

**ELDRED TOWNSHIP, MONROE COUNTY,  
PENNSYLVANIA  
STORM WATER  
MANAGEMENT ORDINANCE OF 2007**

**ORDINANCE NO.                    2007**

**WHEREAS**, Eldred Township is authorized to regulate land use activities that affect runoff, surface and ground water quality and quantity pursuant to the Water Resources Management Act of 2002, as amended, the Municipalities Planning Code and the Second Class Township Code;

**NOW THEREFORE**, be it **ORDAINED** and **ENACTED** by the Board of Supervisors of Eldred Township, Monroe County, Pennsylvania, and it is hereby **ORDAINED** and **ENACTED** by the authority of the same, the following to be known as the Eldred Township Storm Water Management Ordinance of 2007:

100. General Provisions.

1. Storm water runoff from any subdivision or land development (including during construction and earthmoving) shall not occur at a peak rate (measured in cubic feet per second) that is greater after development than occurred prior to development, and said postdevelopment flow peak shall not be reached prior to the predevelopment time of concentration.
2. Runoff shall be controlled from a site using appropriate means of detention of water on the site and/or other approved types of storm water management, within the requirements of this Ordinance.
3. Runoff that is detained shall be held and released at a predetermined controlled rate by appropriately installed devices. The release shall be in the same manner as the natural or predevelopment means of discharge from a site (such as point discharge or sheet flow).
4. Storm water runoff shall not be increased or redirected in such a way that it results in hazards to persons or property or interferes with the normal movement of vehicles.
5. All storm water management methods including all outlet locations are subject to approval by the Township.
6. All lots shall be laid out and graded to prevent cross lot drainage, to provide positive drainage away from proposed building locations including primary or alternate septic system locations. Storm water shall also not be redirected toward buildings or on-lot septic systems off site.
7. All storm water management plans shall take into account and provide for existing flow from upstream areas within the entire watershed, including future flows after development considering existing zoning regulations.
8. The existing points of natural drainage discharge onto adjacent property shall not be altered to increase flows nor shall the concentration of water runoff be increased because of development without the written approval of all affected landowners.

9. No storm water runoff or watercourse shall be diverted in a way that overloads existing drainage systems, or creates flooding or the need for additional drainage structures on other private properties or public lands, without Township approval of provisions to be made by the developer for properly handling such conditions, including water runoff impoundments, if necessary.
10. Properly designed open swales and other surface drainage facilities shall be used where feasible. If determined by the Board of Supervisors to be necessary, based upon the recommendation of the Township Engineer, an adequate storm sewer system consisting of inlets and underground drainage pipes with approved outlets shall be constructed by the developer. The Township may determine whether an underground storm drainage is needed based upon the expected velocity and depth of the storm waterflows (including depths in the street) and the proximity of dwellings.
  - a. Underground flows. Any diverted or affected underground water flows shall be properly dissipated or controlled to prevent velocities or concentrations that could harm a street or cause erosion within the right-of-way. Appropriate methods of control may include, but are not limited to, perforated pipe or other methods to slow the discharge of the water.
11. Sequence of Construction. No substantial grading shall occur, and no building permits shall be issued for any building unless any detention basin, sediment basin/trap, siltation basin or improved major swale approved to handle the resulting runoff is in place. Any detention basin/trap shall be seeded and stabilized and have an installed outlet structure prior to the construction of any streets or buildings within that drainage basin area.
12. Phasing. The phasing of a development shall ensure that all storm water facilities needed to manage runoff from a phase are in place and functioning adequately prior to and after the construction of buildings in that phase. This shall, for example, include the extension of the main outfall line. This may require the use of temporary structures, which shall be shown on submitted plans. If the development occurs in phases, the entire system shall be shown as part of the preliminary plan submission.

101. Calculations of Storm Water Runoff

All storm water drainage system designs, plans and/or construction shall utilize the following method of computation:

1. Peak discharge and runoff shall be computed using the SCS runoff curve number method as set forth in the latest edition of "Urban Hydrology for Small Watershed, Technical Release No. 55" (TR-55), as published by USDA or by any other method approved by the Township Engineer.
2. Curve Numbers. The values for the curve numbers can be found in Table 2.2 in TR-55.
3. Rainfall Frequency. Rainfall frequency data shall be obtained from the most current available information from the U.S. Department of Commerce, National Weather Service information, the Pennsylvania Department of Environmental Protection Research Publication Number 70, or "Rainfall Duration Frequency Tables for Pennsylvania" published by the Pennsylvania Department of Environmental Protection.
4. Storms with a frequency of occurrence of one in ten years shall be used for drainage facilities in new developments for minor streets, and 25-year storms shall be used for collector and connector highways. All detention facilities shall be designed for the 2, 50 and 100-year 24-hour storms.
5. Time of Concentration. The time of concentration shall be the time for runoff to travel from the hydraulically most distant point of the watershed to a point of interest within the watershed. Time of concentration shall include the time of sheet flow, shallow concentrated flow, flow through pipes, culverts and natural streams or some combination of these.
  - (a) Sheet flow and shallow concentrated flow shall be computed using the guidelines as established in the latest edition of TR-55.
  - (b) The Manning Formula is widely used for open channel flow calculations, but may also be applied to closed conduit and pressure flows. The expected velocity may be calculated using the Manning Formula and the travel time can then be calculated using the velocity and the flow length.
6. Permissible Stream Velocities in Open Channels. The permissible stream velocities to be used in channels shall adhere to the values tabulated in the latest edition of the Pennsylvania Department of Environmental Protection Soil Erosion and Sedimentation Control Manual.

7. The storm water calculations shall include the following:
  - a. Information required for Preliminary and Final Plans within the Subdivision and Land Development Ordinance,
  - b. Pre and postdevelopment drainage maps showing existing and proposed grades and including any off-site tributary area,
  - c. Pre and postdevelopment runoff calculations,
  - d. Detention basin design calculations (as applicable),
  - e. Pipe and swale sizing calculations,
  - f. Such additional information as the Township Engineer requires to determine compliance with this Ordinance, including, but not limited to, slopes, proposed elevations, typical cross sections, profiles, and details.
8. Where crop farming or disturbed earth exists on the site prior to development, meadows in good condition shall be used as the starting base for the predevelopment calculation.
9. If the storm water calculations assume that a certain percentage of a site will remain forested, the Supervisors may require that the applicant establish a legally binding method to insure that such percentage of the site will remain forested.

102. Design Submission.

1. Within the 100-year floodplain, any storm water management structures and systems shall be designed to handle a 100-year storm.
2. The storm water management plan shall show that a 100-year, 24-hour storm can be safely conveyed without jeopardizing any principal building on or adjacent to the site.
3. All plans showing proposed storm drainage construction must be accompanied by a complete design sealed and signed by a Pennsylvania Registered Engineer, Surveyor, or Landscape Architect.

103. Methods of Detention and Flow Delay. The following methods of detention or flow-delay devices may be found to be acceptable by the Township Engineer:

1. Wet or dry ponds and detention basins
2. Roof storage and increased roof roughness
3. Parking lot detention
4. Infiltration trenches
5. Porous pavements, grassed channels and vegetated strips
6. Cisterns, underground reservoirs or covered ponds
7. Increasing the roughness coefficients on the development's surface area
8. Decreasing the percentage of impervious area
9. Promoting groundwater recharge
10. Routing flow over lawns in swales within storm water easements
11. Detention storage within the storm sewer
12. Another method that may be approved by the Township Engineer

104. Groundwater Recharge: Best Storm Water Management Practices.

1. Where determined by the Township Engineer to be feasible considering soil and subsurface conditions, the Board of Supervisors may require that a subdivision or land development include Best Management Practices (BMP's) to promote groundwater recharge and to minimize pollutants in runoff. These measures shall be based upon the most recent edition of the manual entitled "Best Management Practices for Developing Areas in Pennsylvania" that is available through the County Conservation District or from other published standards acceptable to the Township.
  - a. Infiltration BMPs intended to receive runoff from developed areas shall be selected based upon suitability of soils and site conditions and shall be constructed on soils that have the following characteristics:
    - (1) A minimum depth of 24 inches between the bottom of the facility and the seasonal high water table and/or bedrock (limiting zones).
    - (2) An infiltration and/or percolation rate sufficient to accept the additional storm water load and drain completely as determined by field tests conducted by the applicant's professional designer.
  - b. The Township may require a soils evaluation of the project site to determine the suitability of recharge facilities. Such evaluation shall address soil permeability, depth to bedrock, susceptibility to sinkhole formation and sub-grade stability.
2. Where such measures are required, the applicant shall submit construction details of the measures with the final plan submission.
3. Best Management Practice measures to promote recharge shall include, but not be limited to, the following:  
Seepage beds, infiltration devices and/or porous pavement to promote groundwater recharge.
4. Best Management Practice measures to protect water quality shall include, but not be limited to, the following:
  - a. Water quality inlets to separate oils and grits from runoff.
  - b. Regular cleaning of paved surfaces to pick up oils and lubricants.
  - c. Storm water or sediment basins designed to hold the "first flush" of runoff, such as holding a one year storm for 24 hours, to allow time for solids to be separated from runoff.
  - d. Maintenance of planting of strips of thick vegetation between paved areas and creeks to filter out pollutants.
5. Maintenance. Where such measures are required, the applicant shall show that adequate provisions will be put into place to ensure proper maintenance of the measures and to avoid groundwater contamination. Throughout the life of the use, the lot owner shall be

responsible for maintenance of the measures to make sure that they continue to serve their intended purposes.

6. Infiltration. Areas intended for infiltration devices shall be protected from compaction, including prior to and during construction. Infiltration devices shall not receive runoff until areas flowing into the devices have been stabilized.

105. Detention Basin Standards.

1. Perforated risers, staggered orifices, V-notch weirs, or other outlet structures as approved by the Township, may be required for outlet control.
2. All detention basins shall be designed with an emergency spillway.
  - a. An emergency spillway shall be designed to pass the 100-year runoff event with a minimum 1.0 foot freeboard.
  - b. The downstream slope of the spillway shall, as a minimum, extend to the toe of the berm embankment. The edge of the basin grading shall be within the subject property.
3. The emergency spillway and the outfall of the detention basin shall be lined with riprap and shall meet requirements of PennDOT Publication 408, as amended.
4. The minimum top width of a detention basin berm shall be 10 feet, unless the Township determines that a greater width is needed for maintenance.
5. In order to provide proper drainage, a minimum grade of 1.0 percent, directed toward the outlet structure, shall be maintained across the basin floor of any basin designed to fully drain. A lesser grade may be permissible provided that a low flow channel is provided.
6. Slopes of Basin. The maximum inside slope of earth detention basin embankments shall be 4 horizontal to 1 vertical, and the maximum outside slope shall be 4 to 1. The Board of Supervisors may permit a reduction of inside and outside slopes to a 3 to 1 maximum where the applicant proves that such slopes will be properly and attractively maintained. The top or toe of any slope shall be located a minimum of 5 feet from any property line. The maximum slope of an accessway for maintenance shall be 8 horizontal to 1 vertical where such accessway is required by the Board of Supervisors.
7. Outfall. Where no existing point of concentrated flow exists, the outfall from a detention basin shall not discharge closer than 30 feet from the adjoining property line unless permission is given, in writing, by the adjacent property owner.
8. Where discharge from the detention basin is to be spread into sheet flow, the allowable flow shall be determined by the predevelopment flow rate for a 2-year storm, across the length of the spreader.
9. Antiseep collars and a cutoff trench shall be required on basins having a berm height exceeding 5 feet. Watertight antiseep collars shall be installed around the discharge pipe at intervals not to exceed 24 feet or as approved by the Township Engineer. Such collars shall extend a minimum of 2 feet beyond the outside of the pipe.
10. Basins not having direct access to a public street shall have a 25-foot wide access easement to a public street for the purpose of basin maintenance.
11. The design engineer shall verify that the operation of the detention facility will not

significantly increase peaking conditions downstream of the site.

12. For the purpose of this Section, a retention basin shall be required to meet the applicable standards as a detention basin.
13. Landscaped Screening of Detention Basins. All landscaping shall comply with Section 615.5 of the Subdivision and Land Development Ordinance.
14. Areas of storm water basins that are visible from streets and dwellings shall be attractively maintained.
15. All outflow structures from storm water storage facilities shall be equipped with a regulatory device that will permit modification to regulate the amount of outflow.
16. Basins greater than three feet in depth shall be fenced the entire perimeter with a four foot high security fence with gate. Any basin with a permanent pool of water shall be fenced, regardless of depth. Fencing to be galvanized or vinyl coated chain link material or alternative material acceptable to the Supervisors.

106. Construction Standards.

1. Standards. Construction methods and materials for storm drainage and control facilities (including pipes) and erosion control facilities shall be in accordance with the approved plans and any accompanying specifications. The construction details and standards of the following publications, or their successor publications, in their most recent revision shall be used:
  - a. "PA DEP Erosion and Sedimentation Control Program Manual."
  - b. PennDOT, Form 408, Specifications.
  - c. PennDOT, RC Series, Roadway Construction Standards.
  - d. In cases where the above documents conflict with Township specifications, the Township's specifications shall supercede, except in areas of exclusive PennDOT jurisdiction.
2. Pipe Materials. All pipe materials shall meet PennDOT standards. Drainage pipes may be constructed out of galvanized corrugated metal, aluminized corrugated metal, corrugated polyethylene plastic, bituminous coated corrugated metal, reinforced concrete, or similar materials preapproved by the Township.
3. All earth fill shall be free from brush, roots, and other organic material subject to decomposition. The fill material in all earth dams and embankments shall be compacted to at least 95 percent of the maximum density obtained from compaction tests performed by the appropriate method in ASTM D698.

107. Drainage Pipe, Culvert and Catch Basin Design.

1. Open pipe ends must be fitted with concrete end walls, prefabricated end sections, and riprap and/or energy dissipaters, as deemed appropriate by the Township.
2. Drainage pipes shall have a minimum slope of 0.5 percent, and drainage swales not designed for storm water detention shall have a minimum slope of 1 percent. As a



minimum, the tops of all pipes should be at the same elevation when changing pipe sizes.

3. Manholes or inlets shall be used at all changes in horizontal alignment, at changes of vertical grade, and at all pipe intersections. No run of pipe shall exceed 400 feet in length without appropriate measures to allow cleanout.
4. Bridges and culverts shall meet PennDOT Construction Standards. PA DEP shall be contacted to determine if a Dams and Waterways Permit is required.
5. Grating. Along streets and pedestrian areas, bicycle safe grates shall be required for all catch basins.
6. "V" shaped swales shall not be permitted.

108. Surface Waters.

1. All natural streams, channels, swales, drainage systems and/or areas of concentration of surface water shall be maintained in their existing condition unless alteration is approved by the Township. The applicant shall be responsible to obtain all necessary PA DEP permits (see Chapter 105 of Title 25 of the State regulations).
2. Creek Alignments. Any change to the alignment of a watercourse, or any blocking, impeding or redirecting of a watercourse shall only occur with written approval of PA DEP and the Township.

109. Ownership and Maintenance of Storm Water Facilities. The Ownership of Storm Water Facilities shall be treated the same as development improvements and provisions for the ownership and responsibility for maintenance thereof shall be in compliance with section 506 of the Eldred Township Subdivision and Land Development Ordinance.

110. Waivers/Modifications

1. The provisions of this Ordinance are intended as a minimum standard for the protection of the public health, safety, and welfare. If the literal compliance with any provision of these regulations is shown by the applicant, to the satisfaction of the Supervisors, to be unreasonable or to cause undue hardship as it is applied to a particular property, or, if the applicant shows that an alternative proposal will allow for equal or better results, the Supervisors may grant a waiver/modification from such mandatory provisions so that substantial justice may be done and the public interest secured while permitting the reasonable utilization of the property. However, the granting of a waiver/modification shall not have the effect of making null and void the intent or any other applicable provision of this or any other applicable Township Ordinance.
2. Conditions. In granting waivers/modifications, the Supervisors may impose such conditions as will, in its judgment, secure substantially the objectives of the standards and requirements of this Ordinance.
3. Procedures. All requests for waiver/modifications shall be made in writing, shall accompany the submission of the plan and shall include;
  - The specific sections of this Ordinance in question.
  - Provisions for the minimum modification necessary as an alternative to the Ordinance requirements.
  - Justification for the waiver/modification, including the full grounds and facts of unreasonableness and hardship.

4. Action. If the Board of Supervisors denies the request, the applicant shall be notified, in writing, of all the reasons for the denial. If the Supervisors grant the request, the plan shall identify the modification or waiver that was granted.

5. The Preventive and Enforcement Remedies of this Ordinance are those set forth in Article X, section 1004.1 and 1004.3 of the Eldred Township Subdivision and Land Development Ordinance of April 2005, which provisions are hereby incorporated herein by reference.

111. Severability. Except as amended hereby, all provisions of existing Eldred Township ordinances shall remain in full force and effect. Furthermore, the provisions of any other existing ordinances or part of ordinances in conflict with this ordinance, to the extent of such conflict, and no further, are hereby repealed. If any part of the provisions of this ordinance shall be held to be unconstitutional, illegal, or invalid, such unconstitutionally, illegality, or invalidity shall not affect the validity of any of the remaining provisions of this ordinance or other provisions of other existing Eldred Township ordinances.

Duly **ORDAINED, ENACTED** and **EFFECTIVE** this \_\_\_\_\_ day of \_\_\_\_\_, 2007, by the Board of Supervisors of Eldred Township, Monroe County, Pennsylvania, in lawful session duly assembled.

BOARD OF SUPERVISORS, ELDRED TOWNSHIP

\_\_\_\_\_  
Glenn W. Beers, Chairman

\_\_\_\_\_  
Ilene M. Eckhart

\_\_\_\_\_  
Sharon F. Solt

Attest: \_\_\_\_\_  
Sharon F. Solt, Secretary