CHAPTER 26

WATER

PART 1

STORMWATER MANAGEMENT

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STORMWATER MANAGEMENT

A. General Provisions.

§101. STATEMENT OF FINDINGS.

The Borough Council of the Borough of East Conemaugh finds that:

A. Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, over taxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines floodplain management and flood control efforts in downstream communities, reduces gro undwater recharge and threatens public health and safety.

B. A comprehensive program of stormwater management, including reasonable regulation of development and activities that causes accelerated erosion, is fundamental to the public health, safety, welfare and the protection of the people of the Borough and all the people of the Commonwealth, their resources, and the environment.

(Ord. 110-94, -/-/1994, §101)

§102. PURPOSE.

The purpose of this Part is to:

A. Promote the general health, welfare and safety of the community.

B. Control accelerated runoff/erosion from modifications to natural terrain and the alteration of existing drainage from land developments.

C. Provide design, construction and maintenance criteria for permanent and temporary onsite stormwater management facilities necessary to control stormwater runoff.

D. Provide performance standards and design criteria for watershed-wide stormwater management and planning.

E. Encourage the recharge of groundwater, where appropriate, and prevent the degradation of groundwater quality.

(Ord. 110-94, -/-/1994, §102)

§103. AUTHORITY.

The Stormwater Management Act of October 4, 1978, P.L. 864, No. 167, provides for the regulation of land development and stormwater and confers powers of enforcement to the local municipalities.

(Ord. 110-94, -/-/1994, §103)

§104. APPLICABILITY.

1. This Part shall only apply to those areas of the Borough which are located within the Little Conemaugh River drainage basin as delineated on the Watershed Boundary Map provided as "Appendix D" of this Part.

2. This Part shall apply to permanent and temporary stormwater management controls and facilities constructed as part of any of the activities listed in this Section.

3. This Part contains only minimum stormwater runoff control criteria and standards which are necessary or desirable from a total watershed perspective. Additional stormwater management design criteria (i.e., inlet spacing, inlet type, collection system details, etc.) which represent sound engineering practice should be regulated as part of the general responsibilities of the Borough Engineer.

4. The following activities are included within the scope of this Part:

   A. Land development.

   B. Subdivision.

   C. Construction of new or additional impervious or semipervious surfaces (driveways, parking lots, etc.).

   D. Construction of new buildings or additions to existing buildings.

   E. Diversion or piping of any natural or manmade channel.

   F. Installation of stormwater controls and facilities or appurtenances thereto.

   G. Mining operations.

(Ord. 110-94, -/-/1994, §104)

§105. EXEMPTIONS.

The following activities are specifically exempt from this Part:

A. Any proposed regulated activity which would create 10,000 or less square feet

of additional impervious cover.

B. Use of land for gardening for residential consumption.

C. Landscaping improvements which do not significantly alter the runoff characteristics.

D. The agricultural activities such as growing crops, rotating crops, filling of soil and grazing animals and other such activities are specifically exempt from complying with the requirements of the Stormwater Management Act when such activities are conducted in accordance with a conservation plan or erosion and sedimentation control plan prepared by the County Conservation District. The construction of buildings, parking lots or any activity that may result in impervious surface which increases the rate and volume of stormwater runoff should comply with the requirements of this Part.

E. Minor improvements to existing residential (single family) properties.

For the purpose of this Part, the creation of more than three lots (irrespective of size) of which new construction of buildings or impervious surfaces could take place at the present or in the future will be considered to have an impervious surface greater than 10,000 square feet. Parcels shall be considered from the date of this Part adoption irrespective of phasing or the time frame for the subdivision process.

(Ord. 110-94, -/-/1994, §105)

§106. COMPATIBILITY WITH OTHER PERMIT AND ORDINANCE REQUIREMENTS.

Permits and approvals issued pursuant to this Part do not relieve the applicant of the responsibility to secure required permits or approvals for activities regulated by any other applicable code, rule, act, permit or ordinance.

(Ord. 110-94, -/-/1994, §106)

§107. ABROGATION AND GREATER RESTRICTION.

This Part supersedes any provisions of existing ordinances currently in effect with respect to stormwater management within the boundaries of the Little Conemaugh River Watershed.

(Ord. 110-94, -/-/1994, §107)

B. Definitions.

§121. GENERAL.

For the purpose of this Part, any word or term not defined shall be used with a meaning of standard usage.

(Ord. 110-94, -/-/1994, §201)

§122. DEFINITIONS.

The following words and phrases shall have for the purpose of this Part the following meaning:

ACCELERATED EROSION - the removal of the surface of the land through the combined action of man's activity and the natural processes at a rate greater than would occur because of the natural process alone.

AGRICULTURAL ACTIVITIES - the work of producing crops and raising livestock including tillage, plowing, harrowing, pasturing and the installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

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

APPLICANT - a landowner or developer who has filed an application for approval to engage in any regulated activity as defined in §104 of this Part.

CAMBRIA COUNTY CONSERVATION DISTRICT - the Conservation District serving Cambria County.

CAMBRIA COUNTY PLANNING COMMISSION - the planning commission serving Cambria County or the County Planning Commission.

CHANNEL - a natural stream which conveys water; a ditch or open channel excavated to convey water.

CHANNEL EROSION - the widening, deepening and headward cutting of small channels and waterways, due to erosion caused by moderate to large floods.

CISTERN - an underground reservoir or tank for storing rainwater.

COUNTY - the County of Cambria, Pennsylvania.

CULVERT - a pipe, conduit or similar enclosed structure including appurtenant works which carries surface or stormwater.

DAM - an artificial barrier, together with its appurtenant works, constructed for the purpose of impounding or storing water or another fluid or semifluid; or a refuse bank, fill or structure for highway, railroad or other purposes which does not impound water or another fluid or semifluid.

DEP - the Pennsylvania Department of Environmental Protection. [A.O.]

DESIGNEE (DESIGNER) - the agent of the Cambria County Planning Commission and/or agent of the governing body involved with the administration, review or enforcement of any provisions of this Part by contract or memorandum of understanding.

DESIGN STORM - the magnitude of precipitation from a storm event measured in probability of occurrence (e.g., 50 year storm) and duration (e.g., 24-hour), and used in computing stormwater management control systems.

DETENTION BASIN - a basin designed to retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate. A detention basin can be designed to drain completely after a storm event, or it can be designed to contain a permanent pool of water.

DEVELOPER - a person or persons, partnership, association, corporation or other entity, or any responsible person therein or agent thereof, that undertakes the activities covered by this Part.

DEVELOPMENT SITE - the specific tract of land for which a regulated activity is proposed.

DISCHARGE - rate of flow, specifically fluid flow. A volume of fluid flowing from a conduit or channel or being released from detention storage per unit of time. Commonly expressed as cubic feet per second (C.F.S.), million gallons per day (M.G.D.), gallons per minute (G.P.M.) or cubic meters per second (C.M.S.).

DRAINAGE - interception and removal of excess surface water or groundwater from land by artificial or natural means.

DRAINAGE AREA - the contributing area to a single drainage basin, expressed in acres, square miles or other units of area; also referred to as a catchment area, watershed or river basin; the area served by a drainage system or by a watercourse receiving storm and surface water.

DRAINAGE BASIN - the area from which water is carried off by a drainage system; a watershed or catchment area.

DRY BOTTOM STORMWATER STORAGE AREA (DRY BOTTOM BASIN) - a facility that is designed to be normally dry and contains water only when excess stormwater runoff occurs.

EARTH DAM - a dam constructed of compacted soil materials.

EFFLUENT - the discharge of outflow of water from ground or subsurface storage.

EMBANKMENT (FILL) - a bank of earth, rock or other material constructed above the natural ground surface.

ENGINEER (MUNICIPAL ENGINEER) - an experienced, licensed engineer or engineering firm duly appointed as the engineer for local municipalities or the qualified designated reviewing agent.

ERODIBLE - susceptible to erosion.

EROSION - the wearing away of the land surface by running water, wind, ice or other geological agents, including gravitational creep.

EXCAVATION (CUT) - any act by which soil or rock is cut into, dug, quarried, uncovered, removed, displaced or relocated and shall include the conditions resulting therefrom.

FEE - a charge fixed by the Borough to review stormwater management plans.

FREEBOARD - a vertical distance between the elevation of the design highwater and the top of a dam, levee, tank, basin or diversion ridge. The space is required as a safety margin.

GRADE - a slope, usually of a road, channel or natural ground specified in percent and shown on plans as specified herein.

(TO) GRADE - to finish the surface of a roadbed, top of embankment or bottom of excavation.

GRASSED WATERWAY - a natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to conduct surface water from cropland.

GROUNDWATER RECHARGE - replenishment of existing natural underground water supplies.

HYDROGRAPH - a plot of the discharge of the stream flow, discharge or runoff versus time.

IMPERVIOUS SURFACE - a surface which prevents the penetration of water into the ground including roofs, concrete, asphalt, compacted shale, sidewalks, etc. Any areas which may be designed to initially be semipervious (e.g. gravel crushed stone, porous pavement, etc.) shall be impervious areas for the purpose of waiver evaluation.

IMPOUNDMENT - a retention or detention basin designed to retain stormwater runoff and release it at a controlled rate.

INFILTRATION - the flow of a liquid into a substance through pores or other

openings, connoting flow into a soil in contradistinction to the word, "percolation," which connotes flow through a porous substance. The infiltration capacity is expressed in terms of inches per inch.

INFILTRATION STRUCTURE - a structure designed to direct runoff into the ground (e.g. french drains, seepage pits, seepage trench).

INLET - a surface connection to a closed drain. A structure at the diversion end of a conduit. The upstream end of any structure through which water may flow.

INVERT ELEVATION - the vertical elevation of a pipe or orifice.

LAND DEVELOPMENT - (i) the improvement of one lot or two or more contiguous lots, tracts or parcels of land for any purpose involving (a) a group of two or more buildings, or (b) the division or allocation of land or space between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups or other features; (ii) a subdivision of land.

LAND DISTURBANCE - any activity involving grading, tilling, digging or filling of ground or stripping of vegetation or any other activity that causes an alteration to the natural condition of the land.

MAIN STEM (MAIN CHANNEL) - any stream segment or other runoff conveyance facility used as a reach in the Little Conemaugh River Watershed hydrologic model.

MANNING EQUATION (MANNING FORMULA) - a method for the calculation of velocity of flow (e.g. feet per second) and flow rate (e.g. cubic feet per second) in open channels based upon channel shape, roughness, depth of flow and slope. "Open channels" may include closed conduits so long as the flow is not under pressure.

MINING - the process of the extraction of soil or minerals from the earth, or from waste or stockpiles, or from pits or banks for use offsite of a subdivision, development site or land development.

OPEN CHANNEL - a drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and manmade drainageways, swales, streams, ditches, canals and pipes flowing partly full.

OUTFALL - point where water flows from a conduit, stream or drain.

OUTLET - point of water disposal from a stream, river, lake, tidewater or artificial drain.

OVERFLOW RATE - detention basin release rate divided by the surface area of the basin. It can be thought of as an average flow rate through the basin.

OWNER - a person who owns.

PARKING LOT STORAGE - involves the use of impervious parking areas as temporary impoundments with controlled release rates during rainstorms.

PEAK DISCHARGE - the maximum rate of water flow at a given point and time resulting from a storm event.

PENN STATE RUNOFF MODEL (CALIBRATED) - the computer-based hydrologic modeling technique adapted to the Little Conemaugh River Watershed for the Act 167 plan. The model has been "calibrated" to reflect actual recorded flow values by adjusting key model input parameters.

PLAN - the Little Conemaugh River Watershed Stormwater Management Control Plan (including narrative and exhibits).

PLAN ADMINISTRATOR - the entity set up specifically to review Act 167 Drainage plans, inspect stormwater management structures and otherwise enforce all regulations as outlined in the "Little Conemaugh River Watershed Act 167 Stormwater Management Ordinance."

PLANNING COMMISSION - the Planning Commission of Cambria County.

RATIONAL FORMULA - a rainfall-runoff relation used to estimate peak flow.

REGULATED ACTIVITIES - actions or proposed actions which impact, upon proper management of stormwater runoff, erosion and sediment pollution control and activities in wetlands and which are governed by this Part as specified in §104.

RELEASE RATE - the percentage of the predevelopment peak rate of runoff for a development site to which the postdevelopment peak rate of runoff must be controlled to protect downstream areas.

RETURN PERIOD - average interval of the time or number of years within which an event will be equaled or exceeded.

RISER - a vertical pipe extending from the bottom of a pond that is used to control the discharge rate from the pond for a specified design storm.

ROOFTOP DETENTION - temporary ponding and gradual release of stormwater falling directly onto flat roof surfaces by incorporating controlled-flow roof drains into building designs.

RUNOFF - that part of precipitation which flows over the land.

SCS - Soil Conservation Service, U.S. Department of Agriculture.

SEDIMENT - soils or other surficial materials transported by surface water as a product of erosion.

SEDIMENTATION - the process by which solid material, both mineral and organic,

is accumulated; transported or deposited by moving wind, water or gravity. Once this matter is deposited (or remains suspended in water), it is usually referred to as "sediment."

SEDIMENT BASIN - a temporary structure, barrier, dam, retention or detention basin designed to retain sediment, designed and constructed in accordance with 25 Pa. Code, Chapter 102.

SEDIMENT TRAP - a temporary sediment control device formed by excavation and/or embankments or hay bales to intercept sediment laden runoff and retain the sediment.

SEEPAGE AREAS - grass-covered areas that infiltrate stormwater runoff and allow particulate contaminants to settle.

SEDIMENT POLLUTION - the placement, discharge or any other introduction of sediment into the waters of the Commonwealth occurring from the failure to design, construct, implement or maintain control measures and control facilities in accordance with 25 Pa. Code, Chapter 102.

SHEETFLOW - runoff which flows over the ground surface as a thin, even layer, not concentrated in a channel.

SOIL-COVER COMPLEX METHOD - a method of runoff computation developed by SCS, and found in its publication "Urban Hydrology for Small Watersheds," Technical Release No. 55, SCS, June 1986, or latest edition.

SOIL GROUP, HYDROLOGIC - a classification of soils by the Soil Conservation Service into four runoff potential groups. The groups range from "A" soils, which are very permeable and result in little runoff, to "D" soils, which are not very permeable and result in much more runoff.

SPILLWAY - a depression in the embankment of a pond or basin which is used to pass peak discharge greater than the maximum design storm controlled by the pond.

STORM FREQUENCY - statistical procedure involved in interpreting the past of a hydrological event to occurrences of that event in the future. See "return period."

STORM SEWER - a system of pipes or other conduits which carries intercepted surface runoff, street water and other wash waters or drainage, but excludes domestic sewage and industrial wastes.

STORMWATER MANAGEMENT CONTROLS - all structural and nonstructural appurtenances utilized to manage or control stormwater runoff including, but not limited to: detention facilities, swales, diversion channels, streams, culverts, bridges, infiltration facilities, cisterns and sediment basins.

STORMWATER MANAGEMENT PLAN - the plan for managing stormwater runoff adopted by a County as required by the Act of October 4, 1978, P.L. 864, (Act 167), and

known as the "Stormwater Management Act."

STORMWATER MANAGEMENT SITE PLAN - the plan prepared by the developer or his representative indicating how stormwater runoff will be managed at the particular site of interest according to this Part.

STORMWATER RUNOFF - that part of precipitation which flows over the land (surface runoff) excluding that portion which infiltrates or is evapotranspired.

SUBAREA - the smallest drainage unit of a watershed for which stormwater management criteria have been established in the stormwater management plan.

SUBDIVISION - the division or redivision of a lot, tract or parcel of land by any means into two or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, transfer of ownership or building or lot development.

SWALE - a low lying stretch of land which gathers or carries surface water runoff.

TERRACE - an embankment or combination of an embankment and channel across a slope to control erosion by diverting or storing surface runoff instead of permitting it to flow uninterrupted down the slope.

TIME OF CONCENTRATION (Tc) - the time for surface runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. This time is the combined total of overland flow time and flow time in pipes or channels, if any.

WATERCOURSE - a stream of water, river, brook, creek or a channel or ditch for water, whether natural or manmade.

WATERS OF THE COMMONWEALTH - any and all rivers, streams, creeks, rivulets, ditches, watercourses, storm sewers, lakes, dammed waters, wetlands, ponds, springs, and all other bodies or channels of conveyance of surface and underground water, or parts thereof, whether natural or artificial, within or on the boundaries of this Commonwealth.

WETLANDS - wetlands are those areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include swamps, marshes, bogs and similar areas. A significant natural resource, wetlands serve important functions, relating to fish and wildlife food chain production, habitat, nesting, spawning, rearing and resting sites for protected aquatic and land species; protection of other areas from erosion and sediment pollution, storage areas for storm and flood waters or natural recharge areas where ground and surface water are interconnected; and natural water filtration and purification functions.

(Ord. 110-94, -/-/1994, §202; as amended by A.O.

C. Stormwater Management Requirements.

§131. GENERAL REQUIREMENTS.

1. All stormwater management system designs, plans and/or construction shall:

   A. Limit the peak postdevelopment runoff to the applicable release rate of the predevelopment peak rate of runoff from the 2, 10 and 25-year storms. It is the developer/owner/engineer's responsibility to insure that the proposed development site/subdivision meets the release rate criteria of this Part and does not increase stormwater runoff onto other properties.

   B. Be compatible with the Little Conemaugh River Stormwater Management Plan.

   C. Shall comply with all the requirements of the local ordinances and those of the Pennsylvania Department of Environmental Protection. The Pennsylvania Department of Environmental Protection, Chapter 105, "Rules and Regulations," apply to the construction, modification, operation or maintenance of both existing and proposed dam, water obstructions and encroachments throughout the watershed, including wetlands. Inquiries on permit requirements or other concerns should be addressed to the Southwest Regional Office, 400 Waterfront Drive, Pittsburgh, PA 14222-4745. [A.O.]

   D. Be conducted in such a way as to minimize accelerated erosion and resulting sediment pollution. Measures to control erosion and resulting sediment pollution shall, at a minimum, meet the standards of Chapter 102 (Erosion and Sediment Pollution Control) of Title 25, rules and regulations of the Pennsylvania Department of Environmental Protection and Erosion and Sediment Pollution Control Manual (latest edition). [A.O.]

   E. Be designed so that the construction of basins within the 100 year floodplain are avoided, where possible, but where unavoidable, the situation shall be examined for its functionability and supporting documentation submitted to the governing body for review and shall be consistent with Chapter 106 (Floodplain Management) of Title 25, rules and regulations of the PA DEP. [A.O.]

   F. Comply with all zoning, subdivision and floodplain management regulations at the State or Borough level. The more restrictive regulation(s) supersede(s) all other regulations.

   G. Be designed by a person trained and experienced in stormwater management. The design and installation of the control measures are the responsibility of the developer.

2. These requirements are in addition to any and all criteria established by the Pennsylvania Department of Environmental Protection. [A.O.]

(Ord. 110-94, -/-/1994, §301; as amended by A.O.

§132. TECHNICAL REQUIREMENTS.

1. All stormwater management facilities required or regulated by this Part shall be designed to meet the performance standards presented within this Part.

2. The design of any detention facility intended to meet the requirements of this Part shall be verified by routing the design storm hydrograph through the proposed facility.

3. All facilities that require stream encroachment or dam safety permits, as defined in PA DEP, Chapter 105 regulations (as amended or replaced from time to time by PA DEP), shall be designed in accordance with Chapter 105. See §131(C), for further information. [A.O.]

4. All calculations using the soil-cover-complex method shall use the 24-hour rainfall amounts obtained from "Rainfall-Duration-Frequency Tables for Pennsylvania", PA DEP. [A.O.]

5. Rainfall intensities required for the rational formula shall use rainfall intensities consistent with appropriate times of concentration and return periods and shall be obtained from the "Rainfall-Duration-Frequency Tables for Pennsylvania," PA DEP. [A.O.]

6. Infiltration/storage structures are promoted throughout the watershed, particularly on the more porous soils (hydrologic soil groups A and B). Of course, size limitations and geologic conditions (potential for groundwater contamination) should be carefully examined before proposing infiltration facilities. The table provided (Source: Rawls, Brakenseik and Saxton, 1982) may be consulted in determining the storage potential for infiltration structures. The effects of frozen conditions should also be considered when designing such facilities. The Little Conemaugh River Watershed Act 167 Stormwater Management Plan provides accepted infiltration runoff control techniques. It should be noted that these techniques are suggestions and should not be limited to only those shown. Most often a combination of techniques are utilized to obtain most practical installations. The most common installations are:

   A. Detention basins.

   B. Retention basins.

   C. Infiltration beds/leaching chambers.

   D. Open channels.

   E. Infiltration ponds.

   F. Percolation basins.

   G. Pipe trenches.

H. Pervious pavement.

I. Rooftop storage.

J. Dutch drains.

K. Permanent ponds.

L. Underground detention tanks.

HYDROLOGIC SOIL PROPERTIES CLASSIFIED BY SOIL TEXTURE

Texture Class	Effective Water Capacity (In. per hour)	Minimum Infiltration Rate (In. per hour)	Hydrologic Soil Group
Sand	0.35	8.25	A
Loamy sand	0.31	2.41	A
Sandy loam	0.25	1.02	B
Loam	0.19	0.52	B
Silt loam	0.17	0.27	C
Sandy clay loam	0.14	0.09	C
Clay loam	0.14	0.17	C
Silty clay loam	0.11	0.06	D
Sandy clay	0.09	0.05	D
Silty clay	0.09	0.04	D
Clay	0.08	0.02	D

Source: Rawls, Brakenseik and Saxton, 1982.

7. The following list of general structural criteria may be used to aid in the design of a proposed stormwater detention basin:

A. The basin is to be sodded or topsoiled and seeded, including the bottom, side slopes, and all earthen dams and embankments.

B. Suitable lining shall be required to all points of inflow to the basin where erosion and scour may occur.

C. The basin shall have a minimum slope of 1% towards the primary outlet to assure positive drainage and prevent saturated conditions.

D. The side slopes shall be maximum of 3 feet horizontal to 1 foot vertical (3:1), unless the design engineer can provide justification to propose steeper slopes.

E. Basins greater than 3 feet deep shall be fenced.

F. Safety ledges shall be constructed on the side slopes of all detention basins having a permanent pool of water.

G. Any stormwater management facility required or regulated by this Part shall be designed to provide an emergency spillway to handle flow up to 100-year post-development conditions. The height of embankment must be set as to provide a minimum 1.0 foot of freeboard above the maximum pool elevation computed when the facility functions for 100 year postdevelopment inflow. However, criteria for design and construction of stormwater management facilities are not the same criteria that are used in the permitting of dams under the Dam Safety Program. Depending upon the physical characteristics of a dam, a dam permit may be required and the design will have to meet the provisions of Chapter 105 of the Dam Safety and Encroachments Act. Depending on the physical characteristics of a dam, the design could require that anywhere from a 50 year to a PMF storm event be considered.

H. Outlets shall be designed to function without manual, electric or mechanical controls where possible.

I. Provide all spillways (primary and emergency) with erosion protection.

J. All earth fill shall be free from brush, roots and other organic material subject to decomposition.

K. The fill material in all earth dams and embankments shall be compacted to at least 95% of the maximum density obtained from compaction tests performed by the appropriate method in ASTM D698.

8. Infiltration facilities cannot discharge to or be directly hydrologically connected to an underlying deep mine.

9. All stormwater detention facilities shall be designed to provide an emergency overflow which shall pass 100% of the 100 year postdevelopment runoff rate.

10. The design of all stormwater management facilities shall incorporate sound engineering principles and practices. The plan administrator shall reserve the right to disapprove any design that would result in the occurrence or perpetuation of an adverse hydrologic or hydraulic condition within the watershed.

(Ord. 110-94, -/-/1994, §302; as amended by A.O.

§133. CALCULATION METHODOLOGY.

1. Any stormwater runoff calculations involving drainage areas greater than 20 acres, including on and offsite areas, shall use any generally accepted calculation technique that is based on the SCS soil cover complex method. It is assumed that all methods will be selected by the design professional based on the individual limitations and suitability of each method for a particular site.

Method	Method Developed By	Applicability
TR-20 (or commercial package based on TR-20)	USDA SCS	Applicable where use of full hydrology computer model is desirable or necessary
TR-55 (or commercial computer package based on TR-55)	USDA SCS	Applicable for land development plans within limitations desired in TR-55
HEC-1	U.S. Army Corps of Engineers	Applicable where use of full hydrologic computer model is desirable or necessary
PSRM	Penn State University	Applicable where use of hydrologic computer model is desirable or necessary; simpler than TR-20 or HEC-1
Rational Method (or commercial computer package based on rational method)	Emil Kuichling (1889)	For sites less than 20 acres, or as approved by the plan administrator and Borough Engineer
Other Methods	Varies	Other computation methodologies approved by the plan administrator and Borough Engineer

2. The following steps outline the procedure for calculating stormwater runoff:

   A. Compute the predevelopment runoff hydrograph for the 2, 10 and 25-year event.

   B. Compute the postdevelopment runoff hydrograph for the 2, 10 and 25-year event with no stormwater management. If the postdevelopment hydrograph is identical to the predevelopment runoff hydrograph in peak discharge and shape, the requirements of this Part have been met; otherwise proceed to step C.

   C. If site conditions allow, apply onsite stormwater management technique(s) to increase infiltration and reduce impervious surfaces. Recompute the 2, 10 and 25 year postdevelopment hydrographs. If the peak rates are greater than predevelopment rates, stormwater detention will be required.

D. Using the subbase release rate percentage (provided on the watershed map in Appendix D) and the predevelopment rate of runoff, multiply to determine the allowable release rates from the detention facility for the 2, 10 and 25 year events.

E. Prove by accepted hydraulic methods that the allowable release rates from the detention facilities are being achieved for the 2, 10 and 25 year events through principal outlet/outlets.

F. Provide all detention facilities with an emergency spillway or emergency overflow outlet with the capacity of safely passing 100% of the peak inflow from the 100 year postdevelopment event.

3. It should be noted that stormwater storage can be provided on or offsite. The possibility for regional or offsite facilities provides increased management flexibility within a watershed. In many areas, the most cost-effective solution may be several developments sharing a joint facility. Municipalities also may benefit from this approach. Joint facilities may maximize development in appropriate areas and provide regional storage through the use of natural or artificial lakes, floodplains and valleys with steep slopes that are unsuitable for development. However, where offsite storage is to be used, the developer must insure that no flooding or harm will be caused by runoff between the new development and the offsite storage area. This may require the protection of the stream channel or the construction of a storm sewer to convey runoff to the storage site.

4. The release rate percentage provides a standard for the watershed plan to define what measures are reasonably necessary to manage stormwater so as to prevent injury to persons and property in a watershed.

(Ord. 110-94, -/-/1994, §303)