dep
west virginia department of environmental protection

Region 9

WEST VIRGINIA MODEL

STORMWATER

ORDINANCE

Specifically Designed for West Virginia Region 9

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INTRODUCTION

The West Virginia Department of Environmental Protection (DEP) and the U.S. Environmental Protection Agency (EPA) have provided the Eastern Panhandle Regional Planning and Development Council (Region 9) with funding to contract professional services to achieve short-term objectives from West Virginia's Potomac Stormwater Strategy and other actions to reduce nutrient and sediment loads from urban/suburban sources while engaging Region 9's local governments in the Watershed Implementation Plan writing process.

In accordance with that goal, Region 9 assembled a variety of stakeholders from various planning agencies, government representatives, engineers, attorneys, etc., from throughout the region as well as some from beyond the region to assist with Ordinance development. In addition, Region 9 selected Delta Development Group, Inc. (Delta) to assist with technical stormwater assistance. The Ordinance was developed with assistance from various local governments through a Steering Committee, but it will be up to each local government or county to adopt the Ordinance.

This Model Stormwater Management Ordinance has been designed to address issues including stormwater control and the Chesapeake Bay Nutrient Reduction requirements in the Potomac River Watershed in West Virginia. The Ordinance is a result of an EPA grant that was administered by the DEP.

The West Virginia DEP, Region 9 provides this Model Ordinance for guidance to establish minimum criteria for county and municipal code development. While all local development review and approval processes are unique, Region 9 counties and local governments are encouraged to use this document as a template to ensure that all stormwater management ordinances contain the minimum requirements for effective program implementation.

This Model Ordinance has been designed to lay out a large portion of the necessary regulations for a successful Stormwater Management Ordinance. However, the Model Ordinance has not been designed to be adopted as written. The Ordinance contains several "boxes" that are designed to flag areas that need to be tailored to fit the needs of the Governing Body. In addition, for this Model Ordinance to be implemented properly, a county or local government must perform its independent legal review to ensure it is consistent with jurisdictional laws and regulations.

This Model Ordinance will achieve each of the following:

- Limit the post-construction Runoff rates to rates equal to or less than Pre-development Runoff rates
- Include provisions that will improve water quality by reducing Nonpoint Source Pollution and nutrients
- Encourage flexible Best Management Practice (BMP) requirements and Low Impact Development (LID) design criteria. Provide an incentives program to encourage BMP features
- Address the vast areas of Karst Terrain and specify BMP criteria in these areas

The State of West Virginia does not currently have a stormwater management handbook or similar document to include as a technical resource. This Model Stormwater Management

Ordinance provides the minimum content for implementing and enforcing the *Virginia Stormwater Management Handbook* (referenced by adoption) and "Stormwater Design Guidelines for Karst Terrain in the Chesapeake Bay Watershed" (referenced by adoption) consistent with the Code of West Virginia Chapter 22, Environmental Resources, Article 11, Water Pollution Control Act. When West Virginia writes and adopts such a document, it should be included as an additional source of information.

The complexity of local or county stormwater management implementation varies, depending upon the extent and nature of development. While West Virginia's urbanizing jurisdictions may find this Model Ordinance helpful in supplementing existing codes, the model also provides assistance to jurisdictions that are developing new stormwater management ordinances. This Model Stormwater Management Ordinance provides minimum content only. Each local jurisdiction should review the enclosed components and tailor their ordinances in accordance with local conditions and development activities. Inclusion of all Model Ordinance components is necessary to obtain approval.

NEXT STEPS

The Governing Body will assemble a Steering Committee to tailor the Model Ordinance to fit the needs of the community or region. The Steering Committee should consist of a variety of stakeholders from various planning agencies, government representatives, engineers, attorneys, etc., from throughout the area of jurisdiction. The Steering Committee should hold several meetings to collaborate ideas and incorporate them into the Model Ordinance to address local strengths, weaknesses, opportunities, and threats regarding stormwater management. It is advisable to include members of the Planning Commission as well as members of the Governing Body on the Steering Committee to encourage adoption.

The municipal and/or county Planning Commission will review the Model Ordinance to make recommendations to the Governing Body.

Upon receipt of the Planning Commission's findings and recommendations with respect to the proposed Model Ordinance, the Governing Body shall within 60 days read, by title, the proposed Model Ordinance at not less than two (2) meetings with at least one (1) week intervening between each meeting. The Model Ordinance can be adopted following the second meeting by the Governing Body.

Project Steering Committee Members

Stefenie	*Allemong-Miller*	*Angela*	*Kelley*
Tom	*Bayuzik, Jr.*	*Todd*	*Kelvington*
Andy	*Blake*	*Bette*	*Kidwell*
Chris	*Blount*	*Sarah*	*Kleckner*
Jennie	*Brockman*	*Steve*	*Knipe*
Mike	*Covell*	*Jim*	*Lawrence*
Carol	*Crabtree*	*Bob*	*Marggraf*
Rick	*Curry*	*Noah*	*Mehrkam*
Patrick	*Felling*	*Richard*	*Parks*
Jason	*Gerhart*	*Kristine*	*Ringstaff*
Roger	*Goodwin*	*Michael*	*Schwartz*
Alma	*Gorse*	*Katie*	*See*
Joe	*Hankins*	*Kim*	*Shrader*
Robert	*Hardy*	*Joseph*	*Sladki*
David	*Hartley*	*Scott*	*Swaim*
Alana	*Hartman*	*Laura*	*Taylor*

West Virginia Region 9 –

Eastern Panhandle Regional Planning and Development Commission Staff

Carol Crabtree, Executive Director

Angela Kelley, Grants Administrator/Fiscal Agent

Bette J. Kidwell, Administrative/Project Assistant

Michael J. Ball, Program/Project Coordinator

Robert S. Gordon, HEPMPO Coordinator

Consultant

Delta Development Group, Inc.

ARTICLE I GENERAL PROVISIONS

A. STATUTORY AUTHORITY

(1) Short Title

(a) This Ordinance and Ordinances supplemental or amendatory thereto, shall be known and may be cited as the "Stormwater Management Ordinance of <GOVERNING BODY>" and hereinafter referred to as the "Ordinance".

(b) EFFECTIVE DATE:

NOTE: *The <GOVERNING BODY> shall enter the date of adoption in Article I A (1) (b) above.*

(2) The provisions of this Ordinance are enacted pursuant to West Virginia Code:

- Chapter 8, Municipal Corporations, Article 20, Combined Systems
- Chapter 8A, Land Use Planning, Article 4, Subdivision and Land Disturbance Ordinance
- Chapter 16, Public Health, Article 13, Sewage Works and Stormwater Works
- Chapter 22, Environmental Resources, Article 11, Water Pollution Control Act

(3) The provisions of this Ordinance are also enacted pursuant to the Chesapeake Bay Restoration Act of 2000.

NOTE:

West Virginia Code §8-20-1 (a) *pertains to the acquisition and operation of stormwater systems or stormwater management programs.*

West Virginia Code §8A-4-2 (a)(5) *states that localities shall adopt subdivision and land disturbance ordinances with stormwater management standards.*

West Virginia Code §16-13(a)(2) *specifies that any municipal corporation and/or sanitary district in the State of West Virginia is hereby authorized and empowered to own, acquire, construct, equip, operate, and maintain within and/or without the corporate limits of such municipal corporation a stormwater collection system and control system, including all lines, pumping stations, and all other facilities and appurtenances necessary or useful and convenient for the collection and control of stormwater, and an associated stormwater management program.*

West Virginia Code §22-11 (a) *declares public policy of the State of West Virginia to maintain reasonable standards of purity and quality of the water of the state consistent with (1) public health and public enjoyment thereof; (2) the propagation and protection of animal, bird, fish, aquatic, and plant life; and (3) the expansion of employment opportunities, maintenance and expansion of agriculture, and the provision of a permanent foundation for healthy industrial development.*

B. PURPOSE AND OBJECTIVES

This Ordinance has the following purpose:

(1) Protect, maintain, and enhance the environment of the <GOVERNING BODY> and the public health, safety, and general welfare of the citizens of the <GOVERNING BODY> by controlling discharges of pollutants to the <GOVERNING BODY's> stormwater system, and maintain and improve the quality of the receiving waters into which all stormwater flows, including, without limitation, lakes, rivers, streams, ponds, wetlands, and groundwater of the community

(2) Enable the <GOVERNING BODY> to comply with the West Virginia DEP-administered National Pollutant Discharge Elimination System (NPDES) stormwater permit program and applicable regulations (40 CFR, §122.26) for stormwater discharges

(3) Enable the <GOVERNING BODY> to comply with the EPA's Total Maximum Daily Loads (TMDLs) Water Quality Standards established for the Potomac River Basin

(4) Enable the <GOVERNING BODY> to comply with the West Virginia Water Pollution Control Act, West Virginia Code, Chapter 22, Article 11

(5) Allow the <GOVERNING BODY> to exercise the powers granted in West Virginia Code §8-12-5 and §8-20-1a, which provide, among other powers municipal corporations have with respect to stormwater systems and stormwater management programs, the power by ordinance or resolution, as the case may require, and by appropriate action based thereon to do the following:

(a) Exercise general regulation over the planning, location, construction, operation, and maintenance of stormwater facilities in the <GOVERNING BODY> whether or not owned and operated by the <GOVERNING BODY>

(b) Adopt any rules and regulations deemed necessary to accomplish the purposes of this Ordinance, including the adoption of a system of fees for services and permits

(c) Establish standards to regulate the quantity of stormwater discharged and to regulate stormwater contaminants as may be necessary to protect water quality

(d) Review and approve plans and plats for stormwater management in proposed residential and nonresidential subdivisions as applicable under Subsection D below

(e) Issue permits for stormwater discharges, or for the construction, alteration, extension, or repair of stormwater facilities

(f) Suspend or revoke permits when it is determined that the permittee has violated any applicable ordinance, resolution, or condition of the permit

(g) Regulate and prohibit discharges into stormwater facilities of sanitary, industrial, or commercial sewage or waters that have otherwise been contaminated

(h) Expend funds to remediate or mitigate the detrimental effects of contaminated land or other sources of stormwater contamination, whether public or private

C. ADMINISTERING ENTITY

(1) Pursuant to West Virginia Code §16-13-1, any municipal corporation and/or sanitary district in the State of West Virginia is hereby authorized and empowered to own, acquire, construct, equip, operate, and maintain within and/or without the corporate limits of such municipal corporation a stormwater system, stormwater works, and stormwater management program as defined herein.

(2) The <GOVERNING BODY> is the entity responsible for administering the provisions of this Ordinance.

D. APPLICABILITY

(1) This Ordinance shall be applicable to all Land Disturbance Activities as defined herein. These standards apply to any new development or Redevelopment Parcel that meets one (1) or more of the following criteria:

NOTE: *Section I.D(1) above is in reference to the B.A McClure and Cheryl McClure vs. City of Hurricane case regarding approved subdivision plans that have not been fully developed. The court decided that any parcel that is not developed in an approved Subdivision Plan shall meet the requirements in all current regulations to obtain a building permit.*

This Ordinance as written applies to all Land Disturbance Activities regardless of the status of a subdivision plan that was previously approved.

(a) New development that involves the creation of <5,000 SQUARE FEET OR MORE> of Impervious Cover, or involves other land disturbance activities of one (1) acre or more

(b) Redevelopment that includes the creation, addition, or replacement of <5,000 SQUARE FEET OR MORE> of Impervious Cover, or that involves other Land Disturbance Activity of one (1) acre or more

NOTE: *This model ordinance states that an Erosion and Sedimentation Control Plan is required for all developments that create 5,000 square feet or more of disturbance. This number may be modified by the administering agency or the Governing Body prior to adoption. The Governing Body should consider enforcement and inspection costs prior to making a change to this requirement.*

(c) Land disturbance activities that are smaller than the minimum applicability criteria set forth in items (a) and (b) above, if such activities are part of a larger common plan of development, even though multiple, separate, and distinct land disturbance activities may take place at different times on different schedules.

(2) Compatibility with Other Permits and Ordinance Requirements

(a) Compliance with the requirements herein does not create exclusion to permitting requirements from the West Virginia DEP, the U.S. Army Corps of Engineers, or any other agency or reviewing body that has jurisdiction over the proposed project area.

(b) Whenever this Ordinance imposes a conflicting restriction regarding stormwater regulation, the provisions of the more restrictive ordinance shall control. Where, due to vagueness or lack of clarity in the language of this Ordinance, a reasonable doubt exists regarding the meaning of any restriction, said doubt shall be resolved in favor of the property owner.

(3) The following activities are exempt from this Ordinance:

(a) Any emergency activity that is immediately necessary for the protection of life, property, or natural resources

(b) Additions or modifications to existing single-family or duplex residential structures

NOTE: *Users of this Model Ordinance may consider two (2) options for Land Disturbance Activity associated with the construction of a single-family or duplex residential lot. Other options may also be considered and should be applied as appropriate.*

Option 1: *An "Agreement in Lieu of an Erosion and Sedimentation Control Plan/Stormwater Pollution Prevention Plan" may be considered in lieu of a Land Disturbance Permit for any Land Disturbance Activity associated with the construction of a single-family or duplex residential lot. Such an agreement requires the permit holder to implement and maintain certain Erosion and sediment controls at the direction of the Governing Body's Stormwater Management Program Administrator.*

Option 2: Sample requirements include the following (from Culpeper, Virginia):

In lieu of submission of an <EROSION AND SEDIMENT CONTROL PLAN/STORMWATER POLLUTION PREVENTION PLAN> for the construction of this single-family/duplex dwelling, I agree to comply with any reasonable requirements determined necessary by employees of the <GOVERNING BODY>, representing the <EROSION AND SEDIMENT CONTROL PLAN/STORMWATER POLLUTION PREVENTION PLAN> Program Administrator. Such requirements shall be based on the conservation standards contained in the <GOVERNING BODY's> <STORMWATER MANAGEMENT ORDINANCE/SUBDIVISION AND LAND DEVELOPMENT ORDINANCE>, and shall represent the minimum practices necessary to provide adequate control of Erosion and sedimentation on or resulting from this project.

As a minimum, all lots will have a stone construction entrance, a Silt Fence will be constructed as needed, and all denuded areas on the lot shall be stabilized within seven (7) days of final grading with permanent vegetation or protective ground cover suitable for the time of year.

I further understand that failure to comply with such requirements following notice by the representatives of the <GOVERNING BODY> could result in a citation for violation of the <GOVERNING BODY's> <STORMWATER MANAGEMENT ORDINANCE/SUBDIVISION AND LAND DEVELOPMENT ORDINANCE>.

(c) Any logging or Agricultural Activity that is consistent with an approved farm conservation plan or a timber management plan prepared or approved by the Eastern Panhandle Conservation District

(d) Repairs to any Stormwater Management Facility

E. SEVERABILITY

If any section, clause, sentence, part, or provision hereof shall be held to be invalid, or unconstitutional, by any court of competent jurisdiction, such decision of the court shall not affect or impair the remaining sections, clauses, sentences, parts, or provisions of this Ordinance.

F. INCORPORATION BY REFERENCE

(1) For the purposes of this Ordinance, the <GOVERNING BODY> has adopted by reference the following published standards:

(a) *Virginia Stormwater Management Handbook*, volumes 1 and 2, 1st ed. (1999), or latest edition

(b) Chesapeake Stormwater Network Technical Bulletin No. 1, "Stormwater Design Guidelines for Karst Terrain in the Chesapeake Bay Watershed," version 2.0 (June 2009)

(c) Darrin Holmes and Ramesh Chintala, *West Virginia Division of Highways Drainage Manual,* 3rd ed. (Charleston, WV: West Virginia Department of Transportation, Division of Highways, Engineering Division, Hydraulic and Drainage Unit, December 2007), http://www.wvdot.com/engineering/TOC_engineering.htm

(2) All Stormwater Management Plans shall be consistent with the regulations and design standards established in the listed published standards.

NOTE: Additional or other secondary source standards, guidelines, etc., may be considered and incorporated by reference accordingly. Other state or locally *developed stormwater management handbooks, design manuals, etc., may be considered in lieu of the Virginia Stormwater Management Handbook. Upon the approval of a West Virginia Stormwater Management Handbook, it should be adopted throughout this sample ordinance.*

ARTICLE II STORMWATER MANAGEMENT PROGRAM PROCEDURES AND REQUIREMENTS

A. LAND DISTURBANCE PERMIT REQUIREMENT

NOTE: *In order to streamline the approval process and reduce paperwork, it is suggested that the Governing Body include the following Land Disturbance Permit requirements in an existing permitting process, such as a building permit, grading permit, etc.*

(1) Any entity proposing to perform any Land Disturbance Activity(ies) pursuant to the applicability standards outlined under Article I.D. of this Ordinance shall submit to the <GOVERNING BODY> a completed Land Disturbance Permit Application (see Attachment A) provided by the <GOVERNING BODY> for that purpose.

(2) Unless specified otherwise by this Ordinance, the Land Disturbance Permit Application must be accompanied by the following:

(a) Stormwater Management Plan in accordance with Article II.C.

(b) Maintenance requirements in accordance with Article II.D.(2)(r)

(3) No Land Disturbance Permit Application will be approved unless it includes a Stormwater Management Plan, as required by this Ordinance, detailing how Runoff and associated water quality impacts resulting from the activity will be controlled or managed.

(4) No Land Disturbance Permit shall be issued until a satisfactory final Stormwater Management Plan, or a waiver thereof, shall have undergone a review and been approved by the <GOVERNING BODY> after determining that the plan or waiver is consistent with the requirements of this Ordinance.

(5) No applicant shall receive a Land Disturbance Permit without first meeting the requirements of this Ordinance prior to commencing the proposed activity.

B. STORMWATER MANAGEMENT CONCEPT PLANS

(1) Prior to submission of any Stormwater Management Plan or Land Disturbance Permit Application, the applicant may be required to submit a Stormwater Management Concept Plan.

(a) The Stormwater Management Concept Plan is *required* for all Major Site [Land Development] Plans.

(b) The Stormwater Management Concept Plan is *recommended*, but not required, for Minor Site [Land Development] Plans.

NOTE: *Users of this Model Ordinance may consider the Concept Plan submission as an optional requirement and tailor the submission standards to suit user's administration and enforcements policies and practices.*

(2) The applicant shall request a consultation meeting with the <GOVERNING BODY> to discuss BMP and post-construction stormwater management. The <GOVERNING BODY> shall schedule the meeting within 15 business days following the applicant's request.

(3) Discussions, opinions, and/or representations made during the review of a Stormwater Management Concept Plan shall not be a basis for noncompliance with the applicable requirements for plan approval, and shall not be binding upon the <GOVERNING BODY> when acting upon subsequently submitted Stormwater Management Plans.

(4) The Stormwater Management Concept Plan shall include at a minimum the following information:

(a) Existing Conditions Plan and a Proposed Site Plan

i. Contour lines at five (5)-foot intervals and any streams found on U.S. Geological Survey (USGS) topographic mapping

ii. Soils, Riparian buffer zones, managed turf and vegetative boundaries

iii. Roads, buildings, parking areas, and other Impervious Cover

(b) Natural Features Plan(s) (with existing and proposed features)

i. Floodplains, rock outcrops, Karst features, large trees (diameter at 4.5 feet >18")

NOTE: ***Diameter at Breast Height (DBH) –*** *In the United States, tree diameter is usually measured at 4.5 feet above ground level. This height is referred to as Diameter at Breast Height or DBH.*

ii. Natural drainage areas and wetlands

iii. Threatened and/or endangered species

iv. Any required setbacks (existing septic areas, wells)

(c) Stormwater Management System Plan

i. Graphic illustration of the proposed Post-development stormwater facilities and/or nonstructural practices

ii. Conveyance system and flow paths

iii. Relationship to upstream and downstream properties and drainage

iv. Bridge and/or culvert crossings

v. Approximate location of stormwater inlets and outlets

C. REVIEW AND APPROVAL OF STORMWATER MANAGEMENT PLANS

(1) All applicants as noted in Article I.D. shall submit a complete Stormwater Management Plan to the <GOVERNING BODY> for review and approval. Each plan submittal shall include the minimum content specified in Section D of this Article and meet the minimum stormwater design requirements contained in Article IV of this Ordinance.

(2) The <GOVERNING BODY> shall perform a comprehensive review of the applicant's Stormwater Management Plan. Coordinated comments will be provided for each plan phase that reflect input from all appropriate agencies including but not limited to the Eastern Panhandle Conservation District and <LOCAL APPROVING AGENCIES SHOULD BE SPECIFIED AS APPROPRIATE>.

NOTE: *These and additional review and approval requirements should be used to specify more details about local procedures that may exist for accepting, reviewing, and approving Stormwater Management Plans.*

D. STORMWATER MANAGEMENT PLAN REQUIREMENTS

(1) All Stormwater Management Plans shall be appropriately sealed and signed by a Professional Engineer in adherence to all minimum standards and requirements pertaining to the practice of that profession in accordance with West Virginia Code Chapter 30, Professions and Occupations, and attendant regulations certifying that the plan meets all submittal requirements outlined in this Ordinance and is consistent with good engineering practice.

NOTE: *Section I.D(1) above requires a seal by a Professional Engineer. The <GOVERNING BODY> may want to include requirements for a signature from a Registered Landscape Architect with regard to green infrastructure, buffering and landscaping requirements found in this Ordinance.*

(2) The Stormwater Management Plan shall include the following:

(a) Name, address, and telephone number of all persons having a legal interest in the property

(b) Tax reference number and parcel number of the property or properties affected

(c) Existing and proposed buildings, roads, and parking areas

(d) Existing and proposed drainage areas, including areas necessary to determine downstream analysis for proposed stormwater management facilities

(e) Existing and proposed utilities, easements, and structural stormwater management and sediment control facilities

(f) Proposed land use with tabulation of the percentage of surface area to be adapted to various uses

(g) Clearing and grading limit boundaries

(h) A 1" = 200' topographical base map of the Site, which extends a minimum of 200 feet beyond the limits of the proposed development

(i) Existing surface water drainage including streams, ponds, culverts, ditches, drainage patterns, and wetlands

(j) Current land use including all existing structures and significant natural and man-made features not otherwise shown

(k) A written or graphic inventory of the natural resources at the Site and surrounding area as it exists prior to the commencement of the project and a description of the Watershed and its relation to the project Site

(l) Forest cover, wetlands, and other native vegetative areas on the Site

(m) Environmentally sensitive features (e.g., wetlands, 100-year floodplains, steep slopes, Karst Terrain, threatened and/or endangered species, etc.) that provide particular opportunities or constraints for development

NOTE: *Communities participating in the Federal Emergency Management Agency (FEMA) National Floodplain Insurance Program (NFIP) are required to enact floodplain management regulations, which regulate all Land Development and improvement activities within the 100-year floodplain. Provisions of this Model Ordinance and any enacted floodplain management regulations should be closely coordinated to ensure compatibility in their local administration and enforcement.*

(n) Hydrologic and hydraulic design calculations for the Pre-development and Post-development conditions for the Design Storms specified in this Ordinance. Such calculations shall include the following:

i. Description of the Design Storm Frequency, intensity, and duration

ii. Time of concentration

iii. Soil Curve Numbers (CNs) or Runoff Coefficients

iv. Peak Runoff rates and total Runoff volumes for each Watershed

v. Infiltration rates, where applicable

vi. Culvert and/or channel capacities

vii. Flow velocities

viii. Data on the increase in rate and volume of Runoff for the specified Design Storms

ix. Documentation of sources for all computation methods and field test results

(o) Sufficient engineering analysis to show that the proposed stormwater management measures are capable of controlling Runoff from the Site in compliance with this Ordinance (see Article IV) and the specifications of the *Virginia Stormwater Management Handbook*

(p) Geotechnical properties for the hydrologic and structural properties of soils, especially for dam embankments, shall be described in a soils report. The submitted report shall include boring depth, sampling Frequency and types, and associated laboratory testing with results and conclusions, and follow the criteria in the *Virginia Stormwater Management Handbook*. Soil properties for Infiltration facilities shall also conform to the guidance and specification outlined in the *Virginia Stormwater Management Handbook*.

(q) The Drainage Design Plan should include the drainage characteristics of the entire Watershed. The capacity of the receiving channels and conveyance should be addressed.

NOTE: *To avoid subjectivity, "entire Watershed" should be specifically defined based on a designated Hydrologic Unit Code(s) (HUC) or Watershed. This will provide the specific geographic area within which the applicant is required to evaluate downstream impacts.*

(r) Maintenance Requirements

i. The design and planning of all stormwater management facilities shall include detailed maintenance procedures to ensure their continued function. These maintenance plans will identify the parts or components of a Stormwater Management Facility that need to be maintained and the equipment and skills or training necessary. Provisions for the periodic review and evaluation of the effectiveness of the maintenance program and the need for revisions or additional maintenance procedures shall be included in the plan.

ii. The applicant must ensure access to all stormwater treatment facilities at the Site for the purpose of inspection and repair by securing all the maintenance easements needed on a permanent basis. These easements will be recorded with the plan and will remain in effect even with the transfer of title to the property.

iii. Prior to the issuance of any Land Disturbance Permit that has a Stormwater Management Facility as one (1) of the requirements of the permit, the applicant or owner of the Site must execute a maintenance easement agreement that shall be binding on all subsequent owners of land served by the Stormwater Management Facility.

NOTE: ***Maintenance Agreement –*** *This Model Ordinance includes a sample Maintenance Agreement that may be utilized for the requirements in this section.*

iv. All maintenance, inspections, and cleaning shall be the responsibility of the Homeowners Association or property owner. This shall be specified in the recorded maintenance agreement.

v. The <GOVERNING BODY> shall ensure that preventative maintenance is performed by inspecting all stormwater management systems. Inspections shall occur during the time frames noted in Article IV of this Ordinance, with all costs to be forwarded to the responsible party.

vi. The <GOVERNING BODY> engineer shall provide forms and request needed information for the conduction of such inspection.

NOTE: *The West Virginia legislature amended Sections 8-20-1 et seq. and 16-13-1 et seq. of the West Virginia Code in 2001 to authorize municipalities to include the operation and management of stormwater systems as part of a municipal combined waterworks and sewerage system.*

The City of Morgantown has adopted an ordinance that establishes a Stormwater Utility and delegates authority of the Stormwater Utility to a Utility Board (see Attachment B).

NOTE: ***Maintenance of Stormwater Facility –*** *The Governing Body may establish a Stormwater Utility that will have the responsibility of operating and managing the stormwater systems as part of a combined waterworks and sewerage system. Further, the Stormwater Utility is authorized to charge and collect fees established by the Governing Body for storm, flood, and surface drainage services.*

(s) The applicant must present a detailed Landscaping plan describing the woody and herbaceous vegetative stabilization and management techniques to be used within and adjacent to the stormwater facilities and bodies of water.

i. The Landscaping plan must also describe who will be responsible for the maintenance of vegetation at the Site and what practices will be employed to ensure that adequate vegetative cover is preserved.

ii. This plan must be prepared by a Registered Landscape Architect familiar with the selection of emergent and upland vegetation appropriate for the selected BMP.

(t) All land disturbance activities that adjoin a watercourse or portion thereof shall clearly depict upon a Site plan the proposed stream buffer or methods of preserving an existing natural stream buffer pursuant to Article IV.G. of this Ordinance.

(u) Any applicant engaged in clearing, grading, and excavating activities that disturb one (1) acre or more, including smaller Sites in a larger Common Plan of Development or sale, are required to obtain a West Virginia NPDES General Water Pollution Control Permit for their stormwater discharges. Construction Sites that result in land disturbance of one (1) acre or greater will require the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) meeting the requirements of the General Permit.

(v) The applicant shall provide verification to the <GOVERNING BODY> that all other applicable environmental permits have been acquired for the Site prior to approval of the stormwater design plan.

(3) Permit Application Procedure

(a) Applicants may apply for Land Disturbance Permits after approval of the corresponding Site Plan.

(b) A copy of the permit application submitted to the West Virginia DEP shall be forwarded to the <GOVERNING BODY> for review. This copy shall be provided by the Applicant.

(c) Within 45 days of the receipt of a complete Land Disturbance Permit Application, including all documents as required by this Ordinance, the <GOVERNING BODY> shall inform the applicant whether the application, plan, and maintenance agreement are approved or disapproved.

(d) If the Land Disturbance Permit Application is denied, the <GOVERNING BODY> shall communicate the decision to the applicant in writing. The applicant may then revise the Stormwater Management Plan. If additional information is submitted, the <GOVERNING BODY> shall have 30 days from the date the additional information is received to inform the applicant that the plan is either approved or denied.

(4) If the Land Disturbance Permit Application is approved by the <GOVERNING BODY>, the following conditions apply:

(a) The applicant shall comply with all applicable requirements of the approved plan and this Ordinance and shall certify that all land clearing, construction, land disturbance, and/or drainage will be done according to the approved plan.

(b) The Land Disturbance Activity shall be conducted only within the area specified in the approved plan.

(c) The <GOVERNING BODY> shall be allowed, after giving notice to the owner, occupier, or operator of the Land Disturbance Activity, to conduct periodic inspections of the project.

(d) The person responsible for implementing the approved plan shall conduct monitoring and submit reports as the <GOVERNING BODY> may require to ensure compliance with the approved plan and to determine whether the plan provides effective stormwater management.

(e) No changes may be made to an approved plan without review and written approval by the <GOVERNING BODY>.

(f) A certified inspection of all aspects of the BMP, including surface As-Built Surveys, and geotechnical inspections during subsurface or backfilling and compaction activities shall be required.

(5) A non-refundable permit fee will be collected at the time the Stormwater Management Plan is submitted. The permit fee will provide for the cost of plan review, administration, and management of the permitting process and inspection. A permit fee schedule shall be established by the <GOVERNING BODY> based upon the complexity of the project and may be amended from time to time.

ARTICLE III WAIVERS AND MODIFICATIONS OF REQUIREMENTS

A. GENERAL

(1) This Article is intended to provide a procedure to achieve the water quality and quantity objectives of this Ordinance while providing reasonable flexibility for difficult Site conditions and innovative Site design approaches.

(2) The provisions of this Ordinance are the minimum requirements for the protection of the public's health, safety, and welfare, and should be strictly adhered to. Written requests for waivers to or modifications of these requirements should be granted only where the requirement of strict adherence would be unreasonable, cause undue hardship, or an alternative standard can be demonstrated to provide equal or better results.

B. REQUEST FOR WAIVER OR MODIFICATION

(1) Every applicant defined under Article I.D. of this Ordinance shall submit a Stormwater Management Plan unless a written request for a waiver seeking relief from the stormwater management standards of this Ordinance is filed with the <GOVERNING BODY> and such request is granted by the <GOVERNING BODY>.

(2) If the applicant demonstrates to the satisfaction of the <GOVERNING BODY> that any stormwater management requirements of this Ordinance are unreasonable or cause undue hardship as it applies to the proposed Land Disturbance Activity(ies), the <GOVERNING BODY> may grant relief to such standards provided that such relief meets the findings specified under Section B.(4) below.

NOTE: *Local entities and/or the Governing Body should consider specific waiver requirements as they apply to local regulations and specific ordinance requirements.*

(3) The applicant shall submit all requests for waivers in writing to the <GOVERNING BODY> and shall include such requests as a part of the Stormwater Management Plan review and approval process as defined under Article II.C. of this Ordinance. The applicant shall state in full the facts of unreasonableness or hardship on which the request is based, the provision or provisions of the Ordinance that are involved, and the minimum waiver or relief that is necessary. The applicant shall state how the requested waiver and how the applicant's proposal shall result in an equal or better means of complying with the water quality and quantity objectives and requirements of this Ordinance.

(4) The <GOVERNING BODY> may grant waivers or a modification of requirements when the following findings are made, as relevant:

(a) The waiver will not create an adverse impact to water quality and water quantity.

(b) The waiver is the minimum necessary to provide relief.

(c) The applicant is *not* requesting a waiver based on cost considerations.

(d) Existing off-site stormwater problems will not be exacerbated.

(e) Runoff is not being diverted to a different drainage area.

(f) Increased flooding or ponding on off-site properties or roadways will not occur.

(g) Potential icing conditions will not occur.

(h) Increase of peak flow or volume from the Site will not occur.

(i) Erosive conditions due to increased peak flows or volume will not occur.

(j) Increased 100-year floodplain levels will not result.

(k) Increased or unusual municipal maintenance expenses will not result from the waiver.

(l) The amount of stormwater generated has been minimized to the greatest extent allowed.

(m) Infiltration of Runoff throughout the proposed Site has been provided where practicable, and Pre-development groundwater recharge protected at a minimum.

(n) Peak flow attenuation of Runoff has been provided.

(o) Long-term operation and maintenance activities are established.

(p) The <IMMEDIATE DOWNSTREAM WATERWAYS> will not be subject to each of the following criterion:

i. Deterioration of existing culverts, bridges, dams, and other structures

ii. Deterioration of biological functions or habitat

iii. Accelerated streambank or streambed Erosion or siltation

iv. Increased threat of flood damage to public health, life, and property

NOTE: *To avoid subjectivity, "immediate downstream waterways" should be specifically defined based on a designated HUC(s) or Watershed. This will provide the specific geographic area within which the applicant is required to evaluate downstream impacts.*

ARTICLE IV STORMWATER MANAGEMENT DESIGN CRITERIA

A. REFERENCE TO THE DESIGN MANUAL

(1) The <GOVERNING BODY> shall use the technical specifications and standards in the *Virginia Stormwater Management Handbook* as the tool for making decisions about stormwater permits and about the design, implementation, and performance of structural and nonstructural stormwater BMPs.

(2) The *Virginia Stormwater Management Handbook* includes a list of stormwater treatment practices, including the specific design criteria for each stormwater practice. Stormwater treatment practices that are designed, constructed, and maintained in accordance with these design and sizing criteria will be presumed to meet the minimum water quality performance standards. If the specifications or guidelines found therein are more restrictive than other requirements, that shall not prevent application of the specifications or guidelines in the *Virginia Stormwater Management Handbook*.

B. GENERAL PERFORMANCE CRITERIA

NOTE: *Design standards in other sections of the <GOVERNING BODY's> ordinances should be evaluated for their impact on generating stormwater Runoff. Parking stall sizes, parking space quantities, roadway widths, and area requirements can work against the minimization of stormwater generated.*

(1) LID is a stormwater management method that is modeled after nature. LID is unique to each site and uses both structural and nonstructural practices to control runoff close to where it falls. LID is recommended as the standard stormwater management practice.

(a) The use of LID and BMPs in conjunction with traditional stormwater management shall control stormwater Runoff at the source and more closely approximate Pre-development Runoff conditions.

(b) Karst Terrain Considerations

(i) Developers and designers shall minimize the amount of Impervious Cover created at the Site to reduce the volume and velocity of stormwater Runoff generated.

(ii) Developers and designers shall place a high priority on preserving as much of the length of natural Karst swales present on the Site to increase Infiltration and accommodate flows from major storm events.

NOTE: *An underground injection control permit is not required for stormwater management ponds unless there is a sinkhole in the pond or if the discharge from the pond discharges into a sinkhole. Liners are not required in all ponds, but a liner may be required by the DEP.*

(iii) Developers and designers should consider small-scale LID practices as prescribed in the latest version of the Chesapeake Stormwater Network Technical Bulletin No. 1, "Stormwater Design Guidelines for Karst Terrain in the Chesapeake Bay Watershed."

(c) LID stormwater management design plans developed consistent with the requirements of this subsection shall satisfy the water quality and quantity performance criteria of this Ordinance.

(d) The design criteria, hydrologic analysis, and computational procedures for LID stormwater management design plans shall be those of the latest edition of the *Virginia Stormwater Management Handbook*.

(e) LID stormwater management design plans shall not conflict with existing state or <GOVERNING BODY> laws, ordinances, regulations, or policies.

(f) Storm drainage easements shall be recorded to identify the locations of integrated management practices on lots or parcels. The property owner shall not remove or structurally alter integrated management practices without prior written approval from the <GOVERNING BODY>.

(g) Stormwater Runoff from parking lots shall utilize stormwater management Infiltration facilities and/or stormwater management filtering systems. These shall be placed within or near the parking lot islands.

NOTE: *Stormwater from parking lots may be infiltrated into the groundwater, provided that they do not meet the definition of a Class V well with regard to stormwater. A list of stormwater BMPs that are considered Class V wells is found at the following link:*

http://www.dep.wv.gov/WWE/Programs/stormwater/MS4/permits/Documents/ClassV_Well_IdentificationGuide[1].pdf

If the BMP is considered a Class V well, an Underground Injection Control Permit (UIC Permit) will be required from the DEP.

NOTE: ***Low Impact Developments –*** *LID techniques are not specifically addressed in the* Virginia Stormwater Management Handbook*.*

(2) All applicants shall design stormwater control facilities to achieve Post-development hydrologic conditions that are consistent with Pre-development conditions and to improve Runoff conditions for Redevelopment.

(3) The Site shall maintain, as closely as possible, the Pre-development Infiltration processes and rates by implementing Infiltration close to the source of Runoff.

(4) Stormwater shall be treated to reduce pollutants during conveyance and collection.

(5) Peak flows shall be attenuated to prevent high Runoff rates and subsequent flooding of the receiving stream.

(6) Site design should implement Runoff reduction techniques to reduce the amount of stormwater that must be collected, conveyed, and treated by stormwater management facilities.

(7) The applicant shall improve Runoff conditions for Redevelopment projects.

C. STORMWATER QUALITY CRITERIA

(1) Stormwater quality treatment is required for all discharges. If stormwater quantity control does not provide for stormwater quality control, then a BMP shall be utilized prior to the Runoff entering the stormwater quantity control facility.

(2) Stormwater quality control facilities shall reduce solids, sediment, nutrients, and other pollutants from the stormwater. This shall be presumed to occur when each of the following criteria is met:

(a) The facility is sized to capture the prescribed volume of water.

(b) The facility is designed per the requirements and engineering calculations in the latest edition of the *Virginia Stormwater Management Handbook*

(c) The facility is constructed in accordance with all applicable plans and permits.

(d) The facility is maintained per an approved Operations and Maintenance Agreement.

NOTE*: Water quality calculations and requirements can be found in the latest edition of the* Virginia Stormwater Management Handbook *(chapter 5). The handbook contains procedures for complying with the water* ***quality*** *criterion outlined in the stormwater management regulations. The water quality criterion represents a consolidation of the requirements of three (3) state agencies charged with the responsibility of monitoring and improving the water resources of the Commonwealth of Virginia: the Department of Conservation and Recreation (DCR), the Department of Environmental Quality (DEQ), and the Chesapeake Bay Local Assistance Department (CBLAD).*

NOTE: *West Virginia has developed a spreadsheet that determines how many pollutants are removed from stormwater based on other environmental findings and proposed BMPs. The spreadsheet represents an option for the <GOVERNING BODY> to use to enforce stormwater quality regulations. The spreadsheet developed by the West Virginia Department of Environmental Protection can be found at the following website:*

http://www.dep.wv.gov/WWE/Programs/stormwater/MS4/workshops/pages/Default.aspx

NOTE: *Total Dissolved Solid (TDS) control standards shall be achieved through NPDES Regulations as prescribed in the NPDES Permit.*

The NPDES general permit requires that permittees meet local government requirements and/or criteria for post development stormwater management in order to satisfy the appropriate requirements of the federal Clean Water Act.

If a Municipal Separate Storm Sewer System (MS4) discharges into a water body with an approved TMDL, and the TMDL contains requirements for control of pollutants from the MS4 stormwater discharges, then the Stormwater Management Plan must include BMPs specifically targeted to achieve the wasteload allocations prescribed by the TMDL.

(3) Infiltration of Runoff shall be as close to the source of Runoff as possible via Infiltration testing and analysis of Infiltration rates. Preference shall be given to a combination of surface and subsurface Infiltration measures.

(4) Site design shall minimize disturbance. All grading should be designed to distribute Runoff evenly. Areas of depression should be designed for subsurface Infiltration techniques.

(5) Stormwater discharges from land uses or activities with a high potential for pollutant loadings (Stormwater Hotspots) require the use of specific filtering or Bioretention BMPs prior to Infiltration. Stormwater control from these hotspots shall be controlled by the following:

(a) In addition to a Stormwater Management Plan as required in Article II.A.(2), a SWPPP shall also be required. The SWPPP outlines pollution prevention and treatment practices that will be implemented to minimize polluted discharges from the Site. All SWPPPs shall be prepared following the guidelines in the West Virginia NPDES General Permit regulations even if an NPDES permit is not required.

(b) A minimum of 50% of the total water quality volume must be treated by a filtering or Bioretention practice prior to any Infiltration. Portions of the Site that are not associated with the hotspot generating area should be diverted away and treated by an acceptable stormwater BMP.

(c) In these cases, an alternative stormwater practice such as closed Bioretention, Sand Filters, or constructed wetland must be used to filter the entire water quality volume before it reaches surface or groundwater.

NOTE: *Table IV-1 is not considered an all-inclusive listing of Stormwater Hotspots. The following language or something similar is recommended: Land uses that may include certain industrial activities known to create polluted stormwater may be subject to these regulations as determined by the <GOVERNING BODY>.*

Table IV-1: Potential Stormwater Hotspot Land Uses

Potential Stormwater Hotspot Operation	SWPPP Required	Restricted Infiltration	Infiltration Prohibited
Facilities with NPDES industrial permits	Yes	☐	☐
Public works yard	Yes		✓
Auto and metal recyclers/scrap yards	Yes		✓
Petroleum storage facilities	Yes		✓
Highway maintenance facilities	Yes		✓
Wastewater, solid waste, composting facilities	Yes		✓
Industrial machinery and equipment	Yes	✓	
Trucks and trailers	Yes	✓	
Aircraft maintenance areas	Yes		✓
Fleet storage areas	Yes		✓
Parking lots (40 or more parking spaces)	No	✓	
Gas stations	No		✓
Highways (2,500 Average Daily Traffic)	No	✓	
Construction business (paving, heavy equipment storage and maintenance)	No	✓	
Retail/wholesale vehicle/equipment dealers	No	✓	
Convenience stores/fast food restaurants	No	✓	
Vehicle maintenance facilities	No		✓
Car washes (unless discharged to sanitary sewer)	No		✓
Nurseries and garden centers	No	✓	
Golf courses	No	✓	

Key: ☐ depends on facility ✓ Yes

Shaded Area: Facilities or operations not technically required to have NPDES permits, but can be designated as potential Stormwater Hotspots by the <GOVERNING BODY>, as part of its local water ordinance

Source: Chesapeake Stormwater Network Technical Bulletin No. 1, "Stormwater Design Guidelines for Karst Terrain in the Chesapeake Bay Watershed," version 2.0 (June 2009)

NOTE: *The Governing Body may add more quantifiable standards regarding activities with a "high potential for pollutant loadings." Further, additional categories of land use(s) may be added to this listing.*

(6) Natural wetlands shall not be used to meet minimum requirements. When used as the end of an outfall pipe, the velocity shall not exceed two (2) feet per second for the two (2)-year storm event and it shall be demonstrated that the discharge will not create Erosion.

(7) For all new development activities, each of the following regulations shall apply:

(a) Stormwater management practices that provide or encourage Infiltration shall be considered first and foremost in all Site designs.

(b) Stormwater quality management practices shall be designed to capture and treat the first 1 inch of stormwater runoff from the Impervious Cover of development.

NOTE: *The <GOVERNING BODY> may change the stormwater quality regulations to capture and treat the first 1.5- or 2-inches of stormwater runoff from the impervous area of development if desired. A majority of the pollutants found in stormwater are found in the early stages of an event (i.e., the first 1 to 2 inches).*

(c) Stormwater quality may be achieved with or as part of Infiltration practices.

(d) Stormwater quality improvement shall be provided for on-site drainage areas not otherwise addressed by Infiltration practices.

(e) Stormwater shall be infiltrated and/or discharged within the same drainage area of the stream receiving the Runoff prior to development.

(8) Infiltration methods should be designed to infiltrate all of the stored volume within 48 hours of the storm event.

(9) All inflows to an Infiltration area shall be treated to prevent the discharge of sediment into the infiltration practice.

NOTE: *When a porous pavement surface is installed on private lots, property owners will need to be educated on their routine maintenance needs, understand the long-term maintenance plan, and be subject to a deed restriction or other mechanism enforceable by the <GOVERNING BODY> to help ensure that the pervious paver system is maintained and functioning.*

The deed restriction or mechanism should contain maintenance responsibilities and needs. If possible, it should grant authority for the <GOVERNING BODY> to access the property for inspection or corrective action. A note with regard to the deed restriction shall also be placed on the approved plans and in the required maintenance agreement.

(10) During Site construction, the Infiltration area shall be protected from compaction, storage of fill, or construction materials.

(a) Where sediment transport in the stormwater runoff is anticipated to reach the infiltration system, appropriate permanent measures to prevent or collect sediment shall be installed prior to discharge to the infiltration system.

(11) For Redevelopment activities, water quality improvements shall be provided for drainage areas not otherwise addressed by Infiltration practices either at the source of Runoff and/or during conveyance away from the source of Runoff. Stormwater quality management shall be designed to capture and treat the first 1 inch of stormwater runoff from the Impervious Cover of development.

NOTE: *The <GOVERNING BODY> may change the stormwater quality regulations to capture and treat stormwater Runoff generated by the 1.5- or 2-inch rainfall event if desired. A majority of the pollutants found in stormwater are found in the early stages of an event (i.e., the first 1 to 2 inches).*

D. STORMWATER QUANTITY CRITERIA

(1) Figures for determining the rainfall amounts for the Design Storms shall be obtained from the latest edition of the *West Virginia Division of Highways, 2007 Drainage Manual* available from the following Web site (see Attachment E): http://www.transportation.wv.gov/highways/engineering/Pages/publications.aspx

(2) Wooded sites shall use a ground cover of woodland in good condition. Portions of a Site having more than one (1) viable tree of a DBH of six (6) inches per 1,500 square feet shall be considered wooded where such trees existed within three (3) years of application.

NOTE: *The intent of Section D.(2) (above) is to recognize woodland conditions and not to encourage tree harvesting.*

(3) The applicant must demonstrate that adequate downstream conveyance facilities are present.

(4) Drainage easements that will establish operation and maintenance for on-site properties shall be obtained.

(5) Runoff calculations should be determined using one (1) of the methods outlined in the latest version of the *Virginia Stormwater Management Handbook*. The applicant should include justification of the method selected.

NOTE: *The <GOVERNING BODY> may select specific methods of determining stormwater calculations if certain methods are desirable.*

(6) For all new Land Development projects, the Post-development Peak Discharge rate shall not exceed the Pre-development peak rate for the 2-year, 10-year, 25-year, 50-year, and 100-year storm events.

NOTE: *The <GOVERNING BODY> may select specific storm events for determining stormwater Runoff.*

(a) Where the Runoff volume requirements in Section D.(6) cannot be met, the applicant may file for a modification of stormwater requirements, provided that the following can be obtained:

i. The applicant must prove to the <GOVERNING BODY> that the requirements in Section D.(6) cannot be met.

ii. The Post-development Peak Discharge rate shall not exceed the Pre-development peak rate for the two (2)-year and 10-year storm events.

iii. For events greater than the 10-year event, the Post-development rate shall not exceed 110% of the Peak Discharge rate given Pre-development cover.

(b) Facilities capable of attenuating the required Runoff shall be designed to attenuate the one (1)-year, 24-hour storm event and release it over a minimum period of 24 hours. The release rate will be based on the receiving stream's ability to contain the discharge within the existing stream banks.

(7) If a high water table or other constraints exist, the following hierarchy should be followed in order of preference:

(a) BMPs that capture and infiltrate or permanently retain on-site the total volume of the first 1.5-inches

(b) If the applicant can demonstrate through on-site soil evaluations that conditions do not allow for item (7)(a), then BMPs that capture and infiltrate or otherwise permanently retain the largest percentage of the total volume of the 1.5-inch, 24-hour storm event

(c) Infiltration practices shall be designed that capture and infiltrate at least the first 0.5 inches of Runoff from all impervious areas. If the volume of Runoff is greater than the volume to be infiltrated or retained, the difference should be treated by an acceptable BMP.

(8) Infiltration areas shall be designed to encourage broad and even Infiltration patterns similar to what existed in Pre-development conditions.

(9) Above-ground Infiltration facilities shall be as shallow as possible while still complying with this Ordinance.

(10) Water quality improvements shall be achieved in conjunction with or as part of Infiltration design.

(11) If a stormwater basin is being utilized to achieve stormwater attenuation, BMP practices for stormwater quality shall be considered in the design of the basin.

(12) Site hydrology and natural Infiltration patterns shall guide Site design, construction, and vegetation decisions.

(13) Structural and nonstructural stormwater management practices that promote or otherwise make best possible use of on-site Infiltration shall be considered first.

(14) Infiltration into Karst Terrain is encouraged only when it is determined that the possibility for subsidence and sinkholes is minimal. Concentrated flows or points of discharge are discouraged in these areas (refer to Article IV, Section E).

(15) For Redevelopment activities, one (1) of the following standards shall be accomplished. Selection of these performance standards shall be based on suitability as determined by the <GOVERNING BODY's> Professional Engineer.

(a) Reduce Impervious Cover by at least 20% based on a comparison of existing Impervious Cover to proposed Impervious Cover.

(b) Achieve a 10% reduction in volume of Runoff discharged by a two (2)-year storm event. Runoff calculations shall be based on a comparison of existing to proposed Site conditions.

(c) Reduce Post-development Peak Discharge rates to 90% of the Pre-development rates for the 2-year, 10-year, 25-year, 50-year, and 100-year, 24-hour storm events based on a comparison of existing ground cover to Post-development Site conditions.

(16) Land disturbance activities that can discharge directly to a main channel, major tributary(ies), or indirectly to the main channel through an existing stormwater drainage system (i.e., storm sewer or tributary) may do so without controlling the Post-development peak rate of Runoff beyond the two (2)-year storm event.

(a) These sites shall comply with the Infiltration criteria and the water quality criteria established in this Ordinance and one (1) of the following:

(i) If the Post-development Runoff is intended to be conveyed by an existing stormwater drainage system to the main channel, assurance must be provided that such system has adequate capacity to convey the flows created by the two (2)-year storm event during Post-development conditions within its banks

(ii) The conveyance facility will be provided with improvements to furnish the required capacity to convey the flows created by the two (2)-year storm event during Post-development conditions within its banks.

(b) In addition, an evaluation of the impact to the stream shall be completed. The following information shall be included in the evaluation:

(i) Hydrologic and hydraulic calculations for Pre-development and Post-development conditions that are necessary to determine the impact of hydrograph timing modifications due to the proposed development upon any dam, highway, structure, natural point of restricted flow, or any stream channel section shall be established with the concurrence of the <GOVERNING BODY>.

(ii) The evaluation shall continue downstream until the increase in flow diminishes due to additional flow from tributaries and/or stream attenuation.

(c) Any natural or man-made channel or swale must be able to convey the increased Runoff associated with the two (2)-year storm event within the banks.

(d) Any natural or man-made channels or swale must be able to convey the increased 25-year storm event without creating any hazards to persons or property.

(e) Any culvert, bridge, storm sewer, or any other facility that is designed to pass or convey flows from the tributary area must demonstrate the ability to pass the Post-development 25-year storm event.

E. SOIL STUDIES AND KARST TERRAIN REQUIREMENTS

(1) Soil Infiltration testing shall be performed to determine the rate at which stormwater will permeate into the ground, thus preventing stormwater Runoff.

(2) Prior to soil Infiltration testing, a soil evaluation shall be completed to determine where the Infiltration testing should take place. Soil evaluations should be performed by a Professional Engineer.

(3) At a minimum, the soil evaluation shall address soil types, soil permeability, depth to bedrock, limitations of soils, presence/absence of Karst Terrain susceptibility to subsidence and/or sinkhole formation and subgrade stability. This testing should be completed during the preliminary design stage.

(4) Soil Infiltration testing shall be completed for all developments or Redevelopments that are proposing to utilize Infiltration methods for stormwater management.

(a) Soil Infiltration testing shall be performed at the same depth as the bottom of the proposed Infiltration area.

(b) The location and method of soil Infiltration testing should be determined using percolation test techniques described in West Virginia Title 64, Bureau for Public Health Series 47, Sewage Treatment and Collection System Design Standards.

(5) In regions underlain by Karst Terrain, a preliminary Site investigation regarding Site-specific conditions shall be completed. If necessary, the investigation shall be followed by a detailed Site investigation.

(a) The preliminary Site investigation(s) shall be completed as noted in the latest version of the Chesapeake Stormwater Network Technical Bulletin No. 1, “Stormwater Design Guidelines for Karst Terrain in the Chesapeake Bay Watershed” and the *Virginia Stormwater Management Handbook*.

(b) All necessary investigations as noted in the above-referenced bulletin shall be completed by a qualified Professional Engineer, licensed by the State of West Virginia and experienced in working in Karst Terrain.

NOTE: *Section E.(5) may be removed in areas that do not contain Karst Terrain.*

F. LANDSCAPING

NOTE: *Many governing bodies require Landscaping as part of stormwater management. However, these regulations may already be addressed in a Subdivision and Land Development Ordinance. Listed below is an example of the Landscaping that may be required for structural BMPs. Other types of BMPs include Riparian buffers, constructed wetlands, etc.*

(1) The applicant must present a detailed Landscaping plan describing the woody and herbaceous vegetative stabilization and management techniques to be used within and adjacent to the stormwater facilities. The Landscaping plan must also describe who will be responsible for the maintenance of vegetation at the Site and what practices will be employed to ensure that adequate vegetative cover is preserved. This plan must be prepared by a qualified individual familiar with the selection of emergent and upland vegetation appropriate for the selected BMP.

(2) Landscaping shall be required in and around all constructed stormwater management practices with a minimum surface area of 1,000 square feet.

(3) No woody plants shall be planted within the saturated zone or on a berm constructed for impounded water.

G. RIPARIAN BUFFERS

Any property that adjoins a watercourse or portion thereof shall provide a stream buffer with the following standards. The stream buffer requirements shall include two (2) zones. These stream buffer requirements are to be established and protected, as defined below:

(1) Zone 1, a 30-foot setback zone, measured from the top of the bank of the watercourse, where no disturbance of vegetation and soil except for restoration shall occur

(2) Zone 2, a managed buffer zone, extending a distance equal to 40 feet outward from Zone 1 or to the 100-year floodplain boundary, whichever is larger, where disturbance of natural vegetative cover shall be limited to any of the following activities:

(a) Corridor crossings for farm vehicles and livestock

(b) Public roads and improvements

(c) Corridor crossings for roads and railroads

(d) Public utility crossings including but not limited to sewer, water, and electric

(e) Passive recreation uses

(f) Streambank improvement projects

(g) Any activity, as approved by the <GOVERNING BODY>, which will minimally disrupt existing tree cover and soil mantle in order to maximize filtering and overall physical removal of particulate-form pollutants from stormwater Runoff

ARTICLE V CONSTRUCTION INSPECTION

NOTE: *The <GOVERNING BODY> should review the bonding requirements posted in any applicable ordinances to ensure that a posted bond for stormwater facilities is not already required. If a posted bond is already required, the following section may be removed, or changed to duplicate the existing regulation.*

A. PERFORMANCE BOND

(1) The <GOVERNING BODY> shall require from the developer a surety, irrevocable letter of credit, or other means of security acceptable to the <GOVERNING BODY> prior to the issuance of any permits for the construction of a development requiring a Stormwater Management and/or Erosion and Sediment Control Plan.

(2) The amount of the security shall not be less than the total estimated construction cost of the required items covered in this Ordinance, plus a 15% contingency factor to cover administrative and engineering costs in the event of default and potential damage to existing roads or utilities.

(a) The amount of security shall be based upon the current market rates plus labor rates for installation. The total estimated construction cost should be reviewed, signed, and sealed by a Licensed Professional Engineer prior to submission to the <GOVERNING BODY>.

(b) The amount of security based on the current market rates plus labor rates for installation shall be reviewed and approved by the <GOVERNING BODY> or agents thereof prior to approval of the performance bond.

(3) The bond required in this section shall include provisions relative to the forfeiture for failure to complete work specified in the approved plans, permits, compliance with the provisions of this Ordinance, and other applicable laws and regulations and any time limitations.

(4) The bond shall not be fully released without each of the following:

(a) A final inspection of the completed work by the <GOVERNING BODY> or agents thereof

(b) Submission of “As-Built” plans and certification of completion by the <GOVERNING BODY> that the Stormwater Management Plan and facilities comply with the requirements of the approved plan and the provisions of this Ordinance.

B. INSPECTIONS DURING CONSTRUCTION

NOTE: *The <GOVERNING BODY> should determine who will incur the cost of construction inspections and include language in this Model Ordinance. This cost is typically paid by the developer. The <GOVERNING BODY> will normally retain a reviewing engineer who inspects during construction.*

(1) Periodic inspections of the stormwater management facilities during construction shall be conducted by the <GOVERNING BODY> or agents thereof. Construction inspections shall utilize the approved Stormwater Management Plan to establish whether the applicant is in compliance.

(2) All inspections shall be documented by a written report prepared by the <GOVERNING BODY> or agents thereof and include each of the following:

(a) The date of the inspection

(b) The project location

(c) A statement regarding compliance with the approved stormwater plan

(d) Documentation of any variations from the approved stormwater plan

(e) Any other variations or violations regarding the on-site conditions as compared to the approved stormwater plan

(3) The applicant shall be notified in writing of any violations and the required corrective actions.

(4) Additional work shall not proceed until the <GOVERNING BODY> or agents thereof inspect and approve all the facilities in violation. The applicant shall be notified in writing of the inspection and any outstanding violations.

(5) For enforcement purposes, the <GOVERNING BODY> may utilize any combination of the following:

(a) A notice of violation that specifies the need for correction may be used.

(b) A stop-work order may be issued by the <GOVERNING BODY>.

(c) The bonds or securities may be held or the case can be referred for legal action if reasonable efforts to correct the violation have not been attempted.

(d) A civil action or criminal prosecution may be brought against any person in violation of this Ordinance.

C. POST-CONSTRUCTION FINAL INSPECTION AND AS-BUILT PLANS

(1) Upon completion of a project, and before an occupancy permit is issued, the applicant is required to certify that the completed project is in accordance with the approved Stormwater Management Plan.

(2) All applicants shall submit actual "As-Built" plans and a certification letter from the design Professional Engineer for all stormwater management facilities or practices after final construction is completed. The plan shall include final design specifications for all stormwater facilities and must be certified by a Professional Engineer or a Professional Land Surveyor.

(a) The applicant shall submit two (2) copies of the As-Built plans and the certification letter to the <GOVERNING BODY>. The plans shall be prepared and signed by a Professional Engineer or a Professional Land Surveyor.

(b) The As-Built plans and certification letter shall accompany the request for bond release in accordance with section Article V.A. of this Ordinance.

(c) The required certification letter must state that the conditions on the Site and the As-Built plan are identical to the facilities shown on the final approved Site Plan. The certification letter should be completed, signed, and stamped by the design Professional Engineer.

i. Changes made during the construction process will not be permitted without prior written approval from the <GOVERNING BODY> or agents thereof.

ii. At a minimum, all As-Built plans and certification letters shall include a red-lined set of drawings that compare the approved Stormwater Management Plan with what was constructed. Final acceptance and approval will not be given until all final inspections and As-Built plans have been approved.

(d) The following items shall be surveyed to determine actual field conditions, and the approved Site plans as annotated to reflect such actual field conditions shall constitute the As-Built plans.

NOTE: *This list may be adjusted to require more or less information as determined by the <GOVERNING BODY>. The <GOVERNING BODY> may consider adding the following additional requirements:*

1. Volume of the proposed facilities

2. LID details and structures

i. The location, material, and size of all piping and all manholes, inlets, cleanouts, and points of connection to the existing system shall be referenced in two (2) perpendicular directions.

ii. The location of mains located within the public right-of-way shall be surveyed.

iii. Horizontal dimensions shall be to the nearest tenth of a foot, and vertical dimensions shall be to the nearest hundredth of a foot.

iv. Runs of storm sewers shall be identified.

v. Elevations shall be given for the north rim of the top of all manhole covers, inlets, and catch basins, and all manhole, inlet, and catch basin inverts.

vi. Elevations shall be given for all outlet structures.

vii. Storm drain, manhole, inlet, and catch basin types shall be identified.

viii. All infiltration and runoff reduction facilities including nonstructural practices.

(3) The <GOVERNING BODY> shall perform a final inspection prior to the release of any performance bonds or securities.

ARTICLE VI POST-CONSTRUCTION MAINTENANCE, INSPECTION, AND REPAIR OF STORMWATER FACILITIES

NOTE: *The West Virginia legislature amended Sections 8-20-1 et seq. and 16-13-1 et seq. of the West Virginia Code in 2001 to authorize municipalities to include the operation and management of stormwater systems as part of a municipal combined waterworks and sewerage system.*

The City of Morgantown has adopted an ordinance that establishes a Stormwater Utility and delegates authority of the Stormwater Utility to a Utility Board (see Attachment B).

The City of Bluefield has adopted an ordinance that establishes flat rate charges and land-based rate charges. This ordinance also describes usage of the funds (see Attachment C).

A. INSPECTION AND MAINTENANCE AGREEMENT

(1) Prior to the approval of any Land Disturbance Activity for which stormwater management is required, the <GOVERNING BODY> shall require the applicant or owner to execute an Inspection and Maintenance Agreement (see Attachment D) binding on all subsequent owners of land served by a private Stormwater Management Facility. Such agreement shall provide for access to the facility at reasonable times for regularly scheduled inspections by the <GOVERNING BODY> or the authorized representative to ensure that the facility is maintained in proper working condition to meet design standards.

(2) The agreement shall be recorded by the applicant and/or owner in the land records of the <COUNTY> office of the Clerk and the <GOVERNING BODY> as required.

(3) The agreement shall also provide that, if after notice by the <GOVERNING BODY> to correct a violation found during inspection or requiring maintenance work, satisfactory corrections are not made by the owner(s) within a period of ~~45~~ 90 days or as agreed to by the <GOVERNING BODY>, the <GOVERNING BODY> may perform all necessary work to place the facility in proper working condition. The owner(s) of the facility shall be assessed the cost of the work and any penalties. This may be accomplished by placing a lien on the property.

(4) The Inspection and Maintenance Agreement shall be reviewed and approved by the <GOVERNING BODY> prior to approval of the Land Development Plan.

B. INSPECTION AND MAINTENANCE OF STORMWATER FACILITIES

(1) The party responsible for the maintenance of stormwater management facilities constructed pursuant to this Ordinance shall maintain in good condition and promptly repair and restore all grade surfaces, walls, drains, dams and structures, vegetation, Erosion and sediment control measures, and other protective devices. Such repairs or restoration and maintenance shall be in accordance with approved plans.

(2) A maintenance schedule shall be developed for the life of any Stormwater Management Facility. This maintenance schedule shall be printed on the approved Stormwater Management Plan. All stormwater maintenance schedules must be incorporated by the Homeowners Association and included on the deed, Inspection and Maintenance Agreement, plans, offer of sale of real property, and purchase agreement.

(3) The party responsible for the maintenance of the stormwater management system shall provide written records of all maintenance and repairs to the <GOVERNING BODY>.

(4) The <GOVERNING BODY> shall ensure that preventative maintenance is performed by inspecting all stormwater management systems. Inspection shall occur at the following times:

(a) The first year of operation

(b) A minimum of at least one (1) time every three (3) years after the first year of operation

(c) After the two (2)-year, 24-hour storm event

(d) Based upon complaints or other notice of possible violations

(5) Inspection Report Requirements

(a) Inspection Reports shall be written and maintained by the <GOVERNING BODY> for all stormwater management systems.

(b) A copy of the Inspection Report shall be provided to the party responsible for the maintenance of the stormwater management.

(c) Inspection Reports for stormwater management systems shall include the following:

i. Date of inspection

ii. Location and address of facility

iii. Name of inspector

iv. Condition of the following:

1. Vegetation or filter media
2. Fences or other safety devices
3. Spillways, valves, or other control structures
4. Embankments, slopes, and safety benches
5. Reservoir or treatment areas
6. Inlet and outlet channels or structures
7. Underground drainage
8. Sediment and debris accumulation in storage and forebay areas
9. Any nonstructural practices to the extent practicable
10. Any other item that could affect the proper function of the stormwater management system

ARTICLE VII ENFORCEMENT AND PENALTIES

NOTE: *The <GOVERNING BODY> should consider whether a violation of this Model Stormwater Ordinance constitutes a violation of the Zoning Ordinance, Subdivision and Land Development Ordinance, or Building Code Regulations and may wish to make amendments to those regulations accordingly.*

A. GENERAL PROCEDURES

Any failure to comply with the requirements of this Ordinance or the requirements of an approved Stormwater Management Plan or permit may be subject to the enforcement actions outlined in this section. Any such action or inaction that is continuous with respect to time is deemed to be a public nuisance and may be abated by injunctive or other equitable relief. The imposition of any of the penalties described below shall not prevent such equitable relief.

B. VIOLATIONS

(1) When a person or persons has failed to comply with the terms and conditions of a permit, an approved Stormwater Management Plan, or the provisions of this Ordinance, the <GOVERNING BODY> shall issue a written notice of violation to the applicant or responsible party.

(2) When a person or persons is engaged in an activity covered by this Ordinance without having a secured permit for such, a notice of violation shall be served on the owner or the responsible person in charge of the activity being conducted on the Site.

(3) A Notice of Violation shall contain the following information:

(a) The name and address of the landowner or the person responsible for the activity

(b) The physical address and location of the activity and a description of the activity

(c) A statement that explains the violation

(d) A written statement explaining how to bring the action or inaction into compliance with the permit, Stormwater Management Plan, or the Ordinance, and the deadline for compliance

(e) Penalty or penalties that may be assessed

(f) A statement that the determination of violation may be appealed to the <GOVERNING BODY> within 30 days of the Notice of Violation

C. STOP-WORK ORDERS

(1) The <GOVERNING BODY> may issue a stop-work order that shall be served on the applicant or other responsible person.

(2) The stop-work order shall remain in effect until one (1) of the following occurs:

(a) The applicant or other responsible person has taken the remedial measures set forth in the notice of violation.

(b) The applicant has otherwise cured the violation or violations described therein.

(3) The stop-work order may be withdrawn or modified to enable the applicant or other responsible person to take the necessary remedial measures to cure such violation or violations.

D. DISAPPROVAL OF SUBSEQUENT PERMITS

As long as a violation of this Ordinance continues and remains uncorrected, the <GOVERNING BODY> may withhold or disapprove any request for permit or development approval or authorization required by this Ordinance, the Zoning Ordinance, the Subdivision and Land Development Ordinance, or a building regulation for the land on which the violation occurs.

E. HOLDS ON OCCUPATION PERMITS

The <GOVERNING BODY> may refuse to issue a certificate of occupancy for the building or other improvements constructed or being constructed on the Site and served by the stormwater practices in question until the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violations described therein.

F. SUSPENSION, REVOCATION, OR MODIFICATION OF PERMIT

The <GOVERNING BODY> may suspend, revoke, or modify the permit authorizing the Land Development project. A suspended, revoked, or modified permit may be reinstated after the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violations described therein, provided such permit may be reinstated to enable the applicant or other responsible person to take the necessary remedial measures to cure such violations.

G. CIVIL AND CRIMINAL PENALTIES

(1) In the event the applicant or other responsible person fails to take the remedial measures set forth in the notice of violation or otherwise fails to cure the violations described therein within 10 days, or such greater period as the <GOVERNING BODY> shall deem appropriate after the <GOVERNING BODY> has taken one (1) or more of the actions described in Article VII.D.–F., the <GOVERNING BODY> may impose a penalty not to exceed $1,000.00 (depending on the severity of the violation) for each day the violation remains after receipt of the notice of violation.

NOTE: *The <GOVERNING BODY> may consider increasing the required time to cure violations.*

(2) For intentional and flagrant violations of this Ordinance, the <GOVERNING BODY> may issue a citation to the applicant or other responsible person, requiring such person to appear in court to answer charges for such violation. Upon conviction, such person shall be punished by a fine not to exceed $1,000.00 or imprisonment for 60 days or both. Each act of violation and each day upon which any violation shall occur shall constitute a separate offense.

H. PROCEDURES

(1) When a violation of this Ordinance occurs, or is alleged to have occurred, any person may file a written complaint. Such complaint shall state fully the alleged violation and the basis thereof, and shall be filed with the <GOVERNING BODY>, which shall record the complaint. The <GOVERNING BODY> shall investigate the complaint.

(2) The <GOVERNING BODY> shall have the authority, upon presentation of proper credentials, to enter and inspect any land, building, structure, or premises to ensure compliance with this Ordinance.

ARTICLE VIII DEFINITIONS

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

1. Words used in the present tense include the future tense; the singular number includes the plural, and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.
2. The words “includes” or “including” shall not limit the term to the specific example but is intended to extend its meaning to all other instances of like kind and character.
3. The words “shall” and “must” are mandatory; the words “may” and “should” are permissive.
4. Words defined herein may be listed in a separate ordinance by a different definition. If this occurs, then the word shall be used and interpreted within each code in accordance with the specific definition contained therein.

NOTE: *Conflicting defined terms and regulations may arise from other regulations in the <GOVERNING BODY>. The <GOVERNING BODY> should make statements such as the one found in Article VIII (number 4 above) for conflicting regulations, fees, requirements, and definitions.*

Agricultural Activity - The occupation, business, or science of cultivating the land, producing crops, and raising livestock.

As-Built - Drawing or certification of conditions as they were actually constructed.

Best Management Practice (BMP) - Structural or nonstructural practice that is designed to minimize the impacts of changes in land use on surface and groundwater systems. Structural BMP refers to basins or facilities engineered for the purpose of reducing the pollutant load in stormwater Runoff, such as Bioretention, Constructed Stormwater Wetlands, etc. Nonstructural BMP refers to land use or development practices that are determined to be effective in minimizing the impact on receiving stream systems, such as preservation of open space and Stream Buffers, disconnection of impervious surfaces, etc.

Bioretention Basin - Water quality BMP engineered to filter the water quality volume through an engineered planting bed, consisting of a vegetated surface layer (vegetation, mulch, ground cover), planting soil, and sand bed (optional), and into the in-situ material; also called rain gardens.

Common Plan of Development – A contiguous construction project where multiple separate and distinct construction activities may be taking palce at different times on different schedules but under one plan. The “plan” is broadly defined as any announcement or piece of documentation or physical demarcation indicating construction activities may occur on a specific plot; included in this definition are most subdivisions.

Constructed Stormwater Wetlands - Areas intentionally designed and created to emulate the water quality improvement function of wetlands for the primary purpose of removing pollutants from stormwater.

Curve Number (CN) - A numerical representation of a given area's hydrologic soil group, plant cover, Impervious Cover, interception and surface storage derived in accordance with Natural Resource Conservation Service methods. This number is used to convert rainfall depth into Runoff volume. Sometimes referred to as a Runoff CN.

Design Storm - A selected rainfall Hyetograph of specified amount, intensity, duration, and Frequency that is used as a basis for design.

Detention - The temporary impoundment or holding of stormwater Runoff.

Detention Basin - A Stormwater Management Facility that temporarily impounds Runoff and discharges it through a hydraulic outlet structure to a downstream conveyance system. While a certain amount of outflow may also occur via Infiltration through the surrounding soil, such amounts are negligible when compared to the outlet structure discharge rates and therefore are not considered in the facility's design. Since an extended Detention Basin impounds Runoff only temporarily, it is normally dry during non-rainfall periods.

Development - See "Land Development."

Diameter at Breast Height (DBH) - The standard method of expressing the diameter of the trunk of a standing tree.

EPA - U.S. Environmental Protection Agency.

Erosion - The wearing away of the land surface by running water, wind, ice, or other geological agents.

Accelerated Erosion - Erosion in excess of what is presumed or estimated to be naturally occurring levels and is a direct result of human activities.

Gully Erosion - Erosion process whereby water accumulates in narrow channels and removes the soil to depths ranging from a few inches to 1 or 2 feet to as much as 75 to 100 feet.

Rill Erosion - Erosion process in which numerous small channels only several inches deep are formed.

Sheet Erosion - Spattering of small soil particles caused by the impact of raindrops on wet soils. The loosened and spattered particles may subsequently be removed by surface Runoff.

Erosion and Sedimentation Control Plan - A Site-specific plan identifying Best Management Practices or ways in which accelerated Erosion and sediment pollution will be minimized.

Frequency (Design Storm Frequency) - The recurrence interval of storm events having the same duration and volume. The Frequency of a specified Design Storm can be expressed either in terms of Exceedance Probability or Return Period.

Exceedance Probability - The probability that an event having a specified volume and duration will be exceeded in one (1) time period, usually assumed to be one (1) year. If a storm has a 1% chance of occurring in any given year, then it has an Exceedance Probability of 0.01.

Return Period - The average length of time between events having the same volume and duration. If a storm has a 1% chance of occurring in any given year, than it has a Return Period of 100 years.

Governing Body - The body that governs a municipality or county.

Homeowners Association - The association of persons formed by the residents of a housing locality to address their common problems and issues connected with their residence and their living in that area.

Impervious Cover - A surface composed of any material that significantly impedes or prevents natural Infiltration of water into soil. Impervious surfaces include but are not limited to roofs, buildings, streets, parking areas, Managed Turf, and any concrete, asphalt, or compacted gravel surface.

Infiltration - The downward entry of water into soil.

Karst Terrain - Regions that are characterized by formations underlain by carbonate rock and typified by the presence of limestone caverns and sinkholes.

Land Development - The development of one (1) or more lots, tracts, or parcels of land by any means and for any purpose, but does not include easements, rights-of-way, or construction of private roads for extraction, harvesting, or transporting of natural resources. This definition includes projects that are part of a larger common plan of development or sale.

Land Development, Major - The development and/or subdivision of more than five (5) lots, tracts, or parcels or any nonresidential Land Development that disturbs more than 5,000 square feet. Also, any development and/or subdivision that includes a new street shall be considered a major Land Development.

Land Development, Minor - The development and/or subdivision of five (5) or fewer lots, tracts, or parcels; or where land is being transferred to be combined with an existing lot. To qualify as a Minor Land Development, the proposed project must be placed on existing streets and no new streets shall be proposed.

Land Disturbance Activity - Any land change that may result in soil Erosion from water or wind or the movement of sediments into state waters or onto lands in the State of West Virginia, including but not limited to clearing, grading, excavating, transporting, and filling of land.

Landscaping - The placement of vegetation in and around stormwater management BMPs.

Low Impact Development (LID) - Hydrologically functional Site design with pollution prevention measures to reduce impacts and compensate for development impacts on hydrology and water quality.

Managed Turf - Any of various grasses (such as Kentucky bluegrass or perennial ryegrass) grown to form turf.

Municipal Separate Storm Sewer System (MS4) - An MS4 is a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) with the following characteristics:

(1) Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created or pursuant to state law), including special districts under state law such as a sewer district, flood control district, or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under Section 208 of the Clean Water Act that discharges into waters of the United States

(2) Designed or used for collecting or conveying stormwater

(3) Not a combined sewer

(4) Not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR 122.2

National Pollutant Discharge Elimination System (NPDES) - The national program for issuing, modifying, monitoring, and enforcing permits under Sections 307, 402, 318, and 405 of the Clean Water Act.

Nonpoint Source Pollution - Contaminants such as sediment, nitrogen and phosphorous, hydrocarbons, heavy metals, and toxins whose sources cannot be pinpointed but rather are washed from the land surface in a diffuse manner by stormwater Runoff.

Parcel - A portion of a subdivision or any other lot of land intended as a unit for transfer of ownership or for development or both. The word "Parcel" includes the word "plot" or "Lot".

Peak Discharge - The maximum rate of flow associated with a given rainfall event or channel.

Percolation Rate - The velocity at which water moves through saturated, granular material.

Post-development - Refers to conditions that reasonably may be expected or anticipated to exist after completion of the Land Development activity on a specific Site or tract of land.

Pre-development - Refers to the conditions that exist at the time that plans for the Land Development of a tract of land are approved by the plan approval authority. Where phased development or plan approval occurs (preliminary grading, roads and utilities, etc.), the existing conditions at the time prior to the first item being approved or permitted establishes the Pre-development conditions.

Professional Engineer - An engineer who is licensed within a specific jurisdiction to offer professional services directly to the public.

Redevelopment - Any construction, alteration, or improvement on existing development.

Retention - Permanent storage of stormwater.

Retention Basin - A Stormwater Management Facility that includes a permanent impoundment, or normal pool of water, for the purpose of enhancing water quality and therefore is normally wet, even during non-rainfall periods. Storm Runoff inflows may be temporarily stored above this permanent impoundment for the purpose of reducing flooding or stream channel Erosion.

Riparian - Relating to or inhabiting the banks of a natural course of water.

Runoff - The portion of precipitation, snow melt, or irrigation water that runs off the land into surface waters.

Runoff Coefficient - The fraction of total rainfall that appears as Runoff; represented as “C” in the rational method formula.

Runoff Reduction - The runoff reduction approach that seeks to maintain the same predevelopment runoff volume delivered to a body of water after a site is developed.

Sand Filter - A contained bed of sand that acts to filter the first flush of Runoff. The Runoff is then collected beneath the sand bed and conveyed to an adequate discharge point or infiltrated into the in-situ soils.

Silt Fence - A temporary linear sediment barrier of permeable fabric designed to intercept and slow the flow of sediment-laden sheet flow Runoff.

Site - The parcel of land being developed, or a designated planning area in which a Land Development project is located.

Stormwater Hotspot - An area where the land use or activities are considered to generate Runoff with concentrations of pollutants in excess of those typically found in stormwater (see Table IV-1).

Stormwater Management Facility - A device that controls stormwater Runoff and changes the characteristics of that Runoff, including but not limited to the quantity and quality, the period of release, or the velocity of flow.

Stormwater Management Plan - A document containing material for describing how existing Runoff characteristics will be affected by a Land Development project and methods for complying with the requirements of the local program or chapter.

Stormwater Pollution Prevention Plan (SWPPP) – The erosion and sediment control plan and the post development plan submitted as part of the Site Registration Application form required in the NPDES General Permit.

Stream Buffers - The zones of variable width that are located along both sides of a stream and are designed to provide a protective natural area along a stream corridor.

Total Maximum Daily Load (TMDL) - A calculation of the maximum amount of a pollutant that a water body can receive and still meet Water Quality Standards, and an allocation of that amount to the pollutant's sources.

Water Quality Standards - State-adopted and EPA-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

Watershed - A defined land area drained by a river, stream, or drainage way, or system of connecting rivers, streams, or drainage ways such that all surface water within the area flows through a single outlet.

ATTACHMENTS

A. SAMPLE LAND DISTURBANCE PERMIT APPLICATION

LAND DISTURBANCE PERMIT APPLICATION

PROJECT INFORMATION

Project Name:_____

Municipality:_____

Type of Development (circle one):

Residential Commercial Industrial Institutional Utility Other_____

Total project acres:_____ Total Disturbed Acres:_____

Number of Lots and/or Units (Residential only):_____

Name of receiving stream:_____

Does the project require an NPDES Permit (Circle one): YES NO

Type of Permit (Circle one): INDIVIDUAL GENERAL

LANDOWNER INFORMATION

Responsible Official Name:_____ email (optional):_____

Address:_____

City:_____ State:_____ Zip Code:_____

Telephone:_____ Fax:_____

ENGINEERING FIRM INFORMATION

Plan Preparer:_____ email (optional):_____

Address:_____

City:_____ State:_____ Zip Code:_____

Telephone:_____ Fax:_____

B. CITY OF MORGANTOWN – STORMWATER UTILITY BOARD

AN ORDINANCE ESTABLISHING A STORMWATER UTILITY AND DELEGATING RESPONSIBILITY OF SAID UTILITY TO THE MORGANTOWN UTILITY BOARD.

WHEREAS, **the West Virginia Legislature amended sections 8-20-1 et seq. and 16-13-1 et seq. of the West Virginia Code in 2001 so as to authorize municipalities to include the operation and management of stormwater systems as part of a municipal combined waterworks and sewerage system.**

WHEREAS, **there is a public need to protect life, property and the water environment from loss, injury and damage caused by storm and surface water, and a responsibility of the City as a trustee of the water environment for future generations; and,**

WHEREAS, **there is a public need to establish a single authority for planning, acquisition, improvement, construction, inspection, development, installation, modification, management, operation, maintenance, repair, replacement, control, demolition, abandonment, regulation and funding of storm and surface water drainage services, systems and facilities; and,**

WHEREAS, **it is in the public interest to transfer all storm, flood and surface water drainage responsibility, management, interest and authority to the Morgantown Utility Board and empower and authorize and approve the Utility Board in providing storm, flood and surface water drainage services to all real property located within the corporate limits of the City of Morgantown and in its adjacent watershed drainage area, as now or in the future may exist, and for the Utility Board to charge service fees for storm, flood and surface drainage services rendered by the Utility Board; and,**

NOW, THEREFORE, the City of Morgantown hereby ordains that:

1. There is hereby established the Morgantown Stormwater Utility. This utility shall serve the Morgantown urban watershed, which shall include all areas within the corporate boundaries of the City of Morgantown and all adjacent and contiguous areas over and through which surface and stormwater flows into the City of Morgantown. The Stormwater Utility shall provide storm, flood and surface water drainage management services to all real property located within the Morgantown urban watershed.

2. The Morgantown Stormwater Utility shall protect, to the greatest extent practicable, life, property and the water environment from loss, injury and damage by pollution, erosion, flooding, and other potential hazards, whether from natural causes or from human activity, and shall protect, to the greatest extent practicable, surface waters and receiving waters from pollution, mechanical damage, excessive flows, and other conditions which degrade the water environment, reduce recharging of groundwater, or endanger aquatic and benthic life within the Morgantown urban watershed and other receiving waters of the State. The Morgantown Stormwater Utility shall further meet the requirements of state and federal law and the City's municipal stormwater NPDES permit.

3. The Morgantown Stormwater Utility is authorized to plan, acquire, improve, construct, inspect, develop, install, modify, manage, operate, maintain, replace, control, demolish, abandon, regulate, and fund storm and surface water drainage services, system and facilities within the urban watershed. The Utility is further authorized to acquire property and/or rights in land by gift, purchase, lease, or exercise of the right of eminent domain, to construct, to reconstruct, to improve, to better and to extend stormwater and flood management facilities within the City watershed. The Utility is further authorized to charge and collect rates and fees for these services, which rates and fees shall be determined by the Council of the City of Morgantown. The Utility is further authorized to accept federal funds under any federal law for actions preliminary to construction/reconstruction or construction/reconstruction of stormwater and flood management facilities.

4. The Morgantown Stormwater Utility is authorized, in anticipation of the collection of revenues of and from stormwater facilities, to issue revenue bonds to finance in whole or in part the cost of acquisition, construction,

reconstruction, improvement, betterment or extension of such facilities, and to pledge punctual payment of said bonds and interest thereon all or any part of the revenues of the Utility.

5. The Morgantown Stormwater Utility may enter into and perform contracts and agreements with other governmental entities, utility enterprises and private parties for or concerning the planning, construction, lease or other acquisition and the financing of stormwater and flood management facilities and the maintenance and operation thereof.

6. Fees and charges for stormwater management services shall be subject to review, approval and enactment by the Morgantown City Council, pursuant to the Morgantown City Charter and the City Code of the City of Morgantown and the duly enacted operating procedures of City Council. Enacted rates and fees shall be sufficient to fully fund the operation of the Morgantown Stormwater Utility. Collected rates and fees shall be solely for the operation of the Stormwater Utility.

7. Article 169, of the Morgantown City Code shall be amended to authorize the Morgantown Utility Board to operate and maintain the stormwater collection system.

8. A new Article 929 shall be added to the streets, utilities, and public services code of the City of Morgantown which shall address applicable stormwater management rules and regulations, as well as applicable service fees.

9. All power and authority possessed by the City of Morgantown pertaining to public flood control and storm and surface water drainage services and operation of the Stormwater Utility is hereby transferred to the Morgantown Utility Board. The appointed General Manager of the Utility Board shall serve as Director of the Morgantown Stormwater Utility.

10. All storm and surface water drainage systems or facilities owned or controlled by the City of Morgantown, and revenues raised for the purpose of or pertaining to public flood control and storm and surface water drainage services and operation of the Stormwater Utility, are to be collected and/or managed by the Morgantown Utility Board. The Utility Board shall, no less than annually, present to the City Council a budget and audited financial statements of the Stormwater Utility.

This ordinance shall take effect upon date of adoption.

FIRST READING:

ADOPTED:

_____
Mayor

FILED:

RECORDED:

_____
City Clerk

C. CITY OF BLUEFIELD – STORMWATER RATE ESTABLISHMENT AND CHARGES

Doug/BSB/SWORD4

AN ORDINANCE ENACTING CHAPTER 24 OF THE CODE OF THE CITY OF BLUEFIELD, AS THE SAME APPLIES TO STORMWATER MANAGEMENT AND SURFACE WATER DISHCAGE CONTROL AND APPLICABLE RATES AND FEES

WHEREAS, the 2001 West Virginia Legislature amended §16-13-1 et seq., of the West Virginia Code so as to authorize municipalities to regulate stormwater management and surface water discharge, in addition to waterworks and sewerage systems; and,

WHEREAS, there is a public need to protect life, property and the water environment from loss, injury and damage caused by storm and surface water, and a responsibility of the City of Bluefield, a trustee of the water environment for future generations; and,

WHEREAS, it is necessary for the City to enact rules and regulations, as well as service fees, pertaining to the same.

NOW, THEREFORE, the City hereby ordains that (Applicable Statute), addressing stormwater management and surface water drainage control is added to its City Code and reads as follows:

ARTICLE I

Stormwater Management and Surface Water Discharge Control

Section 1. Definitions.

Unless the context specifically indicates otherwise, the meaning of the terms used herein shall be as follows:

(a) "Best Management Practices (BMPs)" are physical, structural and/or managerial practices that, when used singly or in combination, control site run-off, spillage and leaks, waste disposal and drainage from raw material storage and prevent or reduce the discharge of pollutants directly or indirectly to waters of the state. BMPs may include schedules of activities, prohibition of practices, general good-housekeeping practices, maintenance procedures, design standards, educational activities and treatment requirements.

(b) "Board" is the Board of Directors of the Sanitary Board of Bluefield, a municipal entity created by the City Board of Bluefield, West Virginia pursuant to §16-13-1 et seq of the Code of West Virginia.

(c) "City Board" is the governing body of the City of Bluefield, West Virginia, a West Virginia municipality.

(d) "City watershed" is that area within the corporate limits of the City, and designated areas outside of those limits, over which surface water drains into the City. Designation of areas outside of the corporate limits of the City shall be made by the Executive Director.

(e) "Executive Director" is the Executive Director of the Sanitary Board who works at the will and pleasure of the Board.

(f) "Facility" for purposes of this Article is a building, structure, installation or construction site in which pollutants are produced and/or generated and/or discharged as a result of a process or processes, conducted within the building, structure or installation.

(g) "Flat rate charge" is the charge applicable to a single-family dwelling per dwelling unit or other properties if so designated in this ordinance.

(h) "Footing drain" is a pipe or conduit which is placed around the perimeter of a building foundation or other structures for the purpose of admitting ground water.

(i) "Illicit connection" means any direct or indirect non-stormwater discharge to a publicly maintained storm drain system which has not been permitted or allowed by the Sanitary Board from the date of enactment of this ordinance.

(j) "Illicit discharge" means any discharge, surface or subsurface, to a storm drain or into the stormwater collection system that is not composed entirely of stormwater, except discharges pursuant to a NPDES permit, discharges resulting from firefighting activities, and other discharges exempted in this Article.

(k) "Impervious area" is land area covered by buildings, pavement, gravel or other material that significantly inhibits stormwater from penetrating the soil.

(l) "Industrial sites" are those sites that contain industrial activities which require NPDES stormwater permits as set forth in 40 CFR 122.26(a)(6) or (b)(14).

(m) "Multi-unit property" is a residential or commercial property of any size that has located upon the property two or more tenants, at least one of which having no ownership interest in the property.

(n) "Non-stormwater" is all flows to the stormwater system not defined as stormwater by this Article or as determined by the municipality. This includes, but is not limited to, cooling water, process water, ground water from a purge well and swimming pool discharge.

(o) "Pervious area" is all land area that is not impervious.

(p) "Pollutant" means objects including, but not limited to, dredged soil, solid waste, incinerator residue, sewage, garbage, sewage sludge, grease, petroleum products, munitions, chemical waste, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, silt, dirt, industrial, municipal and agricultural waste, gasses entrained in water, paints, oil and other automotive fluids, soil rubbish, debris, materials containing fecal coliform, fecal streptococcus, and enterococcus, heavy metals, hazardous wastes, yard waste from commercial landscaping operations, animal waste, materials that result from the process of building, and offensive matter of any kind, which, when discharged to water, cause or contribute to water pollution.

(q) "Pollution" is the degradation of the physical, thermal, chemical, biological or radioactive properties of the waters of the state and/or the discharge of any pollutant to the waters of the state which will or is likely to create a nuisance or to render such waters harmful, detrimental, or injurious to public health, safety or welfare or to the beneficial use of the water and/or the water environment.

(r) "Stormwater" is natural precipitation, surface runoff water, ground water discharge, water from operation of the water distribution system, water used in fire fighting, runoff from street sweeping, flows from footing drains and all other discharge sources identified in the City's stormwater NPDES permit, except as may be defined as non-stormwater by this Article.

(s) "Stormwater management" is the process of collection, conveyance, storage, treatment and disposal of stormwater to ensure control of the magnitude and frequency of runoff to minimize the impact of the runoff upon the water quality of the receiving stream.

(t) "Stormwater service charge" is a monthly charge assessed in accordance with §5 or §6, and/or a non-stormwater user charge.

(u) "Stormwater system" is public and private stormwater sewers, drains, ditches, streets, retention/detention ponds, dams, river impoundments and flood control facilities used for collecting and transporting stormwater and non-stormwater.

(v) "User" is a person or entity which is the legal owner or occupant of a property that directly or indirectly contributes stormwater or non-stormwater flows to the stormwater system, whether within or outside the corporate limits of the City of Bluefield.

Section 2. General.

(a) This article has been enacted to protect and enhance the water quality of our watercourses, water bodies, groundwater and wetlands in a manner pursuant to and consistent with the Clean Water Act and associated federal and state stormwater regulations.

(b) The intent of this article is:

(1) To control non-stormwater discharges to storm drain systems.

(2) To reduce pollutants in stormwater discharges.

(3) To control stormwater runoff by providing design, construction and maintenance criteria for permanent and temporary stormwater facilities.

(4) To maintain and improve the stormwater collection system in order to protect and improve water quality in the receiving streams.

(5) To fully comply with federal and state statutory and regulatory requirements and schedules regarding stormwater management and the water quality of the receiving streams.

(c) This ordinance shall apply to all water entering the storm drain system generated on any developed and undeveloped lands unless explicitly exempted.

(d) The City shall administer, implement and enforce the duties imposed by this Article. Said duties may further be delegated to other entities acting in compliance with applicable ordinances.

Section 3. Stormwater Service Charge

(a) Users connected to or draining into the public storm drainage system shall pay a fee to defray the actual cost of the operation of, maintenance of, improvements to, necessary additions to the stormwater system, and all costs and expenses associated with complying with the City's Stormwater Management Plan in accordance with 40 CFR 122.32 and 47 CSR 10 of the West Virginia Legislative Rules, including capital expenditures. Therefore, all owners or tenants of real property in the City watershed shall be charged a fee for the use of the stormwater system.

(b) The City Board shall, by ordinance, set fees which will recover from users the costs for use of the stormwater system by property within and outside the corporate limits of the City and within the City watershed. Such fees will be for purposes set out in Section 3a above.

Section 4. Properties Affected by Ordinance.

Except as provided in this Article, all real property shall be subject to the stormwater service charges regardless of whether privately or publicly owned.

Section 5. Flat Rate Charges.

The monthly service charge for users occupying a residential dwelling, as defined by the Ordinance, shall be $1.95. The City Board governing authority may, from time to time, by ordinance, change these service charges.

Section 6. Land Based Rate Charges.

The monthly service charge for properties other than described in the previous section shall be $3.95 until June 30, 2007. Effective July 1, 2007 the monthly service charge for properties other than described in the previous section shall be established by the City Board by amendment of this Ordinance prior to June 30, 2007. Said monthly service charge for non-residential properties may include a fixed charge, a fee based on impervious area, a fee based on building area, or a combination of the same.

Service charges for a multi-unit property shall be billed to each individual tenant upon the property in a fair and proportionate share of the total property service charge, if said tenant has an individual drinking water service meter. At the discretion of the property owner, or if the individual tenants do not have individual drinking water service meters, service charges for a multi-unit property may be billed to the property owner. A property owner exercising this choice must complete a written agreement as required by the Executive Director.

The Executive Director shall assign discount credits to those newly constructed properties employing volumetric flow reduction facilities. The Executive Director may further assign discount credits to those existing properties employing rate of flow reduction practices.

The City Board may, from time to time, by ordinance, change these rate charges.

Section 7. Billing.

The billing for stormwater service may be combined with the billing for other utility services provided by the Sanitary Board.

Section 8. Collection.

Unpaid stormwater service charges shall constitute just cause for disconnection of water service to the non-paying property. The Executive Director shall ensure sufficient notice of disconnection is issued in the same manner as is provided for in its Tariff for sewer service as approved by the West Virginia Public Service Commission. Water service shall be reactivated only upon full payment of the stormwater service charges or other payment arrangements approved by the Executive Director. In the alternative, the Executive Director may take appropriate legal action to collect unpaid charges.

Section 9. Use of Funds.

All funds collected for stormwater service shall be accounted for separately and shall be used solely for the operation of, maintenance of, improvements to, necessary additions to the stormwater system, and all costs and expenses associated with complying with the City's Stormwater Management Plan in accordance with 40 CFR 122.32 and 47 CSR 10 of the West Virginia Legislative Rules, including the purchase of stormwater related equipment and machinery and other capital equipment, the financing of stormwater related projects, and reimbursement of an equitable share of the administrative costs of the Sanitary Board.

Section 10. General Requirements and Prohibitions.

(a) The use of the stormwater collection system shall be the collection and transportation of stormwater.

(b) No person shall place or cause to be placed any pollutant into the stormwater system other than stormwater, unless written approval has been granted by the Executive Director. The Executive Director may refuse to grant approval to discharge non-stormwater into the stormwater system for any reason or combination of reasons.

(c) The Sanitary Board shall administer use of the stormwater system to all users with the City watershed, whether located within or outside City limits.

(d) No person shall cause or permit the introduction of any pollutant into the stormwater system, whether solid, liquid or gaseous, that will cause:

(1) Chemical reaction, either directly or indirectly with the materials of construction used in the stormwater system or that will impair the strength or durability of sewers or structures;

(2) Mechanical action that will destroy or damage sewers or structures;

(3) Restriction of the normal maintenance and inspection of sewers;

(4) Danger to public health and safety or to the environment;

(5) Conditions that create a public nuisance;

(6) An oil sheen or unusual color;

(7) Abnormal demand on the stormwater system capacity; or,

(8) The stormwater system to violate its NPDES permit or applicable receiving water standards and all other Federal, State, and local regulations.

(e) Any person or entity engaged in activities which will or may result in pollutants entering the storm drain system shall undertake best management practices to reduce such pollutants. Examples of such activities include, but are not limited to, ownership and/or operation of facilities that may be a source of pollutants, such as paved parking lots, gasoline stations, industrial facilities and private roads/streets.

(f) No person shall throw, deposit, leave, maintain or cause to be thrown, deposited, left or maintained any refuse, rubbish, garbage, grease, petroleum products, or other discarded or abandoned objects, articles and accumulations in or upon any street, alley, sidewalk, storm drain inlet, catch basin, conduit or other drainage structures, parking area, or upon any private or public plot of land so that the same might become a pollutant, except where the pollutant is being temporarily stored in properly contained waste receptacles or is part of a well defined compost system.

(g) No person shall cause or permit any dumpster, solid waste bin or similar container to leak such that any pollutant is discharged into any street, alley, sidewalk, storm drain, inlet, catch basin, conduit or other drainage structure, or upon any public or private plot of land in the urban watershed.

(h) No person shall use the stormwater system for discharge from any environmental cleanup that is regulated under federal or state law unless approved by the Executive Director. Approval by the Executive Director must be conditioned upon the discharge meeting all criteria for discharge under this chapter. Approval conditions may provide for measures appropriate to prevent harm due to possible exfiltration into the ground adjacent to the system or failure of any pretreatment system for the discharge.

Section 11. Illicit Connections.

It is prohibited to establish, use, maintain or continue illicit connections to the municipal stormwater system, or to commence or continue any illicit discharges to the municipal stormwater system.

Section 12. Outdoor Storage Areas.

In outdoor areas, no person shall store grease, oil, or other hazardous substances in a manner that will or may result in such substances entering the stormwater system. In outdoor areas, no person shall store motor vehicles, machine parts, or other objects in a manner that may leak grease, oil, or other hazardous substances to the stormwater system. To prevent the discharge of hazardous substances to the stormwater system, the Executive Director may require the installation of a spill containment system. Spill containment systems may consist of a system of dikes, walls, barriers, berms, or other devices as required. No person shall operate a spill containment system such that it allows incompatible liquids to mix and thereby create a hazardous condition.

Section 13. Construction Sites.

Any person performing construction work in the city watershed of the City shall comply with the provisions of this Article and shall provide erosion and sediment controls that effectively prevent discharges of pollutants to a storm drain system. The City Board may establish by ordinance standards and guidelines implementing BMPs designed to provide erosion and sediment control from construction sites.

Section 14. Discharge of Pollutants.

Discharges from the following activities will not be considered a source of pollutants to waters of the state when properly managed: water line flushing and other discharges from potable water sources, landscape irrigation and lawn watering, irrigation water, diverted stream flows, rising ground waters, groundwater infiltration to separate storm drains, uncontaminated pumped ground water, foundation and footing drains, roof drains, water from crawl space pumps, residential air conditioning condensation, springs, individual residential and non-profit group car washes, flows from riparian habitats and wetlands, dechlorinated swimming pool discharges or flows from fire fighting activities and training.

Section 15. Discharge in Violation of Permit.

Any discharge that would cause a violation of a Municipal NPDES Permit and any amendments, revisions or reissuance thereof, either separately considered or when combined with other discharges, is prohibited. Liability for any such discharge, including, but not limited to, the cost of remedial activity, shall be the responsibility of the person(s) causing or responsible for the discharge, and the City shall seek to have such persons defend, indemnify and hold harmless the City in any administrative or judicial enforcement action against the City and/or the Sanitary Board relating to such discharge as provided by applicable rules of law.

Section 16. Notification of Spills.

All persons in charge of a facility or responsible for emergency response for a facility are responsible to train facility personnel, maintain records of such training, and maintain notification procedures to assure that immediate notification is provided to the Executive Director upon becoming aware of any suspected, confirmed or unconfirmed release of material, pollutants or waste creating a risk of discharge into the municipal stormwater system or into a receiving stream.

Section 17. Construction.

(a) Only designated Sanitary Board employees, City employees, or parties authorized by the Executive Director may perform construction upon the public facilities of the stormwater system. Public facilities of the system shall include:

(1) Those facilities that serve two or more properties, including, but not limited to, main pipelines that collect and transmit stormwater from and/or across two or more properties; and,

(2) All taps or other connections from a private lateral to a public facility of the system.

(b) All public costs and expenses of and incidental to the installation of private stormwater facilities, connections to public facilities, and installation of public facilities to facilitate and convey flows from a specific private facility shall be borne by the owner(s) of the private facility. Payment terms for these costs and expenses shall be designated by the Executive Director.

(c) Parties authorized by the Executive Director to perform construction of or upon the public facilities of the stormwater system shall comply with the design and construction standards promulgated by the Executive Director. These parties shall allow for inspection of the construction by the Executive Director at all times, and construction shall only occur during normal working hours of the Sanitary Board. No facility constructed by an authorized party may be covered or connected to a public facility without specific authorization of the Executive Director. This authority shall be granted by the Executive Director upon satisfaction of the announced design and construction standards.

(d) All public facilities shall, upon authorized completion, be property of the Municipality.

(e) A party authorized by the Executive Director to perform construction upon the public facilities of the stormwater system shall meet the following requirements prior to and throughout construction:

(1) Compliance with all relevant Federal and State labor, employment and environmental laws; and,

(2) Compliance with all relevant and applicable state laws regarding government construction contracts, including, but not limited to, WV Code §§5-22-1, et seq., and 21-5A-1, et seq.; and

(3) Full and active policy coverage as certified by the West Virginia Bureau of Employment Programs, Workers' Compensation Division; and,

(4) Certification of full compliance with all relevant state and local permitting and tax rules and regulations, certification of appropriate

property rights to perform the construction, and conveyance to the City of appropriate property rights for the completed public facilities.

(5) Nothing in sub-paragraph 2 shall apply to any situation where the Executive Director shall come to an agreement with volunteer or a volunteer group doing work for a qualified not-for-profit entity, whereby the Executive Director will provide engineering, technical or other services and the volunteers will provide the necessary labor without charge to, or liability upon, the City or Sanitary Board. The not-for-profit entity shall be responsible for all costs to the utility associated with such a project.

Section 18. Stormwater Taps.

(a) The Executive Director or a party authorized by the Executive Director will furnish and install stormwater system taps of the size and at the location requested in writing by an applicant upon a form to be provided by the Executive Director. The applicant shall pay the full cost of the tap installation.

(b) The Executive Director may deny a tap application when the requested tap is proposed to an inadequate public facility.

Section 19. Enforcement.

(a) No person shall construct or maintain any property, residence or business not in compliance with the standards of this Article.

(b) The Executive Director and other authorized employees of the City bearing proper credentials and identification shall be permitted, after reasonable notice, to enter upon all properties for the purposes of inspection, observation, measurement, sampling and testing in accordance with the provisions of this Article.

(c) No person or firm shall fail to provide any report or other information or perform any duty required by this Article.

(d) The Executive Director is authorized to take appropriate legal action to require compliance with this Article.

(e) The Executive Director is authorized to enforce and collect upon the terms of a construction and/or repair bond in the event of default of the conditions described therein.

(f) If, after reasonable notice, a person fails to comply with this Article, the Executive Director may cause the work to be done to obtain compliance and shall charge the cost of that work to the person responsible. The responsible person shall pay in full the charged amount within thirty (30) days of the invoice date, or otherwise make arrangements, acceptable to the Executive Director, for full payment of the invoiced amount.

(g) In addition to any other remedy, the Executive Director, after thirty (30) calendar days written notice and five (5) calendar days notice posted on the affected property, is authorized to disconnect water service, sanitary sewer and stormwater sewer

services to any property in violation of this Article. The notice shall state that persons affected may within five (5) calendar days provide the Executive Director with any information or reasons as to why services should not be disconnected.

(h) The Executive Director is authorized to take all steps necessary to immediately halt any discharge of pollutants which reasonably appear to present an imminent danger to the health or welfare of persons or to the environment.

(i) Persons aggrieved by any determination of the Executive Director in enforcing this Article may appeal that determination to the Sanitary Board or a court of proper jurisdiction. Prosecution shall be stayed pending such an appeal.

Section 20. Stormwater Management and Comprehensive Drainage Plans.

(a) Within twelve (12) months of the effective date of this Article, the Executive Director shall propose and there shall be enacted by ordinance regulations providing for specific requirements and standards for stormwater management and drainage upon all new developments and redevelopment projects. These regulations shall be written to minimize the discharge and transport of pollutants to storm drain systems and prevent the deterioration of water quality. At a minimum, these regulations shall address:

(1) Restriction of increased post-development discharge rates.

(2) Description and implementation of best management practices, and the continuation of those BMPs for appropriate periods of time.

(3) Protection of ground water from instances of polluted runoff infiltration.

Section 21. Drainage System Standards.

Drainage systems shall comply with the standards established by ordinance.

Section 22. Plan Submission and Review Process.

(a) Within eighteen (18) months of the effective date of this Article, and no sooner than six (6) months following the enactment of regulations providing for specific requirements and standards for stormwater management and drainage upon all new developments and redevelopment projects, stormwater management plans and comprehensive drainage plans for any new construction or reconstruction within the city watershed shall be submitted to the Executive Director. The plans shall be reviewed by the Executive Director for compliance with the applicable rules and standards. Plans developed to meet federal or state requirements may be submitted, and will be approved if they conform to the requirements of this Article.

(b) The plan submission and review process shall be coordinated with and integrated into the City planning and permitting process. Following the effective date of this section, no building permit shall be issued without an approved stormwater management plan if

required under this Article.

Section 23. Maintenance of Stormwater Facilities.

(a) Private stormwater facilities located in private property and within the City watershed shall be maintained by the owner or other responsible party and shall be repaired and/or replaced by such person when such facilities are no longer functioning as designed.

(b) Disposal of waste from maintenance of private facilities shall be conducted in accordance with applicable federal, state and local laws and regulations.

(c) Records of installation and maintenance and repair shall be retained by the owner or other responsible party for a period of five (5) years and shall be made available to the Executive Director upon request.

(d) The Executive Director may perform corrective or maintenance work, which shall be at the owner's expense, upon any failure to maintain facilities or correct problems with facilities after receiving due reasonable notice from the Executive Director.

(e) Routine maintenance of detention/retention facilities shall be conducted by the owner of the facility in accordance with this Article and guidance of the Executive Director.

Section 24. Inspection.

(a) Stormwater systems within the City watershed shall be inspected by the Executive Director during and after construction to assure consistency with the approved stormwater management plan.

(b) All stormwater systems within the City watershed shall be subject to the authority of the Executive Director to ensure compliance with this Article and may be inspected when deemed necessary.

(c) The owner of a private stormwater system, or other responsible party designated by the owner, shall make annual inspections of the facilities, including any detention/retention facility, and maintain records of such inspections for a period of five (5) years.

(d) Whenever necessary to make an inspection to enforce any of the provisions of this Article, or whenever the Executive Director has reasonable cause to believe that there exists in any building or upon any premises any condition which may constitute a violation of the provisions of this article, the Executive Director may enter such building or premises at all reasonable times to inspect the same or perform any duty imposed by this Article; provided that (1) if such building or premises is occupied, he or she first shall present proper credentials and request entry; and (2) if such building or premises is unoccupied, he or she first shall make a reasonable effort to locate the owner or other persons having charge or control of the building or premises and request entry.

(e) The property owner or occupant has the right to refuse entry but, in the event such entry is refused, the Executive Director is hereby empowered to seek assistance from

any court of competent jurisdiction in obtaining such entry and performing such inspection.

(f) Routine or area inspections shall be based upon such reasonable selection processes as may be deemed necessary to carry out the objectives of this Article, including but not limited to, random sampling and/or sampling in areas with evidence of stormwater pollution, illicit discharges or similar factors.

Section 25. Sampling.

With the consent of the owner or occupant or with Court order, the Executive Director may establish on any property such devices as are necessary to conduct sampling or metering operations. During all inspections as provided herein, the Executive Director may take any samples deemed necessary to aid in the pursuit of the inquiry or to record the on-site activities, provided that owners or occupants shall be entitled to split samples.

Section 26. Testing and Monitoring.

(a) Whenever the Executive Director determines that any person engaged in any activity and/or owning or operating any facility may cause or contribute to stormwater pollution or illicit discharges to the stormwater system, the Executive Director may, by written notice, order that such person undertake such monitoring activities and/or analyses and furnish such reports as the Executive Director may require. The written notice shall be served either in person or by certified or registered mail, return receipt requested, and shall set forth the basis for such order and shall particularly describe the monitoring activities and/or analyses and reports required. The burden to be borne by the owner or operator, including costs of these activities, analyses and reports, shall bear a reasonable relationship to the need for the monitoring, analyses and reports and the benefits to be obtained. The recipient of such order shall undertake and provide the monitoring, analyses and reports within the time frames set forth in the Order.

(b) Within twenty (20) days of the date of receipt of the order notice, the recipient shall respond personally or in writing advising the Executive Director of the recipients position with respect to the Order's requirements. Thereafter, the recipient shall be given the opportunity to meet with the Executive Director to review the Order's requirements and revise the Order as the Executive Director may deem necessary. Within ten (10) days of such meeting, the Executive Director shall issue a final written order. Final Orders issued pursuant to this Section may be appealed to the Sanitary Board by the filing of a written appeal with the Board within ten (10) days of receipt of the final Order. The appeal notice shall set for the particular Order requirements or issues being appealed. The Sanitary Board shall hear the appeal at its earliest practical date and may either affirm, revoke or modify the Order. The decision of the Sanitary Board shall be final, but may be subject to review by a Court of competent jurisdiction.

(c) In the event the owner or operator of a facility or property fails to conduct the monitoring and/or analyses and furnish the reports required by the Order in the time frames set forth therein the Executive Director may cause such monitoring and/or analyses to occur. If a violation is found, the Executive Director may assess all costs incurred, including reasonable administrative costs and attorney's fees, to the owner or operator. The Executive Director may pursue judicial action to enforce the Order and recover all costs incurred.

Section 27. Concealment.

Causing, permitting, aiding, abetting or concealing a violation of any provision of this Article shall constitute a violation of such provision.

Section 28. Acts Resulting in Violation of Federal Clean Water Act.

Any person who violates any provision of this Article, or who discharges waste or wastewater which causes pollution, or who violates any cease and desist order, prohibition, or effluent limitation, also may be in violation of the federal Clean Water Act and may be subject to the sanctions of that Act including civil and criminal penalties.

Section 29. Violations Deemed a Public Nuisance.

(a) In addition to the penalties hereinbefore provided, any condition caused or permitted to exist in violation of any of the provisions of this Article shall be considered a threat to the public health, safety, welfare and environment, and may be declared and deemed a nuisance by the Executive Director and may be summarily abated and/or restored by the Executive Director and/or civil action taken to abate, enjoin or otherwise compel the cessation of such nuisance.

(b) The cost of such abatement and/or restoration shall be borne by the owner of the property and the cost thereof shall be a lien upon and against the property and such lien shall continue in existence until the same shall be paid.

(c) If any violation of this Article constitutes a seasonal and recurrent nuisance, the Executive Director shall so declare. Thereafter such seasonal and recurrent nuisance shall be abated every year without the necessity of any further declaration.

(d) In any administrative or civil proceeding under this Article in which the Sanitary Board or its agent prevails, the Sanitary Board, or its agent, may be awarded all costs of investigation, administrative overhead, out-of-pocket expenses, costs of administrative hearings, costs of suit and reasonable attorney's fees.

Section 30. Administrative Enforcement Powers.

(a) In addition to the other enforcement powers and remedies established by this Article, the Executive Director has the authority to utilize the following administrative remedies.

(1) Cease and Desist Orders. When the Executive Director finds that a discharge has taken place or is likely to take place in violation of this Article, the Executive Director may issue an order to cease and desist such discharge, or practice, or operation likely to cause such discharge and direct that those persons not complying shall: (a) comply with the requirement; (b) comply with a time schedule for compliance, and/or (c) take appropriate remedial or preventive action to prevent the violation from recurring.

(2) Notice to Clean. Whenever the Executive Director finds any oil, earth dirt, grass, weeds, dead tees, tin cans, rubbish, refuse, waste or any other material of any kind, in or upon the sidewalk abutting or adjoining any parcel of land, or upon any parcel of land or grounds or in close proximity to any open drain or ditch channel, which may result in an increase in pollutants entering the storm drain system or a non-stormwater discharge to the storm drain system, he or she may give notice to the property owner to remove and lawfully dispose of such material in any manner that he or she reasonably may provide. The recipient of such notice shall undertake the activities as described in the notice within the time frames set forth therein.

(3) In the event the owner or operator of a facility fails to conduct the activities as described in the notice, the Executive Director may cause such required activities as described in the notice to be performed, and the cost thereof shall be assessed and invoiced to the owner of the property. If the invoice is not paid within sixty (60) days, a lien shall be placed upon and against the property.

Section 31. Nonexclusivity Remedies.

Remedies under this Article are in addition to and do not supersede or limit any and all other remedies, civil or criminal. The remedies provided for herein shall be cumulative and not exclusive.

Section 32. Appeal.

Any person, firm, corporation or organization notified of non-compliance with this Article or required to perform monitoring, analyses, reporting and/or corrective activities who is aggrieved by the decision of the Executive Director may appeal such decision in writing to the Sanitary Board within ten (10) days following the effective date of the decision. Upon receipt of such request, the Board shall request a report and recommendation from the Executive Director and shall set the matter for administrative hearing at the earliest practical date. At said hearing, the Sanitary Board may hear additional evidence, and may revoke, affirm or modify the earlier decision. Such decision shall be final, subject to appeal to a Court of competent jurisdiction.

Section 33. Disclaimer of Liability.

The degree of protection required by this Article is considered reasonable for regulatory purposes. The standards set forth herein are minimum standards and this Article does not imply that compliance will ensure that there will be no unauthorized discharge of pollutants into the waters of the State. This Article shall not create liability on the part of the City, any agent or employee thereof for any damages that result from reliance on this Article or any administrative decision lawfully made thereunder.

Section 34. Severability.

The provisions of this ordinance are hereby declared to be severable. If any provision, clause, sentence or paragraph of this Ordinance or the application thereof to any person, establishment or circumstances shall be held invalid, such invalidity shall not invalidate the other provisions or application of this Ordinance.

Section 35. Industrial or Construction Activity Discharges.

Any person subject to an industrial or construction activity NPDES stormwater discharge permit shall comply with all provisions of such permit. Proof of compliance with this permit may be required in a form acceptable to the City prior to allowing discharges to the stormwater system.

Section 36. Notification of Spills.

Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation has any information of any known or suspected release of materials which are or may result in illegal discharges or pollutants discharging into stormwater, the storm drain system, or waters of the state of West Virginia, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of release. In the case of a release of hazardous material said person shall immediately notify emergency response agencies of the spill.

Section 37. Adoption of Ordinance.

This ordinance shall be in full force and effect beginning August 1, 2005. All prior ordinances and parts of ordinances in conflict with this ordinance are hereby repealed.

FIRST READING:
Mayor

ADOPTED:

FILED:
City Clerk

RECORDED:

PASSED AND ADOPTED this____day of_____, by the following vote:

D. SAMPLE STORMWATER INSPECTION AND MAINTENANCE AGREEMENT

STORMWATER MANAGEMENT FACILITIES
MAINTENANCE AGREEMENT

THIS STORMWATER MANAGEMENT FACILITIES MAINTENANCE AGREEMENT

made this ___ day of _____, _____, by _____
(month) (year) (individual, partnership, association, corporation, LLC)

(the "Covenantor", and for indexing purposes “Grantor”);the <GOVERNING BODY> , a municipal corporation of the State of West Virginia,(the"<GOVERNING BODY>", and for indexing purposes “Grantee”); _____(the “Trustee”, and for indexing purposes “Grantor”); and _____(the “Noteholder”, and for indexing purposes “Grantor”).

W I T N E S S E T H:

WHEREAS, the <GOVERNING BODY> is authorized and required to regulate and control the disposition of storm and surface waters as set forth in the <GOVERNING BODY’S> Stormwater Management Ordinance effective <INSERT DATE>, as amended (the “Ordinance”), adopted pursuant to Chapter 8A, Land Use Planning, Article 4, Subdivision and Land disturbance Ordinance, as amended (the “Act”); and

WHEREAS, the Covenantor is the owner and is seized in fee simple of a certain tract or parcel of land more particularly described on Schedule A attached hereto (the “Property”); and

WHEREAS, Covenantor desires to construct certain improvements on the Property which will alter existing storm and surface water conditions on both the Property and adjacent lands; and

WHEREAS, in order to accommodate and regulate these anticipated changes in existing storm and surface water flow conditions, the Covenantor desires to build and maintain at Covenantor's expense a storm and surface water management facility and system (the "Facility and System") more particularly described and shown on plans titled sheets ___ through ___ of _____ prepared by _____ and dated _____, which plans and any amendments thereto, are on file with the <COUNTY> office of the Clerk and <GOVERNING BODY> as required, and are hereby incorporated by reference (the "Site Plan"); and

WHEREAS, the <GOVERNING BODY> has reviewed and approved the Site Plan subject to the execution of this Agreement.

NOW, THEREFORE, in consideration of the benefit received and to be received by the Covenantor, its successors and assigns, as a result of the <GOVERNING BODY'S> approval of the Site Plan, the Covenantor, hereby covenants and agrees with the <GOVERNING BODY> as follows:

1. At their sole expense, the Covenantor, its successors and assigns, shall construct and perpetually maintain the Facility and System in strict accordance with the Site Plan and any amendments thereto which have been approved by the <GOVERNING BODY>, the Ordinance and the Act.

2. At their sole expense, the Covenantor, its successors and assigns, shall make such changes or modifications to the Facility and System as may be determined as reasonably necessary by the <GOVERNING BODY> to ensure that the Facility and System is properly maintained and continues to operate as originally

designed and approved.

3. At reasonable times and in a reasonable manner as provided in Article VI Section A (1) of the Ordinance, the <GOVERNING BODY>, its agents, employees and contractors, shall have the right of ingress and egress over the Property and the right to inspect the Facility and System in order to ensure that the Facility and System is being properly maintained, is continuing to perform in an adequate manner and is in compliance with the Act, the Ordinance and Site Plan and any amendments thereto approved by the <GOVERNING BODY>.

4. Should either the Covenantor or its successors and assigns, fail to correct any defects in the Facility and System within the time specified in a written notice from the <GOVERNING BODY> that the Covenantor or its successors and assigns has/have failed to maintain the Facility and System in accordance with the approved design standards and/or the Site Plan and in accordance with the law and applicable regulations of the Act and the Ordinance, the <GOVERNING BODY> may pursue such remedies as provided by law, including, but not limited to, such civil and criminal remedies set forth in Article VII of the Ordinance.

5. The Covenantor, its successors and assigns, shall indemnify, hold harmless and defend the <GOVERNING BODY> from and against any and all claims, demands, suits, liabilities, losses, damages and payments, including reasonable attorney fees claimed or made against the <GOVERNING BODY> that are alleged or proven to result or arise from the Covenantor's, its successors' and/or assigns', construction, operations or maintenance of the Facility and System.

6. This Agreement and the covenants and agreements contained herein shall run with the title to the land and whenever the Property shall be held, sold,

conveyed or otherwise transferred, it shall be subject to the covenants, stipulations, agreements and provisions of this Agreement which shall apply to, bind and be obligatory upon the Covenantor hereto, its successors and assigns, and shall bind all present and subsequent owners of the Property described herein.

Initially, the Covenantor is solely responsible for the performance of the obligations required hereunder and, to the extent permitted under applicable law, the payment of any and all fees, fines, and penalties associated with such performance or failure to perform under this Agreement. Notwithstanding any provisions of this Agreement to the contrary, upon the recordation of a deed or other instrument of sale, transfer or other conveyance of fee simple title to the Property or any portion thereof (a " Transfer") to a third party (the "Transferee"), the Covenantor shall be released of all of its obligations and responsibilities under this Agreement accruing after the date of such Transfer to the extent such obligations and responsibilities are applicable to that portion of the Property included in such Transfer, but such release shall be expressly conditioned upon the Transferee assuming such obligations and responsibilities by recorded written agreement for the benefit of the <GOVERNING BODY>. Such written agreement may be included in the Transfer deed or instrument, provided that the Transferee joins in the execution of such deed or instrument. A certified copy of such deed, instrument or agreement shall be provided to the <GOVERNING BODY>. The provisions of the preceding three sentences shall be applicable to the original Covenantor and any successor Transferee who has assumed the obligations and responsibilities of the Covenantor under this Agreement as provided above.

7. Nothing herein shall be construed to prohibit a transfer by the Covenantor to subsequent owners and assigns.

8. The provisions of this Agreement shall be severable and if any phrase, clause, sentence or provision is declared unconstitutional, or the applicability thereof to the Covenantor, its successors and assigns, is held invalid, the remainder of this Covenant shall not be affected thereby. This Agreement shall be interpreted under the laws of the State of West Virginia.

9. _____, the Noteholder, being the holder of a note or notes secured by a lien on the Property through a deed of trust dated _____, from _____ to _____ and _____, Trustees, either of whom may act, recorded in the land records of the <COUNTY> office of the Clerk (the "Clerk's Office") and <GOVERNING BODY> as required in Deed Book _____, at page _____ (the "Deed of Trust"), joins in the execution of this Agreement to evidence its consent to the provisions hereof and to direct the Trustee to execute same for subordination purposes. At the direction of the Noteholder, the Trustee joins herein to subordinate the lien of the Deed of Trust, and the Noteholder and the Trustee hereby acknowledge and agree that the lien of the Deed of Trust is hereby subordinated to this Agreement, the covenants created or set forth herein and all of the rights of the <GOVERNING BODY> hereunder.

10. This Agreement shall be recorded in the Clerk's Office.

11. In the event that the <GOVERNING BODY> shall determine at its sole discretion at any future time that the Facility and System is no longer required, then at the request of the Covenantor, its successors and/or assigns, the <GOVERNING BODY> shall execute a release of this Agreement which the Covenantor, its successors and/or assigns, shall record in the Clerk's Office, at its/their expense.

12. This Agreement shall be deemed to be a West Virginia contract and

shall be governed as to all matters whether of validity, interpretations, obligations, performance or otherwise exclusively by the laws of the State of West Virginia, and all questions arising with respect thereto shall be determined in accordance with such laws. Regardless of where actually delivered and accepted, this Agreement shall be deemed to have been delivered and accepted by the parties in the State of West Virginia.

13. Any and all suits for any claims or for any and every breach or dispute arising out of this Agreement shall be maintained in the appropriate court of competent jurisdiction in the <GOVERNING BODY>.

14. This Agreement shall not be modified except by written instrument executed by the <GOVERNING BODY> and the owner(s) of the Property at the time of modification, and no modification shall be effective until recorded in the Clerk's Office.

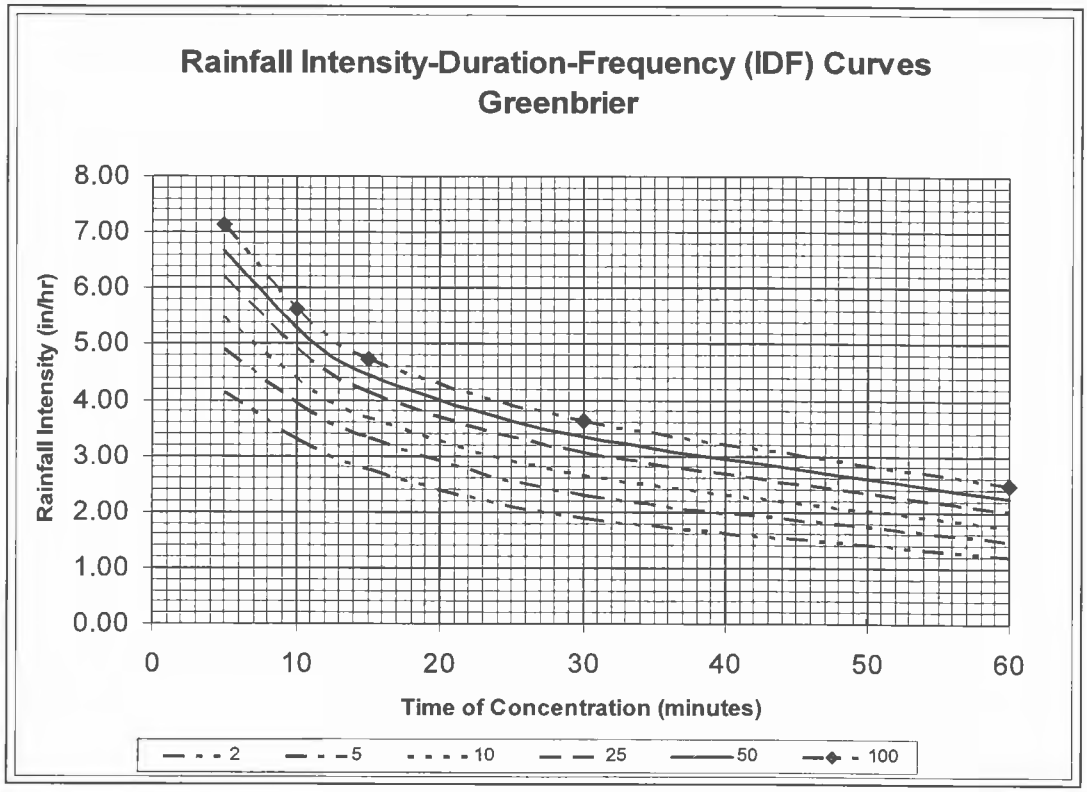
IN WITNESS WHEREOF, the Covenantor has executed this Agreement as of the date first set forth above.

 owner's initials _____

E. WEST VIRGINIA DEPARTMENT OF HIGHWAYS INFORMATION

Chart 4-3

Intensity-Duration-Frequency Curves for West Virginia



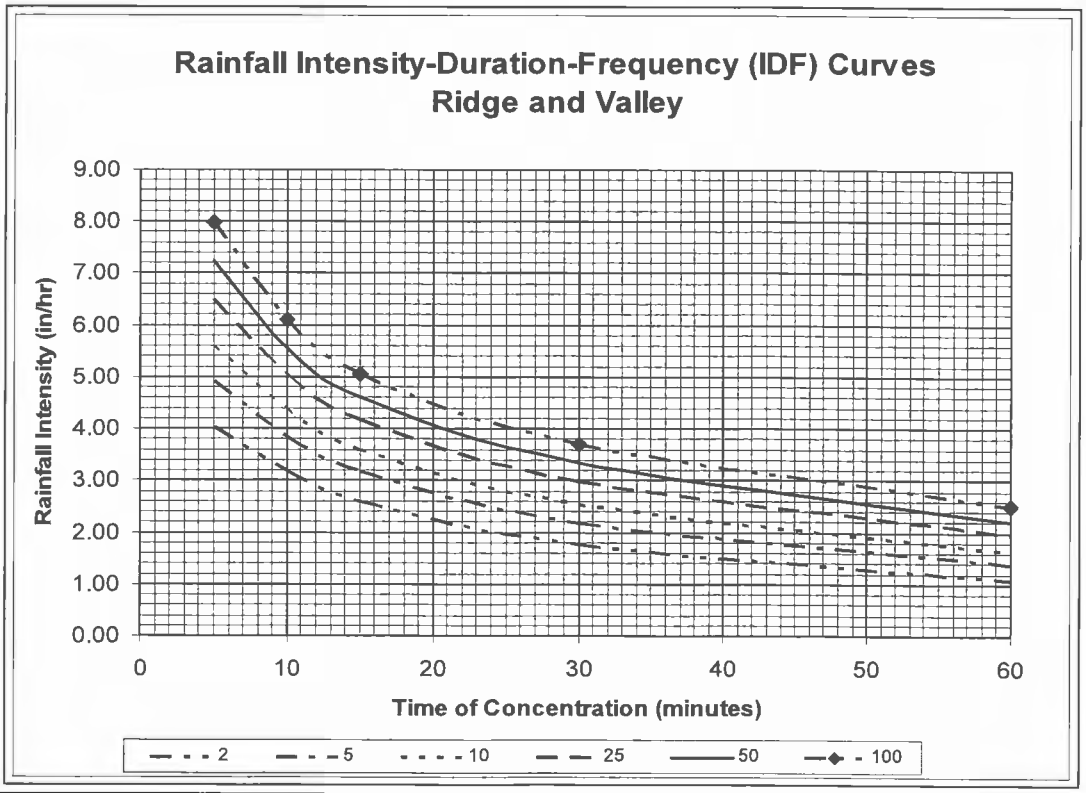
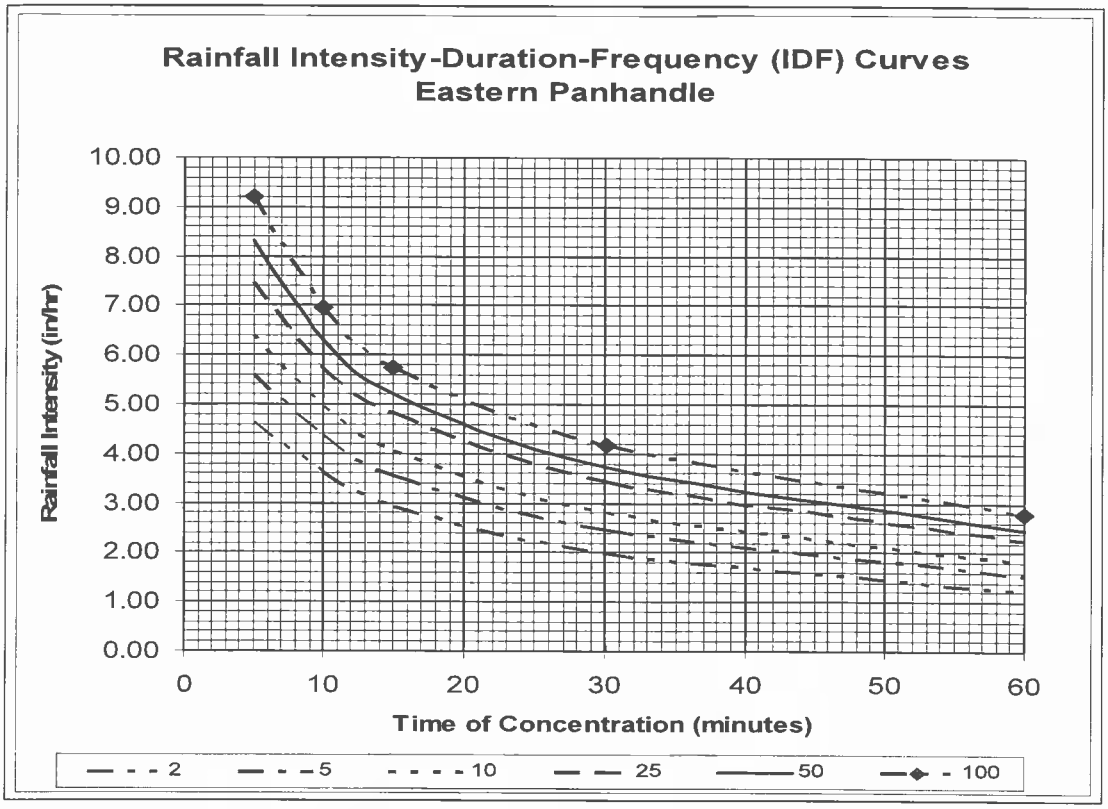


Chart 4-4

Intensity-Duration-Frequency Curves for West Virginia



Source: NOAA Atlas 14, PFDS, National Weather Service, 2004

Table 4-9

Runoff Curve Numbers for Rural Areas

Cover description Cover type and hydrologic condition	Curve numbers for the hydrologic soil group A	B	C	D
Pasture, grassland, or range land with continuous forage for grazing.				
Poor condition (< 50% cover, heavily grazed)	68	79	86	89
Fair condition (50% - 75% cover, not heavily grazed)	49	69	79	84
Good condition (> 75% cover, lightly grazed)	39	61	74	80
Meadow with continuous grass cover, protected from grazing and generally mowed.	30	58	71	78
Brush-weed-grass mixture with brush as the major element.				
Poor condition (< 50% cover)	48	67	77	83
Fair condition (50% - 75% cover)	35	56	70	77
Good condition (> 75% cover)	30	48	65	73
Woods 50% cover - grass 50% cover (such as an orchard or tree farm)				
Poor condition	57	73	82	86
Fair condition	43	65	76	82
Good condition	32	58	72	79
Woods only				
Poor condition (small trees, brush, forest litter)	45	66	77	83
Fair condition (medium trees, heavy brush, forest litter)	36	60	73	79
Good condition (large trees, thick undergrowth, undisturbed forest area)	30	55	70	77
Farm areas with buildings, driveways, gravel access roads mowed fields	59	74	82	86

Source: Urban Hydrology for Small Watersheds, TR-55, June 1986

Table 4-10

Runoff Curve Numbers for Urban Areas

Cover description Cover type and hydrologic condition	Average % impervious area	Curve numbers for the hydrologic soil group A	B	C	D
Fully developed urban areas with established vegitation					
Open areas such as lawns, parks, golf courses etc. equivalent to pasture. For other combinations determine a composite curve number.					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% - 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas					
Paved parking lots, roofs, driveways etc.		98	98	98	98
Paved roads, curb and gutter		98	98	98	98
Concrete open ditches		83	89	92	93
Gravel roadway		76	85	89	91
Soil roadway		72	82	87	89
Urban districts					
Commercial and buisness	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acre	12	46	65	77	82
Developing urban areas					
Newly graded areas, all pervious with no vegetation Composite curve numbers should be used if this cover type represents an area under construction.		77	86	91	94
Idle lands not currently under development should be treated as rural areas see Table 4-		-	-	-	-

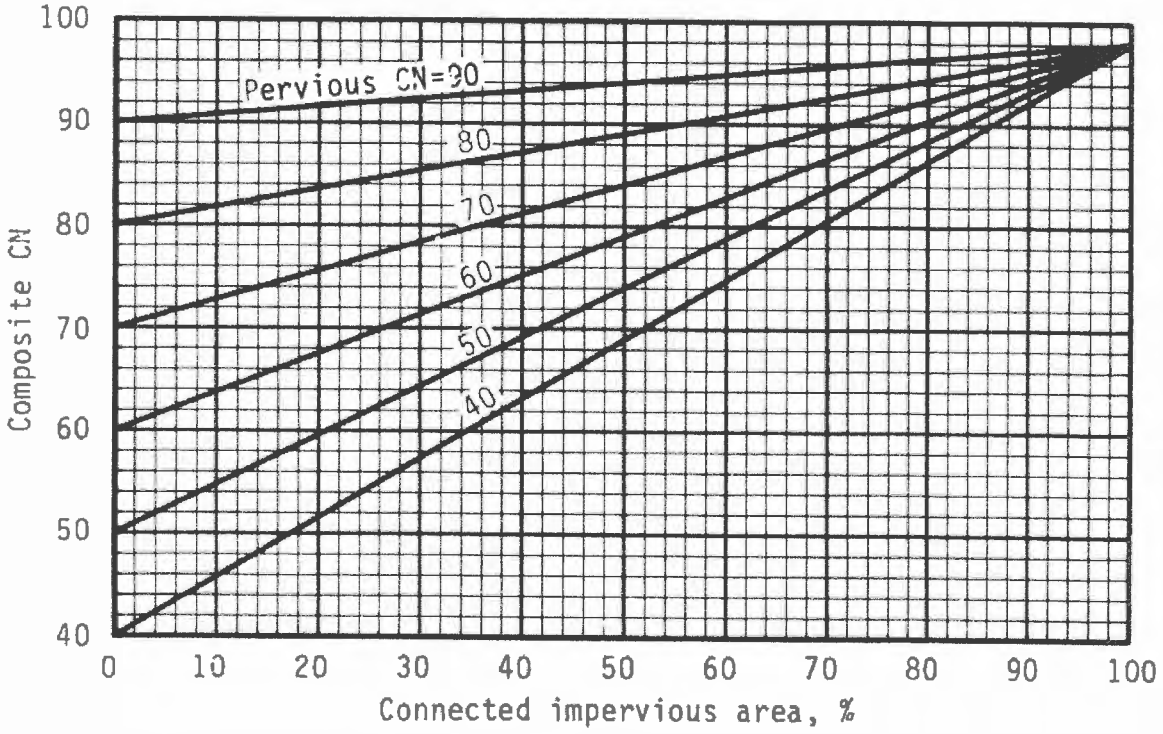
Source: Urban Hydrology for Small Watersheds, TR-55, June 1986

Urban Impervious Area Modifications

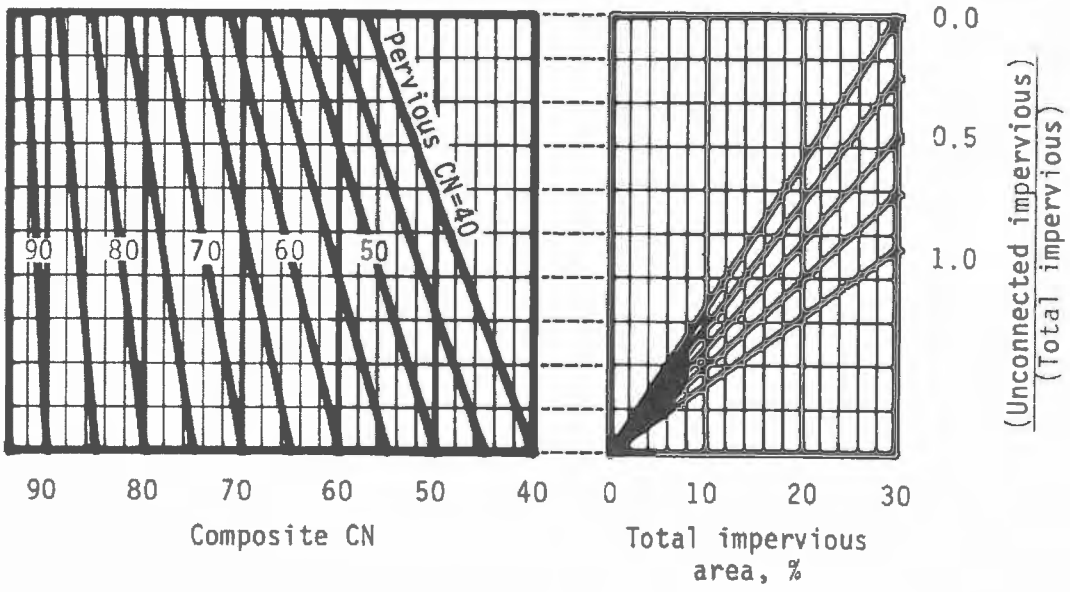
Factors such as the percentage of impervious area and the means of conveying runoff from those impervious areas to the drainage system should be considered in determining the curve number for urban areas. For example, do the impervious areas connect directly to the drainage system or do they outlet onto lawns or other pervious areas where infiltration can occur before they reach the drainage system?

Chart 4-5

Curve Number Modification for Urban Impervious Area



Composite Curve Number with Connected Impervious Area



Composite Curve Number with Unconnected Impervious Area

Source: Urban Hydrology for Small Watersheds, TR-55, June 1986

Table 4-11

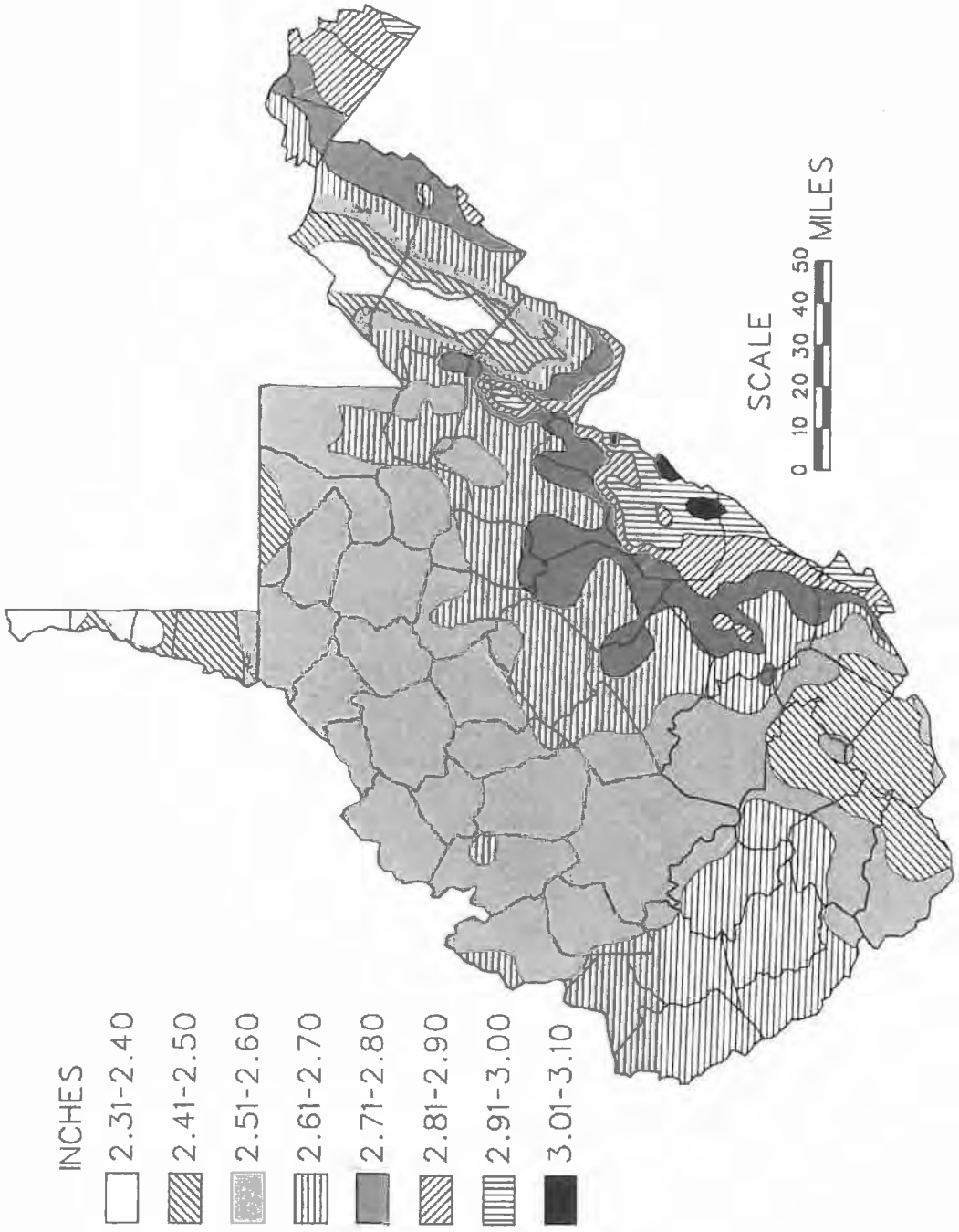
24-hour Rainfall Depth by County for a 1 Year Return Period

County	1-year	County	1-year
Barbour	2.36	Mingo	2.42
Berkeley	2.46	Monongalia	2.30
Boone	2.38	Monroe	2.47
Braxton	2.36	Morgan	2.43
Brooke	2.22	Nicholas	2.39
Cabell	2.38	Ohio	2.24
Calhoun	2.32	Pendleton	2.46
Clay	2.35	Pleasants	2.27
Doddridge	2.30	Pocahontas	2.44
Fayette	2.38	Preston	2.35
Gilmer	2.33	Putnam	2.34
Grant	2.42	Raleigh	2.40
Greenbrier	2.45	Randolph	2.40
Hampshire	2.45	Ritchie	2.29
Hancock	2.20	Roane	2.33
Hardy	2.48	Summers	2.43
Harrison	2.32	Taylor	2.34
Jackson	2.32	Tucker	2.39
Jefferson	2.50	Tyler	2.28
Kanawha	2.35	Upshur	2.37
Lewis	2.35	Wayne	2.42
Lincoln	2.38	Webster	2.39
Logan	2.40	Wetzel	2.28
McDowell	2.43	Wirt	2.29
Marion	2.30	Wood	2.28
Marshall	2.25	Wyoming	2.41
Mason	2.34		
Mercer	2.45		
Mineral	2.41		

Source: NOAA Atlas 14, PFDS, National Weather Service, 2004

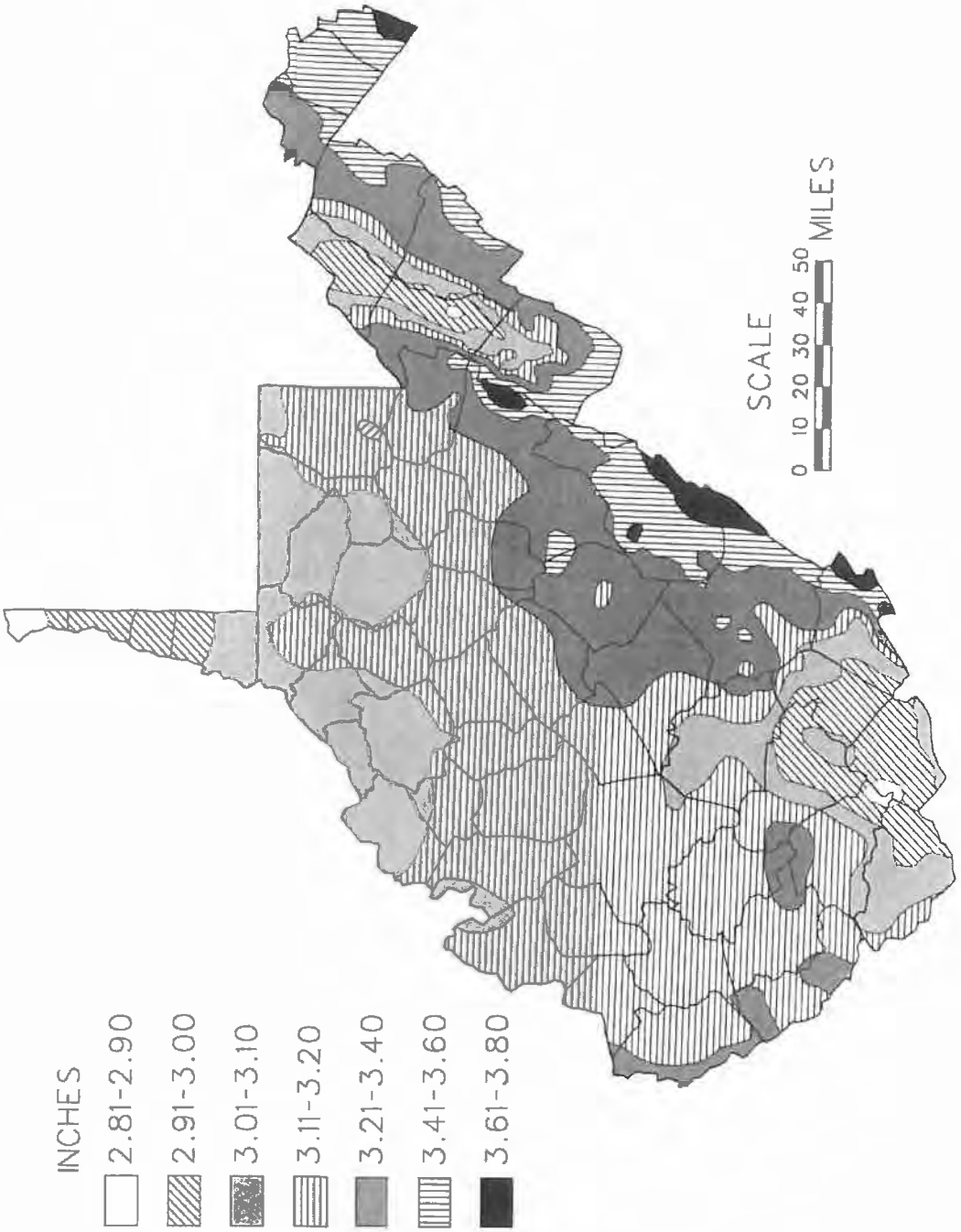
Map 4-3

24-hour Rainfall Depth for a 2 Year Return Period



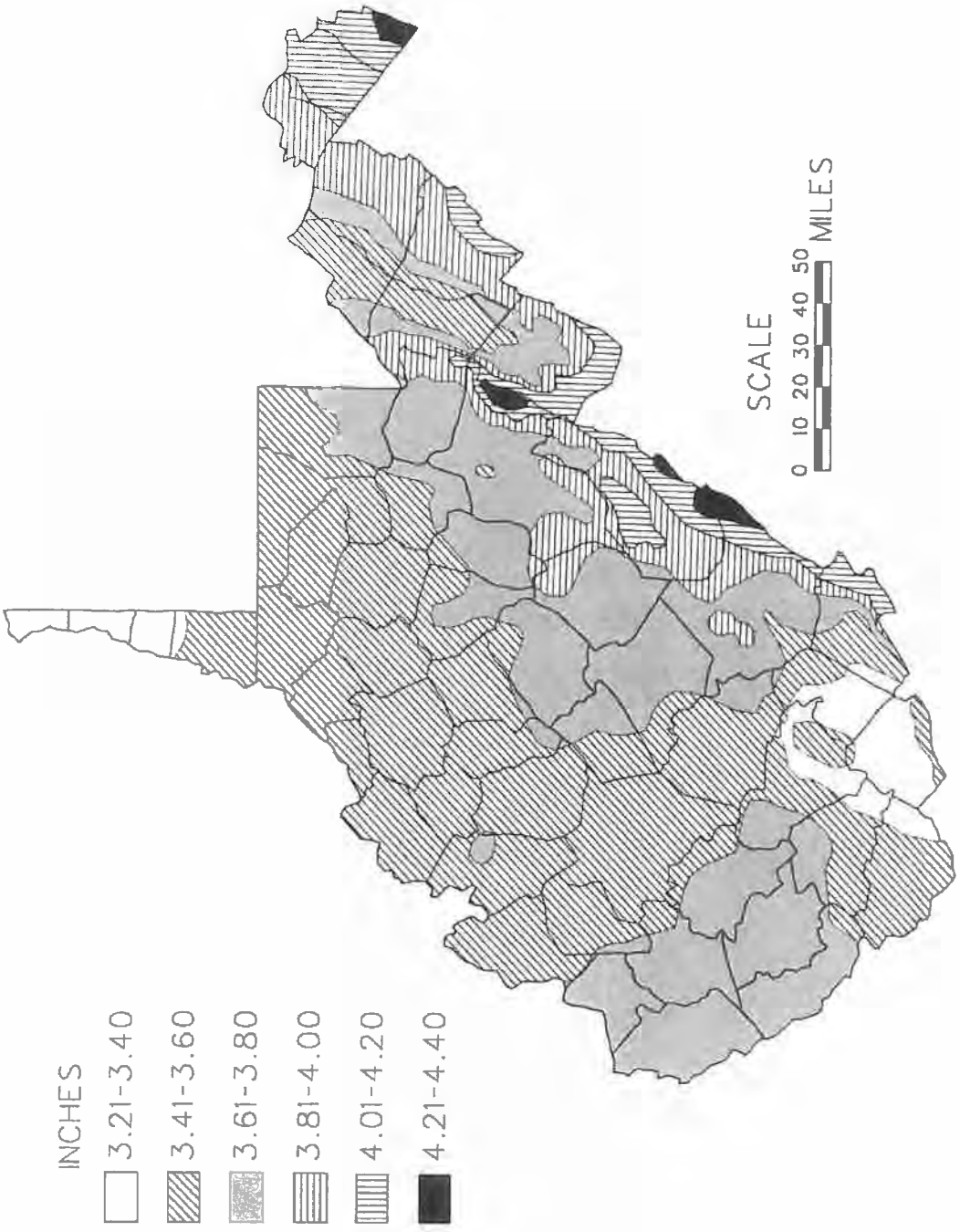
Source: NOAA Atlas 14, PFDS, National Weather Service, 2004.

Map 4-4
24-hour Rainfall Depth for a 5 Year Return Period



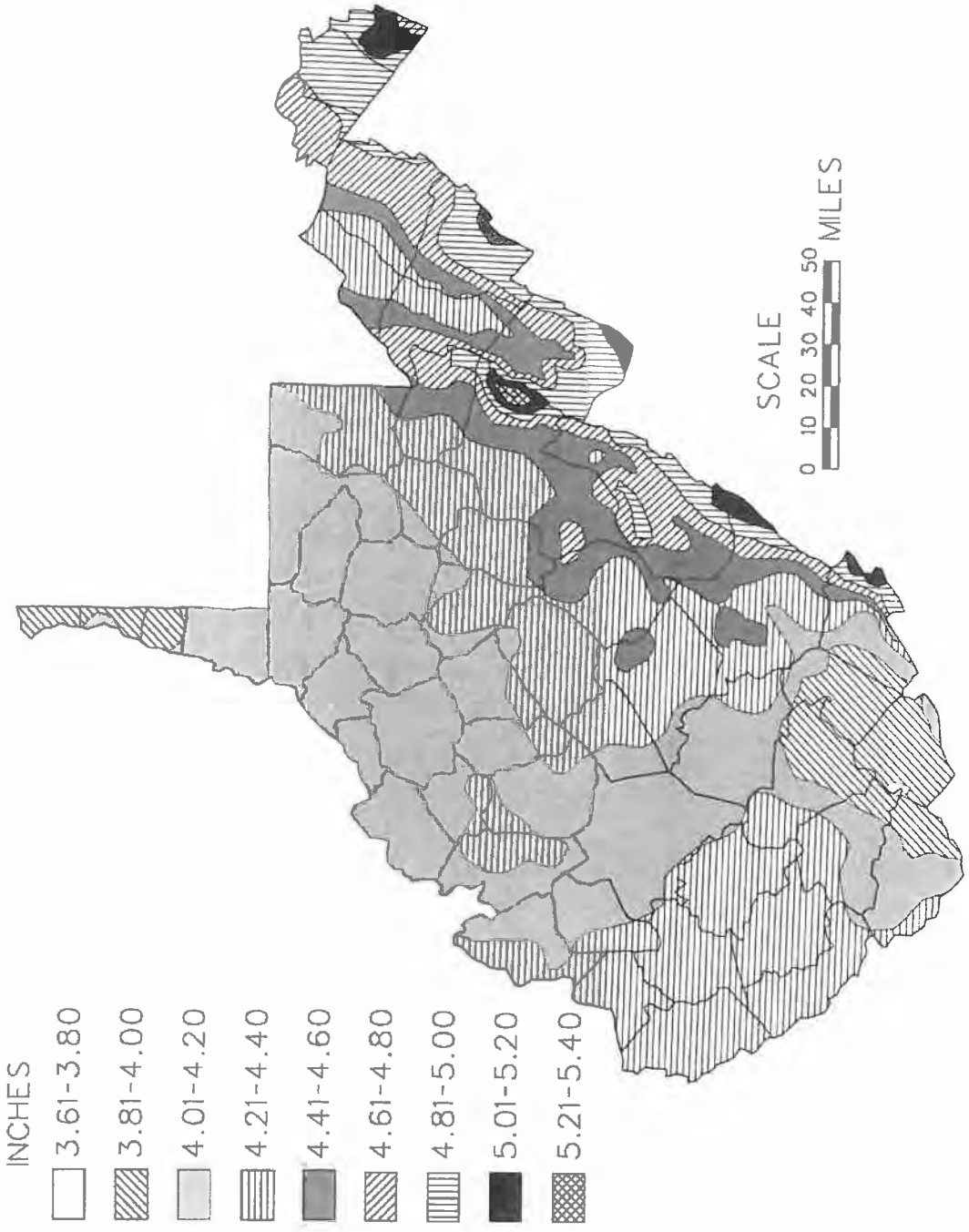
Source: NOAA Atlas 14, PFDS, National Weather Service, 2004.

Map 4-5
24-hour Rainfall Depth for a 10 Year Return Period



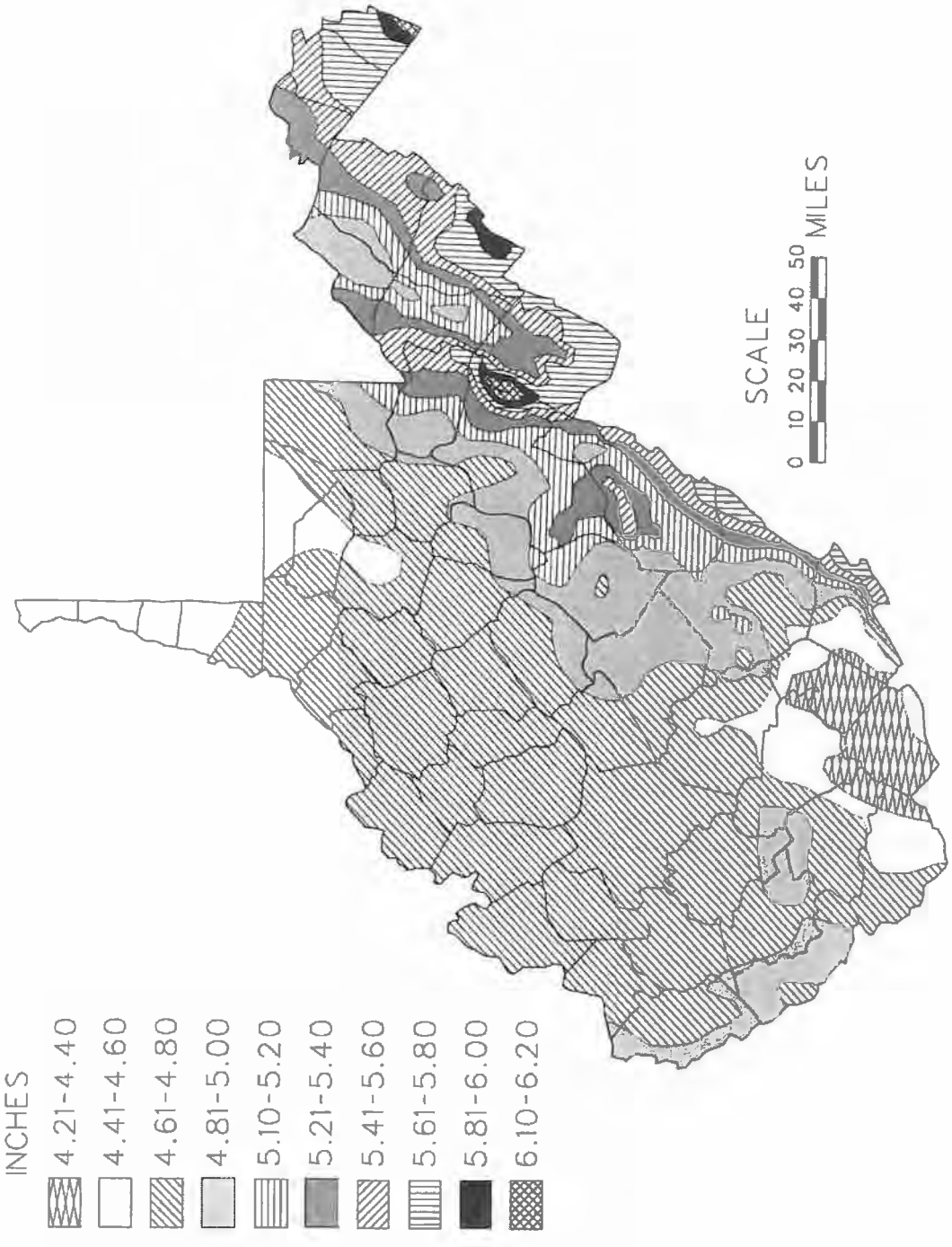
Source: NOAA Atlas 14, PFDS, National Weather Service, 2004.

Map 4-6
24-hour Rainfall Depth for a 25 Year Return Period



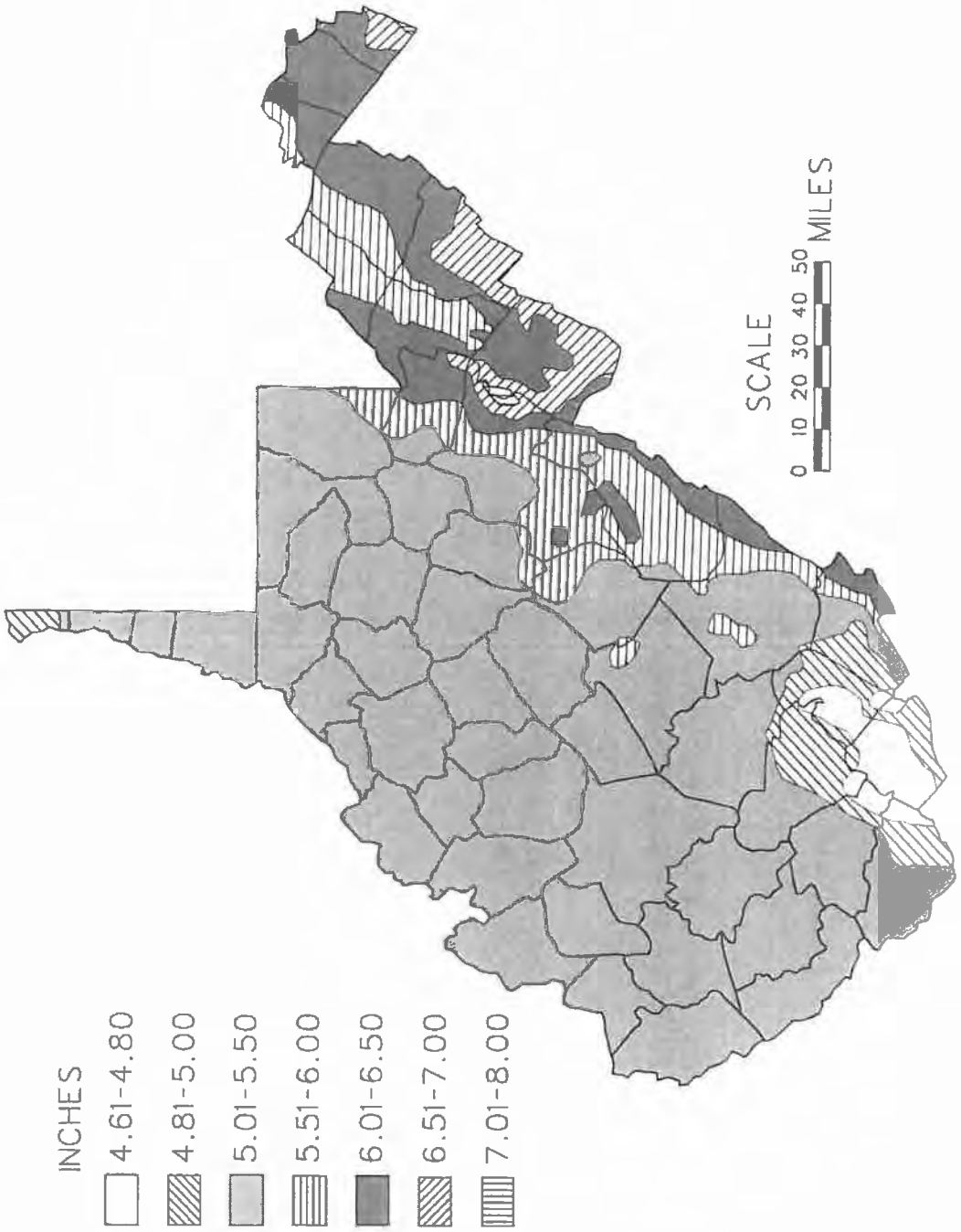
Source: NOAA Atlas 14, PFDS, National Weather Service, 2004.

Map 4-7
24-hour Rainfall Depth for a 50 Year Return Period



Source: NOAA Atlas 14, PFDS, National Weather Service, 2004.

Map 4-8
24-hour Rainfall Depth for a 100 Year Return Period



Source: NOAA Atlas 14, PFDS, National Weather Service, 2004.

Table 4-12

Runoff Depth for Selected CN & 24 Hr Rainfall Depth

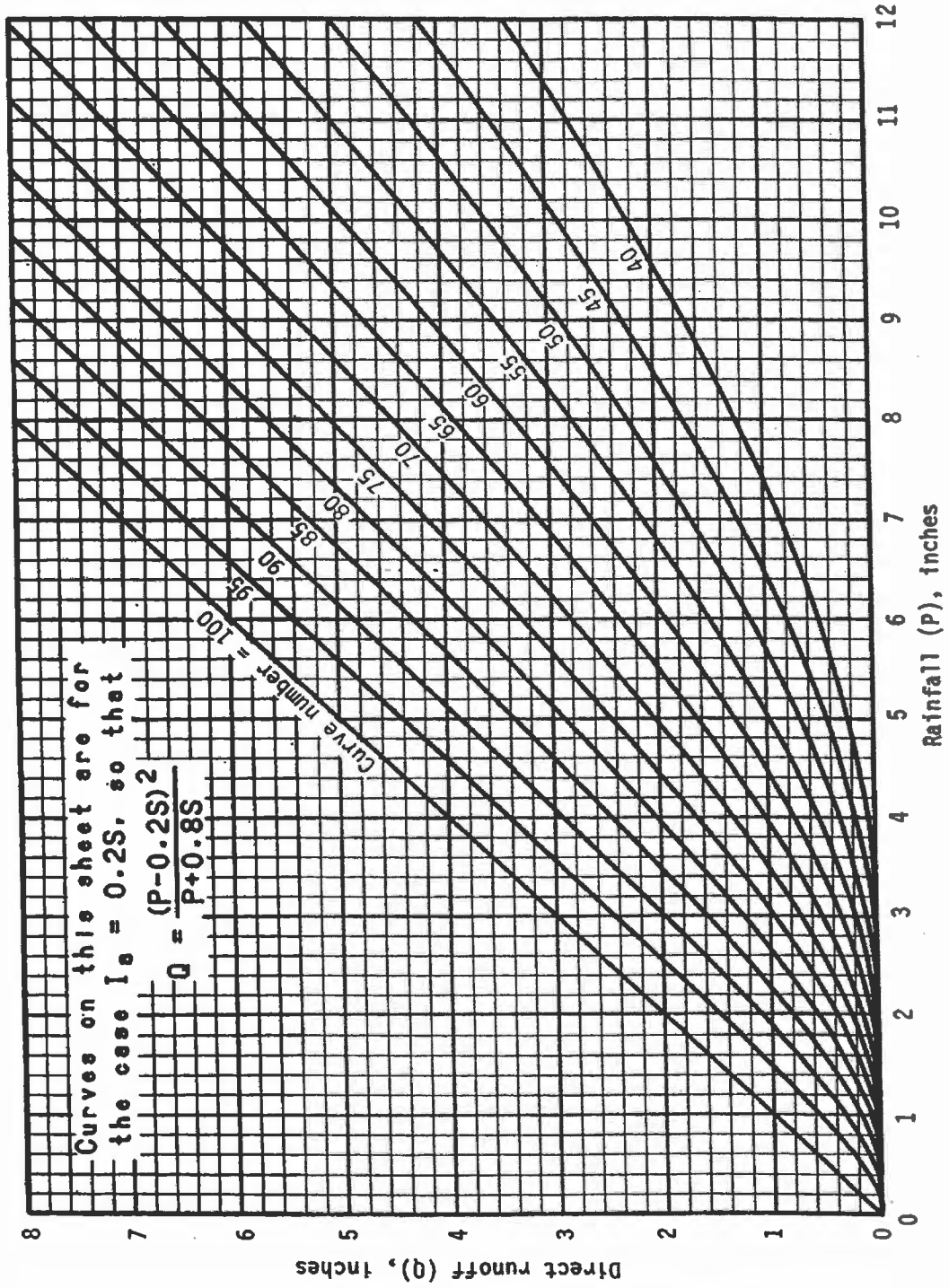
Rainfall	Runoff depth for curve number of—												
	40	45	50	55	60	65	70	75	80	85	90	95	98
	inches												
1.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.08	0.17	0.32	0.56	0.79
1.2	.00	.00	.00	.00	.00	.00	.03	.07	.15	.27	.46	.74	.99
1.4	.00	.00	.00	.00	.00	.02	.06	.13	.24	.39	.61	.92	1.18
1.6	.00	.00	.00	.00	.01	.05	.11	.20	.34	.52	.76	1.11	1.38
1.8	.00	.00	.00	.00	.03	.09	.17	.29	.44	.65	.93	1.29	1.58
2.0	.00	.00	.00	.02	.06	.14	.24	.38	.56	.80	1.09	1.48	1.77
2.5	.00	.00	.02	.08	.17	.30	.46	.65	.89	1.18	1.53	1.96	2.27
3.0	.00	.02	.09	.19	.33	.51	.71	.96	1.25	1.59	1.98	2.45	2.77
3.5	.02	.08	.20	.35	.53	.75	1.01	1.30	1.64	2.02	2.45	2.94	3.27
4.0	.06	.18	.33	.53	.76	1.03	1.33	1.67	2.04	2.46	2.92	3.43	3.77
4.5	.14	.30	.50	.74	1.02	1.33	1.67	2.05	2.46	2.91	3.40	3.92	4.26
5.0	.24	.44	.69	.98	1.30	1.65	2.04	2.45	2.89	3.37	3.88	4.42	4.76
6.0	.50	.80	1.14	1.52	1.92	2.35	2.81	3.28	3.78	4.30	4.85	5.41	5.76
7.0	.84	1.24	1.68	2.12	2.60	3.10	3.62	4.15	4.69	5.25	5.82	6.41	6.76
8.0	1.25	1.74	2.25	2.78	3.33	3.89	4.46	5.04	5.63	6.21	6.81	7.40	7.76
9.0	1.71	2.29	2.88	3.49	4.10	4.72	5.33	5.95	6.57	7.18	7.79	8.40	8.76
10.0	2.23	2.89	3.56	4.23	4.90	5.56	6.22	6.88	7.52	8.16	8.78	9.40	9.76
11.0	2.78	3.52	4.26	5.00	5.72	6.43	7.13	7.81	8.48	9.13	9.77	10.39	10.76
12.0	3.38	4.19	5.00	5.79	6.56	7.32	8.05	8.76	9.45	10.11	10.76	11.39	11.76
13.0	4.00	4.89	5.76	6.61	7.42	8.21	8.98	9.71	10.42	11.10	11.76	12.39	12.76
14.0	4.65	5.62	6.55	7.44	8.30	9.12	9.91	10.67	11.39	12.08	12.75	13.39	13.76
15.0	5.33	6.36	7.35	8.29	9.19	10.04	10.85	11.63	12.37	13.07	13.74	14.39	14.76

1/ Interpolate the values shown to obtain runoff depths for CN's or rainfall amounts not shown.

Source: Urban Hydrology for Small Watersheds, TR-55, June 1986

Chart 4-6

Runoff Depths for Selected CN & 24 Hr Rainfall Depth



Source: Urban Hydrology for Small Watersheds, TR-55, June 1986

Worksheet 4-1

Runoff Curve Number Determination

WORKSHEET 4-1 RUNOFF CURVE NUMBER DETERMINATION

CALCULATED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

PROJECT NAME: _____
STATE PROJECT NUMBER: _____

Soil Name	Hydrologic Group	Cover Description percent impervious unconnected/connected impervious area ratio	CN Source			Area In mi^2	CN X Area
			Table 4-9	Table 4-10	Chart 4-5		

one CN source per line

Weighted CN = Total CN X Area / Total Area

Totals →

Weighted Curve Number →

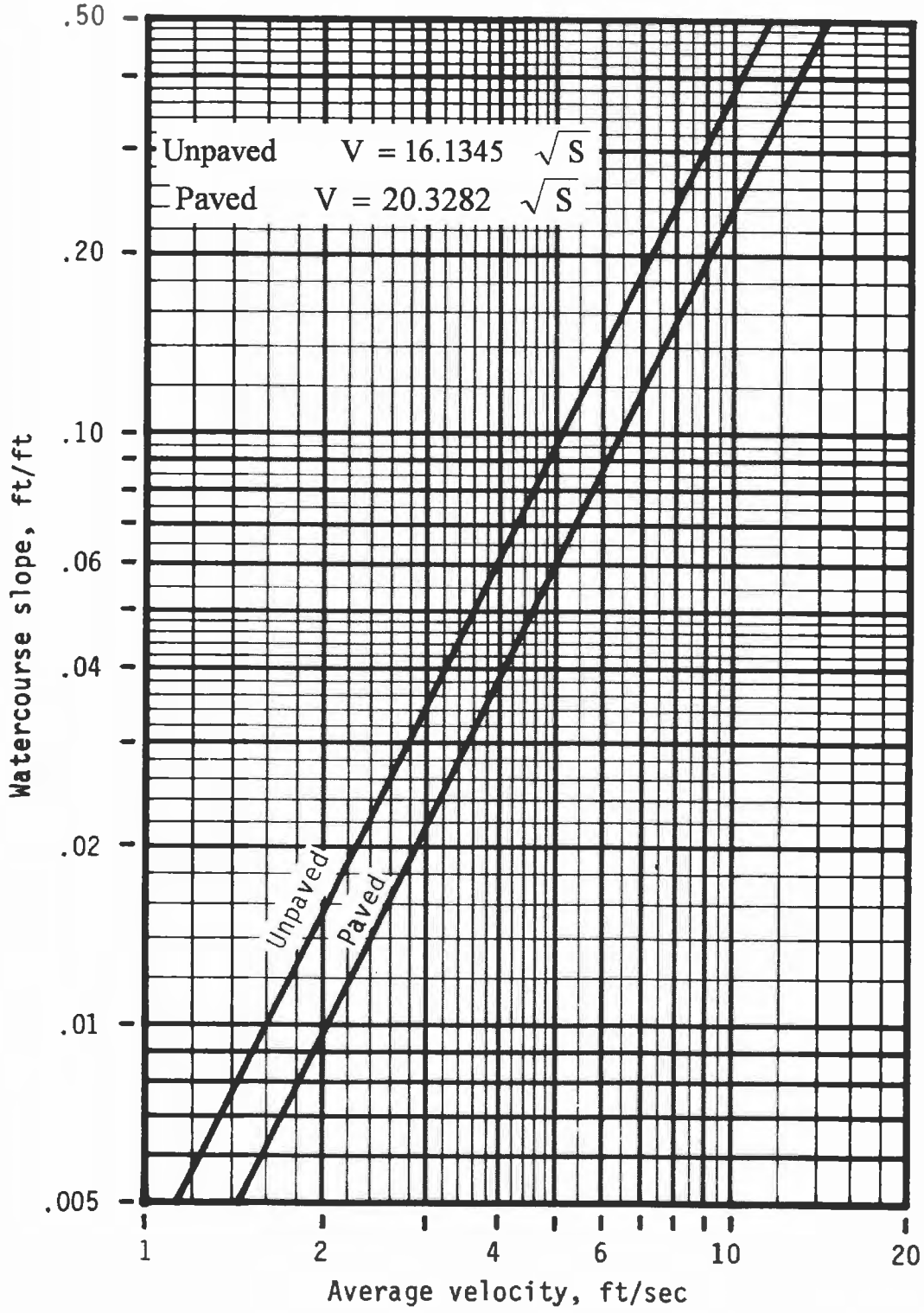
	Storm #1	Storm #2
Return Period in years		
24 Hour Rainfall Depth, P in inches		
Runoff Depth, Q in inches		

24 hour Rainfall Depth from Table 4-11, or Map 4-3 through Map 4-8
Runoff Depth from Table 4-12 or Chart 4-6

Source: Urban Hydrology for Small Watersheds, TR-55, June 1986

Chart 4-7

Average Velocity for Shallow Concentrated Flow



Source: Urban Hydrology for Small Watersheds, TR-55, June 1986

Worksheet 4-2

Time of Concentration Calculation

WORKSHEET 4-2 TIME OF CONCENTRATION COMPUTATION

CALCULATED BY: _____ DATE: _____
CHECKED BY: _____ DATE: _____

PROJECT NAME: _____
STATE PROJECT NUMBER: _____

Space for two sections per flow type can be used for each worksheet.
Include a map, schematic or description of the flow segements

OVERLAND FLOW SEGEMENT, SHEET FLOW TYPE

Section ID			
Surface description (Table 4-5)			
Roughness coeff. n (Table 4-5)			
Flow length L in ft (should be ≤ 100 ft)			
2 Yr 24 Hr rainfall depth P in inches (Map 4-3)			
Land slope S in ft / ft			
Computed travel time T_t in hours		+	=

OVERLAND FLOW SEGEMENT, SHALLOW CONCENTRATED FLOW TYPE

Section ID			
Cover type			
Surface cover coefficient in equation			
Watercourse slope S in ft / ft			
Average velocity V in ft / s (Chart 4-7)			
Flow length in ft			
Computed travel time T_t in hours		+	=

note: overland flow (sheet flow + shallow concentrated flow should be < 200' urban areas, < 400' rural areas)

CHANNEL FLOW SEGEMENT

Section ID			
Cross sectional flow area A in ft^2			
Wetted flow perimter P in ft			
Hydraulic radius R = A / P in ft			
Channel slope S in ft / ft			
Mannings roughness coeff. n (Table 4-7)			
Velocity from Mannings equation, V in ft / s			
Flow length L in ft			
Computed travel time T_t in hours		+	=

Watershed time of concentration T_c in hours _____

Source: Urban Hydrology for Small Watersheds, TR-55, June 1986

Table 4-13

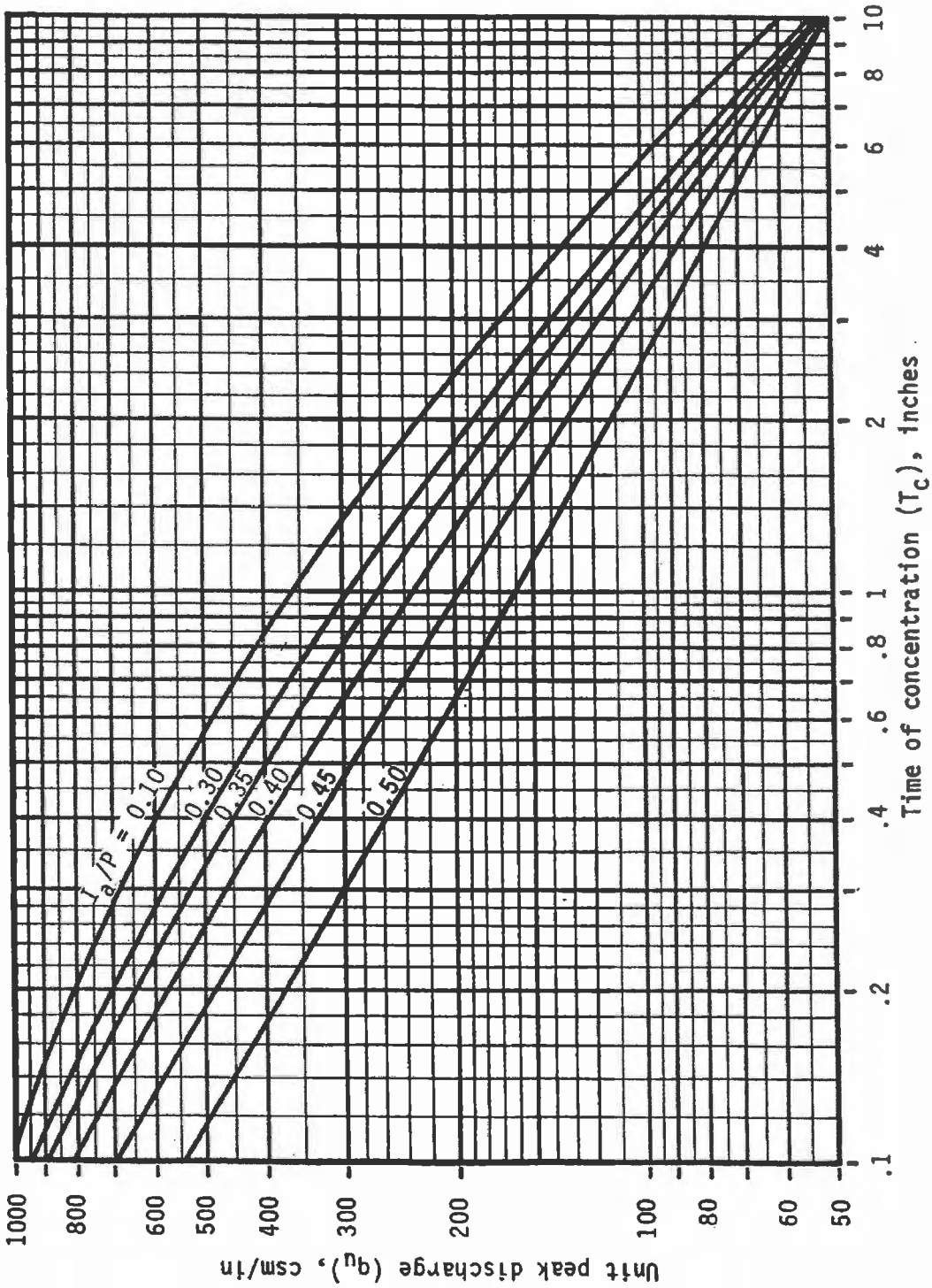
Initial Abstraction Values (I_a) for Curve Numbers

Curve number	I_a (in)	Curve number	I_a (in)
40	3.000	70	0.857
41	2.878	71	0.817
42	2.762	72	0.778
43	2.651	73	0.740
44	2.545	74	0.703
45	2.444	75	0.667
46	2.348	76	0.632
47	2.255	77	0.597
48	2.167	78	0.564
49	2.082	79	0.532
50	2.000	80	0.500
51	1.922	81	0.469
52	1.846	82	0.439
53	1.774	83	0.410
54	1.704	84	0.381
55	1.636	85	0.353
56	1.571	86	0.326
57	1.509	87	0.299
58	1.448	88	0.273
59	1.390	89	0.247
60	1.333	90	0.222
61	1.279	91	0.198
62	1.226	92	0.174
63	1.175	93	0.151
64	1.125	94	0.128
65	1.077	95	0.105
66	1.030	96	0.083
67	0.985	97	0.062
68	0.941	98	0.041
69	0.899		

Source: Urban Hydrology for Small Watersheds, TR-55, June 1986

Chart 4-8

Unit Peak Discharge for Type II Rainfall Distribution



Source: Urban Hydrology for Small Watersheds, TR-55, June 1986