildings, and utilities
     - v. 100-year floodplain
     - vi. off-site drainage entering site
   - C. Site Drainage Plan
     - i. drawing no larger than 24-inch x 36 inch and at a scale of 1 inch equals 10 feet to 1 inch equals 50 feet
     - ii. existing and proposed structures, roads, buildings, paved areas
     - iii. existing and proposed storm water management system and components including sizes, lengths, pertinent elevations, etc.
     - iv. where and how proposed storm water management system will be connected to existing systems
     - v. location and grade of all swales including cross sections
     - vi. location and design of all other best management structures/implementations
     - vii. location and type of best management practice erosion and sediment control structures
     - viii. existing and proposed ground cover
     - ix. total impervious area
     - x. control release facilities showing cross-sections and profiles.
   - D. Final As-Built Drawings
     - i. drawing no larger than 24-inch x 36 inch and at a scale of 1 inch equals 10 feet to 1 inch equals 50 feet
     - ii. submitted in AutoCAD, DXF or DWG or another authorized file format

iii. show all revised contours and appropriate "spot elevations"
iv. show location, length, sizes, and pertinent elevations of the storm water management system
v. all impervious areas accurately depicted

Final as-built drawings shall be submitted to the Planning Commission prior to final plat approval.

2. Design Standards
   A. Standards as stated in Section 300.01~~(A)~~ and the following:
      i. flow rates calculated by use of the Rational Method or SCS TR-55 method unless sufficient justification for use of another method is approved by the Planning Commission or Officer
      ii. calculations shall utilize a six (6) minute minimum "time of concentration"

   B. Design Backup
      i. calculations of volumetric runoff and peak runoff rate of flow for both pre-development and post-development
      ii. calculations for storm water detention/retention facility and other system elements including description and rationale supporting the design methodology
      iii. Operation and Maintenance Manual for private storm water control facilities.

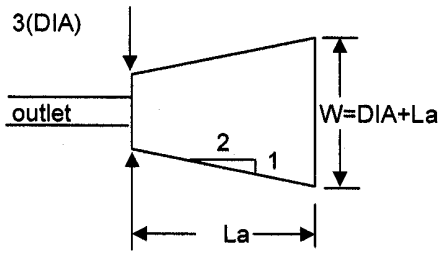
3. Material Standards
   A. Standards as stated in Section 300.01(5).

300.05 EROSION AND SEDIMENT CONTROL *(Amended 10-11-22)*

Erosion and sedimentation control measures are required as outlined in accordance with the West Virginia Department of Environmental Protection General Permit. Refer to the most current edition of the West Virginia Department of Environmental Protection Erosion and Sediment~~ation~~ Control BMP Manual for acceptable means and methods.

Outlet Protection*

Diameter	La	D_{50}	D_{MIN}	D_{MAX}	Min. Thickness
12" or smaller	6'	3"	2"	5"	5"
18"	10'	4"	3"	6"	6"
24"	14'	6"	4"	9"	9"
36"	23'	9"	6"	15"	15"
42"	30'	12"	8"	18"	18"
48"	35'	14"	10"	21"	21"
54"	40'	16"	10"	24"	24"



* This table is based upon Corregated Plastic Pipe (Mannings = 0.012), flowing full at 1%, with minimum tailwater. This table may also be used for reinforced concrete pipe and corregated metal pipe. For pipes at steeper grades use Figure 26 of the WV Erosion Sediment Control Handbook for Developing Areas. For maximum tailwater conditions, use Figure 27 of the WV Erosion Sediment Control Handbook for Developing Areas.