

STORMWATER AND WATER QUALITY MANAGEMENT
ORDINANCE

ORDINANCE NO. _____

VALLEY TOWNSHIP
MONTGOMERY COUNTY, PENNSYLVANIA

Adopted at a Public Meeting Held on

_____, 20__

Prepared By:

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ARTICLE I - GENERAL PROVISIONS

Section 101. Short Title

This Ordinance shall be known and may be cited as the “Valley Township Stormwater and Water Quality Management Ordinance”.

Section 102. Statement of Findings

The governing body of Valley Township finds that:

- A. Inadequate management of accelerated runoff of stormwater resulting from development throughout a watershed increases flows and velocities, contributes to erosion and sedimentation, overtaxes the carrying capacity of streams and storm sewers, greatly increases the cost of public facilities to carry and control stormwater, undermines flood plain management and flood control efforts in downstream communities, reduces groundwater recharge, threatens public health and safety, and increases non-point source pollution of water resources.
- B. A comprehensive program of stormwater management, including reasonable regulation of development and activities causing accelerated runoff, is fundamental to the public health, safety and welfare and the protection of people of the Commonwealth, their resources and the environment.
- C. Stormwater is an important water resource which provides groundwater recharge for water supplies and base flow of streams which also protects and maintains surface water quality.
- D. Federal and state regulations require certain municipalities to implement a program of stormwater controls. These municipalities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).

Section 103. Purpose

The purpose of this Ordinance is to promote health, safety, and welfare within Valley Township and it’s watershed by minimizing the harms and maximizing the benefits described in Section 102 of this Ordinance, through provisions designed to:

- A. Meet legal water quality requirements under state law, including regulations at 25 Pa. Code Chapter 93 to protect, maintain, reclaim and restore the existing and designated uses.
- B. Preserve the natural drainage systems as much as possible.

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- C. Manage stormwater runoff close to the source.
- D. Provide procedures and performance standards for stormwater planning and management.
- E. Maintain groundwater recharge to prevent the degradation of surface and groundwater quality and to otherwise protect water resources.
- F. Prevent scour and erosion of stream banks and streambeds.
- G. Provide proper operations and maintenance of all permanent SWM BMP's that are implemented within the Municipality.

Section 104. Statutory Authority

Primary Authority:

Valley Township is empowered to regulate these activities by the authority of the Act of October 4, 1978, P.L. 864 (Act 167), 32 P.S. Section 680.1, et seq., as amended, the "Stormwater Management Act" and the Valley Township Subdivision and Land Development and Zoning Ordinances.

Secondary Authority:

Valley Township is also empowered to regulate land use activities that affect runoff by the authority of the Act of July 31, 1968, P.L. 805, No. 247, The Pennsylvania Municipalities Planning Code, as amended by Act 170 of December 21, 1988 and Act 131 of December 14, 1992.

Section 105. Applicability

All activities involving land development or earth disturbance are subject to regulation by this Ordinance.

Section 106. Repealer

Any other ordinance provision(s) or regulation of Valley Township inconsistent with any of the provisions of this Ordinance is hereby repealed to the extent of the inconsistency only.

Section 107. Severability

In the event that a court of competent jurisdiction declares any section or provision of this Ordinance invalid, such decision shall not affect the validity of any of the remaining provisions of this Ordinance.

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Section 108. Compatibility with Other Requirements

Approvals issued, and actions taken, under this Ordinance do not relieve the Applicant of the responsibility to secure required permits or approvals for activities regulated by any other code, law, regulation or ordinance.

ARTICLE II - DEFINITIONS

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

- A. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender, and words of feminine gender include masculine gender.
- B. The words "includes" or "including" shall not limit the term to the specific example, but are intended to extend their meaning to all other instances of like kind and character.
- C. The words "shall" and "must" are mandatory; the words "may" and "should" are permissive.

Agricultural Activity - The work of producing crops including tillage, land clearing, plowing, disking, harrowing, planting, harvesting crops, or pasturing and raising of livestock and installation of conservation measures. Construction of new buildings or impervious area is not considered an Agricultural Activity.

Applicant - A landowner, developer or other person who has filed an application for approval to engage in any Regulated Earth Disturbance activity at a project site in Valley Township.

BMP (Best Management Practice) - Activities, facilities, designs, measures, or procedures used to manage stormwater impacts from Regulated Activities to meet State Water Quality Requirements, to promote groundwater recharge, and to otherwise meet the purposes of this Ordinance. BMPs include, but are not limited to, infiltration, filter strips, low impact design, bioretention, wet ponds, permeable paving, grassed swales, forested buffers, sand filters, and detention basins. Structural SWM BMPs are permanent appurtenances to the project site.

Conservation District - A conservation district, as defined in section 3(c) of the Conservation District Law (3 P. S. § 851(c)), which has the authority under a delegation agreement executed with the Department to administer and enforce all, or a portion of, the erosion and sediment control program in this Commonwealth.

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Design Storm - The magnitude and temporal distribution of precipitation from a storm event measured in probability of occurrence (e.g. a 5-year storm) and duration (e.g. 24-hours) used in the design and evaluation of stormwater management systems.

Detention - The volume of runoff that is captured and released into the Waters of this Commonwealth at a controlled rate.

DEP - The Pennsylvania Department of Environmental Protection.

Development Site (Site) - See Project Site.

Earth Disturbance Activity - A construction, or other human activity, which disturbs the surface of the land, including, but not limited to, clearing and grubbing, grading, excavations, embankments, road maintenance, building construction and the moving, depositing, stockpiling, or storing of soil, rock or earth materials.

Erosion - The natural process by which the surface of the land is worn away by water, wind, or chemical action.

Extended Detention Volume (EDV) - Release of detained runoff in excess of **Permanently Removed Volume (PRV)** over an extended period of time of 24 to 72 hours.

Floodplain - Any land area susceptible to inundation by water from any natural source or delineated by applicable Department of Housing and Urban Development, Federal Insurance Administration Flood Hazard Boundary - Mapped as being a special flood hazard area. Also included are areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania Department of Environmental Protection (PADEP) Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by PADEP).

Floodway - The channel of the watercourse and those portions of the adjoining floodplains that is reasonably required to carry and discharge the 100-year flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the 100-year floodway, it is assumed - absent evidence to the contrary - that the floodway extends from the stream to 50 feet from the top of the bank of the stream.

Forest Management / Timber Operations - Planning and activities necessary for the management of forestland. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, site preparation and reforestation.

Hydrologic Soil Group (HSG) - Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates. Soils are classified into four HSG's (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged wetting. The Natural Resources Conservation Service (NRCS) of the US Department of Agriculture defines the four groups and provides a list of most of the soils in the United States

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and their group classification. The soils in the area of the development site may be identified from a soil survey report that can be obtained from local NRCS offices or conservation district offices. Soils become less pervious as the HSG varies from A to D.

Impervious Surface (Impervious Area) - A surface that prevents the infiltration of water into the ground. Impervious surfaces (or covers) shall include, but not be limited to, roofs, additional indoor living spaces, patios, garages, storage sheds and similar structures, and any new streets or sidewalks. Decks, parking areas, and driveway areas are not counted as impervious areas if they do not prevent infiltration.

Karst – A type of topography or landscape characterized by depressions, sinkholes, limestone towers and steep-sided hills, underground drainage, and caves. Karst is formed on carbonate rocks, such as limestones or dolomites and sometimes gypsum.

Land Development (Development) – Inclusive of any or all of the following meanings: (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) any subdivision of land; (iii) development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

Municipality – Valley Township, Montour County, Pennsylvania.

NRCS - Natural Resources Conservation Service (previously SCS).

Peak Discharge - The maximum rate of stormwater runoff from a specific storm event.

Permanently Removed Volume (PRV) – The volume of runoff that is permanently removed from the runoff and not released into surface Waters of this Commonwealth during or after a storm event.

Project Site - The specific area of land where any Regulated Activities in Valley Township are planned, conducted or maintained.

Qualified Professional - Any person licensed by the Pennsylvania Department of State, or otherwise qualified by law, to perform the work required by the Ordinance.

Regulated Activities - All activities involving land development or earth disturbance.

Retention / Removed - The volume of runoff that is captured and not released directly into the surface Waters of this Commonwealth during or after a storm event.

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Return Period - The average interval, in years, within which a storm event of a given magnitude can be expected to occur one time. For example, the 25-year return period rainfall would be expected to occur on average once every twenty-five years.

Runoff - Any part of precipitation that flows over the land.

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

State Water Quality Requirements - The regulatory requirements to protect, maintain, reclaim, and restore water quality under Pennsylvania Code Title 25 and the Clean Streams Law.

Stormwater - Drainage runoff from the surface of the land resulting from precipitation or snow or ice melt.

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

Stormwater Management Plan - The plan for managing storm water runoff adopted by the County of Montour for the Valley Township Watershed as required by the Act of October 4, 1978, P.L. 864, (Act 167), as amended, and known as the “Stormwater Management Act”.

Stormwater Management BMP's - Is abbreviated as **SWM BMPs** throughout this Ordinance.

Stormwater Management Site Plan - The plan prepared by the Developer, or his representative, indicating how storm water runoff will be managed at the development site in accordance with this Ordinance. **Stormwater Management Site Plan** will be designated as **SWM Site Plan** throughout this Ordinance.

Subdivision - The division, or re-division, 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.

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

Watershed - Region or area drained by a river, watercourse or other body of water, whether natural or artificial.

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Wetland - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and, that under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, fens, and similar areas.

ARTICLE III - STORMWATER MANAGEMENT STANDARDS

Section 301. General Requirements

Note: All Stormwater designs shall be in compliance with the latest recommendations listed in the PA Best Management Practice Manual. Valley Township reserves the right to reject any design that does not meet or exceed the design practices and standards listed in this state manual.

- A. All Regulated Activities in Valley Township shall be subject to the requirements of this Ordinance.
- B. No Regulated Activities shall commence until Valley Township approves a plan which demonstrates compliance with the requirements of this Ordinance.
- C. Plans approved by Valley Township shall be on-site throughout the duration of the Regulated Activity.
- D. Valley Township may, after consultation with DEP, approve alternative methods for meeting the State Water Quality Requirements other than those in this Ordinance, provided that they meet the minimum requirements of, and do not conflict with, State law including, but not limited to, the Clean Streams Law.
- E. Impervious Areas:
 - 1. The measurement of impervious areas shall include all of the impervious areas in the total proposed development, even if development is to take place in stages.
 - 2. For development taking place in stages, the entire development plan must be used in determining conformance with this Ordinance.
 - 3. For projects that add impervious area to a parcel, the total impervious area on the parcel is subject to the requirements of this ordinance.
- F. Discharges onto adjacent property shall not be created, increased, decreased, or relocated, or otherwise altered without permission of the adjacent property owner(s). Such discharges shall be subject to the requirements of this Ordinance.
- G. Techniques described in Appendix A (Low Impact Development Practices) of this Ordinance are to be used when practical.

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- H. The design of all facilities over Karst shall include an evaluation of measures to minimize adverse effects.
- I. All land development projects shall be required to illustrate existing streams, wetlands, and floodplain areas. The Township may require the streams and wetland areas to be verified by a jurisdictional determination by the US Army Corp of Engineers and/or PA DEP if deemed necessary. All applicable permits for related impacts shall be required.
- J. The design storm volumes to be used in the analysis of peak rates of discharge should be obtained from the Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2, US Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland, 20910. NOAA's Atlas 14 can be accessed at Internet address: <http://hdsc.nws.noaa.gov/hdsc/pfds/>.
- K. Exemptions from any provisions of this Ordinance shall not relieve the applicant from implementing such measures as necessary to:
 - 1. Protect health, safety, and property;
 - 2. Meet State Water Quality Requirements as defined in Article II;
 - 3. Meet the water quality goals of this ordinance by implementing measures to:
 - a. Minimize disturbance to floodplains, wetlands, natural slopes over 15%, and existing native vegetation.
 - b. Preserve and maintain trees and woodlands. Maintain or extend riparian buffers and protect existing forested buffer. Provide trees and woodlands adjacent to impervious areas whenever feasible.
 - c. Establish and maintain non-erosive flow conditions in natural flow pathways.
 - d. Minimize soil disturbance and soil compaction. Cover disturbed areas with topsoil having a minimum depth of 4 inches. Use tracked equipment for grading when feasible.
 - e. Disconnect impervious surfaces by directing runoff to pervious areas.
 - f. Locate discharge points to avoid causing basement seepage or other damage to adjoining properties.

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- L. Stormwater Collection, Conveyance, and Stabilization requirements shall meet the provisions of PA DEP Title 25, Chapter 102 and 105 and the Penn DOT Design Manuals.
- M. All applicants shall obtain approval by the County Conservation District of the Erosion and Sedimentation Control Plans as outlined in PA DEP Title 25, Chapter 102.
- N. All applicants shall obtain related permits from PA DEP and the USACOE's for stream and wetland encroachments. All sites containing wetlands or streams shall have delineation by qualified personnel as determined by the USACOE and the delineation shall be jurisdictional verified by DEP and the USACOE's.
- O. All site impacts shall remain 50' from the top of bank of streams and wetlands that are determined to be jurisdictional by the USACOE and PA DEP.
- P. All stabilized areas shall be considered as impervious unless otherwise approved.

Section 302. Exemptions

- A. For Regulated Activities equal to or greater than 1,000 sq. ft., implementation of peak rate controls and preparation of a SWM Site Plan, are required under this Ordinance.
- B. After the date of the Ordinance adoption, if a subdivision and land development plan is submitted that addresses peak rate control and includes a SWM Site Plan, then the impervious exemption is calculated from the date of approval of that plan based upon the impervious area shown on the subdivision and land development plan.
- C. Agricultural plowing and tilling are exempt from the rate control and SWM Site Plan preparation requirements of this ordinance provided the activities are performed according to the requirements of 25 Pa.Code Chapter 102, and that no adverse impacts are occurring downstream. Sites where no-till farm methods are employed and drainage problems have been occurring may not be exempt.
- D. Subdivision plans for two lots are exempt from the requirement to submit a SWM Site Plan at the time of subdivision; however, developments of the individual lots created by the subdivision are subject to provisions of this Ordinance.
- E. All exemptions are subject to interpretation by the Township based on the existing conditions and related stormwater characteristics.

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Section 303. Water Quality

Water quality control shall be implemented using the following methodologies:

- A. The Simplified Method is independent of site conditions.
 - 1. Retention and detention facilities shall be sized to capture the first two inches (2”) of runoff from all impervious surfaces.
 - 2. The first **one-inch** (1.0”) of runoff shall be permanently removed and shall not be released into the surface Waters of this Commonwealth. This is the Permanently Removed Volume (PRV). Removal options include reuse, evaporation, transpiration, and infiltration.
 - 3. The subsequent **one-inch** (1.0”) of runoff shall be detained. This is the Extended Detention Volume (EDV).
 - 4. Infiltration of the first **one-half inch** (0.5”) of the PRV is encouraged. This portion of the PRV is the Groundwater Recharge Volume (GRV).
 - 5. Water quality volume requirements for land areas with existing cover consisting of meadow, brush, wood-grass combination, or woods proposed for conversion to any other non-equivalent type of pervious cover shall be sized for one-half (1/2) the volume required for impervious surfaces as calculated in Paragraphs A through D above.
 - 6. Retention and detention facilities should be designed to drain both the PRV and EDV completely within 24 to 72 hours.
 - 7. Retention facilities should be designed to accommodate infiltration of the PRV. Infiltration areas should be spread out and located in the sections of the site that are most suitable for infiltration. A list of the site conditions and BMPs generally suitable for infiltration is provided in Appendix C.
- B. The Design Storm Method requires detailed modeling based on site conditions.
 - 1. Do not increase the post-development total runoff volume for all storms equal to, or less than, the 2-year, 24-hour duration rainfall unless otherwise approved.
 - 2. Do not increase peak rate of runoff for (2-, 5-, 10-, 25-, 50-, 100-year storms (at minimum), pre-development to post-development; as necessary, provide additional peak rate control for as required by Act 167 planning.

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3. Existing (pre-development) non-forested pervious areas must be considered meadow or its equivalent.

The Pennsylvania Stormwater Best Management Practices Manual (1) provides guidance on selection and application of both water quality control methodologies.

Section 304. Rate Controls

A. Communities Without a Release Rate Map from an Act 167 Plan

Post-development discharge rates shall not exceed the predevelopment discharge rates for the 2-, 5-, 10-, 25-, 50-, and 100-year storms. If it is shown that the peak rates of discharge indicated by the post-development analysis are less than or equal to the peak rates of discharge indicated by the pre-development analysis for 2-, 5-, 10-, 25-, 50-, and 100-year, 24-hour storms, then the requirements of this section have been met. Otherwise, the applicant shall provide additional controls as necessary to satisfy the peak rate of discharge requirement.

B. Communities With a Release Rate Map from an Act 167 Plan

For the 2-, 5-, 10-, 25-, 50-, and 100-year storms, the post-development discharge rates will follow the release rate maps. For any areas not shown on the release rate maps, the post-development discharge rates shall not exceed the predevelopment discharge rates.

C. BMPs for Rate Controls

A list of BMPs for peak rate controls is provided in Appendix C.

ARTICLE IV - STORMWATER MANAGEMENT (SWM) SITE PLAN REQUIREMENTS

Section 401. Plan Contents

The following items shall be included in the SWM Site Plan:

- A. Appropriate sections from Valley Township Planning Code shall be followed to prepare the SWM Site Plans as designated by Valley Township.
- B. The SWM Site Plan shall provide the following supplemental information:
 1. The overall stormwater management concept for the project.
 2. A determination of Site Conditions. A detailed site evaluation shall be completed for projects proposed in karst topography.

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3. Stormwater runoff computations as specified in this Ordinance.
4. Expected project time schedule.
5. A soil erosion and sedimentation control plan, where applicable, as prepared for and submitted to the approval authority.
6. The effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any existing municipal stormwater collection system that may receive runoff from the project site.
7. Plan and profile drawings of all SWM BMPs including open channel and swales. Drawings shall indicate hydraulic facility.
8. SWM Site Plan shall show the locations of existing and proposed septic tank infiltration areas and wells.
9. A permanent, fifteen-foot wide pathway for use by vehicles shall be provided around all SWM BMPs, such as ponds and infiltration structures. The pathways shall connect to a public thoroughfare.
10. The post construction stormwater plan and maintenance requirements.
11. Existing and proposed wetlands, streams, floodplains, and buffers.
12. All stormwater management facility easements and right-of-ways.
13. The following signature block for Valley Township:

“ _____, on this date (date of signature), has reviewed and hereby certify that the SWM Site Plan meets all design standards and criteria of the Valley Township Ordinance.”

Section 402. Plan Submission

- A. Six (6) copies of the SWM Site Plan shall be submitted as follows:
 1. Two (2) copies to Valley Township.
 2. One (3) copy to the Montour County Conservation District.
 3. One (1) copy to the Montour County Planning Commission/Office
- B. Additional copies shall be submitted as desired by Valley Township or DEP.

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Section 403. Plan Review

- A. Valley Township shall notify the applicant in writing within the time frame allotted by the municipal planning code whether the SWM Site Plan is approved or disapproved. If disapproved, Valley Township shall cite the reasons for disapproval.
- B. Valley Township's approval of a SWM Site Plan shall be valid for a period not to exceed 5-years or based on the provisions of the Municipal Planning Code. This 5-year time period shall commence on the date that Valley Township signs the approved SWM Site Plan. If stormwater management facilities included in the approved SWM Site Plan have not been constructed, or if an As-Built Survey of these facilities has not been approved within this 5-year time period, then Valley Township may consider the SWM Site Plan disapproved and may revoke any and all permits. SWM Site Plans that are considered disapproved by Valley Township shall be resubmitted in accordance with Section 405 of this Ordinance.

Section 404. Modification of Plans

A modification to a submitted SWM Site Plan that involves a change in SWM BMPs or techniques, or that involves the relocation or re-design of SWM BMPs, or that is necessary because soil or other conditions are not as stated on the SWM Site Plan as determined by Valley Township, shall require a resubmission of the modified SWM Site Plan in accordance with this Article.

Section 405. Resubmission of Disapproved SWM Site Plans

A disapproved SWM Site Plan may be resubmitted, with the revisions addressing Valley Township's concerns, to Valley Township in accordance with this Article. The applicable Review Fee must accompany a resubmission of a disapproved SWM Site Plan or the plan will not be approved until payment is complete.

Section 406. As Built Surveys, Completion Certificate and Final Inspection

- A. The Developer shall be responsible for completing an "As-Built Survey" of all SWM BMPs included in the approved SWM Site Plan. The As-Built Survey and an explanation of any discrepancies with the design plans shall be submitted to Valley Township.
- B. The submission shall include a certification of completion from an engineer, architect, surveyor or other qualified person verifying that all permanent SWM BMPs have been constructed according to the plans and specifications and approved revisions thereto.
- C. After receipt of the completion certification by Valley Township, Valley Township may conduct a final inspection.

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ARTICLE V- OPERATION AND MAINTENANCE

Section 501. Responsibilities

- A. Valley Township shall make the final determination on the continuing maintenance responsibilities prior to final approval of the SWM Site Plan. Valley Township may require a dedication of such facilities as part of the requirements for approval of the SWM Site Plan. Such a requirement is not an indication that Valley Township will accept the facilities. Valley Township reserves the right to accept the ownership and operating responsibility for any or the entire stormwater management controls.
- B. Structural SWM BMPs shall be enumerated as permanent real estate appurtenances and recorded as deed restrictions.

Section 502. Operation and Maintenance Agreements

The owner is responsible for Operation and Maintenance of the SWM BMPs. If the owner fails to adhere to the Operation and Maintenance Agreement, Valley Township may perform the services required and charge the owner appropriate fees. Non-payment of fees may result in a lien against the property.

ARTICLE VI-FEES AND EXPENSES

Section 601. General

Valley Township may include all costs incurred in the Review Fee charged to an Applicant.

The Review Fee may include but not be limited to costs for the following:

- A. Administrative/Clerical Processing.
- B. Review of the SWM Site Plan.
- C. Attendance at Meetings.
- D. Inspections.

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ARTICLE VII-PROHIBITIONS

Section 701. Prohibited Discharges

- A. Any drain or conveyance, whether on the surface or subsurface, which allows any non-stormwater discharge including sewage, process wastewater, and wash water to enter the Waters of this Commonwealth is prohibited.
- B. Discharges, which may be allowed, if they do not significantly contribute to pollution to the Waters of this Commonwealth, are:

-Discharges from fire fighting activities	-Flows from riparian habitats and wetlands
-Potable water sources including dechlorinated water line and fire hydrant flushings	-Uncontaminated water from foundations or from footing drains
-Irrigation drainage	-Lawn watering
-Air conditioning condensate	-Dechlorinated swimming pool discharges
-Springs	-Uncontaminated groundwater
-Water from crawl space pumps	-Water from individual residential car washing
-Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used	-Routine external building wash down (which does not use detergents or other compounds)

- C. In the event that Valley Township or DEP determines that any of the discharges identified in Subsection 701.B significantly contribute to pollution of the Waters of this Commonwealth, Valley Township or DEP will notify the responsible person(s) to cease the discharge.

Section 702. Roof Drains

Roof drains and sump pumps shall discharge to infiltration or vegetative BMPs to the maximum extent practicable.

Section 703. Alteration of BMPs

No person shall modify, remove, fill, landscape, or alter any SWM BMPs without the written approval of Valley Township.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

ARTICLE VIII - ENFORCEMENT AND PENALTIES

Section 801. Right-of-Entry

Upon presentation of proper credentials, Valley Township may enter at reasonable times upon any property within Valley Township to inspect the condition of the stormwater structures and facilities in regard to any aspect regulated by this Ordinance.

Section 802. Inspection

SWM BMPs should be inspected by the land owner/developer (including Valley Township for dedicated facilities) according to the following list of frequencies:

1. Annually for the first 5 years;
2. Once every 3 years thereafter;
3. During or immediately after the cessation of a 10-year or greater storm.

Section 803. Enforcement

- A. It shall be unlawful for a person to undertake any Regulated Activity except as provided in an approved SWM Site Plan.
- B. It shall be unlawful to alter or remove any control structure required by the SWM Site Plan.
- C. Inspections regarding compliance with the SWM Site Plan are a responsibility of Valley Township.

804. Suspension and Revocation

- A. Any approval for a Regulated Activity issued may be suspended or revoked by Valley Township for:
 1. Non-compliance with, or failure to, implement any provision of the approval.
 2. A violation of any provision of this Ordinance or any other applicable law, Ordinance, rule or regulation relating to the Regulated Activity.
 3. The creation of any condition or the commission of any act during the Regulated Activity which constitutes or creates a hazard or nuisance, pollution, or which endangers the life or property of others.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

- B. A suspended approval may be reinstated by Valley Township when:
 - 1. Valley Township has inspected and approved the corrections to the violations that caused the suspension.
 - 2. Valley Township is satisfied that the violation has been corrected.
- C. An approval that has been revoked by Valley Township cannot be reinstated. The Applicant may apply for a new approval under the provisions of this Ordinance.
- D. Prior to revocation or suspension of a permit, if there is no immediate danger to life, public health, or property, Valley Township may notify the land owner/ developer to discuss the non-compliance.

Section 805. Penalties

- A. Any person or entity that violates any provision of this Ordinance shall, upon being found liable therefore in a civil enforcement proceeding commenced by Valley Township, pay a judgment of not more than \$500.00 plus court costs, including reasonable attorney fees incurred by the Township in connection with said proceeding. Each day that a violation continues shall constitute a separate violation for purposes of establishing the judgment. Valley Township may enforce the judgment pursuant to the applicable rules of the civil procedure.
- B. In addition, Valley Township may institute appropriate proceedings in law or equity before any court of competent jurisdiction for the enforcement of this Ordinance, including a request for injunctive relief.

Section 806. Appeals

- A. Any person or entity aggrieved by the decision of any designee of Valley Township relating to the application or interpretation of the provisions of this Ordinance may appeal to the Board of Supervisors of Valley Township within 30 days after the date of such decision. The appeal must be in writing and must be set forth in reasonable detail the basis for the assertion of error on the part of the Valley Township official. Upon receiving such a written appeal, the Board of Supervisors will schedule and hold a record hearing within 30 days thereafter in accordance with the procedural provisions of the Local Agency Law.
- B. Any person or entity aggrieved by the decision of the Board of Supervisors of Valley Township relating to the application or interpretation of the provisions of this Ordinance may appeal to the Court of Common Pleas of Montour County within 30 days after the date of issuance of the written decision of the Board of Supervisors in accordance with the provision of the Local Agency Law.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

ARTICLE IX - REFERENCES

1. Pennsylvania Department of Environmental Protection. 2005. *Draft Pennsylvania Stormwater Best Management Practices Manual*. Harrisburg, PA.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

APPENDIX A

LOW IMPACT DEVELOPMENT PRACTICES
ALTERNATIVE APPROACH FOR
MANAGING STORMWATER RUNOFF

Natural hydrologic conditions may be altered by development practices which may create impervious surfaces, destroy drainage swales, construct storm sewers, and change local topography. A traditional approach to drainage has been to remove runoff from sites as quickly as possible and capture it in downstream detention basins. This approach leads to the degradation of water quality as well as additional expenditures for detaining and managing concentrated runoff.

The recommended approach is to promote practices that will minimize post-development runoff rates and volumes and minimize needs for artificial conveyance and storage facilities. To simulate pre-development hydrologic conditions, increased infiltration often is helpful to offset the effects of increasing the area of impervious surfaces. The ability to increase infiltration depends upon the soil types and land use.

Preserving natural hydrologic conditions requires careful site design that includes preservation of natural drainage features, minimization of impervious surfaces, reduction of hydraulic connectivity of impervious surfaces, and protection of natural depression storage areas. A well-designed site will contain a mix of all these features. The following describes various techniques to achieve this:

- A. **Preserve Drainage Features.** Protect natural drainage features, particularly vegetated drainage swales and channels. Locate streets and adjacent storm sewers away from valleys and swales.
- B. **Protect Natural Depression Storage Areas.** Depression storage areas have no surface outlet or they drain very slowly. Depressions should be protected and the storage capacity should be incorporated into required detention facilities.
- C. **Avoid Creating Impervious Surfaces.** Reduce impervious surfaces to the maximum extent possible. Building footprints, sidewalks, driveways and other features should be minimized.
- D. **Avoid Connecting Impervious Surfaces.** Route roof runoff over lawns and avoid using storm sewers. Grade sites to increase the travel time of stormwater runoff. Avoid concentrating runoff.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

- E. **Use Pervious-Paving Materials.** Use pervious materials for driveways, parking lots, access roads, sidewalks, bike trails and hiking trails. Provide pervious strips between streets and sidewalks.
- F. **Reduce Setbacks.** Reduce setbacks for buildings to shorten the driveways and entry walks.
- G. **Construct Cluster Developments.** Construct Cluster Developments to reduce street length per lot.

APPENDIX B

A. LIST OF SITE CONDITIONS SUITABLE FOR INFILTRATION

- 2. Depth of bedrock below the invert of infiltration BMPs should be greater than or equal to 2 feet.
- 3. Depth of seasonal high water table below the invert of infiltration BMPs should be greater than or equal to 2 feet.
- 4. Soil permeability tests should be greater than or equal to 0.10 inches / hour and less than or equal to 10 inches per hour.
- 5. Setback distances or buffers of infiltration BMPs should be a minimum of:
 - a. 50 feet from individual water supply wells and 100 feet from community or municipal water supply wells.
 - b. 20 feet from building foundations.
 - c. 50 feet from septic system drain fields.
 - d. 50 feet from karst geologic contacts such as sinkholes, closed depressions, fracture traces, faults, and pinnacles.
 - e. 20 feet from the property line unless documentation is provided to show that all setbacks from wells, foundations and drain fields on neighboring properties will be met.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

B. EFFECTIVE BMPs FOR INFILTRATION

1. Infiltration Trench
2. Infiltration Basin
3. Biofilters, Rain Gardens, Bio Infiltration, Bio Swales
4. Filters for Pre-treatment.

C. EFFECTIVE BMP's FOR RATE CONTROL

1. Wet Ponds
2. Stormwater Wetlands
3. Extended Detention (dry) Ponds
4. Swales
5. Runoff Volume Reduction BMP's Listed and B and C Above such as Retention, Infiltration and Re-vegetation.

D. EFFECTIVE BMP's FOR EVAPOTRANSPIRATION

1. Rain Gardens
2. Green Roofs

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

APPENDIX C

OPERATION AND MAINTENANCE AGREEMENT STORMWATER BEST MANAGEMENT PRACTICES

THIS AGREEMENT, made and entered into this _____ day of _____, 200__, by and between _____, (hereinafter the “Landowner”), and Valley Township, Montour County, Pennsylvania.

WITNESSETH

WHEREAS, the Landowner is the owner of certain real property as recorded by deed in the land records of _____ County, Pennsylvania, Deed Book _____ at Page _____, (hereinafter “Property”).

WHEREAS, the Landowner is proceeding to build and develop the Property; and

WHEREAS, the Stormwater Management BMP Operation and Maintenance Plan approved by Valley Township (hereinafter referred to as the “Plan”) for the property identified herein, which is attached hereto as Appendix A and made part hereof, as approved by Valley Township, provides for management of stormwater within the confines of the Property through the use of Best Management Practices (BMPs); and

WHEREAS, Valley Township, and the Landowner, his successors and assigns, agree that the health, safety, and welfare of the residents of Valley Township and the protection and maintenance of water quality require that on-site stormwater Best Management Practices be constructed and maintained on the Property; and

WHEREAS, Valley Township requires, through the implementation of the SWM Site Plan, that Stormwater Management BMP’s, as required by said Plan and Valley Township Stormwater Management Ordinance, be constructed and adequately operated and maintained by the Landowner, his successors and assigns.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

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

1. The Landowner shall construct the BMPs in accordance with the plans and specifications identified in the SWM Site Plan.
2. The Landowner shall operate and maintain the BMPs as shown on the Plan in good working order accordance with the specific maintenance requirements noted on the approved SWM Site Plan.
3. The Landowner hereby grants permission to Valley Township, its authorized agents and employees, to enter upon the property, at reasonable times and upon presentation of proper credentials, to inspect the BMPs whenever necessary. Whenever possible, Valley Township shall notify the Landowner prior to entering the property.
4. In the event the Landowner fails to operate and maintain the BMPs per paragraph 2, Valley Township or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMP(s). This provision shall not be construed to allow Valley Township to erect any permanent structure on the land of the Landowner. It is expressly understood and agreed that the Municipality is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on Valley Township.
5. In the event Valley Township, pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner shall reimburse Valley Township for all expenses (direct and indirect) incurred within ten (10) days of receipt of invoice from Valley Township.
6. The intent and purpose of this Agreement is to ensure the proper maintenance of the onsite BMPs by the Landowner; provided, however, that this Agreement shall not be deemed to create or affect any additional liability of any party for damage alleged to result from or be caused by stormwater runoff.
7. The Landowner, its executors, administrators, assigns, and other successors in interests, shall release Valley Township from all damages, accidents, casualties, occurrences or claims which might arise or be asserted against said employees and representatives from the construction, presence, existence, or maintenance of the BMP(s) by the Landowner or Valley Township.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

8. Valley Township shall inspect the BMPs at a minimum of once every three years to ensure their continued functioning.

This Agreement shall be recorded at the Office of the Recorder of Deeds of Montour County, Pennsylvania, and shall constitute a covenant running with the Property and/or equitable servitude, and shall be binding on the Landowner, his administrators, executors, assigns, heirs and any other successors in interests, in perpetuity.

ATTEST:

WITNESS the following signatures and seals:

(SEAL)

For Valley Township:

(SEAL)

For the Landowner:

ATTEST:

_____ (City, Borough, Township)

County of _____, Pennsylvania

I, _____, a Notary Public in and for the County and State aforesaid, whose commission expires on the _____ day of _____, 20__, do hereby certify that _____ whose name(s) is/are signed to the foregoing Agreement bearing date of the _____ day of _____, 20__, has acknowledged the same before me in my said County and State.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

GIVEN UNDER MY HAND THIS _____ day of _____, 200_.

NOTARY PUBLIC

(SEAL)

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

APPENDIX D

**VOLUNTARY STORMWATER MANAGEMENT PROCEDURES
FOR PROJECTS MEETING THE LAND COVER EXEMPTION
CRITERIA**

What are the Act 167 stormwater management requirements?

Pennsylvania Act 167 was authorized on October 4, 1978 (32 P.S., P.L. 864) and gave Pennsylvania Municipalities the power to regulate activities that affect stormwater runoff and surface and groundwater quantity and quality.

Do I require professional services to meet these requirements?

This brochure has been developed to assist the individual homeowner in meeting the voluntary water quality and groundwater recharge goals of this Ordinance. If the guidelines presented in this brochure are followed, the individual homeowner will not require professional services to comply with these water quality and groundwater recharge goals.

What do I need to send to the Municipality?

Even though a formal drainage plan is not required for individual lot owners, a brief description of the proposed infiltration facilities including types of material to be used, total impervious areas and volume calculations as shown above, and a simple sketch plan showing the following information shall be submitted to the contractor prior to construction:

- Location of proposed structures, driveways, or other paved areas with approximate size in square feet.
- Location of any existing or proposed on-site septic system and/or potable water wells showing rough proximity to infiltration facilities.

Determination of Recharge Volume

The amount of recharge volume that should be provided can be determined by following the simple steps below. Impervious area calculations should include all areas on the individual lots that are covered by roof area or pavement which would prevent rain from naturally percolating into the ground, including sidewalks, driveways, or parking areas. Sidewalks, driveways, or patios that are constructed with gravel or turf pavers and will not be blacktopped in the future need not be included in this calculation.

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Example Recharge Volume:

STEP 1 – Determine Total Impervious Surfaces:

House Roof (Front)	12 ft. x 48 ft.	=	576 sq. ft
House Roof (Rear)	12 ft. x 48 ft.	=	576 sq. ft.
Driveway	12 ft. x 50 ft.	=	600 sq. ft.
Parking Pad	12 ft. x 12 ft.	=	144 sq. ft.
Walkway	6 ft. x 20 ft.	=	120 sq. ft.

			2,016 sq. ft.

STEP 2 – Determine Required Infiltration Volume (Rv) Using the Following Equation

$R_v = 1.0 \text{ inch} \times (\text{total impervious area in square feet}) = \underline{\hspace{2cm}}$ cubic feet of recharge

$$R_v = \underline{1.0 \text{ in} \times 2,016 \text{ sq. ft.}} = 168 \text{ cu. ft.}$$

STEP 3 – Sizing of Select Infiltration Method

The following pages show several methods of infiltrating stormwater runoff from residential areas. Their appropriateness depends on the amount of infiltration volume required and the amount of land available. More than one method can be implemented on a site, depending on site constraints. Dry wells should be used only for receiving runoff from roof drains. Infiltration trenches are appropriate for receiving runoff from driveways, sidewalk, or parking areas. Other methods may be appropriate, but these should be discussed with the municipal Engineer prior to installation.

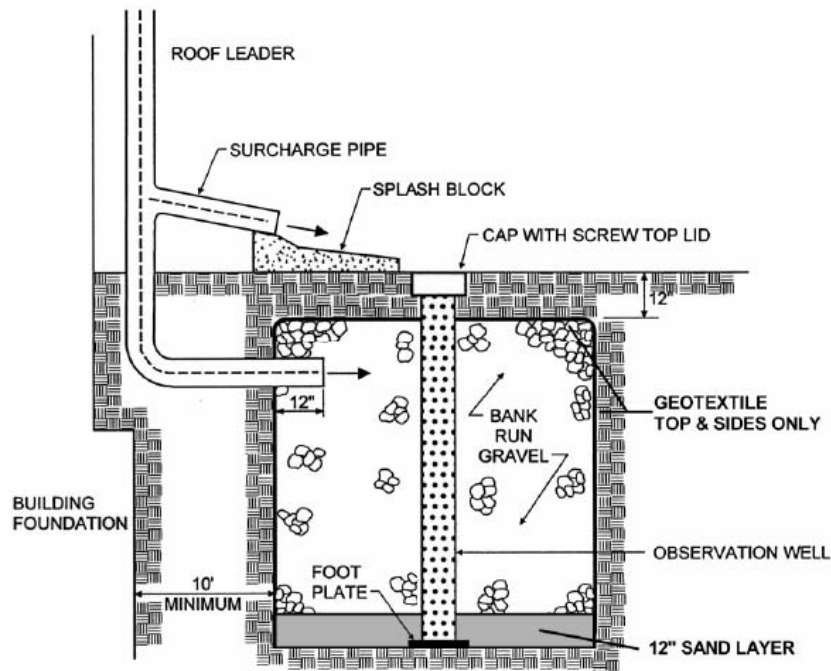
**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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Dry Wells

Dry wells are effective methods of infiltrating runoff from roof leaders. These facilities should be located a minimum of ten (10) feet from the building foundation to avoid seepage problems. A dry well can be either a structural prefabricated chamber or an excavated pit filled with aggregate. Construction of a dry well should be performed after all other areas of the site are stabilized to avoid clogging. During construction, compaction of the subgrade soil should be avoided and construction should be performed with only light machinery. Depth of dry wells in excess of three and one half (3½) feet should be avoided. Gravel fill should be an average one and one half to three (1.5 – 3.0) inches in diameter. Dry wells should be inspected at least four (4) times annually as well as after large storm events.

FIGURE D-1

TYPICAL DRY WELL CONFIGURATION



Source: Maryland Stormwater Design Manual

Example Sizing:

STEP 1 – Determine Total Impervious Surfaces

House Roof Area: 12 ft. x 48 ft. = 576 sq. ft.

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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STEP 2 – Determine Required Infiltration Volume Using Equation

$$\frac{1.0 \text{ in.} \times 576 \text{ sq. ft.}}{12} = 48 \text{ cu. ft.}$$

$$\frac{48 \text{ cu. ft.}}{0.4^*} = 120 \text{ cu. ft.} \text{ (* assume 40\% void ratio in gravel bed)}$$

STEP 3 – Sizing of Select Infiltration Method

Volume of facility = Depth x Width x Length

Set D = 3.5 ft; Set W = L for a square chamber

$$120 \text{ cu. ft.} = 3.5 \times L \times L; L = 5.9 \text{ ft.}$$

Final facility dimensions: 3.5 ft (D) x 5.9 ft. (W) x 5.9 ft. (L)

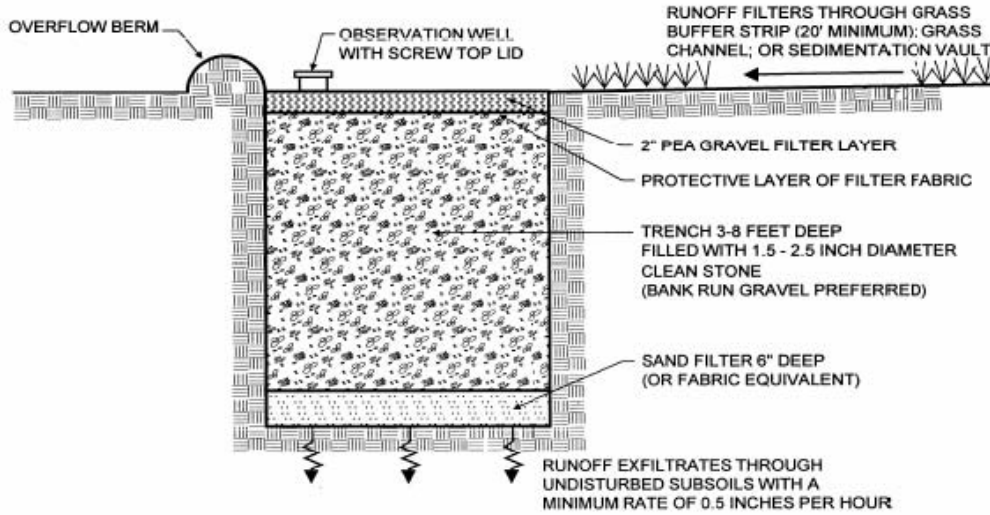
Infiltration Trenches

An infiltration trench is a long, narrow, rock-filled trench with no outlet that receives stormwater runoff. Runoff is stored in the void space between the stones and infiltrates through the bottom and into the soil matrix. Infiltration trenches perform well for removal of fine sediment and associated pollutants. Pretreatment using buffer strips, swales, or detention basins is important for limiting amounts of coarse sediment entering the trench which can clog and render the trench ineffective.

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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FIGURE D-2

TYPICAL INFILTRATION TRENCH CONFIGURATION



Source: Maryland Stormwater Design Manual

Example Sizing:

STEP 1 – Determine Total Impervious Surfaces

Driveway	12 ft. x 50 ft.	=	600 sq. ft.
Parking Pad	12 ft. x 12 ft.	=	144 sq. ft.
Walkway	6 ft. x 20 ft.	=	120 sq. ft.

			864 sq. ft.

STEP 2 – Determine Required Infiltration Volume Using Equation

$$\frac{1.0 \text{ in.} \times 864 \text{ sq. ft.}}{12} = 72 \text{ cu. ft.}$$

$$\frac{72 \text{ cu. ft.}}{0.4^*} = 180 \text{ cu. ft.} \text{ (* assume 40\% void ratio in gravel bed)}$$

STEP 3 – Sizing of Select Infiltration Method

Volume of facility = Depth x Width x Length

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Set $D = 3$ ft: determine required surface area of trench

$$180 \text{ cu. ft.} / 3 \text{ ft.} = 60 \text{ sq. ft.}$$

The width of the trench should be greater than 2 times its depth ($2 \times D$); therefore, in this example a trench width of 6 feet is selected;

$$\text{Determine trench length: } L = 60 \text{ sq. ft.} / 6 \text{ ft.} = 10 \text{ ft.}$$

Final trench dimensions: 3 ft. (D) x 6 ft. (W) x 10 ft. (L)

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APPENDIX E

SAMPLE DRAINAGE PLAN APPLICATION

(To be attached to the “Land Subdivision Plan or Development Plan Review Application” or “Minor Land Subdivision Plan Review Application”)

Application is hereby made for review of the Stormwater Management Plan and related data as submitted herewith in accordance with the _____ Stormwater Management Ordinance.

_____ Final Plan _____ Preliminary Plan _____ Sketch Plan

Date of Submission: _____, Submission No.: _____

1. Name of Subdivision or Development _____

2. Name of Applicant _____, Telephone No. _____

(if corporation, list the corporation’s name and the names of two officers of the corporation)

_____ Officer 1

_____ Officer 2

Address _____

Zip _____

Applicant’s interest in subdivision or development
(if other than property owner, give owner’s name and address)

3. Name of property owner _____, Telephone No. _____

Address _____

Zip _____

4. Name of engineer or surveyor _____, Telephone No. _____

Address _____

Zip _____

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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5. Type of subdivision or development proposed:

_____ Single-family Lots _____ Townhouses _____ Commercial (Multi-lot)
_____ Two-family Lots _____ Garden Apartments _____ Commercial
_____ Multi-family Lots _____ Mobile Home Park _____ Industrial
_____ Cluster Type Lots _____ Campground _____ Industrial (One Lot)
_____ Planned Residential _____ Other (_____)
Development

6. Linear feet of new road proposed: _____ L.F.

7. Area of proposed and existing impervious area on the entire tract.

a. Existing (to remain) _____ S.F. _____ % of property
b. Proposed _____ S.F. _____ % of property

8. Stormwater

a. Does the peak rate of runoff from proposed conditions exceed that flow which occurred for existing conditions for the designated design storm? _____

b. Design storm utilized (on-site conveyance systems) (24 hr.) _____
No. of Sub-area _____
Watershed Name _____

Explain: _____

c. Does the submission and/or district meet the criteria for the applicable management district? _____

d. Number of sub-area(s) from Act 167 Ordinance Watershed Stormwater Management Plan or other sub-areas identified in other watershed stormwater management plans _____

e. Type of proposed runoff control _____

f. Does the proposed stormwater control criteria meet the requirements/guidelines of the Stormwater Ordinance? _____

If not, what variances/waivers are requested? _____

Reasons: _____

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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g. Does the plan meet the requirements of this Stormwater Ordinance?

If not, what variances/waivers are requested? _____

Reasons why:

h. Was TR-55, June 1986, utilized in determining the time of concentration?

i. What hydrologic method was used in the stormwater computations?

j. Is a hydraulic routing through the stormwater control structure submitted?

k. Is a construction schedule or staging attached? _____

l. Is a recommended maintenance program attached? _____

9. Erosion and Sediment Pollution Control (E&S):

a. Has the stormwater management and E&S plan, supporting documentation, and narrative been submitted to the Montour County Conservation District? _____

b. Total area of earth disturbance _____ S.F.

10. Wetlands

a. Have the wetlands been delineated by someone trained in wetland delineation? ____

b. Have the wetland lines been verified by a state or federal permitting authority? ____

c. Have the wetland lines been surveyed? _____

d. Total acreage of wetland within the property _____

e. Total acreage of wetland disturbed _____

f. Supporting documentation _____

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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11. Filing

- a. Has the required fee been submitted? _____
Amount _____
- b. Has the proposed schedule of construction inspection to be performed by the Applicant's engineer been submitted? _____
- c. Name of individual who will be making the inspections _____
- d. General comments about stormwater management at the development

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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APPENDIX F

**CERTIFICATE OF OWNERSHIP AND ACKNOWLEDGMENT OF
APPLICATION:**

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF MONTOUR.

On this the _____ day of _____ , 20 ___, before me, the undersigned officer, personally appeared _____ who, being duly sworn according to law, deposes and says that _____ are owners of the property described in this application and that the application was made with _____ knowledge and/or direction and does hereby agree with the said application and to the submission of the same.

Property Owner

My Commission Expires _____, 20 ____

Notary Public

THE UNDERSIGNED HEREBY CERTIFIES THAT TO THE BEST OF HIS KNOWLEDGE AND BELIEF THE INFORMATION AND STATEMENTS GIVEN ABOVE ARE TRUE AND CORRECT.

SIGNATURE OF APPLICANT

////////////////////////////////////

(Information Below This Line To Be Completed By The Municipality)

_____ (Name of) Municipality official submission receipt:

Date Complete Application Received _____ Plan Number _____

Fees _____ Date Fees Paid _____ Received by _____

Official Submission Receipt Date _____

Received by _____ Municipality _____

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

APPENDIX G

PROPOSED SCHEDULE OF FEES

[Note: Review fees shall vary of the type and size of the proposed project. This sheet may be used as a template if the Township determines it to be necessary.]

Subdivision Name _____ Submittal No. _____

Owner _____ Date _____

Engineer _____

- 1. Filing fee \$ _____

- 2. Proposed land use
 - 2a. Subdivision, campgrounds, mobile home parks, and multi-family dwelling where the units are located in the same local watershed \$ _____
 - 2b. Multi-family dwelling where the designated open space is located in a different local watershed from the proposed units \$ _____
 - 2c. Commercial/industrial \$ _____
 - 2d. Other \$ _____

- 3. Relative amount of earth disturbance
 - 3a. Residential
 - road <500 l.f. \$ _____
 - road 500-2,640 l.f. \$ _____
 - road >2,640 l.f. \$ _____
 - 3b. Commercial/industrial and other
 - impervious area <3,500 s.f. \$ _____
 - impervious area 3,500-43,560 s.f. \$ _____
 - impervious area >43,560 s.f. \$ _____

- 4. Relative size of project
 - 4a. Total tract area <1 ac. \$ _____
 - 1-5 ac. \$ _____
 - 5-25 ac. \$ _____
 - 25-100 ac. \$ _____
 - 100-200 ac. \$ _____
 - >200 ac. \$ _____

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5. Stormwater control measures	
5a. Detention basins and other controls which require a review of hydraulic routings (\$ per control)	\$ _____
5b. Other control facilities which require storage volume calculations but no hydraulic routings (\$ per control)	\$ _____
6. Site inspection (\$ per inspection)	\$ _____
Total	\$ _____

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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APPENDIX H

DRAINAGE PLAN CHECKLIST

Project: _____
Municipality: _____
Engineer: _____
Submittal No: _____
Date: _____

ARTICLE I: GENERAL PROVISIONS

Reference: Section 105 Applicability/Regulated Activities

1. Is the Proposed Project within the Mahoning Creek or Sechler Run Creek watershed? Yes No

2. Does the Proposed Project meet the definition of a “Regulated Activity”? Yes
No

STOP – If you have checked NO for either of the above questions, you are not required to submit a Storm Water Management Plan under the Mahoning Creek/Sechler Run Storm Water Management Ordinance.

ARTICLE I: GENERAL PROVISIONS

ARTICLE I: GENERAL PROVISIONS

Reference: Section 106 Exemptions

Note: Parent Tract refers to the total parcel configuration on June 30, 2005 and includes any subdivision of lands which may have occurred after than date.

Parent Tract Area: _____ acres

Total Existing Impervious Area (as of June 30, 2005): _____ acres

Total New Impervious Area (all Phases): _____ acres

Parcel IS Exempt

Parcel IS NOT Exempt

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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ARTICLE IV: STORMWATER MANAGEMENT

Reference: Section 404 Nonstructural Project Design

1. Has an Existing Resource and Site Analysis Map (ERSAM) been prepared?

_____ Yes _____ No Explain:

ARTICLE IV: STORMWATER MANAGMENT (Continued)

2. Are any of the following Environmentally Sensitive areas identified on site?

Steep Slopes	Yes	No	Unknown
Ponds / Lakes / Vernal Pools	Yes	No	Unknown
Streams	Yes	No	Unknown
Wetlands	Yes	No	Unknown
Hydric Soils	Yes	No	Unknown
Flood plains	Yes	No	Unknown
Stream Buffer Zones	Yes	No	Unknown
Hydrologic Soil Groups A or B	Yes	No	Unknown
Recharge Areas	Yes	No	Unknown
Others: _____	Yes	No	Unknown

3. Does the site layout plan avoid Environmentally Sensitive Areas identified on site?

_____ Yes _____ No Explain:

4. Has a stream buffer been established per Section 406.G.?

_____ Yes _____ No Explain:

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

ARTICLE IV: STORMWATER MANAGEMENT

Reference: Section 405 Groundwater Recharge

1. Is the proposed activity considered a “Stormwater Hotspot”? ____ Yes ____ No

2. Have provisions been installed to promote groundwater recharge on site?
_____ Yes _____ No Explain:

3. Total Recharge Volume Required: _____ cubic feet (using: Method A ____;
Method B _____)

4. How is the required recharge volume being addressed?

Infiltration Trench Dry Swales
Infiltration Basin Other:
Bio-retention

ARTICLE IV: STORMWATER MANAGEMENT

Reference: Section 406 Water Quality Requirements

1. Have provisions been installed to address stormwater runoff water quality on site?

_____ Yes _____ No Explain:

2. Total Water Quality Volume Required: _____ acre feet

3. Is the site in a Special Protection watershed which includes Exceptional Value
(EV) of High Quality (HQ) waters? Yes _____ No _____

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

4. How is the Required Water Quality Volume being addressed?

Wet Detention Basin	Sand Filter
Extended Dry Detention Basin	Constructed Wetlands
Bio-retention	Other: _____

ARTICLE IV: STORMWATER MANAGMENT

Reference: Section 407 Stream bank Erosion Requirements

1. Has the two (2) year proposed conditions flow been reduced to the one (1) year existing conditions flow?

_____ Yes _____ No Explain:

2. Does the proposed conditions one (1) year storm drain over a minimum 24 hour period?

_____ Yes _____ No Explain:

ARTICLE IV: STORMWATER MANAGEMENT

Reference: Section 408 Stormwater Peak Rate Control and Management Districts

1. In which of the following Storm Water Management District(s) is the site located?

A	B-2
B-1	C

2. Does the Proposed Conditions Runoff meet the Criteria established in Table 408.1?

_____ Yes _____ No, if you answered Yes proceed to Section V.

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

ARTICLE IV: STORMWATER MANAGEMENT

a. Are you claiming “No Harm” as described in Section 408.____ in lieu of meeting the requirements of this District?

_____ Yes _____ No Explain:

b. If you are claiming “No Harm”, has a Downstream Impacts Evaluation been prepared in accordance with Section 408.____?

_____ Yes _____ No Explain:

c. Are claiming “Hardship”, as described in Section 408.____. in lieu of meeting the requirements of this District?

_____ Yes _____ No Explain:

ARTICLE IV: STORMWATER MANAGEMENT

Reference: Section 409 Calculation Methodology

1. Which method(s) are utilized in the site stormwater management plan for computing stormwater runoff rates and volumes?

TR-20	PSRM
TR-55	Rational Method
HEC-1 / HEC-HMS	Other: _____

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

2. Were Table F-1 or Figure F-4 in Appendix F utilized in rainfall determination?

_____ Yes _____ No Explain:

3. Were Table F-2 (Runoff Curve Numbers) or Table F-3 in the Appendix F (Rational Runoff Coefficients) utilized in calculations for runoff?

_____ Yes _____ No Explain:

4. For any proposed storm water detention facility, were the appropriate design storms routed through the facility using the Storage-Indication Method?

_____ Yes _____ No, Explain

ARTICLE IV: STORMWATER MANAGEMENT

Reference: Section 410 Other Requirements

1. Is this project subject to PENNDOT approval?

_____ Yes _____ No

a. If “YES” have these plans been forwarded to PENNDOT for review?

_____ Yes _____ No Explain:

2. Have proposed wet detention basins incorporated biologic control consistent with the West Nile Guidelines presented in Appendix H?

_____ Yes _____ No _____ Not Applicable

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

3. Are any proposed stormwater facilities subject to PADEP Chapter 105 permitting?

_____ Yes _____ No

a. If “YES” have these plans been forwarded to PADEP for review?

_____ Yes _____ No Explain:

ARTICLE VII: MAINTENANCE RESPONSIBILITIES

Reference: Section 702 Responsibilities for Operations and Maintenance of Stormwater Controls/BMP's

1. Has a Stormwater Control and BMP Operations and Maintenance Plan been approved by the Municipality?

_____ Yes _____ No Explain:

2. Who shall assume responsibility for implementing the Stormwater Control and BMP Operations and Maintenance Plan?

Municipality Homeowner Association
Private Owner Other _____

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

ORDINANCE APPENDIX I

LOW IMPACT DEVELOPMENT (LID) PRACTICES

**ALTERNATIVE APPROACH FOR
MANAGING STORMWATER RUNOFF**

Natural hydrologic conditions can be altered radically by poorly planned development practices such as introducing unnecessary impervious surfaces, destroying existing drainage swales, constructing unnecessary storm sewers, and changing local topography. A traditional drainage approach of development has been to remove runoff from a site as quickly as possible and capture it in a detention basin. This approach leads ultimately to the degradation of water quality as well as expenditure of additional resources for detaining and managing concentrated runoff at some downstream location.

The recommended alternative approach is to promote practices that will minimize proposed conditions runoff rates and volumes, which will minimize needs for artificial conveyance and storage facilities. To simulate pre-development hydrologic conditions, infiltration is often necessary to offset the loss of infiltration by creation of impervious surfaces. The ability of the ground to infiltrate depends upon the soil types and its conditions.

Preserving natural hydrologic conditions requires careful alternative site design considerations. Site design practices include preserving natural drainage features, minimizing impervious surface area, reducing the hydraulic connectivity of impervious surfaces, and protecting natural depression storage. A well-designed site will contain a mix of all of those features. The following describes various techniques to achieve the alternative approach:

- **Preserving Natural Drainage Features.** Protecting natural drainage features, particularly vegetated drainage swales and channels, is desirable because of their ability to infiltrate and attenuate flows and to filter pollutants. However, this objective is often not accomplished in land development. In fact, commonly held drainage philosophy encourages just the opposite pattern -- streets and adjacent storm sewers are typically located in the natural headwater valleys and swales, thereby replacing natural drainage functions with a completely impervious system. As a result, runoff and pollutants generated from impervious surfaces flow directly into storm sewers with no opportunity for attenuation, infiltration, or filtration. Developments designed to fit site topography also minimize the amount of grading on site.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

- **Protecting Natural Depression Storage Areas.** Depressional storage areas either have no surface outlet or drain very slowly following a storm event. They can be commonly seen as ponded areas in farm fields during the wet season or after large runoff events. Traditional development practices eliminate these depressions by filling or draining, thereby obliterating their ability to reduce surface runoff volumes and trap pollutants. The volume and release rate characteristics of depressions should be protected in the design of the development site. The depressions can be protected by simply avoiding the depression or by incorporating its storage as additional capacity in required detention facilities.
- **Avoiding Introduction of Impervious Areas.** Careful site planning should consider reducing impervious coverage to the maximum extent possible. Building footprints, sidewalks, driveways, and other features producing impervious surfaces should be evaluated to minimize impacts on runoff.
- **Reducing the Hydraulic Connectivity of Impervious Surfaces.** Impervious surfaces are significantly less of a problem if they are not directly connected to an impervious conveyance system (such as a storm sewer). Two basic ways to reduce hydraulic connectivity are routing of roof runoff over lawns and reducing the use of storm sewers. Site grading should promote increasing travel time of stormwater runoff and should help reduce concentration of runoff to a single point in the development.
- **Routing Roof Runoff Over Lawns.** Roof runoff can be easily routed over lawns in most site designs. The practice discourages direct connection of downspouts to storm sewers or parking lots. The practice also discourages sloping driveways and parking lots to the street. By routing roof drains and crowning the driveway to run off to the lawn, the lawn is essentially used as a filter strip.
- **Reducing the Use of Storm Sewers.** By reducing use of storm sewers for draining streets, parking lots, and back yards, the potential for accelerating runoff from the development can be greatly reduced. The practice requires greater use of swales and may not be practical for some development sites, especially if there are concerns for areas that do not drain in a “reasonable” time. The practice requires educating local citizens and public works officials who expect runoff to disappear shortly after a rainfall event.
- **Reducing Street Widths.** Street widths can be reduced by either eliminating on-street parking or by reducing roadway widths. Municipal planners and traffic designers should encourage narrower neighborhood streets which ultimately could lower maintenance.

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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- **Limiting Sidewalks to One Side of the Street.** A sidewalk on one side of the street may suffice in low-traffic neighborhoods. The lost sidewalk could be replaced with bicycle/recreational trails that follow back-of-lot lines. Where appropriate, backyard trails should be constructed using pervious materials.
- **Using Permeable Paving Materials.** These materials include permeable interlocking concrete paving blocks or porous bituminous concrete. Such materials should be considered as alternatives to conventional pavement surfaces, especially for low use surfaces such as driveways, overflow parking lots, and emergency access roads.
- **Reducing Building Setbacks.** Reducing building setbacks reduces impervious cover associated with driveway and entry walks and is most readily accomplished along low-traffic streets where traffic noise is not a problem.
- **Constructing Cluster Developments.** Cluster developments can also reduce the amount of impervious area for a given number of lots. The biggest savings occurs with street length, which also will reduce costs of the development. Cluster development groups the construction activity in less-sensitive areas without substantially affecting the gross density of development.

In summary, a careful consideration of the existing topography and implementation of a combination of the above mentioned techniques may avoid construction of costly stormwater control measures. Benefits include reduced potential for downstream flooding and water quality degradation of receiving streams/water bodies, enhancement of aesthetics, and reduction of development costs. Other benefits include more stable baseflows in receiving streams, improved groundwater recharge, reduced flood flows, reduced pollutant loads, and reduced costs for conveyance and storage.

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

APPENDIX J

STORMWATER MANAGEMENT DESIGN CRITERIA

**FIGURE J-1
PENNDOT DELINEATED REGIONS**

**FIGURE J-2
NRCS (SCS) TYPE II RAINFALL DISTRIBUTION – S CURVE**

**FIGURE J-3
PENNDOT REGION 3 STORM INTENSITY-DURATION-FREQUENCY CURVE**

**TABLE J-1
RUNOFF CURVE NUMBERS**

**TABLE J-2
RATIONAL RUNOFF COEFFICIENTS**

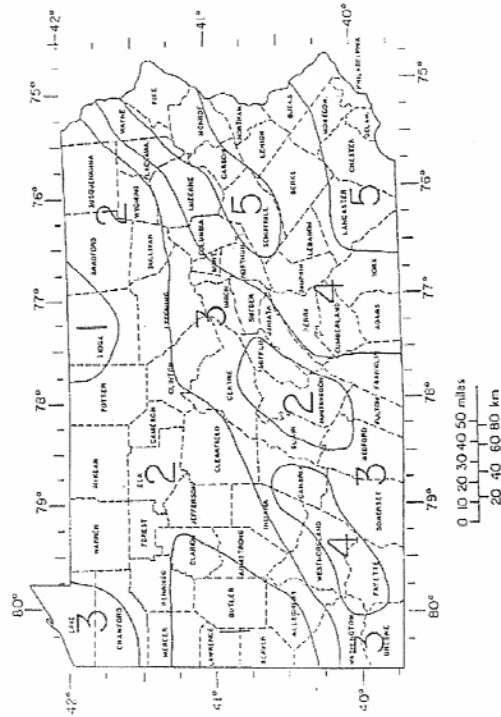
**TABLE J-3
MANNING’S ROUGHNESS COEFFICIENTS**

**TABLE J-4
NONSTRUCTURAL STORMWATER MANAGEMENT MEASURES**

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

FIGURE J-1

PENNDOT DELINEATED REGIONS

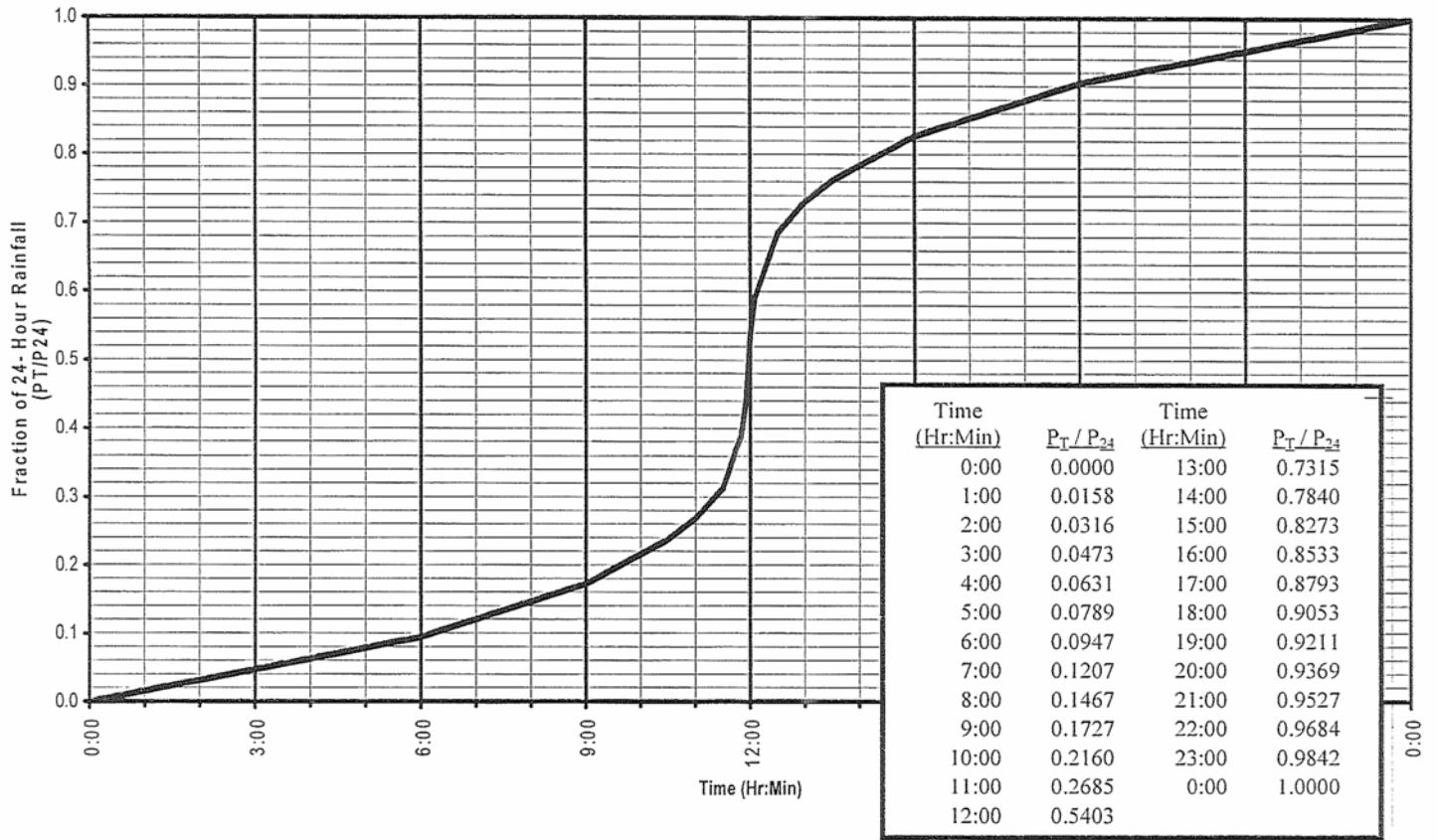


Source: "Field Manual of Pennsylvania Department of Transportation,"
Storm Intensity-Duration-Frequency Charts, PDT- IDF, May 1986.

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

FIGURE J-2

**NRCS (SCS) TYPE II
RAINFALL DISTRIBUTION – S CURVE**

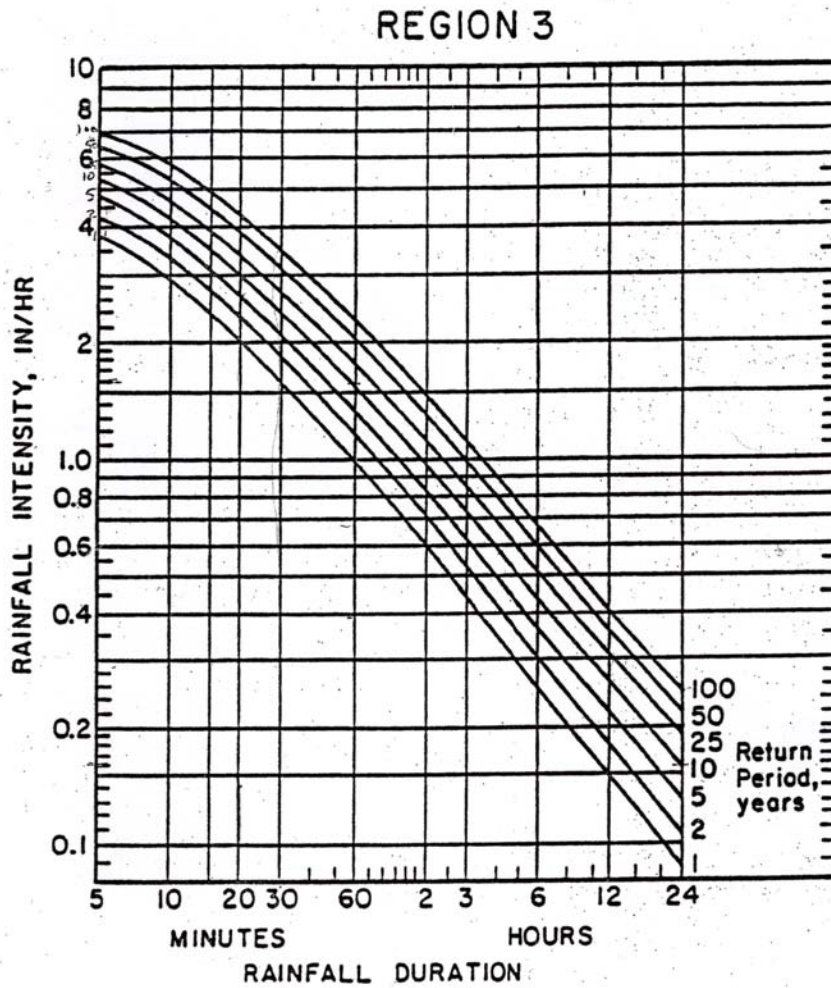


Note: Rainfall Distribution Curve developed from PennDOT Rainfall Intensity-Duration-Frequency Curves (Aron, 1986)

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

FIGURE J-3

PENNDOT REGION 3 STORM INTENSITY-DURATION-FREQUENCY CURVE



**FIGURE 2.10.4.2(C)
STORM INTENSITY - DURATION - FREQUENCY
CURVES FOR REGION 3**

Source: "Field Manual of Pennsylvania Department of Transportation,"
Storm Intensity-Duration-Frequency Charts, PDT- IDF, May 1986.

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
VALLEY TOWNSHIP, MONTOUR COUNTY, PA.**

TABLE J-1

RUNOFF CURVE NUMBERS

LAND USE DESCRIPTION	HYDROLOGIC SOIL GROUP			
	A	B	C	D
Hydrologic Condition				
Open Space:				
Grass cover < 50% (Poor)	68	79	86	89
Grass cover 50% to 75% (Fair)	49	69	79	84
Grass cover > 75% (Good)	39	61	74	80
Meadow:	30	58	71	78
Agricultural:				
Pasture, grassland, or range –				
Continuous forage for grazing (Poor)	68	79	86	89
Pasture, grassland, or range –				
Continuous forage for grazing (Fair)	49	69	79	84
Pasture, grassland, or range –				
Continuous forage for grazing (Good)	39	61	74	80
Brush—brush-weed-grass mixture				
with brush the major element (Poor)	48	67	77	83
Brush—brush-weed-grass mixture				
with brush the major element (Fair)	35	56	70	77
Brush—brush-weed-grass mixture				
with brush the major element (Good)	30	48	65	73
Fallow Bare soil -----	77	86	91	94
Crop residue cover (CR) (Poor)	76	85	90	93
Good	74	83	88	90
Woods: Grass combination (orchard or tree farm)				
(Poor)	57	73	82	86
(Fair)	43	65	76	82
(Good)	32	58	72	79
Woods:				
(Poor)	45	66	77	83
(Fair)	36	60	73	79
(Good)	30	55	70	77

**STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE –
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Commercial: (85% impervious)		89	92	94	95
Industrial: (72% impervious)		81	88	91	93
Institutional: (50% impervious)		71	82	88	90
Residential: Districts by average lot size –					
	% Impervious				
1/8 acre or less * (townhouses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Farmstead:		59	74	82	86
Smooth surfaces: (concrete, asphalt, gravel, or bare compacted soil)		98	98	98	98
Water:		98	98	98	98
Mining/newly graded areas: (areas only)		77	86	91	94 (pervious)

* Includes multi-family housing unless justified lower density can be provided.

Note: Existing site conditions of bare earth or fallow ground shall be considered as meadow when choosing a CN value.

Source: NRCS (SCS) TR-55

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

TABLE J-2

RATIONAL RUNOFF COEFFICIENTS

RUNOFF COEFFICIENTS FOR THE RATIONAL FORMULA
BY HYDRALOGIC SOIL GROUP AND OVERLAND SLOPE (%)

LAND USE	A			B			C			D		
	0-2%	2-6%	> 6%	0-2%	2-6%	> 6%	0-2%	2-6%	> 6%	0-2%	2-6%	> 6%
Cultivated Land	0.00 ^a	0.13	0.16	0.11	0.15	0.21	0.14	0.19	0.26	0.18	0.23	0.31
	0.14 ^b	0.18	0.22	0.16	0.21	0.28	0.20	0.25	0.34	0.24	0.29	0.41
Pasture	0.12	0.20	0.30	0.18	0.28	0.37	0.24	0.34	0.44	0.30	0.40	0.50
	0.15	0.25	0.37	0.23	0.34	0.45	0.30	0.42	0.52	0.37	0.50	0.62
Meadow	0.10	0.16	0.25	0.14	0.22	0.30	0.20	0.28	0.36	0.24	0.30	0.40
	0.14	0.22	0.30	0.20	0.28	0.37	0.26	0.35	0.44	0.30	0.40	0.50
Forest	0.05	0.08	0.11	0.08	0.11	0.14	0.10	0.13	0.16	0.12	0.16	0.20
	0.08	0.11	0.14	0.10	0.14	0.18	0.12	0.16	0.20	0.15	0.20	0.25
Residential Lot Size 1/8 Acre	0.25	0.28	0.31	0.27	0.30	0.35	0.30	0.33	0.38	0.33	0.36	0.42
	0.33	0.37	0.40	0.35	0.39	0.44	0.38	0.42	0.49	0.41	0.45	0.54
Lot Size 1/4 Acre	0.22	0.26	0.29	0.24	0.29	0.33	0.27	0.31	0.36	0.30	0.34	0.40
	0.30	0.34	0.37	0.33	0.37	0.42	0.36	0.40	0.47	0.38	0.42	0.52
Lot Size 1/3 Acre	0.19	0.23	0.26	0.22	0.26	0.30	0.25	0.29	0.34	0.28	0.32	0.39
	0.28	0.32	0.35	0.30	0.35	0.39	0.33	0.38	0.45	0.36	0.40	0.50
Lot Size 1/2 Acre	0.16	0.20	0.24	0.19	0.23	0.28	0.22	0.27	0.32	0.26	0.30	0.37
	0.25	0.29	0.32	0.20	0.32	0.36	0.31	0.35	0.42	0.34	0.38	0.48
Lot Size 1 Acre	0.14	0.19	0.22	0.17	0.21	0.26	0.20	0.25	0.31	0.24	0.29	0.35
	0.22	0.26	0.29	0.24	0.28	0.34	0.28	0.32	0.40	0.31	0.35	0.46
Industrial	0.67	0.68	0.68	0.68	0.68	0.69	0.68	0.69	0.69	0.69	0.69	0.70
	0.85	0.85	0.86	0.85	0.86	0.86	0.86	0.86	0.87	0.86	0.86	0.88
Commercial	0.71	0.71	0.72	0.71	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
	0.88	0.88	0.89	0.89	0.89	0.89	0.89	0.89	0.90	0.89	0.89	0.90
Streets	0.70	0.71	0.72	0.71	0.72	0.74	0.72	0.73	0.76	0.73	0.75	0.78
	0.76	0.77	0.79	0.80	0.82	0.84	0.84	0.85	0.89	0.89	0.91	0.95
Open Space	0.05	0.10	0.14	0.08	0.13	0.19	0.12	0.17	0.24	0.16	0.21	0.20
	0.11	0.18	0.20	0.14	0.19	0.26	0.18	0.23	0.32	0.22	0.27	0.39
Parking	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87	0.85	0.86	0.87
	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97	0.95	0.96	0.97

- a. Runoff coefficients for storm recurrence intervals less than 25 years.
- b. Runoff coefficients for storm recurrence intervals of 25 years or more.

Source: Rawls, W.J., S.L. Wong and R.H. McUen, 1981, "Comparison of Urban Flood Frequency Procedures," Preliminary Draft, U.S. Department of Agriculture, Soil Conservation Service, Beltsville, MD

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

TABLE J-3

MANNING’S ROUGHNESS COEFFICIENTS

Roughness Coefficients (Manning’s “n”) for Overland Flow

Surface Description (n)

Dense growth	0.4 - 0.5
Pasture	0.3 - 0.4
Lawns	0.2 - 0.3
Bluegrass sod	0.2 - 0.5
Short grass prairie	0.1 - 0.2
Sparse vegetation	0.05 - 0.13
Bare clay-loam soil (eroded)	0.01 - 0.03
Concrete/asphalt - very shallow depths (less than 1/4 inch)	0.10 - 0.15
- small depths (1/4 inch to several inches)	0.05 - 0.10

Roughness Coefficients (Manning’s “n”) for Channel Flow

Reach Description (n)

Natural stream, clean, straight, no rifts or pools	0.03
Natural stream, clean, winding, some pools or shoals	0.04
Natural stream, winding, pools, shoals, stony with some weeds	0.05
Natural stream, sluggish deep pools and weeds	0.07
Natural stream or swale, very weedy or with timber underbrush	0.10
Concrete pipe, culvert, or channel	0.012 ⁽¹⁾
Corrugated metal pipe	0.012-0.027 ⁽¹⁾
High density polyethylene (HDPE) pipe	
Corrugated	0.021-0.029 ⁽²⁾
Smooth lined	0.012-0.020 ⁽²⁾

(1) Depending upon type, coating, and diameter

(2) Values recommended by the American Concrete Pipe Association, check manufacturers recommended value

Source: U.S. Army Corps of Engineers, HEC-1 Users Manual

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

TABLE J-4

NONSTRUCTURAL STORMWATER MANAGEMENT MEASURES

Nonstructural Stormwater Measure	Description
Natural Area Conservation	Conservation of natural areas such as forest, wetlands, or other sensitive areas in a protected easement, thereby retaining their existing hydrologic and water quality characteristics.
Disconnection of Rooftop Runoff	Rooftop runoff is disconnected and then directed over a pervious area where it may either infiltrate into the soil or filter over it. This is typically obtained by grading the site to promote overland flow or by providing bio-retention on single-family residential lots.
Disconnection of Non-Rooftop Runoff	Disconnect surface impervious cover by directing it to pervious areas where it is either infiltrated or filtered through the soil.
Buffers	Buffers effectively treat stormwater runoff. Effective treatment constitutes capturing runoff from pervious and impervious areas adjacent to the buffer and treating the runoff through overland flow across a grassy or forested area.
Grass Channel (Open Section Roads)	Open grass channels are used to reduce the volume of runoff and pollutants during smaller storms.
Environmentally Sensitive Rural Development	Environmental site design techniques are applied to low-density or rural residential development.

Source: Maryland Department of the Environment, "Maryland Stormwater Design Manual," Baltimore, MD, 2000

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

APPENDIX K

REFERENCES

BMP Manuals:

California

California Stormwater BMP Handbook: New Development and Redevelopment (January 2003) – separate file available at <http://www.cabmphandbooks.org/Development.asp>

Georgia

Georgia Stormwater Management Manual Volume 2: Technical Handbook (August 2001)- separate file (<http://www.georgiastormwater.com/>)

Maryland

2000 Maryland Stormwater Design Manual –

[http://www.mde.state.md.us/Programs/Waterprograms/SedimentandStormwater/stormwater design/index.asp](http://www.mde.state.md.us/Programs/Waterprograms/SedimentandStormwater/stormwater%20design/index.asp)

Massachusetts

Stormwater Management, Volume Two: Stormwater Technical Handbook (Massachusetts, 1997) – separate file available at <http://www.state.ma.us/dep/brp/stormwtr/stormpub.htm>

Minnesota

Minnesota Urban Small Sites BMP Manual: Stormwater Best Management Practices for Cold Climates (July 2001) –

<http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm>

New Jersey

Revised Manual for New Jersey: Best Management Practices for Control of Nonpoint Source Pollution from Stormwater (Fifth Draft May 2000) –

<http://www.state.nj.us/dep/watershedmgt/bmpmanual.htm>

New York

New York State Stormwater Management Design Manual (2001) –

<http://www.dec.state.ny.us/website/dow/swmanual/swmanual.html>

Pennsylvania

Pennsylvania Association of Conservation Districts, Pennsylvania Handbook of Best Management Practices for Developing Areas, November 14, 1997.

Washington

Stormwater Management Manual for Western Washington (August 2001) –

<http://www.ecy.wa.gov/programs/wq/stormwater/manual.html>

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

Federal

Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring (FHWA) – <http://www.fhwa.dot.gov/environment/ultraurb/3fs1.htm>

USEPA Infiltration Trench Fact Sheet (September 1999) –
<http://cfpub.epa.gov/npdes/stormwater/menuofbmps/post.cfm>

Riparian Buffer References

Alliance for the Chesapeake Bay, Pennsylvania Department of Environmental Protection, September 2000. *Forest Buffer Toolkit*, Stream ReLeaf Program.

Penn State College of Agricultural Sciences, 1996. *Establishing Vegetative Buffer Strips Along Streams to Improve Water Quality*. Publication # AGRS-67.

Fike, Jean, June 1999. *Terrestrial & Palustrine Plant Communities of Pennsylvania*, Pennsylvania Natural Diversity Inventory, The Nature Conservancy, Western Pennsylvania Conservancy, and Pennsylvania Department of Conservation and Natural Resources.

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Palone, R. S. and A. H. Todd (eds), 1997. *Chesapeake Bay Riparian Handbook: A Guide for Establishing and Maintaining Riparian Forest Buffers*. Chesapeake Bay Program and Northeastern Area State and Private Forestry. Natural Resources Conservation Service Cooperative State Research Education and Extension Services.

The Federal Interagency Stream Restoration Working Group (FISRWG, 10/1998). *Stream Corridor Restoration Principles, Processes, and Practices*. GPO Item No. 0120-A; SuDocs No. A57.6/2:EN3/PT.653. ISBN-0-934213-59-3. Published October 1998. Revised August 2000.

STORMWATER AND WATER QUALITY MANAGEMENT ORDINANCE – VALLEY TOWNSHIP, MONTOUR COUNTY, PA.

APPENDIX L

WEST NILE VIRUS GUIDANCE

(This source is from the Monroe County, PA Conservation District that researched the potential of West Nile Virus problems from BMP's due to a number of calls they were receiving)

**Monroe County Conservation District Guidance:
Stormwater Management and West Nile Virus**

Source: Brodhead McMichaels Creeks Watershed Act 167 Stormwater Management Ordinance Final Draft 2/23/04

The Monroe County Conservation District recognizes the need to address the problem of non-point source pollution impacts caused by runoff from impervious surfaces. The new stormwater policy being integrated into Act 167 stormwater management regulations by the PA Department of Environmental Protection (DEP) will make non-point pollution controls an important component of all future plans and updates to existing plans. In addition, to meet post-construction anti-degradation standards under the state National Pollutant Discharge Elimination System (NPDES) permitting program, applicants will be required to employ Best Management Practices (BMP's) to address non-point pollution concerns.

Studies conducted throughout the United States have shown that wet basins in particular constructed wetlands are effective in traditional stormwater management areas such as channel stability and flood control and are one of the most effective ways to remove stormwater pollutants (United States Environmental Protection Agency 1991, Center for Watershed Protection 2000). From Maryland to Oregon, studies have shown that as urbanization and impervious surfaces increase in a watershed, the streams in those watersheds become degraded (CWP 2000). Although there is debate over the threshold of impervious cover when degradation becomes apparent (some studies show as little as 6% while others show closer to 20%), there is agreement that impervious surfaces cause non-point pollution in urban and urbanizing watersheds and that degradation is ensured if stormwater BMP's are not implemented.

Although constructed wetlands and ponds are desirable from a water quality perspective, there may be concerns about the possibility of these stormwater management structures becoming breeding grounds for mosquitoes. The Conservation District feels that although it may be a valid concern, **municipalities should not adopt ordinance provisions prohibiting wet basins for stormwater management.**

Mosquitoes

The questions surrounding mosquito production in wetlands and ponds have intensified in recent years by the outbreak of the mosquito-borne West Nile Virus. As is the case with all vector-borne maladies, the life cycle of West Nile Virus is complicated, traveling from mosquito

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to bird, back to mosquito, and then to other animals including humans. *Culex pipiens* was identified as the vector species in the first documented cases from New York in 1999. This species is still considered the primary transmitter of the disease across its range. Today there are some 60 species of mosquitoes that inhabit Pennsylvania. Along with *C. pipiens*, three other species have been identified as vectors of West Nile Virus while four more have been identified as potential vectors.

The four known vectors in NE Pennsylvania are *Culex pipiens*, *C. restuans*, *C. salinarius*, and *Ochlerotatus japonicus*. All four of these species prefer, and almost exclusively use, artificial containers (old tires, rain gutters, birdbaths, etc.) as larval habitats. In the case of *C. pipiens*, the most notorious of the vector mosquitoes, the dirtier the water, the better they like it. The important factor is that these species do not thrive in functioning wetlands where competition for resources and predation by larger aquatic and terrestrial organisms is high.

The remaining four species, *Aedes vexans*, *Ochlerotatus Canadensis*, *O. triseriatus*, and *O. trivittatus*, are currently considered potential vectors due to laboratory tests (except the *O. trivittatus*, which did have one confirmed vector pool for West Nile Virus in PA during 2002). All four of these species prefer vernal habitats and ponded woodland areas following heavy summer rains. These species may be the greatest threat of disease transmission around stormwater basins that pond water for more than four days. This can be mitigated, however, by establishing ecologically functioning wetlands.

Stormwater Facilities

If a stormwater wetland or pond is constructed properly and a diverse ecological community develops, mosquitoes should not become a problem. Wet basins and wetlands constructed as stormwater management facilities should be designed to attract a diverse wildlife community. If a wetland is planned, proper hydrologic soil conditions and the establishment of hydrophytic vegetation will promote the population of the wetland by amphibians and other mosquito predators. In natural wetlands, predatory insects and amphibians are effective at keeping mosquito populations in check during the larval stage of development while birds and bats prey on adult mosquitoes.

The design of a stormwater wetland must include the selection of hydrophytic plant species for their pollutant uptake capabilities and for not contributing to the potential for vector mosquito breeding. In particular, species of emergent vegetation with little submerged growth are preferable. By limiting the vegetation growing below the water surface, larvae lose protective cover, and there is less chance of anaerobic conditions occurring in the water.

Stormwater ponds can be designed for multiple purposes. When incorporated into an open space design, a pond can serve as a stormwater management facility and a community amenity. Aeration fountains and stocked fish should be added to keep larval mosquito populations in check.

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Publications from the PA Department of Health and the Penn State Cooperative Extension concerning West Nile Virus identify aggressive public education about the risks posed by standing water in artificial containers (tires, trash cans, rain gutters, and birdbaths) as the most effective method to control vector mosquitoes.

Conclusion

The Conservation District understands the pressure faced by municipalities when dealing with multifaceted issues such as stormwater management and encourages the incorporation of water quality management techniques into stormwater designs. As Monroe County continues to grow, conservation design, groundwater recharge, and constructed wetlands and ponds should be among the preferred design options to reduce the impacts of increases in impervious surfaces. When designed and constructed appropriately, the runoff mitigation benefits to the community from these design options will far outweigh their potential to become breeding grounds for mosquitoes.

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APPENDIX M

STORMWATER CONTROLS AND BEST MANAGEMENT PRACTICES, OPERATIONS, AND MAINTENANCE AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____, 200__, by and between _____, (hereinafter the “Landowner”), and _____, _____ County, Pennsylvania, (hereinafter “Municipality”);

WITNESSETH

WHEREAS, the Landowner is the owner of certain real property as recorded by deed in the land records of _____ County, Pennsylvania, Deed Book _____ at Page _____, (hereinafter “Property”).

WHEREAS, the Landowner is proceeding to build and develop the Property; and

WHEREAS, the Stormwater Controls and BMP Operations and Maintenance Plan approved by the Municipality (hereinafter referred to as the “Plan”) for the property identified herein, which is attached hereto as Appendix A and made part hereof, provides for management of stormwater within the confines of the Property through the use of Best Management Practices (BMP’s); and

WHEREAS, the Municipality and the Landowner, his successors, and assigns agree that the health, safety, and welfare of the residents of the Municipality and the protection and maintenance of water quality require that on-site stormwater BMP’s be constructed and maintained on the Property; and

WHEREAS, for the purposes of this agreement, the following definitions shall apply:

BMP – “Best Management Practice”-activities, facilities, designs, measures, or procedures used to manage stormwater impacts from land development, to protect and maintain water quality and groundwater recharge, and to otherwise meet the purposes of the municipal Stormwater Management Ordinance, including but not limited to infiltration trenches, seepage pits, filter strips, bio-retention, wet ponds, permeable paving, rain gardens, grassed swales, forested buffers, sand filters, and detention basins.

- Infiltration Trench – A BMP surface structure designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer,
- Seepage Pit – An underground BMP structure designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or groundwater aquifer,

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- Rain Garden – A BMP overlain with appropriate mulch and suitable vegetation designed, constructed, and maintained for the purpose of providing infiltration or recharge of stormwater into the soil and/or underground aquifer, and

WHEREAS, the Municipality requires, through the implementation of the Plan, that Stormwater Management BMP's as required by said Plan and the municipal Stormwater Management Ordinance, be constructed and adequately operated and maintained by the Landowner, his successors, and assigns.

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

1. The BMP's shall be constructed by the Landowner in accordance with the plans and specifications identified in the Plan.
2. The Landowner shall operate and maintain the BMP(s) as shown on the Plan in good working order acceptable to the Municipality and in accordance with the specific maintenance requirements noted on the Plan.
3. The Landowner hereby grants permission to the Municipality, its authorized agents, and employees to enter upon the property, at reasonable times and upon presentation of proper identification, to inspect the BMP(s) whenever it deems necessary. Whenever possible, the Municipality shall notify the Landowner prior to entering the property.
4. In the event that the Landowner fails to operate and maintain the BMP(s) as shown on the Plan in good working order acceptable to the Municipality, the Municipality or its representatives may enter upon the Property and take whatever action is deemed necessary to maintain said BMP(s). This provision shall not be construed to allow the Municipality to erect any permanent structure on the land of the Landowner. It is expressly understood and agreed that the Municipality is under no obligation to maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation on the Municipality.
5. In the event that the Municipality, pursuant to this Agreement, performs work of any nature or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner shall reimburse the Municipality for all expenses (direct and indirect) incurred within ten (10) days of receipt of an invoice from the Municipality.
6. The intent and purpose of this Agreement is to ensure the proper maintenance of the on-site BMP(s) by the Landowner; provided, however, that this Agreement shall not be deemed to create or affect any additional liability on any party for damage alleged to result from or be caused by stormwater runoff.
7. The Landowner, its executors, administrators, assigns, and other successors in interest shall release the Municipality's employees and designated representatives from all damages,

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accidents, casualties, occurrences, or claims which might arise or be asserted against said employees and representatives from the construction, presence, existence, or maintenance of the BMP(s) by the Landowner or Municipality. In the event that a claim is asserted against the Municipality, its designated representatives, or employees, the Municipality shall promptly notify the Landowner, and the Landowner shall defend, at his own expense, any suit based on the claim. If any judgment or claims against the Municipality’s employees or designated representatives shall be allowed, the Landowner shall pay all costs and expenses regarding said judgment or claim.

8. The Municipality shall inspect the BMP(s) at a minimum of once every three (3) years to ensure their continued functioning.

This Agreement shall be recorded at the Office of the Recorder of Deeds of _____ County, Pennsylvania, and shall constitute a covenant running with the Property and/or equitable servitude and shall be binding on the Landowner, his administrators, executors, assigns, heirs, and any other successors in interest, in perpetuity.

ATTEST:

WITNESS the following signatures and seals:

(SEAL) For the Municipality:

(SEAL) For the Landowner:

ATTEST:

_____ (City, Borough, Township)

County of _____, Pennsylvania

I, _____, a Notary Public in and for the County and State aforesaid, whose commission expires on the _____ day of _____, 20__, do hereby certify that _____ whose name(s) is/are signed to the foregoing Agreement bearing date of the _____ day of _____, 20__, has acknowledged the same before me in my said County and State.

GIVEN UNDER MY HAND THIS _____ day of _____, 200_.

NOTARY PUBLIC (SEAL)