

**Beaverdam Branch Watershed
Act 167 Stormwater Management Plan
Volume 2: Executive Summary**

May 2000

Prepared for the:

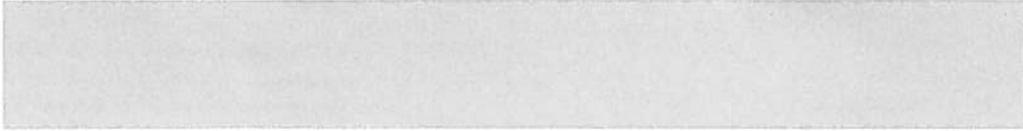
Blair County Planning Commission

Prepared by:

Chester Engineers



CHESTER
ENGINEERS



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Act 167
Stormwater Management Plan**

**Volume 2
Executive Summary**

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Submitted to:
Blair County Planning Commission

Prepared by: John M. Maslanik, P.E.

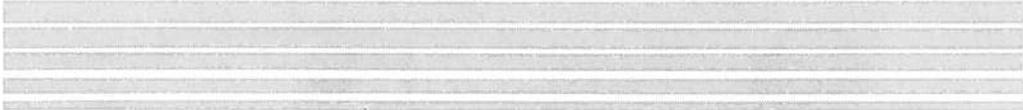
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**BEVERDAM BRANCH WATERSHED
STORMWATER MANAGEMENT PLAN
EXECUTIVE SUMMARY**

TABLE OF CONTENTS

Introduction	1
Recommendations.....	1
Technical	1
Management	2
Contents of the Plan.....	2
Existing Runoff Characteristics	3
General Information	3
Survey of Existing Runoff Characteristics	5
Survey of Significant Obstructions.....	6
Assessment of Potential land Development Patterns.....	6
Development in Flood Hazard Areas.....	7
Survey of Drainage Problems	7
Review of Stormwater Collection Systems	8
Assessment of Alternative Runoff Control Techniques	9
Identification of Existing and Proposed Flood Control Projects.....	9
Designation of Areas to be Served by Stormwater Collection and Control Facilities in the Future	9
Identification of Flood Plains Within the Watershed	10
Criteria and Standards for Stormwater Runoff Control.....	10
Activities Covered.....	10
Specific Technical Standards	10
Runoff Quantity Control Standard.....	10

**BEVERDAM BRANCH WATERSHED
STORMWATER MANAGEMENT PLAN
EXECUTIVE SUMMARY**

**TABLE OF CONTENTS
(CONTINUED)**

Runoff Water Quality Standard 11

Control Storms..... 11

Permissible Runoff Computation Techniques 11

Priorities for Plan Implementation

 DEP Approval of the Plan 13

 Municipal Adoption of Ordinance Provisions to Implement the Plan 13

Development of a Systematic Approach for Correction of Existing
Storm Drainage Problems 15

Provisions for Reviewing, Revising, and Updating the Plan..... 16

**BEAVERDAM BRANCH WATERSHED
STORMWATER MANAGEMENT PLAN
EXECUTIVE SUMMARY**

LIST OF TABLES

Watershed Municipalities 3

Major Streams and Tributaries..... 5

Estimated Peak Discharge - Mount of Beaverdam Branch
(Existing Conditions) 6

Estimated Peak Discharge - Mount of Beaverdam Branch
(Future Conditions)..... 7

Control Storm Rainfall Depths 11

Recommended Ordinance Adoption Options 14

BEAVERDAM BRANCH WATERSHED STORMWATER MANAGEMENT PLAN

EXECUTIVE SUMMARY

INTRODUCTION

The stormwater management plan for the Beaverdam Branch Watershed has been prepared by Blair County in order to meet the requirements of the Pennsylvania Storm Water Management Act (Act of October 4, 1978, P.L. 864 No. 167).

This law, commonly referred to as Act 167, requires that Pennsylvania counties prepare and adopt stormwater management plans for each watershed within its boundaries. It also requires that, within six months after a watershed plan has been adopted by a county and approved by the Pennsylvania Department of Environmental Protection (DEP), municipalities within the watershed must amend or enact ordinances to regulate development and other land alterations in accordance with the standards included in the adopted plan.

Each watershed plan must contain provisions to insure that development or activities in each municipality in the watershed do not adversely affect health, safety and property in other municipalities within the watershed and in basins to which the watershed is tributary. In addition, every entity or individual who alters or develops land in a manner which affects stormwater runoff must implement stormwater control measures consistent with the adopted watershed plan. The plan provides a foundation for future cooperative action which may lead to more effective and economical ways to manage stormwater flows.

RECOMMENDATIONS

Technical

It has been determined that the basic standard for the control of stormwater runoff from new land development activities in the watershed should be that the activities should not result in an increase in the peak rate of runoff above the rates that existed prior to the development.

Management

The planning mandate of Act 167 can be achieved through the enactment and enforcement of municipal ordinances and regulations which incorporate the criteria and standards presented in the plan. The implementation of the regulations will require continuing involvement by all of the municipalities in the watershed and Blair County.

The plan describes the roles of local municipalities and the County in ongoing stormwater management activities. As is required by Act 167, the municipalities are given the responsibility for adopting and enforcing relevant stormwater control requirements. The County has been delegated the responsibility for updating the plan as specifically required by Act 167.

CONTENTS OF THE PLAN

The Stormwater Management Plan for the Beaverdam Branch Watershed includes this document and a report titled Beaverdam Branch Watershed Stormwater Management Plan (main plan document), including appendices and additional unpublished supporting documentation.

Section 5 of Act 167 specifies that a watershed plan shall include the thirteen elements listed below.

1. A survey of existing runoff characteristics in small as well as large storms, including the impact of soils, slopes, vegetation and existing development.
2. A survey of existing significant obstructions and their capacities.
3. An assessment of projected and alternative land development patterns in the watershed and the potential impact on runoff quantity, velocity and quality.
4. An analysis of present development in flood hazard areas and its sensitivity to damage from future flooding or increased runoff.
5. A survey of existing drainage problems and proposed solutions.
6. A review of existing and proposed stormwater collection systems and their impacts.
7. An assessment of alternative runoff control techniques and their efficiency in the particular watershed.
8. An identification of existing and proposed State, Federal and local flood control projects located in the watershed and their design capacities.

9. A designation and description of those areas to be served by stormwater collection and control facilities within a ten-year period.
10. An identification of flood plains within the watershed.
11. Criteria and standards for the control of stormwater runoff from development activities which are necessary to minimize dangers to property and life and carry out the purposes of Act 167.
12. Priorities for implementation of action within the plan.
13. Provisions for periodically reviewing, revising and updating the plan.

Each of these topics is addressed in the main plan document. Summaries of the findings and recommendations relative to these topics are provided in this Executive Summary in the order listed above.

EXISTING RUNOFF CHARACTERISTICS

General Information

The designated Beaverdam Branch watershed is located in Blair County in south-central Pennsylvania. The watershed encompasses the west-central part of the county, encompassing a total area of approximately 88 square miles. Small portions of the watershed lie outside of Blair County in Cambria County (Gallitzin Township and Tunnelhill Borough. A general watershed map is provided in Figure 1 of this document and Plate III-1 in the main plan document. A listing of affected municipalities is provided in Table 1 of this document and Table III-1 in the main plan document.

**Table 1
Watershed Municipalities**

Allegheny Township	Hollidaysburg Borough
Altoona City	Gallitzin Township
Blair Township	Juniata Township
Duncansville Borough	Logan Township
Frankstown Township	Tunnelhill Borough
Freedom Township	

The major streams and tributaries in this watershed are listed in Table 2.

Table 2
Major Streams and Tributaries

Adams Run	Dry Run
Baker Run	Glenwhite Run
Beaverdam Branch Juniata River	Gillans Run
Blair Gap Run	Kittanning Run
Blair Run	Mill Run
Brush Run	Scotch Gap Run
Burgoon Run	Spencer Run
Brush Run	Sugar Run

A general description of the Beaverdam Branch Watershed is presented in Section III of the main plan document.

SURVEY OF EXISTING RUNOFF CHARACTERISTICS

The PSU-IV method of estimating flood peaks was used to describe the effects that existing conditions in the watershed have upon streamflows. In order to apply this procedure, information describing the following conditions was assembled:

- A. Tributary Area (Subbasin) Physical Features
 - 1. Tributary land areas
 - 2. Geographic Location
 - 3. Percent Forestation
 - 4. Percent Urbanized
- B. Tributary Area (Subbasin) Hydrologic Features
 - 1. Estimated Manning's coefficient
 - 2. Reservoir storage

Using this information and the PSU-IV methodology and procedure, flood peaks were estimated for the overall Beaverdam Branch Watershed and four subareas containing reported problem areas. Peak discharge rates were estimated for the 2, 5, 10, 25, 50, and 100-year return frequency flood events. The estimated peak discharges for each of the

locations is presented in Table IV-1 in the main plan document. The estimated peak discharges at the mouth of the Beaverdam Branch are presented in Table 3, below.

Table 3
Estimated Peak Discharges Mouth of Beaverdam Branch
(Existing Conditions)

Return Period	Estimated Peak Discharge
2-year	2,750 cfs
5-year	4,627 cfs
10-year	6,186 cfs
25-year	8,659 cfs
50-year	10,764 cfs
100-year	13,317 cfs

SURVEY OF SIGNIFICANT OBSTRUCTIONS

Information describing the dimensions, condition and flow capacity of 27 separate stream obstructions was developed during the preparation of this plan. The location of these obstructions are illustrated in Plate III-4 contained in the main plan document. Information describing the condition and dimensions of these obstructions were developed based upon a field survey completed during the preparation of this plan.

The capacities of the obstructions were calculated based upon field measurements of critical dimensions and the application of procedures outlined in the U.S. Department of Transportation's publication Hydraulic Design of Highway Culverts. Calculated obstruction capacities are presented in Plate III-4 of the main plan document.

ASSESSMENT OF POTENTIAL LAND DEVELOPMENT PATTERNS

The PSU-IV method was used to indicate the potential impact of future land development on flows peak streamflows in the watershed. This was accomplished by modifying the PSU-IV input parameters to reflect the effects of a ten percent increase in the amount of urbanized area in the watershed. No recent detailed land use planning information is available for the watershed. However, a ten percent increase in a the amount of urbanized area was estimated based on discussions with Blair County Planning Commission staff and a review of the historical rates of urbanization as indicated by successive updates of U.S.G.S. topographic maps. Flow projections under these conditions are presented in

Table VI-2 of the main plan document and are summarized for the overall Beaverdam Branch watershed in Table 4, below.

Table 4
Estimated Peak Discharges Mouth of Beaverdam Branch
(Future Conditions)

Return Period	Estimated Peak Discharge
2-year	2,829
5-year	4,762
10-year	6,367
25-year	8,912
50-year	11,079
100-year	13,707

DEVELOPMENT IN FLOOD HAZARD AREAS

Stream reaches identified as being prone to flooding under 100 year storm conditions in Flood Insurance Studies are identified Plate III-3 of the main plan document. Information obtained from the watershed municipalities through the municipal questionnaire provides an indication of the nature of development in areas affected by stormwater drainage problems. The municipalities were asked to indicate the types of properties affected by reported stormwater drainage problems and to estimate the approximate number of properties affected. Residential properties were identified as being affected by 48% of the problems for which the data was reported. Commercial properties were associated with 24% of the problems, agricultural or undeveloped in 16% of the cases, and industrial in 12% of the cases. Approximately 77% of the problems were reported to affect 10 or more properties and 23% were reported to affect less than 10 properties.

SURVEY OF DRAINAGE PROBLEMS

The delineated flood prone areas established by flood insurance studies relate primarily to stream flooding during major storm events. As such, they do not provide information concerning more minor flooding problems or stormwater problems separate from stream flooding such as street flooding, soil erosion or stormwater pollution instances.

Data obtained through these efforts were supplemented by a review of Flood Insurance Studies conducted in the watershed to produce a listing of identified stormwater problem areas. This is presented in Table III-2 of the main plan document. A total of 20 specific problem areas were reported in 11 of the municipalities in the watershed. The predominant type of stormwater related problem reported by the municipalities is

flooding. 65% of the individual problems were reported as flooding problems and an additional 30% of the problems were described as a combination of flooding accompanied by stream bank erosion and sedimentation. The remaining approximately 5% of the reported problems were attributed specifically to soil erosion and sedimentation.

Suggested solutions were offered for 11 of the reported problem areas. The suggested solutions include structural approaches such as constructing new or increasing the capacity of existing storm sewers, increasing the capacity of culverts, and constructing stormwater detention facilities. Also included are such remedial actions as stream dredging for the removal of accumulated silt, the clearing of debris from trash racks, culvert and bridge openings and the removal of obstructions from the stream bed. Efforts to clear the stream channel is the predominant type of solution (24%) identified. Improvements to existing storm sewer systems were offered as a solution to existing problems in roughly 18% of the cases. Providing erosion protection, increasing stream channel capacity, and employing runoff detention basins are identified as potential solutions to a much lesser extent. All of the suggested solutions offered restore or increase hydraulic capacities. It is important to note that the ultimate success of any of these efforts will require that the incremental increases in hydraulic capacity not be offset by future increases in stormwater runoff. The nature of the problems currently encountered in the watershed and the types of solutions increase the importance of effective stormwater management in the watershed.

REVIEW OF STORMWATER COLLECTION SYSTEMS

The approximate locations of areas served by storm and combined sewer systems are illustrated on Plate III-6 of the main plan document. As one would expect, the areas served by piped stormwater collection systems largely correspond to the most densely developed areas of in the watershed.

The construction of storm sewers has been identified in the municipal questionnaires as a suggested solution to stormwater drainage problems Hollidaysburg and Altoona. While some storm sewer construction can be expected to occur in these and other currently developed areas in order to address localized stormwater drainage problems, most of the future storm sewer construction will occur as new areas of the watershed are developed. Therefore, future storm sewer system construction will occur as residential and commercial development progresses. The locations of such future storm sewer systems will correspond to the locations of future residential and commercial development.

ASSESSMENT OF ALTERNATIVE RUNOFF CONTROL TECHNIQUES

The Beaverdam Branch Watershed Stormwater Management Plan presents performance based standards for the management of runoff within the watershed. Within the context of these quantitative performance standards, this plan does not specify the use of particular runoff control techniques. Each developer is given relatively wide latitude within which to select one or a combination of several specific techniques through which to comply with the control standards.

Section VI of the main plan document contains descriptions of a variety of runoff reduction and control measures. These descriptions identify relative advantages and disadvantages of each of the control techniques as well as special considerations related to associated operation and maintenance requirements and potential water quality and public health considerations where appropriate.

IDENTIFICATION OF EXISTING AND PROPOSED FLOOD CONTROL PROJECTS

The main plan document lists ten existing and six proposed flood protection facilities reported in the watershed. The approximate locations of these facilities are illustrated in Plate III-5 of the main plan document. There are no regional flood control projects within the study area. The existing flood protection facilities are designed to provide localized flood protection and include stream channelization, stream bank protection, storm sewers and debris racks. The proposed facilities would also address localized flooding problems and include stream channel improvements, stream bank protection, and debris rack construction.

DESIGNATION OF AREAS TO BE SERVED BY STORMWATER COLLECTION AND CONTROL FACILITIES IN THE FUTURE

The construction of storm sewers has been identified in the municipal questionnaires as a suggested solution to stormwater drainage problems Hollidaysburg and Altoona. While some storm sewer construction can be expected to occur in these and other currently developed areas in order to address localized stormwater drainage problems, most of the future storm sewer construction will occur as new areas of the watershed are developed. Therefore, future storm sewer system construction will occur as residential and commercial development progresses. The locations of such future storm sewer systems will correspond to the locations of future residential and commercial development.

IDENTIFICATION OF FLOOD PLAINS WITHIN THE WATERSHED

Delineated flood prone areas are identified on Plate III-3 of the main plan document.

CRITERIA AND STANDARDS FOR STORMWATER RUNOFF CONTROL

This section includes a description of the specific criteria and standards recommended for the control of stormwater runoff in the Beaverdam Branch Watershed. These standards are based upon the analysis of runoff conditions in the watershed and are designed to carry out the purpose of Act 167. The standards and criteria developed for Beaverdam Branch Watershed area detailed in the *Model Stormwater Management Provisions for Stormwater Management Ordinance*, *Model Stormwater Management Provisions for Municipal Subdivision/Land Development Ordinance*, and *Model Stormwater Management Provisions for Municipal Zoning Ordinance*. These model ordinance provisions are contained in Appendices B, C, and D of the main plan document and in Appendices A, B, and C of this executive summary.

Activities Covered

The following activities involving alteration or development of land are deemed to have possible effects upon storm water runoff characteristics and are included within the scope of this ordinance:

1. Subdivision
2. Land Development
3. Construction of new or additional impervious or semi-pervious surfaces (driveways, parking lots, etc.)
4. Diversion or piping of any natural or man-made stream channel
5. Installation, replacement or substantial repair of storm water systems or appurtenances
6. Earth moving involving 1.5 or more acres

Specific Technical Standards

Runoff Quantity Control Standard

The runoff control standard recommended to be applied to new land development activities in the Beaverdam Branch Watershed is as follows:

There shall be no increase in the peak rate of stormwater runoff discharge from land subdivision, land development, and land alteration activities following completion of the activity (post-development conditions) over the rate that would have occurred from the land prior to the activity (pre-development conditions).

Runoff Water Quality Standard

The runoff water quality standard suggested to be applied to new land developments is as follows:

Stormwater detention / retention basins shall be designed so that the outlet of the basin shall, in addition to meeting the runoff water quantity standard, discharge the 1 year, 24 hour storm over a 24 hour period. Or, as an alternative, the water quality control objectives may be achieved through a combination of best management practices, including, but not limited to detention / retention basins, vegetation filter strips, and buffers designed in consultation with the municipal engineer.

This standard is presented as a suggestion for incorporation into the municipal ordinances - not as a mandatory aspect of this plan.

Control Storms

Certain control storms must be used to analyze stormwater runoff under pre- and post- development conditions and for the design of stormwater control facilities. The rationale for selecting the 24 hour 2, 10, 25 and 100 year frequency storms is discussed in Section V of the main plan document. These control storms and associated rainfall depths are presented below.

**Table 5
Control Storm Rainfall Depths**

Return Period	Volume (Inches)
2 - year	2.6
10 - year	3.8
25 - year	4.6
100 - year	6.1

The Beaverdam Branch Watershed Stormwater Management Plan specifies that the indicated rainfall volumes must be distributed over a 24 hour period according to the U.S. Soil Conservation Service Type II Rainfall Distribution Pattern.

Permissible Runoff Computation Techniques

A number of techniques and methods have been used to estimate rates and volumes of runoff from land. The Beaverdam Branch Watershed Stormwater

Management Plan identifies The following permissible techniques should be used during plan implementation.

METHOD	METHOD DEVELOPED BY	APPLICABILITY
TR-55 (or commercial package based on TR-55)	USDA NRCS	Applicable for land development plans within limitations described in TR-55.
TR-20 (or commercial package based on TR-20)	USDA NRCS	Applicable where use of full hydrology computer model is desirable or necessary.
HEC-1	U.S. Army Corps of Engineers	Applicable where use of full hydrology computer model is desirable or necessary.
PSRM	Penn State University	Applicable where use of full hydrology computer model is desirable or necessary.
Rational Method (or commercial computer package based on Rational Method)	Emil Kuichling	For sites less than 200 acres, or as approved by the Municipality and Municipal Engineer.
Other methods	Varies	Other computation methodologies approved by the municipality and municipal engineer.

This list of permissible techniques includes a cross section of the most commonly used computation methods entailing a range of approaches, levels of effort and required access to computer facilities. The list affords developers the opportunity to select from a suite of techniques. At the same time, the number of techniques with which the local reviewing engineer must be familiar is kept to a manageable number and the use of inapplicable, unproven, or inaccurate techniques is prohibited.

PRIORITIES FOR PLAN IMPLEMENTATION

The immediate and high priority items which must be completed to begin implementation of the plan include the following:

- Adoption or amendment of local ordinances: Each of the municipalities are required to adopt the stormwater management provisions contained in the

Model Stormwater Management Provisions for Stormwater Management Ordinance, Model Stormwater Management Provisions for Municipal Subdivision/Land Development Ordinance, and Model Stormwater Management Provisions for Municipal Zoning Ordinance. These model ordinance provisions are contained in Appendices B, C, and D of the main plan document and in Appendices A, B, and C of this executive summary.

- Establishment of review and enforcement procedures: The model ordinances call for the review of stormwater management plans prepared by individual developers and the enforcement of ordinance requirements. The responsibility for plan review and enforcement lies with the municipalities

The Beaverdam Branch Watershed Stormwater Management Plan preparation process is complete with Blair County's adoption of the draft Plan and submission of the final Plan to DEP for approval. Subsequent activities to carry out the provisions of the Plan are considered by DEP to be part of the implementation of the Plan. The initial step of Plan implementation is DEP approval. Plan approval sets in motion the mandatory schedule of adoption of municipal ordinance provisions to implement the stormwater management criteria. Beaverdam Branch Watershed municipalities will have six months from the date of DEP approval within which to adopt the necessary ordinance provisions. Failure to do so could result in the withholding of all state funds to the municipality(ies) per Act 167.

Additional implementation activities are the development of a local program to coordinate Chapter 105 and 106 permit application reviews and the development of a systematic approach for correction of existing storm drainage problem areas.

DEP Approval of the Plan

Upon adoption of the watershed plan by the County, the Plan is submitted to DEP for approval. The DEP review process involves determination that all of the activities specified in the approved Scope of Work have been satisfactorily completed in the Plan. Further, the Department will only approve the Plan if it determines the following:

1. That the Plan is consistent with municipal floodplain management plans, State programs which regulate dams, encroachments and other water obstructions, and State and Federal flood control programs; and
2. That the Plan is compatible with other watershed stormwater plans for the basin in which the watershed is located and is consistent with the policies and purposes of Act 167.

DEP action to either approve or disapprove the Plan must take place within ninety (90) days of receipt of the Plan by the Department. Otherwise, the Plan would be approved by default.

Municipal Adoption of Ordinance Provisions to Implement the Plan

The key ingredient for implementation of the Plan is the adoption of the necessary ordinance provisions by the Beaverdam Branch watershed municipalities. Provided as part of this Plan are model stormwater management ordinances to be used by the municipalities as a guide to making the necessary changes to their ordinances. The method ultimately used to adopt the necessary ordinance provisions can be selected by each municipality based upon the recommendations of their solicitor. However, we recommend that the methods listed in Table 6 should be considered for use in adopting the necessary ordinance provisions.

**Table 6
Recommended Ordinance Adoption Options**

Status of Current Ordinances	Municipalities in this Category	Recommended Actions
Existing zoning ordinance and subdivision and land development ordinance in effect	City of Altoona Borough of Duncansville Borough of Hollidaysburg Township of Franklin Township of Logan	Amend the existing zoning ordinance and the subdivision and land development ordinance using the <i>Model Stormwater Management Provisions for the Municipal Zoning Ordinance and Model Stormwater Management Provisions for Municipal Subdivision/Land Development Ordinance</i> (Appendices C and D, respectively). OR Adopt the <i>Model Stormwater Management Provisions for Stormwater Management Ordinance</i> (Appendix B) as stand alone ordinance and place explicit references to this ordinance in the existing zoning ordinance and subdivision and land development ordinance.
Existing subdivision and land development ordinance is in effect, but no zoning ordinance has been enacted	Township of Allegheny Township of Blair Township of Freedom	Amend the existing subdivision and land development ordinance using the <i>Model Stormwater Management Provisions for Municipal Subdivision/Land Development Ordinance</i> (Appendix C). OR Adopt the <i>Model Stormwater Management Provisions for Stormwater Management Ordinance</i> (Appendix B) and place and explicit reference to this ordinance in the existing subdivision and land development ordinances.

The model stormwater management ordinances contain a number of articles or sections that contain recommendations relative to content and language. Much of the model ordinance is presented as guidance to the municipalities and can be modified to comply with local preferences and current practices. However, in order to accomplish the goals of Act 167 and the watershed stormwater management plan, it is important that the specific language of the following key sections of the model ordinances be adopted essentially verbatim:

- General Provisions
- Stormwater Management Performance Standards
- Stormwater Plan Requirements - General Exemptions
- Stormwater Plan Requirements - Exemptions

The portions of the model ordinances listed define the types of activities for which stormwater controls are required and define the specific stormwater control standards to be met. The general content of the other portions of the model ordinances should be included in the municipalities' ordinances; however, there is a greater opportunity for customizing these sections to satisfy local preferences and procedures while accomplishing the overall goals of this plan.

DEVELOPMENT OF A SYSTEMATIC APPROACH FOR CORRECTION OF EXISTING STORM DRAINAGE PROBLEMS

Correction of the existing storm drainage problem areas in the watershed is not specifically part of the Act 167 planning process. However, the development of the watershed plan has provided a framework for their correction for the following reasons: (1) existing storm drainage problems have been identified; (2) implementation of the runoff control criteria specified in the Plan will prevent the existing drainage problems from becoming worse (and prevent the creation of new drainage problem areas); and (3) the hydrologic model developed to formulate the runoff control criteria could be used as an analytical tool for identifying engineering solutions to existing drainage problems.

With the above in mind, municipalities within the Beaverdam Branch watershed should include the following steps in their efforts to implement solutions to existing storm drainage problem areas:

1. Prioritize storm drainage problems within the municipality based up frequency of occurrence, potential for injury to persons or property, damage history, public perception of the problems and other appropriate criteria.

2. For the top priority drainage problems in the municipality, conduct detailed engineering evaluations to determine the exact nature of the problems, determine alternative solutions, provide cost estimates for the alternative solutions, and recommend a course of municipal action. The number of drainage problems to be evaluated by a municipality as a first cut from the priority list should be based on a schedule commensurate with completing engineering studies on all problem areas. The engineering studies should include consideration of the downstream effects of eliminating specific drainage problems so as to avoid transfer of problems progressively downstream.
3. On the priority and cost basis, incorporate implementation of recommended solutions to the drainage problems in the annual municipal capital or maintenance budgets as funds are available.

The above stated procedure for dealing with existing storm drainage problems is not a mandatory action placed on municipalities with the adoption of the watershed plan. Rather, it represents a systematic method to approach the problems uniformly throughout the watershed and attempt to improve the current runoff situation in the basin. The key elements involved in the success of the remedial strategy will be the dedication of the municipalities to construct the corrective measures and the consistent and proper application of the runoff control criteria specified in the Plan. The latter element is essential to ensure that remedial measures do not become obsolete (under-designed) by increases in peak flows with development.

PROVISIONS FOR REVIEWING, REVISING AND UPDATING THE PLAN

Under the requirements of Act 167, this Plan should be updated at intervals not exceeding five (5) years. More frequent updating of this plan may be warranted if significant changes in the watershed occur sooner. Factors which would warrant an update prior to the statutory date may include the following:

1. Changes to major stream segments or primary stormwater conveyance elements occur which serve to affect watershed hydraulics such that the potential for damage is materially.
2. Peculiarities in the application of specific standards and criteria are experienced which interfere with the effective and equitable administration of the Plan requirements.

All of the involved agencies (county, municipalities, and DEP) should monitor conditions in the watershed. In the event that any of the above listed conditions (or others) arise, the county should proceed with updating this Plan as warranted.

**MODEL STORMWATER MANAGEMENT PROVISIONS FOR
MUNICIPAL SUBDIVISION/LAND DEVELOPMENT ORDINANCE**

Article _____, Stormwater Management

Section 101 - General Provisions

A. Purpose

These regulations have the following general purposes and objectives:

1. To assure safe management of stormwater runoff resulting from land alteration and disturbance activities in accordance with watershed stormwater management plans adopted pursuant to the Pennsylvania Storm Water Management Act (Act 167 of 1978, as amended).
2. To utilize and preserve the existing natural drainage systems and to preserve the flood-carrying capacity of streams.
3. To encourage natural infiltration of rainfall to preserve groundwater supplies and stream flows.
4. To provide for adequate maintenance of all permanent stormwater management structures in the municipality.

B. Statutory Authority

The municipality is empowered to regulate land use activities that affect runoff by the authority of the Act of October 4, 1978, P.L. 864 (Act 167), The "Storm Water Management Act" as amended by Act 63 and the Pennsylvania Municipalities Planning Code, Act 247 of 1968, as amended.

C. Applicability

The following activities involving alteration or development of land are deemed to have possible effects upon storm water runoff characteristics and are included within the scope of this ordinance:

1. Subdivision
2. Land Development
3. Construction of new or additional impervious or surfaces with reduced permeability (driveways, parking lots, etc.)

4. Diversion or piping of any natural or man-made stream channel
5. Installation, replacement or substantial repair of storm water systems or appurtenances

D. Repealer

This ordinance shall repeal all other ordinances, or parts thereof, which are contrary to or conflict with the provisions of this ordinance to the extent necessary to give this ordinance full force and effect.

E. Severability

Should any section or provision of this ordinance be declared invalid by a court of competent jurisdiction, such decision shall not affect the validity of this ordinance as a whole or any other part hereof; the parts or sections remaining shall remain in effect as if the part of the section declared unconstitutional had never been a part of this ordinance.

F. Liability Disclaimer

1. Neither the granting nor the denial of any approval nor the compliance with the provisions of this ordinance or with any condition imposed by the municipality, its officials, employees, or designated representatives thereunder, shall relieve any person from any responsibility for damage to persons or property resulting therefrom, or as otherwise imposed by law, nor impose any liability upon the municipal officials, employees or its designated representatives to the maximum extent permitted by law.
2. Neither the granting nor the denial of any permit which includes any stormwater management requirements shall not constitute a representation, guarantee or warranty of any kind by the municipality, the municipal officials, employees, or designated representatives thereof of the practicability or safety of any stormwater structure or facility, use or other plan proposed, and shall create no liability or cause of action upon any municipal official, employee, or designated representative thereof for any damage that may result pursuant thereto to the maximum extent permitted by law.

Section 102 - Stormwater Management Performance Standards

A. General Standards

1. All proposed stormwater control measures shall be evaluated according to the following performance standard:
 - a. Any landowner and any person engaged in the alteration or development of land which may affect stormwater runoff

characteristics shall implement such measures as are reasonably necessary to prevent injury to health, safety or other property. Such measures shall include such actions as are required:

- (1) To assure that the maximum rate of stormwater runoff is no greater after development than prior to development activities; or
 - (2) To manage the quantity, velocity and direction of resulting stormwater runoff in a manner which otherwise adequately protects health and property from possible injury.
2. The stormwater management plan for the development site shall consider all the stormwater runoff flowing over the site.
 3. No discharge of toxic materials shall be permitted into any stormwater management system. Where required by federal and state regulation, the landowner or developer shall be responsible for obtaining and NPDES permit for stormwater discharges.
 4. All land disturbance activities shall be conducted in such a way as to minimize accelerated erosion and sedimentation. Measures to control erosion shall at a minimum meet the standards of the County Conservation District and the rules and regulation of the Pennsylvania Department of Environmental Protection.

B. Stormwater Runoff Quantity Control Standards

1. Runoff Rates: There shall be no increase in the peak rate of stormwater runoff discharge from any activity covered by this Ordinance following the completion of the activity (post-development conditions) over the rate that would have occurred from the land prior to the activity (pre-development conditions). This criteria shall apply to the total activity even if the activity is to take place in stages.
 - a. Off site areas which drain through a proposed development site are not subject to the control standard when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the development site.
 - b. Where the site area to be impacted through a proposed development activity differs significantly from the total site area, only the proposed impact area shall be subject to the runoff criteria.
2. Storm Frequencies. Stormwater management facilities on all development sites shall control the peak stormwater discharge for the 2-, 10-, 25- and

100-year storm frequencies. The USDA NRCS 24-hour, Type II Rainfall Distribution shall be used for analyzing stormwater runoff for both pre- and post-development conditions. The 24-hour total rainfall for these storm frequencies in the watershed are:

<u>Storm Frequency</u>	<u>Rainfall Depth (inches)</u>
2-year	2.6
10-year	3.8
25-year	4.6
100-year	6.1

5. Calculation Methods

- a. Development Sites: For the purpose of computing peak flow rates and runoff hydrographs from development sites, calculations shall be performed using one of the following: USDA NRCS publications, Technical Release (TR) 55 or 20, HEC I or Penn State Runoff Model (PSRM) or Modified Rational Method. Under special circumstances other computation methods may be used subject to the approval of the municipality.
- b. Stormwater Collection/Conveyance Facilities: For the purposes of designing storm sewers, open swales and other stormwater runoff collection and conveyance facilities, the Rational Method or other method as approved by the municipality may be applied. Rainfall intensities for design should be obtained from the Pennsylvania Department of Transportation rainfall charts.
- c. Routing of hydrographs through detention / retention facilities for the purpose of designing those facilities shall be accomplished using the Modified-Puls Method or other recognized reservoir routing method subject to the approval of the municipality.
- d. Predevelopment Conditions: Predevelopment conditions shall be assumed to be those which exist on any site prior to commencing any development activities. SCS runoff curve numbers selected for use in the calculations shall accurately reflect existing conditions subject to the approval of the municipality. At its discretion, the municipality may direct that hydrologic conditions for all areas with pervious cover (i.e., fields, woods, lawn areas, pastures, cropland, etc.) shall be assumed to be in "good" condition, and the lowest recommended SCS runoff curve number (CN) shall be applied for all pervious land uses within the respective range for each land use and hydrologic soil group. Impervious cover shall include, but not be limited to, any roof, parking, or driveway areas, and any new streets and sidewalks. Any areas designed to initially be gravel or crushed stone shall be assumed to be impervious for the purposes of these criteria. The Municipality has

the authority to require that computed existing runoff rates be reconciled with field observations and conditions. If the designer can substantiate through actual physical calibration that more appropriate runoff values should be used at a particular site, then appropriate variations may be made upon review and recommendations of the municipal engineer. Calibration shall require detailed gauge and rainfall data for the particular site in question.

C. Stormwater Quality Management Requirements

1. Applicability

In addition to the performance standards and design criteria requirements of Article III of this Ordinance, the land developer shall implement the following water quality requirements of this Article unless otherwise exempted by the provisions of this ordinance.

2. Water Quality Requirements

- a. No discharge materials, toxic or otherwise, shall be permitted into any stormwater management system except as may be permitted by applicable laws of the Commonwealth of Pennsylvania or United States. Where required by federal and state regulation, the landowner or developer shall be responsible for obtaining an NPDES permit for stormwater discharges.

(Note: The following water quality management requirements are recommended for incorporation into the overall stormwater management requirements. However, they are presented as a suggestion - not as a required element of this plan.)

- b. In addition to the quantity requirements of this ordinance, the land developer shall:
- (1) Design stormwater detention / retention basins so that the outlet of the basin shall, in addition to any other stormwater requirements imposed by the municipal stormwater regulations, discharge the 1 year, 24 hour storm over a 24 hour period.
 - (2) As an alternative to subsection 102.C.2.b.(1), above, the water quality objectives may be achieved through a combination of best management practices (BMPs) including, but not limited to, infiltration structures, detention / retention basins, vegetation filter strips and buffers. The combination of BMPs shall be designed according to the

requirements listed under Section 102.C3. and in consultation with the municipal engineer.

- (3) In lieu of (1) and (2) above, the land developer may submit original and innovative designs to the municipal engineer for review and approval.

3. BMP Selection Criteria

- a. In selecting the appropriate BMP's or combinations thereof, the land developer shall consider the following:

- (1) Total contributing area
- (2) Permeability and infiltration rate of the site soils
- (3) Slope and depth to bedrock
- (4) Seasonal high water table
- (5) Proximity to building foundations and well heads
- (6) Erodibility of soils
- (7) Land availability and configuration of the topography

- b. The following additional factors should be considered when evaluating the suitability of the BMPs used to control water quality at a given development site.

- (1) Peak discharge and required volume control
- (2) Streambank erosion
- (3) Efficiency of the BMPs to mitigate potential water quality problems
- (4) The volume of runoff that will be effectively treated
- (5) The nature of the pollutant(s) being removed
- (6) Maintenance requirements
- (7) Recreation value
- (8) Enhancement of aesthetics and property values

Section 103 - Design criteria for stormwater management controls

A. General criteria

1. Applicants may select runoff control techniques, or a combination of techniques, which are most suitable to control stormwater runoff from the development site. All controls shall be subject to approval of the municipal engineer. The municipal engineer may request specific information on design and/or operating features of the proposed stormwater controls in order to determine their suitability and adequacy in terms of the standards of this ordinance.
2. The applicant should consider the effect of the proposed stormwater management techniques on any special soil conditions or geological

hazards which may exist on the development site. In the event such conditions are identified on the site, the municipal engineer may require in-depth studies by a competent geotechnical engineer. Not all stormwater control methods may be advisable or allowable at a particular development site.

3. In developing a stormwater management plan for a particular site, stormwater controls shall be selected according to the following order of preference:
 - a. infiltration of runoff on-site
 - b. flow attenuation by use of open vegetated swales and natural depressions
 - c. stormwater detention/retention structures
4. Infiltration practices shall be used to the extent practicable to reduce volume increases and promote groundwater recharge. A combination of successive practices may be used to achieve the applicable minimum control requirements. Justification shall be provided by the applicant for rejecting each of the preferred practices based on actual site conditions.

B. Criteria for infiltration systems

1. Infiltration systems shall be sized and designed based upon local soil and ground water conditions.
2. Infiltration systems greater than three (3) feet deep shall be located at least ten (10) feet from basement walls.
3. Infiltration systems shall not be used to handle runoff from commercial or industrial working or parking areas. This prohibition does not extend to roof areas which are demonstrated to be suitably protected from the effects of the commercial/industrial activities.
4. Infiltration systems may not receive runoff until the entire drainage area to the system has received final stabilization.
5. The stormwater infiltration facility design shall provide an overflow system with measures to provide a non-erosive velocity of flow along its length and at the outfall.

C. Criteria for flow attenuation facilities

1. If flow attenuation facilities are employed to assist in the control of peak rates of discharge, their effects must be quantified using the SCS Technical Release (TR) 55 Urban Hydrology for Small Watersheds or other approved

method. The effects of the flow attenuation facilities on travel time should be reflected in the calculations.

2. Flow attenuation facilities such as swales and natural depressions should be properly graded to ensure positive drainage and avoid prolonged ponding of water.
3. Swales shall be properly vegetatively stabilized or otherwise lined to prevent erosion.
4. Swales shall be designed according to the recommendations contained in the Commonwealth of Pennsylvania Erosion and Sediment Pollution Control Program Manual.

D. Criteria for stormwater detention facilities

1. All detention facilities shall be equipped with outlet structures to provide discharge control for the four (4) designated storm frequencies. Provisions shall also be made to safely pass the post-development 100-year storm runoff without damaging (i.e., impairing the continued function of the facilities). Should any stormwater management facilities qualify as a dam under PA DEP Chapter 105, the facility shall be designed in accordance with those regulations and meet the regulations concerning dam safety.
2. Shared-storage facilities which provide detention of runoff for more than one development site within a single subarea are encouraged wherever feasible and provided such facilities meet the criteria contained in this section. In addition, runoff from the development sites involved shall be conveyed to the facility in a manner that avoids adverse impacts (such as flooding or erosion) to channels and properties located between the development site and the shared-storage facilities.
3. Where detention facilities will be utilized, multiple use facilities, such as wetlands, lakes, ballfields or similar recreational/open space uses are encouraged wherever feasible, subject to the approval of the municipality and Pennsylvania Department of Environmental Resources' Chapter 105 regulations.
4. Other considerations which should be incorporated into the design of the detention facilities include:
 - a. Inflow and outflow structures shall be designed and installed to prevent erosion and bottoms of impoundment type structures should be protected from soil erosion.
 - b. Control and removal of debris both in the storage structure and in all inlet or outlet devices shall be a design consideration.

- c. Inflow and outflow structures, pumping stations, and other structures shall be designed and protected to minimize safety hazards.
- d. The water depth at the perimeter of a storage pond should be limited to that which is safe for children. Restriction of access (fence, walls, etc.) may be necessary depending on the location of the facility and the maximum depths of water.
- e. Side slope of storage ponds shall not exceed a ration of two-and-one-half to one (2.5:1) horizontal to vertical dimension.
- f. Landscaping shall be provided for the facility which harmonizes with the surrounding area.
- g. Facility shall be located to facilitate maintenance, considering the frequency and type of equipment that will be required.
- h. Bottoms of detention basins should be graded with sufficient slope to provide positive surface drainage. A subdrainage system may be required depending on the location of the pond bottom relative to groundwater levels.
- i. Fencing shall be provided if required by the municipality.

E. Criteria for collection/conveyance facilities

(Note: The municipality should review the specific requirements of this section for consistency with its existing requirements and local preferences. Specific design and construction details suggested here may be modified upon recommendation of the municipal engineer in order to reflect the municipality's current standard practices, local conditions and preferences.)

- 1. All stormwater runoff collection or conveyance facilities, whether storm sewers or other open or closed channels, shall be designed in accordance with the following basic standards:
 - a. All sites shall be graded to provide drainage away from and around the structure in order to prevent any potential flooding damage.
 - b. Lots located on the high side of streets shall extend roof and french drains to the curb line storm sewer (if applicable). Low side lots shall extend roof and french drains to a stormwater collection/conveyance/control system or natural watercourse in accordance with the approved stormwater management plan for the development site.

- c. Collection/conveyance facilities should not be installed parallel and close to the top or bottom of a major embankment to avoid the possibility of failing or causing the embankment to fail.
- d. All collection/conveyance facilities shall be designed to convey the 25-year storm peak flow rate from the contributing drainage area and to carry it to the nearest suitable outlet such as a stormwater control facility, curbed street, storm sewer or natural watercourse without damage to the drainage structure or roadway, with runoff from the 25-year design storm at a minimum 1.0 foot of freeboard measured below the lowest point along the top of the roadway. Roadway crossings located within designated floodplain areas must be able to convey runoff from a 100-year design storm with a minimum of 1.0 foot freeboard measured below the lowest point along the top of the roadway.

When it can be shown that, due to topographic conditions, natural drainage ways on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainage ways. Work within natural drainage ways shall be subject to approval by PAADEP through the Joint Permit Application process, or, where appropriate by PADEP, through the General Permit process.

- e. Where drainage swales or open channels are used, they shall be suitably lined to prevent erosion and designed to avoid excessive velocities.
- f. Stormwater drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by stormwater management facilities or open channels consistent with this Ordinance.
- g. Existing points of concentrated drainage that discharge onto adjacent property shall not be altered without permission of the altered property owner(s) and shall be subject to any applicable discharge criteria specified in this Ordinance.
- h. Areas of existing diffused drainage discharge shall be subject to any applicable discharge criteria in the general direction of existing discharge, whether proposed to be concentrated or maintained as diffused drainage areas, except as otherwise provided by this ordinance. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the developer must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge, or otherwise prove that no erosion,

sedimentation, flooding, or other harm will result from the concentrated discharge.

- i. Where a development site is traversed by watercourses, drainage easements shall be provided conforming to the line of such watercourses. The terms of the easements shall prohibit excavation, the placing of fill or structures, and any alterations that may adversely affect the flow of stormwater within any portion of the easement. Also maintenance, including mowing of vegetation within the easement shall be required, except as approved by the appropriate governing authority.
 - j. Any stormwater management facilities regulated by this Ordinance that would be located in or adjacent to waters of the Commonwealth of Pennsylvania or wetlands shall be subject to approval by PADEP through the Joint Permit Application process, or, where deemed appropriate by PADEP, the General Permit process. When there is a question whether wetlands may be involved, it is the responsibility of the Developer or his agent to show that the land in question cannot be classified as wetlands, otherwise approval to work in the area must be obtained by PADEP.
 - k. Any stormwater management facilities regulated by this Ordinance that would be located on State highway rights-of-way shall be subject to approval by the Pennsylvania.
 - l. In order to promote overland flow and infiltration/percolation of runoff where it is advantageous to do so, roof drains must not be connected to streets, sanitary or storm sewers, or roadside ditches. When it is more advantageous to connect directly to streets or storm sewers, then it shall be permitted on a case by case basis by the municipality.
2. Wherever storm sewers are proposed to be utilized, they shall comply with the following criteria:
- a. Where practical, designed to traverse under seeded and planted areas. If constructed within ten (10) feet of road paving, walks or other surfaced areas, drains shall have a narrow trench and maximum compaction of backfill to prevent settlement of the superimposed surface or development.
 - b. Preferably installed after excavating and filling in the area to be traversed is completed, unless the drain is installed in the original ground with a minimum of three (3) feet cover and/or adequate protection during the fill construction.

- c. Designed: (1) with cradle when traversing fill areas of indeterminate stability, (2) with anchors when gradient exceeds twenty (20) percent, and (3) with encasement or special backfill requirements when traversing under a paved area.
- d. Designed to adequately handle the anticipated stormwater flow and be economical to construct and maintain. The minimum pipe size shall be fifteen (15) inches in diameter.
- e. Drain pipe, trenching, bedding and backfilling requirements shall conform to the requirements of the municipality and/or applicable PennDOT Specifications, Form 408.
- f. All corrugated metal pipe shall be polymer coated, and with asbestos bonding and paved inverts where prone to erode. Pipe within a municipal right-of-way shall be reinforced concrete pipe with a minimum diameter of 15 inches.
- g. Storm inlets and structures shall be designed to be adequate, safe, self-cleaning and unobtrusive and consistent with municipal standards.
- h. Appropriate grates shall be designed for all catch basins, stormwater inlets and other entrance appurtenances.
- i. Manholes shall be designed so that the top shall be at finished grade and sloped to conform to the slope of the finished grade. Top castings of structures located in roads or parking areas shall be machined or installed to preclude "rattling."
- j. Where proposed sewer connects with an existing storm sewer system, the applicant shall demonstrate that sufficient capacity exists in the downstream system to handle the additional flow.
- k. Storm sewer outfalls shall be equipped with energy dissipation devices to prevent erosion and conform with applicable requirements of the Pennsylvania DEP for stream encroachments (Chapter 105 of Pennsylvania DEP Rules and Regulations).

Section 104 - Erosion and sedimentation controls

- A. An erosion/sedimentation plan shall be prepared for each development site in accordance with the Pennsylvania Erosion/Sedimentation Regulations (25 PA Code, Chapter 102) and the standards and guidelines of the County Conservation District.

(Note: If the municipality has a grading or other ordinance which contains its erosion/sedimentation provisions, then it should be referenced here.)

Section 105 - Maintenance of stormwater management controls

A. Maintenance responsibilities

1. The maintenance plan for stormwater management facilities located on the development site shall establish responsibilities for the continuing operation and maintenance of all proposed stormwater control facilities, consistent with the following principles:
 - a. If a development consists of structures or lots which are to be separately owned and in which streets, sewers and other public improvements are to be dedicated to the municipality, stormwater control facilities should also be dedicated to and maintained by the municipality.
 - b. If a development site is to be maintained in single ownership or if sewers and other public improvements are to be privately owned and maintained, then the ownership and maintenance of stormwater control facilities should be the responsibility of the owner or private management entity.
2. The governing body, upon recommendation of the municipal engineer, shall make the final determination on the continuing maintenance responsibilities prior to final approval of the stormwater management plan. The governing body reserves the right to accept the ownership and operating responsibility for any or all of the stormwater management controls and to determine the terms and conditions under which it will accept ownership and operating responsibility.

B. Maintenance agreement for privately owned stormwater facilities

1. Prior to final approval of the site's stormwater management plan the applicant and municipality shall execute a maintenance agreement covering all stormwater control facilities which are to be privately owned. The maintenance agreement shall be recorded with the final subdivision/land development plan for the site. The agreement shall stipulate that:
 - a. All facilities shall be maintained in accordance with the approved maintenance schedule and in a safe and attractive manner.
 - b. Easements and or rights-of-way shall be conveyed to the municipality to assure access for periodic inspections by the municipality and maintenance if required.
 - c. The name, address and telephone number of the person or company responsible for maintenance activities shall be filed with the

municipality. In the event of a change, new information will be submitted to the municipality within ten (10) days of the change.

- d. If the facility owner fails to maintain the stormwater control facilities, the municipality may perform the necessary maintenance work or corrective work following due notice by the municipality to the facility owner to correct the problem(s). The facility owner shall reimburse the municipality for all costs.
2. Other items may be included in the agreement where determined necessary to guarantee the satisfactory maintenance of all facilities.

C. Municipal stormwater maintenance fund

(Note: This provision illustrates one way a municipality could establish a special fund to finance its maintenance and inspection activities for stormwater retention/detention facilities. It is an optional provision of the ordinance. If a municipality is interested in establishing such a fund, it is recommended that it consult with its solicitor for legal requirements and procedures.)

1. Persons installing stormwater storage facilities shall be required to pay a specified amount to the Municipal Stormwater Maintenance Fund to help defray costs of periodic inspections and maintenance expenses. The amount of the deposit shall be determined as follows:
 - a. If the storage facility is to be privately owned and maintained, the deposit shall cover the cost of periodic inspections performed by the municipality for a period of ten (10) years, as estimated by the municipal engineer. After that period of time, inspections will be performed at the expense of the municipality.
 - b. If the storage facility is to be owned and maintained by the municipality, the deposit shall cover the estimated costs for maintenance and inspections for ten (10) years. The municipal engineer will establish the estimated costs utilizing information submitted by the applicant.
 - c. The amount of the deposit to the fund shall be converted to present worth of the annual series values. The municipal engineer shall determine the present worth equivalents which shall be subject to the approval of the governing body.
2. If a storage facility is proposed that also serves as a recreation facility (e.g., ballfield, lake), the municipality may reduce or waive the amount of the maintenance fund deposit based upon the value of the land for public recreation purposes.

3. If in the future a storage facility (whether publicly or privately owned) is eliminated due to the installation of storm sewers or other storage facility, the unused portion of the maintenance fund deposit will be applied to the cost of abandoning the facility and connecting to the storm sewer system or other facility. Any amount of the deposit remaining after the costs of abandonment are paid will be returned to the depositor.

Section 106 - Stormwater plan requirements

A. General requirements

1. No final subdivision/land development plan be approved, no permit authorizing construction issued, or any clearing and grubbing, or earth moving or land disturbance activity initiated until the final stormwater management plan for the development site is approved in accordance with the provisions of this ordinance.

B. Exemptions

1. The following activities are exempt from the stormwater management plan preparation provisions of this Ordinance. Exemption shall not relieve the applicant from providing adequate stormwater management to meet the purpose of this Ordinance.
 - a. Any regulated activity that would create 5,000 square feet or less of impervious area. This criteria shall apply to the total development even if development is to take place in phases.
 - b. Land disturbance associated with existing one and two family dwellings.
 - c. Use of land for gardening for home consumption.
 - e. Agriculture when operated in accordance with a conservation plan or erosion and sedimentation control plan approved by the Conservation District. The agricultural activities such as growing crops, rotating crops, filling of soil and grazing animals and other such activities are specifically exempt from complying with the requirements of this Ordinance when such activities are conducted in accordance with a conservation plan prepared by the Blair County Conservation District. The construction of buildings, parking lots or any activity that may result in impervious surface which increases the rate and volume of stormwater runoff shall comply with the requirements of this Ordinance.
 - f. Forest management operations which are following the Department of Environmental Protection's management practices contained in its publication "Soil Erosion and Sedimentation Control Guidelines for

Forestry" and are operating under an erosion and sedimentation control plan.

C. Stormwater plan contents

1. General Format: The stormwater plan shall be drawn on sheets no larger than 16" X 22" with a graphic scale of not less than 1 inch = 200 feet. All sheets shall contain a title block with: Name and address of applicant and engineer, scale, north arrow, legend and date of preparation.
2. Existing and Proposed Features: The plan shall show the following under both pre-development and post-development conditions:
 - a. Watershed location - Provide a key map showing the location of the development site within the watershed(s) and watershed subarea(s). On all site drawings, show the boundaries of the watershed(s) and subarea(s) as they are located on the development site and identify watershed names(s) and subarea number(s).
 - b. Floodplain boundaries - Identify 100-year floodplains on the development site (as appropriate) based on the municipal Flood Insurance Study maps.
 - c. Natural features - Show all bodies of water (natural or artificial), watercourses (permanent and intermittent), swales, wetlands and other natural drainage courses on the development site, or which will be affected by runoff from the development.
 - d. Soils - Provide an overlay showing soil types and boundaries within the development site (consult county, SCS and U.S. Geological Survey for information).
 - e. Contours - Show existing and final contours at intervals of two (2) feet; in areas with slopes greater than fifteen (15) percent, five (5) foot contour intervals may be used.
 - f. Land cover - Show existing and final land cover classifications as necessary to support and illustrate the runoff calculations performed.
 - g. Drainage area delineations - Show the boundaries of the drainage areas employed in the runoff calculations performed.
 - h. Stormwater management controls - Show any existing stormwater management or drainage controls and/or structures, such as sanitary and storm sewers, swales, culverts, etc. which are located on the development site, or which are located off-site but will be affected by runoff from the development.

3. Professional certification: The stormwater management plan (including all calculations) shall be prepared and sealed by a registered professional engineer, surveyor or landscape architect with training and expertise in hydrology and hydraulics. Documentation of qualifications may be required by the municipality.
4. Runoff calculations: Calculations for determining pre- and post-development discharge rates and for designing proposed stormwater control facilities must be submitted with the stormwater management plan. All calculations shall be prepared using the methods and data prescribed by Section 102 of this Article.
5. Stormwater controls: All proposed stormwater runoff control measures must be shown on the plan including methods for collecting, conveying and storing stormwater runoff on-site, which are to be used both during and after construction. Erosion and sedimentation controls shall be shown in accordance with Section 104 of this Article. The plan shall provide information on the exact type, location, sizing, design and construction of all proposed facilities and relationship to the existing watershed drainage system. The plan shall include technical specifications for materials and methods to be used in the construction of the stormwater management facilities.
 - a. If the development is to be constructed in stages, the applicant must demonstrate that stormwater facilities will be installed to manage stormwater runoff safely during each stage of development.
 - b. A schedule for the installation of all temporary and permanent stormwater control measures and devices shall be submitted.
 - c. If appropriate, a justification should be submitted as to why any preferred stormwater management techniques, as listed in Section 102 and 103, are not proposed for use.
6. Easements, rights-of-way, deed restrictions: All existing and proposed easements and rights-of-way for drainage and/or access to stormwater control facilities shall be shown along with any areas subject to special deed restrictions relative to or affecting stormwater management on the development site.
7. Other permits/approvals: A list of any approvals/permits relative to stormwater management that will be required from other governmental agencies (Pennsylvania DEP Chapter 105 and 106 permits and/or NPDES permit) and anticipated dates of submission/receipt should be included with the stormwater plan submission. Copies of permit applications may be requested by the municipality where they may be helpful for the plan review.

8. Maintenance program: The proposed maintenance plan for all stormwater control facilities shall:
 - a. Identify the proposed ownership entity (e.g., municipality, property owner, private corporation, homeowner's association, or other entity).
 - b. Identify the type of maintenance, probable frequencies, personnel and equipment requirements and estimated annual maintenance costs.
 - c. Identify method of financing continuing operation and maintenance if the facility is to be owned by other than a governmental agency.
 - d. Include copies of any legal agreements required to implement the maintenance program and, if applicable, copies of the maintenance agreement as required by Section 105 of this Article.
9. Financial guarantees: Submit financial guarantees in accordance with the provisions of Section 111 of this Article.

Section 107 - Plan review procedures

A. Pre-application phase

1. Before submitting the stormwater plan, applicants are urged to consult with the municipality on the applicable regulations and techniques for safely managing runoff from the development site. The municipality may also be helpful in providing necessary data for the stormwater management plan.
2. Applicants are encouraged to submit a sketch plan with a narrative description of the proposed stormwater management controls for general guidance and discussion with the municipality and other agencies.
3. The pre-application phase is not mandatory; any review comments provided by the municipality are advisory only and do not constitute any legally binding action on the part of the municipality.

B. Stormwater plan reviews

1. Submission of plans: Stormwater plan applications shall be submitted with the preliminary and final subdivision/land development applications.
2. Notification of affected municipalities: The applicant shall notify municipalities adjacent to the development site, which may be affected by the stormwater runoff and proposed controls for the site. Copies of the

plans will be made available to the municipalities upon request. Comments received from any affected municipality will be considered by the municipal engineer and county agencies in their reviews.

3. Municipal engineer's review: The municipal engineer shall recommend approval or disapproval of the stormwater management plan based on the requirements of the municipal ordinances, the standards and criteria of the watershed plan and good engineering practice. The engineer shall submit a written report, along with supporting documentation, stating their reasons for approval or disapproval.

(Note: 1) If the municipal Planning Commission has the final authority for approving plans, then this section should be changed as appropriate.)

5. Permits required from other governmental agencies: Where the proposed development requires an obstruction permit from the Pennsylvania DEP or an erosion/sedimentation permit from the County Conservation District, final stormwater management plan approval shall be granted subject to the receipt of such permits. No building permit shall be issued, nor construction started, until the permits are received and copies filed with the municipality.

Section 108 - Status of the stormwater plan after final approval

- A. Upon final stormwater plan approval and receipt of all necessary permits, the applicant may commence to install or implement the approved stormwater management controls.
- B. If site development or building construction does not begin within two years of the date of final approval of the stormwater management plan, then before doing so, the applicant shall resubmit the stormwater management plan to verify that no condition has changed within the watershed that would affect the feasibility or effectiveness of the previously approved stormwater management controls. Further, if for any reason development activities are suspended for two years or more, then the same requirement for resubmission of the stormwater management plan shall apply.

Section 109 - Stormwater plan modifications

- A. If the request for a plan modification is initiated before construction begins, the stormwater plan must be resubmitted and reviewed according to the procedures contained in Section 107 above.
- B. If the request for a plan modification is initiated after construction is underway, the municipal engineer shall recommend approval or disapproval of the modification based on field inspection provided: (1) the requested changes in stormwater controls do not result in any modifications to other approved municipal land

use/development requirements (e.g., building setbacks, yards, etc.) and (2) the performance standards in Section 102 are met. Notification of the engineer's action shall be sent to the governing body which may issue a stay of the plan modification within five (5) days and require the permittee to resubmit the plan modification for full stormwater plan review in accordance with Section 107 above.

Section 110 - Inspections of stormwater management controls

(Note: This section outlines an ideal schedule for inspecting stormwater controls during construction. However, the recommendations may have to be tailored to each municipality's needs and resources.)

- A. The municipal engineer or a designated representative shall inspect the construction of the temporary and permanent stormwater management system for the development site. The permittee shall notify the engineer 48 hours in advance of the completion of the following key development phases:
 - 1. At the completion of preliminary site preparation including stripping of vegetation, stockpiling of topsoil and construction of temporary stormwater management and erosion control facilities.
 - 2. At the completion of rough grading but prior to placing topsoil, permanent drainage or other site development improvements and ground covers.
 - 3. During construction of the permanent stormwater facilities at such times as specified by the municipal engineer.
 - 4. Completion of permanent stormwater management facilities including established ground covers and plantings.
 - 5. Completion of final grading, vegetative control measures or other site restoration work done in accordance with the approved plan and permit.
- B. No work shall commence on any subsequent phase until the preceding one has been inspected and approved. If there are deficiencies in any phase, the municipal engineer shall issue a written description of the required corrections and stipulate the time by which they must be made.
- C. If during construction, the contractor or permittee identifies any site condition, such as subsurface soil conditions, alterations in surface or subsurface drainage which could affect the feasibility of the approved stormwater facilities, he/she shall notify the municipal engineer within 24 hours of the discovery of such condition and request a field inspection. The municipal engineer shall determine if the condition requires a stormwater plan modification.
- D. In cases where stormwater facilities are to be installed in areas of landslide-prone soils or other special site conditions exist, the municipality may require special

precautions such as soil tests and core borings, full-time inspectors and/or similar measures. All costs of any such measures shall be borne by the permittee.

Section 111 - Financial guarantees and dedication of public improvements

(Note: If these provisions are already included in another article of the subdivision/land development ordinance, they can simply be referenced here.)

- A. Guarantee of completion: A completion guarantee in the form of a bond, cash deposit, certified check or other negotiable securities acceptable to the municipality, shall be filed. The guarantee shall cover all streets, sanitary sewers, stormwater management facilities, water systems, fire hydrants, sidewalks and other required improvements; it shall be in the amount and form prescribed by the Municipal Planning Code (Section 509).
- B. Release of completion guarantee: The procedures for requesting and obtaining a release of the completion guarantee shall be in a manner prescribed by the Municipalities Planning Code (Section 510).
- C. Default of completion guarantee: If improvements are not installed in accordance with the approved final plan, the governing body may enforce any corporate bond or other security by appropriate legal and equitable remedies. If proceeds of such bond or other security are insufficient to pay the cost of installing or making repairs or corrections to all the improvements covered by said security, the governing body may at its option install part of such improvements in all or part of the development and may institute appropriate legal or equitable action to recover the moneys necessary to complete the remainder of the improvements. All proceeds, whether resulting from the security or from the security or from any legal or equitable action brought against the developer, or both, shall be used solely for the installation of the improvements covered by such security and not for any other municipal purpose.
- D. Dedication of public improvements:
 - 1. When streets, sanitary sewers, stormwater management facilities, water lines or other required improvements in the development have been completed in accordance with the final approved plan, such improvements shall be deemed private until such time as they have been offered for dedication to the municipality and accepted by separate ordinance or resolution or until they have been condemned for use as a public facility.
 - 2. Prior to acceptance of any improvements or facilities, the municipal engineer shall inspect it to ensure that it is constructed in accordance with the approved plan and is functioning properly. In the case of any stormwater control facility, it must be free of sediment and debris.
 - 3. The owner shall submit as-built plans for all facilities proposed for dedication.

- E. Maintenance guarantee: Prior to acceptance of any improvements or facilities, the applicant shall provide a financial security to secure the structural integrity and functioning of the improvements. The security shall: (1) be in the form of a bond, cash, certified check or other negotiable securities acceptable to the municipality, (2) be for a term of 18 months, and (3) be in an amount equal to 15 percent of the actual cost of the improvements and facilities so dedicated.

Section 112 - Fee Schedule

The municipal governing body may adopt by resolution from time to time a reasonable schedule of fees to cover the cost of plan reviews, inspections and other activities necessary to administer the provisions of this ordinance. All fees shall be set in accordance with the applicable provisions of the Municipalities Planning Code and any dispute over the fee amount shall be resolved in the manner prescribed by the Planning Code.

Section 113 - Enforcement procedures and remedies

(Note: This section is drafted to be consistent with the Planning Code for enforcing a municipal subdivision and land development ordinance. If the municipality adopts a separate, single-purpose stormwater management ordinance, then this section should be modified as appropriate to meet the provisions of the municipal codes.)

- A. Right of entry: Upon presentation of proper credentials, duly authorized representatives of the municipality may enter at reasonable times upon any property to investigate or ascertain the condition of the subject property in regard to an aspect regulated by this ordinance.
- B. Notification: In the event that the applicant, developer, owner or his/her agent fails to comply with the requirements of this ordinance or fails to conform to the requirements of any permit, a written notice of violation shall be issued. Such notification shall set forth the nature of the violations(s) and establish a time limit for correction of the violation(s). Upon failure to comply within the time specified, unless otherwise extended by the municipality, the applicant, developer, owner or his/her agent shall be subject to the enforcement remedies of this ordinance.
- C. Preventive remedies:
1. In addition to other remedies, the municipality may institute and maintain appropriate actions at law or in equity to restrain, correct or abate a violation, to prevent unlawful construction, to recover damages and to prevent illegal occupancy of a building or premises.
 2. In accordance with the Planning Code (Sec. 515.1), the municipality may refuse to issue any permit or grant approval to further improve or develop any property which has been developed in violation of this chapter.

D. Enforcement remedies

1. Any person, who has violated or permitted the violation of the provisions of this Ordinance shall, upon being found liable therefor in a civil enforcement proceeding commenced by the municipality, pay a fine of not less than \$_____ and not more than \$_____ plus court costs, including reasonable attorney fees and engineers and other expert witness fees incurred by the municipality. No judgment shall commence or be imposed, levied or be payable until the date of the determination of a violation by a court of competent jurisdiction.
2. If the defendant neither pays nor timely appeals the judgment, the municipality may enforce the judgment pursuant to applicable rules of civil procedure.
3. Each day that a violation continues shall constitute a separate violation unless the court of competent jurisdiction further determines that there was a good faith basis for the person violating the ordinance to have believed that there was no such violation. In such case there shall be deemed to have been only one such violation until the fifth day following the date of the initial determination of a violation; thereafter each day that a violation continues shall constitute a separate violation.
4. All judgments, costs and reasonable attorney fees collected for the violation of this Ordinance shall be paid over to the municipality.
5. A court of competent jurisdiction, upon petition, may grant an order of stay, upon cause shown, tolling the per diem fine pending a final adjudication of the violation and judgment.
6. Nothing contained in this section shall be construed or interpreted to grant to any person or entity other than the municipality the right to commence any action for enforcement pursuant to this section.

E. Additional remedies: In addition to the above remedies, the municipality may also seek remedies and penalties under applicable Pennsylvania statutes, or regulations adopted pursuant thereto, including but not limited to the Storm Water Management Act (32 P.S. Section 693.1-693.27) and the Erosion and Sedimentation Regulations (25 Pennsylvania Code, Chapter 102). Any activity conducted in violation of this ordinance or any Pennsylvania approved watershed stormwater management plan is declared a public nuisance by the municipality and abatable as such.

Section 114 - Definitions

Act: The Storm Water Management Act (Act of October 4, 1978, P.L. 864 No. 167; 32 P.S. Sections 680.1-680.17, as amended by Act of May 24, 1984, No. 63).

Applicant: A landowner or developer who has filed an application for development including his/her heirs, successors and assigns.

Channel: A perceptible natural or artificial waterway which periodically or continuously contains moving water or which forms a connecting link between two bodies of water. It has a definite bed and banks which confine the water.

Conservation District: The Blair County Conservation District.

County: Blair County, Pennsylvania

Culvert: A closed conduit for the free passage of surface drainage under a highway, railroad, canal or other embankment.

Design criteria: (1) Engineering guidelines specifying construction details and materials. (2) Objectives, results, or limits which must be met by a facility, structure, or process in performance of its intended functions.

Design storm: (see storm frequency)

Detention: The slowing, dampening or attenuating of runoff flows entering the natural drainage pattern or storm drainage system by temporarily holding water on a surface area in a detention basin or within the drainage system.

Detention pond or basin: An basin or reservoir, usually small, constructed to impound or retard surface runoff temporarily.

Developer: The person, persons, or any corporation, partnership, association, or other entity or any responsible person therein or agent therefor that undertakes the activities associated with changes in land use. The term "developer" is intended to include by not necessarily be limited to the term "subdivider", "owner", and "builder" even though the individuals involved in successive stages of a project may vary.

Development: Any activity, construction, alteration, change in land use or practice that affects stormwater runoff characteristics.

Discharge: The flow or rate of flow from a canal, conduit, channel or other hydraulic structure.

Drainage: (1) In general, the removal of surface water from a given area. Commonly applied to surface water and ground water.

Drainage Area: (1) The area of a drainage basin or watershed, expressed in acres, square miles, or other unit of area. Also called catchment area, watershed, river basin. (2) The area served by a sewer system receiving storm and surface water, or by a watercourse.

Encroachment: Any structure or activity which in any manner changes, expands or diminishes, the course, current or cross section of any watercourse, floodway or body of water.

Erosion: Wearing away of the lands by running water, glaciers, winds and waves.

Erosion control: The application of measures to reduce erosion of land surfaces.

Ground Cover: Materials covering the ground surface,

Ground Water: Subsurface water occupying the saturation zone, from which wells and springs are fed.

Ground Water Recharge: Replenishment of ground water naturally by precipitation or runoff or artificially by spreading or injection.

Impervious: Not allowing or allowing only with great difficulty the movement of water; impermeable.

Infiltration: (1) The flow or movement of water through the interstices or pores of a soil or other porous medium. (2) The absorption of liquid by the soil.

Land Development: Any of the following activities:

(1) the improvement of one lot or two or more contiguous lots, tracts or parcels or land for any purpose involving: (a) a group of two or more residential or non-residential buildings, whether proposed initially or cumulatively, or a single non-residential building on a lot or lots regardless of the number of occupants or tenure; or (b) the division or allocation of land or space, whether initially or cumulatively, 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;

(2) a subdivision of land.

Land Disturbance: Any activity involving the changing, grading, transportation, fill and any other activity which causes land to be exposed to the danger of erosion.

Maintenance: The upkeep necessary for efficient operation of physical properties.

Municipality: (name of municipality)

Municipal engineer: A professional engineer licensed in the Commonwealth of Pennsylvania, duly appointed by the (name of municipality).

Natural Stormwater Runoff Regime: A watershed where natural surface configurations, runoff characteristics and defined drainage conveyances have attained the conditions of equilibrium.

Outfall: (1) The point, location or structure where drainage discharges from a sewer, drain or other conduit. (2) The conduit leading to the ultimate discharge point.

Outlet Control Structure: The means of controlling the relationship between the headwater elevation and the discharge, placed at the outlet or downstream end of any structure through which water may flow.

Performance Standard: A standard which establishes an end result or outcome which is to be achieved but does not prescribe specific means for achieving it.

Peak Flow: Maximum flow.

Pennsylvania DEP: Pennsylvania Department of Environmental Protection.

Release Rate Percentage: The watershed factor determined by comparing the maximum rate of runoff from a subbasin to the contributing rate of runoff to the watershed peak rate at specific points of interest.

Retention Pond: A basin, usually enclosed by artificial dikes, that is used to retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate.

Return Period: The average interval in years over which an event of a given magnitude can be expected to recur.

Runoff: That part of precipitation which flows over the land.

Runoff Characteristics: The surface components of any watershed which affect the rate, amount, and direction of stormwater runoff. These may include but are not limited to: vegetation, soils, slopes and man-made landscape alterations.

SCS: U.S. Department of Agriculture Soil Conservation Service.

Sediment: Mineral or organic solid material that is being transported or has been moved from its site of origin by air, water or ice and has come to rest.

Sedimentation: The process by which mineral or organic matter is accumulated or deposited by moving water, wind or gravity.

Storage Facility: (See detention pond and retention pond).

Storm Frequency: The average interval in years over which a storm event of a given precipitation volume can be expected to occur.

Storm Sewer: A sewer that carries intercepted surface runoff, street water and other drainage but excludes domestic sewage and industrial waste.

Stormwater: That portion of precipitation which runs over the land.

Stormwater Collection System: Natural or man-made structures that collect and transport stormwater through or from a drainage area to the point of final outlet including, but not limited to, any of the following: conduits and appurtenant features, canals, channels, ditches, streams, culverts, streets, and pumping stations.

Stormwater Management Plan: The plan for managing stormwater runoff adopted by Blair County as required by the Storm Water Management Act.

Subdivision: The division or redivision of a lot, tract or parcel of land by any means into two or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, partition by the court for distribution to heirs or devisees, transfer of ownership or building or lot development, provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than 10 acres, not involving any new street or easement of access or any residential dwelling shall be exempted.

Swale: A low-lying stretch of land which gathers or carries surface water runoff.

Watercourse: Any channel for conveyance of surface water having a defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

Watershed: The entire region or area drained by a river or other body of water whether natural or artificial. A "designated watershed" is an area delineated by the Pennsylvania DEP and approved by the Environmental Quality Board for which counties are required to develop watershed stormwater management plans.

Watershed Stormwater Management Plan: The plan for managing stormwater runoff throughout a designated watershed adopted by Blair County as required by the Pennsylvania Storm Water Management Act.

**MODEL STORMWATER MANAGEMENT PROVISIONS FOR THE
MUNICIPAL ZONING ORDINANCE**

(Note: The following section should be added to the Supplementary Provisions of the municipality's existing zoning ordinance. This provision assures that stormwater management standards apply to all types of land uses in the municipality)

Section _____, Stormwater Management

- A. All uses or lots in all zoning districts shall comply with the applicable requirements and standards for managing stormwater runoff in accordance with the municipal subdivision and land development ordinance.

(Note: The following language should be included if the municipality permits any of the following land use activities under its zoning district regulations.)

- B. Agricultural activities, nurseries and forestry management operations, where permitted by this ordinance, shall be required to provide for the safe management of stormwater runoff in accordance with the requirements of the subdivision/land development ordinance. However, the submission and approval of a stormwater management plan shall be waived when:
1. agricultural activities are operated in accordance with a conservation plan or erosion and sedimentation control plan approved by the Blair County Conservation District;
 2. forestry management operations are following Pennsylvania DEP management practices contained in its publication Soil Erosion and Sedimentation Control Guidelines for Forestry and are operating under an erosion and sedimentation control plan.
- C. Strip mining where permitted by this ordinance shall have a plan for control of erosion and sedimentation and stormwater runoff which is approved by the Pennsylvania DEP. If the strip mining operation is located within a watershed(s) for which a stormwater management plan has been approved in accordance with the requirements of the Storm Water Management Act, then the erosion/sedimentation plan and any permanent stormwater runoff controls shall be consistent with the standards and criteria of the watershed stormwater management plan. A copy of the state-approved erosion/sedimentation plan shall be filed with the municipality prior to commencing mining operations.

MODEL STORMWATER MANAGEMENT PROVISIONS FOR STORMWATER MANAGEMENT ORDINANCE

ARTICLE I GENERAL PROVISIONS

Section 101 - Purpose

These regulations have the following general purposes and objectives:

1. To assure safe management of stormwater runoff resulting from land alteration and disturbance activities in accordance with watershed stormwater management plans adopted pursuant to the Pennsylvania Storm Water Management Act (Act 167 of 1978, as amended).
2. To utilize and preserve the existing natural drainage systems and to preserve the flood-carrying capacity of streams.
3. To encourage natural infiltration of rainfall to preserve groundwater supplies and stream flows.
4. To provide for adequate maintenance of all permanent stormwater management structures in the municipality.

Section 102 - Applicability

The following activities involving alteration or development of land are deemed to have possible effects upon storm water runoff characteristics and are included within the scope of this ordinance:

1. Subdivision
2. Land Development
3. Construction of new or additional impervious surfaces or surfaces with reduced permeability (driveways, parking lots, etc.)
4. Diversion or piping of any natural or man-made stream channel
5. Installation, replacement or substantial repair of storm water systems or appurtenances

Section 103 - Repealer

This ordinance shall repeal all other ordinances, or parts thereof, which are contrary to or conflict with the provisions of this ordinance to the extent necessary to give this ordinance full force and effect.

Section 104 - Severability

Should any section or provision of this ordinance be declared invalid by a court of competent jurisdiction, such decision shall not affect the validity of this ordinance as a whole or any other part hereof; the parts or sections remaining shall remain in effect as if the part of the section declared unconstitutional had never been a part of this ordinance.

Section 105 - Liability Disclaimer

1. Neither the granting nor the denial of any approval nor the compliance with the provisions of this ordinance or with any condition imposed by the municipality, its officials, employees, or designated representatives thereunder, shall relieve any person from any responsibility for damage to persons or property resulting therefrom, or as otherwise imposed by law, nor impose any liability upon the municipal officials, employees or its designated representatives to the maximum extent permitted by law.
2. Neither the granting nor the denial of any permit which includes any stormwater management requirements shall not constitute a representation, guarantee or warranty of any kind by the municipality, the municipal officials, employees, or designated representatives thereof of the practicability or safety of any stormwater structure or facility, use or other plan proposed, and shall create no liability or cause of action upon any municipal official, employee, or designated representative thereof for any damage that may result pursuant thereto to the maximum extent permitted by law.

ARTICLE II DEFINITIONS

Act: The Storm Water Management Act (Act of October 4, 1978, P.L. 864 No. 167; 32 P.S. Sections 680.1-680.17, as amended by Act of May 24, 1984, No. 63).

Applicant: A landowner or developer who has filed an application for development including his/her heirs, successors and assigns.

Channel: A perceptible natural or artificial waterway which periodically or continuously contains moving water or which forms a connecting link between two bodies of water. It has a definite bed and banks which confine the water.

Conservation District: The Blair County Conservation District.

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Culvert: A closed conduit for the free passage of surface drainage under a highway, railroad, canal or other embankment.

Design criteria: (1) Engineering guidelines specifying construction details and materials. (2) Objectives, results, or limits which must be met by a facility, structure, or process in performance of its intended functions.

Design storm: (see storm frequency)

Detention: The slowing, dampening or attenuating of runoff flows entering the natural drainage pattern or storm drainage system by temporarily holding water on a surface area in a detention basin or within the drainage system.

Detention pond or basin: A basin or reservoir, usually small, constructed to impound or retard surface runoff temporarily.

Developer: The person, persons, or any corporation, partnership, association, or other entity or any responsible person therein or agent therefor that undertakes the activities associated with changes in land use. The term "developer" is intended to include but not necessarily be limited to the term "subdivider", "owner", and "builder" even though the individuals involved in successive stages of a project may vary.

Development: Any activity, construction, alteration, change in land use or practice that affects stormwater runoff characteristics.

Discharge: The flow or rate of flow from a canal, conduit, channel or other hydraulic structure.

Drainage: In general, the removal of surface water from a given area. Commonly applied to surface water and ground water.

Drainage Area: (1) The area of a drainage basin or watershed, expressed in acres, square miles, or other unit of area. Also called catchment area, watershed, river basin. (2) The area served by a sewer system receiving storm and surface water, or by a watercourse.

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Erosion: Wearing away of the lands by running water, glaciers, winds and waves.

Erosion control: The application of measures to reduce erosion of land surfaces.

Ground Cover: Materials covering the ground surface,

Ground Water: Subsurface water occupying the saturation zone, from which wells and springs are fed.

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Impervious: Not allowing or allowing only with great difficulty the movement of water; impermeable.

Infiltration: (1) The flow or movement of water through the interstices or pores of a soil or other porous medium. (2) The absorption of liquid by the soil.

Land Development: Any of the following activities:

(1) 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 residential or non-residential buildings, whether proposed initially or cumulatively, or a single non-residential building on a lot or lots regardless of the number of occupants or tenure; or (b) the division or allocation of land or space, whether initially or cumulatively, 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;

(2) a subdivision of land;

(3) development in accordance with Section 503 (1.1) of the Pennsylvania Municipalities Planning Code.

Land Disturbance: Any activity involving the changing, grading, transportation, fill and any other activity which causes land to be exposed to the danger of erosion.

Maintenance: The upkeep necessary for efficient operation of physical properties.

Municipality: (name of municipality), Blair County

Municipal engineer: A professional engineer licensed in the Commonwealth of Pennsylvania, duly appointed by the (name of municipality).

Natural Stormwater Runoff Regime: A watershed where natural surface configurations, runoff characteristics and defined drainage conveyances have attained the conditions of equilibrium.

Outfall: (1) The point, location or structure where drainage discharges from a sewer, drain or other conduit. (2) The conduit leading to the ultimate discharge point.

Outlet Control Structure: The means of controlling the relationship between the headwater elevation and the discharge, placed at the outlet or downstream end of any structure through which water may flow.

Performance Standard: A standard which establishes an end result or outcome which is to be achieved but does not prescribe specific means for achieving it.

Peak Flow: Maximum flow.

Pennsylvania DEP: Pennsylvania Department of Environmental Protection.

Release Rate Percentage: The watershed factor determined by comparing the maximum rate of runoff from a subbasin to the contributing rate of runoff to the watershed peak rate at specific points of interest.

Retention Pond: A basin, usually enclosed by artificial dikes, that is used to retard stormwater runoff by temporarily storing the runoff and releasing it at a predetermined rate.

Return Period: The average interval in years over which an event of a given magnitude can be expected to recur.

Runoff: That part of precipitation which flows over the land.

Runoff Characteristics: The surface components of any watershed which affect the rate, amount, and direction of stormwater runoff. These may include but are not limited to: vegetation, soils, slopes and man-made landscape alterations.

SCS: U.S. Department of Agriculture Soil Conservation Service.

Sediment: Mineral or organic solid material that is being transported or has been moved from its site of origin by air, water or ice and has come to rest.

Sedimentation: The process by which mineral or organic matter is accumulated or deposited by moving water, wind or gravity.

Storage Facility: (See detention pond and retention pond).

Storm Frequency: The average interval in years over which a storm event of a given precipitation volume can be expected to occur.

Storm Sewer: A sewer that carries intercepted surface runoff, street water and other drainage but excludes domestic sewage and industrial waste.

Stormwater: That portion of precipitation which runs over the land.

Stormwater Collection System: Natural or man-made structures that collect and transport stormwater through or from a drainage area to the point of final outlet including, but not limited to, any of the following: conduits and appurtenant features, canals, channels, ditches, streams, culverts, streets, and pumping stations.

Stormwater Management Plan: The plan for managing stormwater runoff adopted by Blair County as required by the Storm Water Management Act.

Subdivision: The division or redivision of a lot, tract or parcel of land by any means into two or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, partition by the court for distribution to heirs or devisees, transfer of ownership or building or lot development, provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than 10 acres, not involving any new street or easement of access or any residential dwelling, shall be exempted.

Swale: A low-lying stretch of land which gathers or carries surface water runoff.

Watercourse: Any channel for conveyance of surface water having a defined bed and banks, whether natural or artificial, with perennial or intermittent flow.

Watershed: The entire region or area drained by a river or other body of water whether natural or artificial. A "designated watershed" is an area delineated by the Pennsylvania DEP and approved by the Environmental Quality Board for which counties are required to develop watershed stormwater management plans.

**ARTICLE III
STORMWATER QUANTITY MANAGEMENT REQUIREMENTS**

Section 301 - General Standards

- A. Erosion and Sedimentation: All land disturbance activities shall be conducted in such a way as to minimize accelerated erosion and sedimentation. Measures to control erosion and sedimentation shall at a minimum meet the standards of the Conservation District and the Rules and Regulations of the Pennsylvania Department of Environmental Protection.

Section 302 - Stormwater Runoff Quantity Control Standards

- A. Runoff Rates: There shall be no increase in the peak rate of stormwater runoff discharge from any activity covered by the Ordinance following the completion of the activity (post-development conditions) over the rate that would have occurred from the land prior to the activity (pre-development conditions). This criteria shall apply to the total activity even if the activity is to take place in stages.
1. Off site areas which drain through a proposed development site are not subject to the control standard when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the development site.
 2. Where the site area to be impacted through a proposed development activity differs significantly from the total site area, only the proposed impact area shall be subject to the runoff criteria.
- B. Storm Frequencies: Stormwater management facilities on all development sites shall control the peak stormwater discharge for the 2-, 10-, 25- and 100-year storm frequencies. The USDA NRCS 24-hour, Type II Rainfall Distribution shall be used for analyzing stormwater runoff for both pre- and post-development conditions. The 24-hour total rainfall for these storm frequencies in the watershed are:

<u>Storm Frequency</u>	<u>Rainfall Depth (inches)</u>
2-year	2.6
10-year	3.8
25-year	4.6
100-year	6.1

C. Calculation Methods

1. Development Sites: For the purpose of computing peak flow rates and runoff hydrographs from development sites, calculations shall be performed

using one of the following: USDA NRCS publications, Technical Release (TR) 55 or 20, HEC I or Penn State Runoff Model (PSRM) or Modified Rational Method. Under special circumstances other computation methods may be used subject to the approval of the municipality.

2. Stormwater Collection/Conveyance Facilities: For the purposes of designing storm sewers, open swales and other stormwater runoff collection and conveyance facilities, the Rational Method or other method as approved by the municipality may be applied. Rainfall intensities for design should be obtained from the Pennsylvania Department of Transportation rainfall charts.
 3. Routing of hydrographs through detention / retention facilities for the purpose of designing those facilities shall be accomplished using the Modified-Puls Method or other recognized reservoir routing method subject to the approval of the municipality.
 4. Predevelopment Conditions: Predevelopment conditions shall be assumed to be those which exist on any site at the time prior to the commencement of development activities. SCS runoff curve numbers selected for use in the calculations shall accurately reflect existing conditions subject to the approval of the municipality. At its discretion, the municipality may direct that hydrologic conditions for all areas with pervious cover (i.e., fields, woods, lawn areas, pastures, cropland, etc.) shall be assumed to be in "good" condition, and the lowest recommended SCS runoff curve number (CN) shall be applied for all pervious land uses within the respective range for each land use and hydrologic soil group. Impervious cover shall include, but not be limited to, any roof, parking, or driveway areas, and any new streets and sidewalks. Any areas designed to initially be gravel or crushed stone shall be assumed to be impervious for the purposes of these criteria. The Municipality has the authority to require that computed existing runoff rates be reconciled with field observations and conditions. If the designer can substantiate through actual physical calibration that more appropriate runoff values should be used at a particular site, then appropriate variations may be made upon review and recommendations of the municipal engineer. Calibration shall require detailed gauge and rainfall data for the particular site in question.
- D. Post-development rates of runoff shall not exceed the peak rates of runoff prior to development for the 2, 10, 25, and 100 year design storms.

**ARTICLE IV
STORMWATER QUALITY MANAGEMENT REQUIREMENTS**

Section 401 - Applicability

- A. In addition to the performance standards and design criteria requirements of Article III of this Ordinance, the land developer shall implement the following water quality requirements of this Article unless otherwise exempted by the provisions of this ordinance.

Section 402 - Water Quality Requirements

- A. No discharge materials, toxic or otherwise, shall be permitted into any stormwater management system except as may be permitted by applicable laws of the Commonwealth of Pennsylvania or the United States. Where required by federal and state regulation, the landowner or developer shall be responsible for obtaining an NPDES permit for stormwater discharges.

(Note: The following water quality management requirements are recommended for incorporation into the overall stormwater management requirements. However, they are presented as a suggestion - not as a required element of this plan.)

- B. In addition to the quantity requirements of this ordinance, the land developer shall:
1. Design stormwater detention / retention basins so that the outlet of the basin shall, in addition to any other stormwater requirements imposed by the municipal stormwater regulations, discharge the 1 year, 24 hour storm over a 24 hour period.
 2. As an alternative to subsection 402.A.1., above, the water quality objectives may be achieved through a combination of best management practices (BMPs) including, but not limited to, infiltration structures, detention / retention basins, vegetation filter strips and buffers. The combination of BMPs shall be designed according to the requirements listed under Section 403 and in consultation with the municipal engineer.
 3. In lieu of 1 and 2 above, the land developer may submit original and innovative designs to the municipal engineer for review and approval.

Section 403 - BMP Selection Criteria

- A. In selecting the appropriate BMP's or combinations thereof, the land developer shall consider the following:
1. Total contributing area

2. Permeability and infiltration rate of the site soils
3. Slope and depth to bedrock
4. Seasonal high water table
5. Proximity to building foundations and well heads
6. Erodibility of soils
7. Land availability and configuration of the topography

B. The following additional factors should be considered when evaluating the suitability of the BMPs used to control water quality at a given development site.

1. Peak discharge and required volume control
2. Streambank erosion
3. Efficiency of the BMPs to mitigate potential water quality problems
4. The volume of runoff that will be effectively treated
5. The nature of the pollutant(s) being removed
6. Maintenance requirements
7. Recreation value
8. Enhancement of aesthetics and property values

**ARTICLE V
DESIGN CRITERIA FOR STORMWATER MANAGEMENT
CONTROLS**

Section 501 - General criteria

- A. Applicants may select runoff control techniques, or a combination of techniques, which are most suitable to control stormwater runoff from the development site. All controls shall be subject to approval of the municipal engineer. The municipal engineer may request specific information on design and/or operating features of the proposed stormwater controls in order to determine their suitability and adequacy in terms of the standards of this ordinance.
- B. The applicant should consider the effect of the proposed stormwater management techniques on any special soil conditions or geological hazards which may exist on the development site. In the event such conditions are identified on the site, the municipal engineer may require in-depth studies by a competent geotechnical engineer. Not all stormwater control methods may be advisable or allowable at a particular development site.
- C. In developing a stormwater management plan for a particular site, stormwater controls shall be selected according to the following order of preference:
 - 1. minimization of impervious surfaces during site design
 - 2. flow attenuation by use of open vegetated swales and natural depressions
 - 3. stormwater detention/retention structures
- D. Infiltration practices shall be used to the extent practicable to reduce volume increases and promote groundwater recharge. A combination of successive practices may be used to achieve the applicable minimum control requirements. Justification shall be provided by the applicant for rejecting each of the preferred practices based on actual site conditions.

Section 502 - Criteria for Infiltration Systems

- A. Infiltration systems shall be sized and designed based upon local soil and ground water conditions.
- B. Infiltration systems greater than three (3) feet deep shall be located at least ten (10) feet from basement walls.
- C. Infiltration systems shall not be used to handle runoff from commercial or industrial working or parking areas. This prohibition does not extend to roof areas

which are demonstrated to be suitably protected from the effects of the commercial/industrial activities.

- D. Infiltration systems may not receive runoff until the entire drainage area to the system has received final stabilization.
- E. The stormwater infiltration facility design shall provide an overflow system with measures to provide a non-erosive velocity of flow along its length and at the outfall.
- F. Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase, so as to maintain their maximum infiltration capacity.

Section 503 - Criteria for Flow Attenuation Facilities

- A. If flow attenuation facilities are employed to assist in the control of peak rates of discharge, their effects must be quantified using the SCS Technical Release (TR) 55 Urban Hydrology for Small Watersheds or other approved method. The effects of the flow attenuation facilities on travel time should be reflected in the calculations.
- B. Flow attenuation facilities such as swales and natural depressions should be properly graded to ensure positive drainage and avoid prolonged ponding of water.
- C. Swales shall be properly vegetatively stabilized or otherwise lined to prevent erosion.
- D. Swales shall be designed according to the recommendations contained in the Commonwealth of Pennsylvania Erosion and Sediment Pollution Control Program Manual.

Section 504 - Criteria for Stormwater Detention Facilities

- A. If detention facilities are utilized for the development site, the facility(ies) shall be designed such that post-development peak runoff rates from the developed site are controlled to those rates defined by this Ordinance.
- B. All detention facilities shall be equipped with outlet structures to provide discharge control for the four (4) designated storm frequencies. Provisions shall also be made to safely pass the post-development 100-year storm runoff without damaging or impairing the continued function of the facilities. Should any stormwater management facilities be regulated by PA DEP Chapter 105 regulations, the facility shall be designed in accordance with those regulations and meet the regulations concerning dam safety which may require the passage of storms larger than the 100-year event.

- C. Shared-storage facilities which provide detention of runoff for more than one development site within a single subarea are encouraged wherever feasible and provided such facilities meet the criteria contained in this section. In addition, runoff from the development sites involved shall be conveyed to the facility in a manner that avoids adverse impacts (such as flooding or erosion) to channels and properties located between the development site and the shared-storage facilities.
- D. Where detention facilities will be utilized, multiple use facilities, such as wetlands, lakes, ballfields or similar recreational/open space uses are encouraged wherever feasible, subject to the approval of the municipality and compliance with the Pennsylvania Department of Environmental Protection's Chapter 105 regulations.
- E. Other considerations which should be incorporated into the design of the detention facilities include:
 - 1. Inflow and outflow structures shall be designed and installed to prevent erosion and bottoms of impoundment type structures should be protected from soil erosion.
 - 2. Control and removal of debris both in the storage structure and in all inlet or outlet devices shall be a design consideration.
 - 3. Inflow and outflow structures, pumping stations, and other structures shall be designed and protected to minimize safety hazards.
 - 4. The water depth at the perimeter of a storage pond should be limited to that which is safe for children. Restriction of access (fence, walls, etc.) may be necessary depending on the location of the facility and the maximum depths of water.
 - 5. Side slope of storage ponds shall not exceed a ratio of two-and-one-half to one (2.5:1) horizontal to vertical dimension.
 - 6. Landscaping shall be provided for the facility which harmonizes with the surrounding area.
 - 7. Facilities shall be located to facilitate maintenance, considering the frequency and type of equipment that will be required.
 - 8. Bottoms of detention basins should be graded with sufficient slope to provide positive surface drainage. A subdrainage system may be required depending on the location of the pond bottom relative to groundwater levels.
 - 9. Fencing shall be provided if required by the municipality.

Section 505 - Criteria for Collection/Conveyance Facilities

(Note: The municipality should review the specific requirements of this section for consistency with its existing requirements and local preferences. Specific design and construction details suggested here may be modified upon recommendation of the municipal engineer in order to reflect the municipality's current standard practices, local conditions and preferences.)

A. All stormwater runoff collection or conveyance facilities, whether storm sewers or other open or closed channels, shall be designed in accordance with the following basic standards:

1. All sites shall be graded to provide drainage away from and around the structure in order to prevent any potential flooding damage.
2. Lots located on the high side of streets shall extend roof and French drains to the curb line storm sewer (if applicable). Low side lots shall extend roof and french drains to a stormwater collection/conveyance/control system or natural watercourse in accordance with the approved stormwater management plan for the development site.
3. Collection/conveyance facilities should not be installed parallel and close to the top or bottom of a major embankment to avoid the possibility of failing or causing the embankment to fail.
4. All collection/conveyance facilities shall be designed to convey the 25-year storm peak flow rate from the contributing drainage area and to carry it to the nearest suitable outlet such as a stormwater control facility, curbed street, storm sewer or natural watercourse without damage to the drainage structure or roadway, with runoff from the 25-year design storm at a minimum 1.0 foot of freeboard measured below the lowest point along the top of the roadway. Roadway crossings located within designated floodplain areas must be able to convey runoff from a 100-year design storm with a minimum of 1.0 foot freeboard measured below the lowest point along the top of the roadway.

When it can be shown that, due to topographic conditions, natural drainage ways on the site cannot adequately provide for drainage, open channels may be constructed conforming substantially to the line and grade of such natural drainage ways. Work within natural drainage ways shall be subject to approval by PAADEP through the Joint Permit Application process, or, where appropriate by PADEP, through the General Permit process.

5. Where drainage swales or open channels are used, they shall be suitably lined to prevent erosion and designed to avoid excessive velocities.
6. Stormwater drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by stormwater management facilities or open channels consistent with this Ordinance.

7. Existing points of concentrated drainage that discharge onto adjacent property shall not be altered without permission of the altered property owner(s) and shall be subject to any applicable discharge criteria specified in this Ordinance.
 8. Areas of existing diffused drainage discharge shall be subject to any applicable discharge criteria in the general direction of existing discharge, whether proposed to be concentrated or maintained as diffused drainage areas, except as otherwise provided by this ordinance. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the developer must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge, or otherwise prove that no erosion, sedimentation, flooding, or other harm will result from the concentrated discharge.
 9. Where a development site is traversed by watercourses, drainage easements shall be provided conforming to the line of such watercourses. The terms of the easements shall prohibit excavation, the placing of fill or structures, and any alterations that may adversely affect the flow of stormwater within any portion of the easement. Also maintenance, including mowing of vegetation within the easement shall be required, except as approved by the appropriate governing authority.
 10. Any stormwater management facilities regulated by this Ordinance that would be located in or adjacent to waters of the Commonwealth of Pennsylvania or wetlands shall be subject to approval by PADEP through the Joint Permit Application process, or, where deemed appropriate by PADEP, the General Permit process. When there is a question whether wetlands may be involved, it is the responsibility of the Developer or his agent to show that the land in question cannot be classified as wetlands, otherwise approval to work in the area must be obtained by PADEP.
 11. Any stormwater management facilities regulated by this Ordinance that would be located on State highway rights-of-way shall be subject to approval by the Pennsylvania Department of Transportation.
 12. In order to promote overland flow and infiltration/percolation of runoff where it is advantageous to do so, roof drains must not be connected to streets, sanitary or storm sewers, or roadside ditches. When it is more advantageous to connect directly to streets or storm sewers, then it shall be permitted on a case by case basis by the municipality.
- B. Wherever storm sewers are proposed to be utilized, they shall comply with the following criteria:

1. Where practical, designed to traverse under seeded and planted areas. If constructed within ten (10) feet of road paving, walks or other surfaced areas, drains shall have a narrow trench and maximum compaction of backfill to prevent settlement of the superimposed surface or development.
2. Preferably installed after excavating and filling in the area to be traversed is completed, unless the drain is installed in the original ground with a minimum of three (3) feet cover and/or adequate protection during the fill construction.
3. Designed: (1) with cradle when traversing fill areas of indeterminate stability, (2) with anchors when gradient exceeds twenty (20) percent, and (3) with encasement or special backfill requirements when traversing under a paved area.
4. Designed to adequately handle the anticipated stormwater flow and be economical to construct and maintain. The minimum pipe size shall be fifteen (15) inches in diameter.
5. Drain pipe, trenching, bedding and backfilling requirements shall conform to the requirements of the municipality and/or applicable PennDOT Specifications, Form 408.
6. All corrugated metal pipe shall be polymer coated, and with asbestos bonding and paved inverts where prone to erode. Pipe within a municipal right-of-way shall be reinforced concrete pipe with a minimum diameter of 15 inches.
7. Storm inlets and structures shall be designed to be adequate, safe, self-cleaning and unobtrusive and consistent with municipal standards.
8. Approved grates shall be designed for all catch basins, stormwater inlets and other entrance appurtenances.
9. Manholes shall be designed so that the top shall be at finished grade and sloped to conform to the slope of the finished grade. Top castings of structures located in roads or parking areas shall be machined or installed to preclude "rattling."
10. Where a proposed storm sewer connects with an existing storm sewer system, the applicant shall demonstrate that sufficient capacity exists in the downstream system to handle the additional flow.
11. Storm sewer outfalls shall be equipped with energy dissipation devices to prevent erosion and conform with applicable requirements of the Pennsylvania DEP for stream encroachments (Chapter 105 of Pennsylvania DEP Rules and Regulations).

**ARTICLE VI
EROSION AND SEDIMENTATION CONTROLS**

Section 601 - Erosion and Sedimentation Control Requirements

- A. An erosion/sedimentation plan shall be prepared for each development site in accordance with the Pennsylvania Erosion/Sedimentation Regulations (25 PA Code, Chapter 102) and the standards and guidelines of the County Conservation District.

(Note: If the municipality has a grading or other ordinance which contains its erosion/sedimentation provisions, then it should be referenced here.)

**ARTICLE VII
MAINTENANCE OF STORMWATER MANAGEMENT CONTROLS**

Section 701 - Maintenance Responsibilities

- A. The maintenance plan for stormwater management facilities located on the development site shall establish responsibilities for the continuing operation and maintenance of all proposed stormwater control facilities, consistent with the following principals:
1. If a development consists of structures or lots which are to be separately owned and in which streets, storm sewers and other public improvements are to be dedicated to the municipality, stormwater control facilities should also be dedicated to and maintained by the municipality.
 2. If a development site is to be maintained in single ownership or if storm sewers and other public improvements are to be privately owned and maintained, then the ownership and maintenance of stormwater control facilities should be the responsibility of the owner or private management entity.
- B. The governing body, upon recommendation of the municipal engineer, shall make the final determination on the continuing maintenance responsibilities prior to final approval of the stormwater management plan. The governing body reserves the right to accept the ownership and operating responsibility for any or all of the stormwater management controls and to determine the terms and conditions under which it will accept ownership and operating responsibility.

Section 702 - Maintenance Agreement for Privately Owned Stormwater Facilities

- A. Prior to final approval of the site's stormwater management plan, the applicant and municipality shall execute a maintenance agreement covering all stormwater control facilities which are to be privately owned. The maintenance agreement shall be recorded with the final subdivision/land development plan for the site. The agreement shall stipulate that:
1. All facilities shall be maintained in accordance with the approved maintenance schedule and in a safe and attractive manner.
 2. Easements and or rights-of-way shall be conveyed to the municipality to assure access for periodic inspections by the municipality and maintenance if required.
 3. The name, address and telephone number of the person or company responsible for maintenance activities shall be filed with the municipality.

In the event of a change, new information will be submitted to the municipality within ten (10) days of the change.

4. If the facility owner fails to maintain the stormwater control facilities, the municipality may perform the necessary maintenance work or corrective work following due notice by the municipality to the facility owner to correct the problem(s). The facility owner shall reimburse the municipality for all costs.
- B. Other items may be included in the agreement where determined necessary to guarantee the satisfactory maintenance of all facilities.

Section 703 - Municipal Stormwater Maintenance Fund

(Note: This provision illustrates one way a municipality could establish a special fund to finance its maintenance and inspection activities for stormwater retention/detention facilities. It is an optional provision of the ordinance. If a municipality is interested in establishing such a fund, it is recommended that it consult with its solicitor for legal requirements and procedures.)

- A. Persons installing stormwater storage facilities shall be required to pay a specified amount to the Municipal Stormwater Maintenance Fund to help defray costs of periodic inspections and maintenance expenses. The amount of the deposit shall be determined as follows:
1. If the storage facility is to be privately owned and maintained, the deposit shall cover the cost of periodic inspections performed by the municipality for a period of ten (10) years, as estimated by the municipal engineer. After that period of time, inspections will be performed at the expense of the municipality.
 2. If the storage facility is to be owned and maintained by the municipality, the deposit shall cover the estimated costs for maintenance and inspections for ten (10) years. The municipal engineer will establish the estimated costs utilizing information submitted by the applicant.
 3. The amount of the deposit to the fund shall be converted to present worth of the annual series values. The municipal engineer shall determine the present worth equivalents which shall be subject to the approval of the governing body.
- B. If a storage facility is proposed that also serves as a recreation facility (e.g., ballfield, lake), the municipality may reduce or waive the amount of the maintenance fund deposit based upon the value of the land for public recreation purposes.
- C. If in the future a storage facility (whether publicly or privately owned) is eliminated due to the installation of storm sewers or other storage facility, the unused portion

of the maintenance fund deposit will be applied to the cost of abandoning the facility and connecting to the storm sewer system or other facility. Any amount of the deposit remaining after the costs of abandonment are paid will be returned to the depositor.

ARTICLE VIII STORMWATER PLAN REQUIREMENTS

Section 801 - General Requirements

No final subdivision/land development plan shall be approved, no permit authorizing construction shall be issued, or an earth moving or land disturbance activity initiated until the final stormwater management plan for the site is approved in accordance with the provisions of this ordinance.

Section 802 - General Exemptions

The following activities are specifically exempt for the plan preparation provisions of this Ordinance unless the municipality determines that the activity is likely to, has, or will negatively impact the purposes and objectives set forth in Article I. For example, where an activity occurs on very steep terrain or where an activity is the latest in a series of incremental developments expected to cause pronounced stormwater impacts, it may be that these activities will be required to comply with the plan preparation requirements contained herein even though their activities qualify under the listing in this section. Upon making such determination, the municipality shall give notice in writing to the land owner and the developer, if known, and direct the landowner and any developer to immediately cease and desist all activity and affirmatively comply with the formal plan, submission, and approval procedures of this ordinance. Exemption shall not relieve the applicant from providing adequate stormwater management to meet the purpose of this Ordinance.

- A. Any regulated activity that would create 5,000 square feet or less of impervious area. This criteria shall apply to the total development even if development is to take place in phases.
- B. Land disturbances associated with existing one and two family dwellings provided that the activities will not create in excess of 5,000 square feet of impervious area.
- C. Use of land for gardening for home consumption.
- D. Agriculture when operated in accordance with a conservation plan or erosion and sedimentation control plan approved by the County Conservation District. The agricultural activities such as growing crops, rotating crops, filling of soil and grazing animals and other such activities are specifically exempt from complying with the requirements of this Ordinance when such activities are conducted in accordance with a conservation plan prepared by the County Conservation District. The construction of buildings, parking lots or any activity that may result in impervious surface which increases the rate and volume of stormwater runoff shall comply with the requirements of this Ordinance.
- E. Forest management operations which are following the Department of Environmental Protection's management practices contained in its publication "Soil

Erosion and Sedimentation Control Guidelines for Forestry" and are operating under an erosion and sedimentation control plan.

Section 803 - Stormwater plan Contents

- A. General Format: The stormwater plan shall be drawn on sheets no larger than 16" X 22" with a graphics scale of not less than 1 inch = 200 feet. All sheets shall contain a title block with; Name and address of applicant and engineer, scale, north arrow, legend and date of preparation.
- B. Existing and Proposed Features: The plan shall show the following under both pre-development and post-development conditions:
1. Watershed location - Provide a key map showing the location of the development site within the watershed(s) and watershed subarea(s). On all site drawings, show the boundaries of the watershed(s) and subarea(s) as they are located on the development site and identify watershed names(s) and subarea number(s).
 2. Floodplain boundaries - Identify 100-year floodplains on the development site (as appropriate) based on the municipal Flood Insurance Study maps.
 3. Natural features - Show all bodies of water (natural or artificial), watercourses (permanent and intermittent), swales, wetlands and other natural drainage courses on the development site, or which will be affected by runoff from the development.
 4. Soils - Provide an overlay showing soil types and boundaries within the development site (consult county, SCS and U.S. Geological Survey for information).
 5. Contours - Show existing and final contours at intervals of two (2) feet; in areas with slopes greater than fifteen (15) percent, five (5) foot contour intervals may be used.
 6. Land cover - Show existing and final land cover classifications as necessary to support and illustrate the runoff calculations performed.
 7. Drainage area delineations - Show the boundaries of the drainage areas employed in the runoff calculations performed.
 8. Stormwater management controls - Show any existing stormwater management or drainage controls and/or structures, such as storm sewers, swales, culverts, etc. which are located on the development site, or which are located off-site but will be affected by runoff from the development.
- C. Professional certification: The principal in charge of preparing the stormwater management plan (including all calculations) shall be a registered professional

engineer or registered land surveyor and the stormwater management plan shall be sealed by a registered professional engineer or professional land surveyor with training and expertise in hydrology and hydraulics. Documentation of qualifications may be required by the municipality.

- D. Runoff calculations: Calculations for determining pre- and post-development discharge rates and for designing proposed stormwater control facilities must be submitted with the stormwater management plan. All calculations shall be prepared using the methods and data prescribed by Section 302 of this Article.
- E. Stormwater controls: All proposed stormwater runoff control measures must be shown on the plan including methods for collecting, conveying and storing stormwater runoff on-site, which are to be used both during and after construction. Erosion and sedimentation controls shall be shown in accordance with Section 104 of this Article. The plan shall provide information on the exact type, location, sizing, design and construction of all proposed facilities and their relationship to the existing watershed drainage system. The plan shall include technical specifications for materials and methods to be used in the construction of the stormwater management facilities.
1. If the development is to be constructed in stages, the applicant must demonstrate that stormwater facilities will be installed to manage stormwater runoff safely during each stage of development.
 2. A schedule for the installation of all temporary and permanent stormwater control measures and devices shall be submitted.
 3. If appropriate, a justification should be submitted as to why any preferred stormwater management techniques, as listed in Articles IV and V, are not proposed for use.
- F. Easements, right-of-ways, deed restrictions: All existing and proposed easements and rights-of-way for drainage and/or access to stormwater control facilities shall be shown along with any areas subject to special deed restrictions relative to or affecting stormwater management on the development site.
- G. Other permits/approvals: A list of any approvals/permits relative to stormwater management that will be required from other governmental agencies (Pennsylvania DEP Chapter 105 and 106 permits and/or NPDES permit) and anticipated dates of submission/receipt should be included with the stormwater plan submission. Copies of permit applications may be requested by the municipality where they may be helpful for the plan review.
- H. Maintenance program: The proposed maintenance plan for all stormwater control facilities shall:
1. Identify the proposed ownership entity (e.g., municipality, property owner, private corporation, homeowner's association, or other entity).

2. Identify the type of maintenance, probable frequencies, personnel and equipment requirements and estimated annual maintenance costs.
 3. Identify the method for financing the continuing operation and maintenance of the facility if the facility is to be owned by other than a governmental agency.
 4. Include copies of any legal agreements required to implement the maintenance program and, if applicable, copies of the maintenance agreement as required by Article VII.
- I. Financial guarantees: Submit financial guarantees in accordance with the provisions of Article XI.
- J. Evidence of notification of downstream municipality: The developer shall notify (by certified mail) the municipality immediately downstream of the municipality within which the development is proposed that a stormwater control plan has been prepared and submitted. This letter should identify the location of the proposed development site and the name of the affected stream. The developer shall submit a copy of this letter and a copy of the certified mail return receipt.

**ARTICLE IX
PLAN REVIEW PROCEDURES**

Section 901 - Pre-application Phase

- A. Before submitting the stormwater plan, applicants are urged to consult with the municipality on the applicable regulations and techniques for safely managing runoff from the development site. The municipality may also be helpful in providing necessary data for the stormwater management plan.
- B. Applicants are encouraged to submit a sketch plan with a narrative description of the proposed stormwater management controls for general guidance and discussion with the municipality and other agencies.
- C. The pre-application phase is not mandatory; any review comments provided by the municipality are advisory only and do not constitute any legally binding action on the part of the municipality.

Section 902 - Stormwater Plan Reviews

- A. Submission of plans: Stormwater plan applications shall be submitted with the preliminary and final subdivision/land development applications.
- B. Notification of affected municipalities: The developer is required to notify municipalities adjacent to the development site that a stormwater control plan has been submitted. Copies of the plans will be made available to the municipalities upon request. Comments received from any affected municipality will be considered by the municipal engineer and county agencies in their reviews.
- C. Municipal engineer's review: The municipal engineer shall recommend approval or disapproval of the stormwater management plan based on the requirements of the municipal ordinances, the standards and criteria of the watershed plan and good engineering practice. The engineer shall submit a written report, along with supporting documentation, stating their reasons for approval or disapproval.

(Note: 1) If the municipal Planning Commission has the final authority for approving plans, then this section should be changed as appropriate.)

- E. Permits required from other governmental agencies: Where the proposed development requires an obstruction permit from the Pennsylvania DEP or an erosion/sedimentation permit from the County Conservation District, final stormwater management plan approval shall be granted subject to the receipt of such permits. No building permit shall be issued, nor construction started, until the permits are received and copies filed with the municipality.

Section 903 - Status of the Stormwater Plan after Final Approval

- A. Upon final stormwater plan approval, receipt of all necessary permits, and recording of the final subdivision or land development plan in the Blair County Recorder of Deeds Office, the applicant may commence to install or implement the approved stormwater management controls.
- B. If site development or building construction does not begin within two years of the date of final approval of the stormwater management plan, then before doing so, the applicant shall resubmit the stormwater management plan to verify that no condition has changed within the watershed that would affect the feasibility or effectiveness of the previously approved stormwater management controls. Further, if for any reason development activities are suspended for two years or more, then the same requirement for resubmission of the stormwater management plan shall apply.

Section 904 - Stormwater Plan Modifications

- A. If the request for a plan modification is initiated before construction begins, the stormwater plan must be resubmitted and reviewed according to the procedures contained in Section 902 above.
- B. If the request for a plan modification is initiated after construction is underway, the municipal engineer shall recommend approval or disapproval of the modification based on field inspection provided: (1) the requested changes in stormwater controls do not result in any modifications to other approved municipal land use/development requirements (e.g., building setbacks, yards, etc.) and (2) the performance standards in Articles III and IV are met. Notification of the engineer's action shall be sent to the governing body which may issue a stay of the plan modification within fourteen (14) days and require the permittee to resubmit the plan modification for full stormwater plan review in accordance with Section 902 above.

ARTICLE X
INSPECTIONS OF STORMWATER MANAGEMENT CONTROLS

Section 1001 - Inspections

- A. The municipal engineer or a designated representative of the municipality shall inspect the construction of the temporary and permanent stormwater management system for the development site. The permittee shall notify the municipal engineer 48 hours in advance of the completion of the following key development phases:
1. At the completion of preliminary site preparation including stripping of vegetation, stockpiling of topsoil and construction of temporary stormwater management and erosion control facilities.
 2. At the completion of rough grading but prior to placing topsoil, permanent drainage or other site development improvements and ground covers.
 3. During construction of the permanent stormwater facilities at such times as specified by the municipal engineer.
 4. Completion of permanent stormwater management facilities including established ground covers and plantings.
 5. Completion of final grading, vegetative control measures or other site restoration work done in accordance with the approved plan and permit.
- B. No work shall commence on any subsequent phase until the preceding one has been inspected and approved. If there are deficiencies in any phase, the municipal engineer shall issue a written description of the required corrections and stipulate the time by which they must be made.
- C. If during construction, the contractor or permittee identifies any site condition, such as subsurface soil conditions, alterations in surface or subsurface drainage which could affect the feasibility of the approved stormwater facilities, he/she shall notify the municipal engineer within 24 hours of the discovery of such condition and request a field inspection. The municipal engineer shall determine if the condition requires a stormwater plan modification.
- D. In cases where stormwater facilities are to be installed in areas of landslide-prone soils or other special site conditions exist, the municipality may require special precautions such as soil tests and core borings, full-time inspectors and/or similar measures. All costs of any such measures shall be borne by the permittee.

ARTICLE XI
FINANCIAL GUARANTEES AND DEDICATION OF PUBLIC IMPROVEMENTS

Section 1101 - Financial Guarantees

- A. Guarantee of completion: A completion guarantee in the form of a bond, cash deposit, certified check or other negotiable securities acceptable to the municipality, shall be filed. The guarantee shall cover all streets, sanitary sewers, stormwater management facilities, water systems, fire hydrants, sidewalks and other required improvements; it shall be in the amount and form prescribed by the Pennsylvania Municipal Planning Code (Section 509).
- B. Release of completion guarantee: The procedures for requesting and obtaining a release of the completion guarantee shall be in a manner prescribed by the Pennsylvania Municipalities Planning Code (Section 510).
- C. Default of completion guarantee: If improvements are not installed in accordance with the approved final plan, the governing body may enforce any corporate bond or other security by appropriate legal and equitable remedies. If proceeds of such bond or other security are insufficient to pay the cost of installing or making repairs or corrections to all the improvements covered by said security, the governing body may at its option install part of such improvements in all or part of the development and may institute appropriate legal or equitable action to recover the moneys necessary to complete the remainder of the improvements. All proceeds, whether resulting from the security or from any legal or equitable action brought against the developer, or both, shall be used solely for the installation of the improvements covered by such security and not for any other municipal purpose.

Section 1102 - Dedication of Public Improvements

- A. When streets, sanitary sewers, stormwater management facilities, water lines or other required improvements in the development have been completed in accordance with the final approved plan, such improvements shall be deemed private until such time as they have been offered for dedication to the municipality and accepted by separate ordinance or resolution or until they have been condemned for use as a public facility.
- B. Prior to acceptance of any improvements or facilities, the municipal engineer shall inspect them to ensure that they are constructed in accordance with the approved plan and are functioning properly. In the case of any stormwater control facility, it must be free of sediment and debris.
- C. The owner shall submit as-built plans for all facilities proposed for dedication.
- D. Prior to acceptance of any improvements or facilities, the applicant shall provide a financial security to secure the structural integrity and functioning of the improvements. The security shall: (1) be in the form of a bond, cash, certified

check or other negotiable securities acceptable to the municipality, (2) be for a term of 36 months, and (3) be in an amount equal to 25 percent of the actual cost of the improvements and facilities so dedicated.

(Note: The duration and amount of the security may be established at the discretion of the municipality.)

**ARTICLE XII
FEES**

Section 1201 - Fee Schedule

The municipal governing body may adopt by resolution from time to time a reasonable schedule of fees to cover the cost of plan reviews, inspections and other activities necessary to administer the provisions of this ordinance. All fees shall be set in accordance with the applicable provisions of the Pennsylvania Municipalities Planning Code and any dispute over the fee amount shall be resolved in the manner prescribed by the Pennsylvania Municipalities Planning Code.

**ARTICLE XIII
ENFORCEMENT PROCEDURES AND REMEDIES**

Section 1301 - Right of Entry

Upon presentation of proper credentials, duly authorized representatives of the municipality may enter at reasonable times upon any property to investigate or ascertain the condition of the subject property in regard to an aspect regulated by this ordinance.

Section 1302 - Notification

In the event that the applicant, developer, owner or his/her agent fails to comply with the requirements of this ordinance or fails to conform to the requirements of any permit, a written notice of violation shall be issued by the municipal engineer or any designated municipal official. Such notification shall set forth the nature of the violations(s) and establish a time limit for correction of the violation(s). Upon failure to comply within the time specified, unless otherwise extended by the municipality, the applicant, developer, owner or his/her agent shall be subject to the enforcement remedies of this ordinance.

Section 1303 - Preventive Remedies

- A. In addition to other remedies, the municipality may institute and maintain appropriate actions at law or in equity to restrain, correct or abate a violation, to prevent unlawful construction, to recover damages and to prevent illegal occupancy of a building or premises.
- B. In accordance with the Pennsylvania Municipalities Planning Code (Sec. 515.1), the municipality may refuse to issue any permit or grant approval to further improve or develop any property which has been developed in violation of this ordinance.

Section 1304 - Enforcement Remedies

- A. Any person, who has violated or permitted the violation of the provisions of this Ordinance shall, upon being found liable therefor in a civil enforcement proceeding commenced by the municipality, pay a fine of not less than \$_____ and not more than \$_____ plus court costs, including reasonable attorney fees and engineers and other expert witness fees incurred by the municipality. No judgment shall commence or be imposed, levied or be payable until the date of the determination of a violation by a court of competent jurisdiction.
- B. If the defendant neither pays nor timely appeals the judgment, the municipality may enforce the judgment pursuant to applicable rules of civil procedure.
- C. Each day that a violation continues shall constitute a separate violation unless the court of competent jurisdiction further determines that there was a good faith basis for the person violating the ordinance to have believed that there was no such

violation. In such case there shall be deemed to have been only one such violation until the fifth day following the date of the initial determination of a violation; thereafter each day that a violation continues shall constitute a separate violation.

- D. All judgments, costs and reasonable attorney fees collected for the violation of this Ordinance shall be paid over to the municipality.
- E. A court of competent jurisdiction, upon petition, may grant an order of stay, upon cause shown, tolling the per diem fine pending a final adjudication of the violation and judgment.
- F. Nothing contained in this section shall be construed or interpreted to grant to any person or entity other than the municipality the right to commence any action for enforcement pursuant to this section.

Section 1305 - Additional Remedies

In addition to the above remedies, the municipality may also seek remedies and penalties under applicable Pennsylvania statutes, or regulations adopted pursuant thereto, including but not limited to the Storm Water Management Act (32 P.S. Section 693.1-693.27) and the Erosion and Sedimentation Regulations (25 Pennsylvania Code, Chapter 102). Any activity conducted in violation of this ordinance or any Pennsylvania approved watershed stormwater management plan is declared a public nuisance by the municipality and abatable as such.