

COUNTY OF GRAYSON

**STORMWATER MANAGEMENT
PROGRAM MANUAL**

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Building and Zoning Department
129 Davis Street
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1.1 Stormwater Management Goals

As land is developed and woodlands and pastures are converted to more intensive commercial and residential uses, the increase of impervious surfaces causes adverse effects including:

- Increased flooding
- Increased erosion and deposition of sediment in streams
- Increased property damage due to flooding, erosion, or deposition
- Increased runoff of pollutants (nutrients, sediment, bacteria, oil)
- Decreased stream biodiversity

For this purpose, the mission of the County of Grayson Stormwater Management Program is to ensure the general health, safety and welfare of our citizens and to protect the quality and quantity of state waters from the potential harm of unmanaged stormwater, including protection from a land disturbing activity causing unreasonable degradation of properties, water quality, stream channels, and other natural resources, and to establish procedures whereby stormwater requirements related to water quality and quantity shall be administered and enforced.

The following guidelines are developed to provide guidance to developers, property owners, and design professionals and to assist them in meeting the Grayson County Stormwater Management Ordinance, hereafter called the Stormwater Management Ordinance. This document serves as a device to supplement local stormwater requirements and not as a replacement for State regulations or guidance. Other manuals for reference can include but are not limited to the following:

- Virginia Department of Environmental Quality Stormwater Management Handbook
- Virginia Department of Transportation Drainage Manual
- Virginia Department of Environmental Quality Erosion and Sediment Control Handbook
- Grayson County Erosion and Sediment Control Ordinance
- Grayson County Stormwater Management Ordinance

1.2 Definitions

For the purpose of this manual, certain words shall be defined as follows:

“Administrator” means the Building Official for Grayson County who is authorized to delegate duties and responsibilities set forth in this manual to qualified technical personnel, plan examiners, inspectors, and other County employees or third-parties. *“Agreement in lieu of a stormwater management plan”* means a contract between the VSMP authority and the owner or permittee that specifies methods that shall be implemented to comply with the requirements of a VSMP for the construction of a single-family residence; such contract may be executed by the VSMP authority in lieu of a stormwater management plan.

“Applicant” means any person submitting an application for a permit or requesting issuance of a permit.

“Best Management Practices” or *“BMP’s”* means schedules of activities, prohibitions of practices, including both structural and nonstructural practices, maintenance procedures, and other management practices to prevent or reduce the pollution of surface waters and groundwater systems from the impacts of land-disturbing activities.

“Board” means the Virginia State Water Control Board.

“Board of Appeals” means the Grayson County Building Board of Appeals.

“Control measure” means any best management practice or stormwater facility, or other method used to minimize the discharge of pollutants to state waters.

“County” means Grayson County, Virginia.

“Department” means the Department of Environmental Quality.

“Development” means land disturbance and the resulting landform associated with the construction of residential, commercial, industrial, institutional, recreation, transportation or utility facilities or structures or the clearing of land for non-agricultural or non-silvicultural purposes.

“Director” means the Director of the Department of Environmental Quality.

“Erosion & Sediment Control Plan” means a document containing material for the conservation of the land. It may include appropriate maps, an appropriate soil and water plan inventory, and management information with needed interpretations and a record of decisions contributing to conservation decisions and all information deemed necessary by the plan approving authority to assure that the entire unit or units of land will be so treated to achieve the conservation objectives.

“General permit” means the state permit titled GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES found in Part XIV (9VAC25-880-1 et seq.) of the Regulations authorizing a category of discharges

under the CWA and the Act within a geographical area of the Commonwealth of Virginia.

“Land-disturbing activity” means a man-made change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation except that the term shall not include those exemptions specified in Section 1-3 (b) of the Grayson County Stormwater Management Ordinance.

“Layout” means a conceptual drawing sufficient to provide for the specified stormwater management facilities required at the time of approval.

“Minor modification” means an amendment to an existing general permit before its expiration not requiring extensive review and evaluation including, but not limited to, changes in EPA promulgated test protocols, increasing monitoring frequency requirements, changes in sampling locations, and changes to compliance dates within the overall compliance schedules. A minor general permit modification or amendment does not substantially alter general permit conditions, substantially increase or decrease the amount of surface water impacts, increase the size of the operation, or reduce the capacity of the facility to protect human health or the environment.

“Operator” means the owner or operator of any facility or activity subject to regulation under the Grayson County Stormwater Management Ordinance.

“Permit” or *“VSMP Authority Permit”* means an approval to conduct a land-disturbing activity issued by the Administrator for the initiation of a land-disturbing activity, in accordance with this Ordinance, and which may only be issued after evidence of general permit coverage has been provided by the Department.

“Permittee” means the person to whom the VSMP General Permit is issued.

“Person” means any individual, corporation, partnership, association, state, municipality, commission, or political subdivision of a state, governmental body, including federal, state, or local entity as applicable, any interstate body or any other legal entity.

“Regulations” means the Virginia Stormwater Management Program (VSMP) Permit Regulations, 9VAC25-870, as amended.

“Site” means the land or water area where any facility or land-disturbing activity is physically located or conducted, including adjacent land used or preserved in connection with the facility or land-disturbing activity.

“State” means the Commonwealth of Virginia.

“State Board” means the State Water Control Board.

“State Water Control Law” means Chapter 3.1 (§62.1-44.2 et seq.) of Title 62.1 of the Code of Virginia.

"State waters" means all water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands.

"Stormwater" means precipitation that is discharged across the land surface or through conveyances to one or more waterways and that may include stormwater runoff, snow melt runoff, and surface runoff and drainage.

"Stormwater management plan" means a document or a compilation of documents containing material describing methods for complying with the requirements of Section 1-6 of the Grayson County Stormwater Management Ordinance.

"Stormwater Pollution Prevention Plan" or *"SWPPP"* means a document or compilation of documents meeting the requirements of Section 1-5 of the Grayson County Stormwater Management Ordinance, and which include, at minimum, an approved erosion and sediment control plan, an approved stormwater management plan, and a pollution prevention plan.

"Subdivision" means the same as defined in Grayson County Subdivision Ordinance, including the division of a tract, lot or parcel of land into two or more lots, plots, sites or other divisions of land as defined in IV of the Grayson County Subdivision Ordinance.

"Total maximum daily load" or *"TMDL"* means the sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources, natural background loading and a margin of safety. TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. The TMDL process provides for point versus nonpoint source trade-offs.

"Virginia Stormwater Management Act" or *"Act"* means Article 2.3 (§62.1-44.15:24 et seq.) of Chapter 3.1 of Title 62.1 of the Code of Virginia.

"Virginia Stormwater BMP Clearinghouse website" means a website that contains detailed design standards and specifications for control measures that may be used in Virginia to comply with the requirements of the Virginia Stormwater Management Act and associated regulations. <http://www.vwrrc.vt.edu/swc/>

"Virginia Stormwater Management Program" or *"VSMP"* means the program established by the County to manage the quality and quantity of runoff resulting from land-disturbing activities in accordance with state law, and which has been approved by the Director.

"Virginia Stormwater Management Program authority" or *"VSMP authority"* means the County.

"Waste load allocation (WLA)" means the portion of a receiving water's loading or assimilative capacity allocated to one of its existing or future point sources of pollution. WLAs are a type of water quality-based effluent limitation.

1.3 Authority

The Stormwater Management Program Manual is designed to provide policies and procedures that implement the provisions of the Code as they pertain to stormwater management, including storm drainage.

In the event that any part of the Stormwater Management Program Manual is held to be illegal or void, this shall not have the effect of making illegal or void the Stormwater Management Program Manual in its entirety, or any section thereof, which will remain effective.

1.4 Administration

Pursuant to §62.1-44.15:27 of the Code of Virginia the Grayson County Board of Supervisors established a stormwater management program for land-disturbing activities and adopted the applicable Regulations that specify standards and specifications for the VSMP promulgated by the State Board for the purposes set out in Section 1-1 of the Stormwater Management Ordinance. For this reason the Grayson County Board of Supervisors hereby designated the Grayson County Building Official as the Administrator of the Grayson County Stormwater Management Program who will therefore have the authority to accept VSMP registration statements and the authority of completing plan reviews, plan approvals, inspections, and enforcement.

1.4.1 General

The policies and procedures contained within the Stormwater Management Program Manual shall be administered by the County of Grayson, or by the designee, or by the Administrator otherwise identified in this manual.

1.4.2 Manual Amendments

The Stormwater Management Program Manual will be periodically amended, as necessary to address:

- Changes in technology
- Changes in accepted construction practices
- Changes in Federal and/or State requirements
- Items that require clarification to avoid confusion
- Development issues that potentially impact public health, safety and welfare

1.5 Erosion and Sediment Control

Effective erosion and sediment control during land development and redevelopment activities is important to support the goals of minimizing and mitigating adverse effects and to allow the proper long-term operation of many stormwater management facilities.

Erosion and sediment control shall comply with the Grayson County Erosion and Sediment Control Ordinance and the requirements of the Virginia Erosion and Sediment Control Handbook, Current Edition, as amended.

1.6 Permit Application Review Fees

There shall be a reasonable fee charged for the processing of stormwater management permit applications and plan reviews. See fee schedule located in Section 1.24 of the Stormwater Management Program Manual for applicable fees.

1.7 Permit Requirements

Unless specifically exempted under Section 1-3 of the Grayson County Stormwater Management Ordinance or not otherwise required pursuant to Section 1-4(h), permits shall not be issued by the Administrator until the following items have been submitted to and approved by the Administrator:

1. Permit application that includes a General Permit Registration Statement
2. Approved Erosion and Sediment Control Plan
3. A Stormwater Management Plan that meets the requirements of Section 1-6 of the Ordinance, where the activity results from the construction for a single family residence, an agreement in lieu of a plan may be substituted for a stormwater management plan if executed by the plan-approving authority.

Required fees/bonds

4. In addition, no VSMP Permit shall be issued until: Permit application and attendant materials and supporting documentation demonstrate all land clearing, construction, disturbance, land development and drainage will be done according to the approved stormwater management plan.
5. Properties requiring a VSMP permit must be issued by the Administrator prior to the issue of grading, building, or other local permits.
6. Construction record drawings for permanent stormwater management facilities must be submitted to the Administrator upon completion of construction. Record drawings shall be appropriately sealed and signed by professional registered by the Commonwealth of Virginia, certifying stormwater management facilities have been constructed according to approved plans. Construction record drawings may not be

required for stormwater management facilities that meet the requirements of Section 1-10(b) of the Ordinance at the discretion of the Administrator.

1.8 Approval of Plans

In order to maintain the character and integrity of neighborhoods, to promote excellence of development, to prevent undue traffic and environmental hazards, and to encourage the most harmonious development and use of land, a site development plan is required for commercial, Planned Unit Developments, Subdivision Class I and Class II developments as defined in the Grayson County Zoning Ordinance.

An approved site development plan, including a final stormwater management design, is required prior to issuance of an Erosion and Sediment Control permit, Building Permit and Zoning Permit.

The certified plan approving authority or duly authorized agent or approved third party reviewer shall review stormwater management plans and shall approve or disapprove the plan.

The Administrator or duly authorized agent will review a stormwater management plan for **completeness** in accordance with Section 1-6 of the Grayson County Stormwater Management Ordinance. Upon completion of the review the Administrator will notify the applicant in writing within 15 calendar days of receipt for completeness. If the plan is deemed to be incomplete, the above written notification shall contain the reasons the plan is deemed incomplete.

The Administrator shall have 60 days after notice of completeness to review any plan. If that plan has been previously disapproved, the Administrator shall have 45 days after the date of resubmission.

During the review period, the plan shall be approved or disapproved and the decision communicated in writing to the person responsible for the land-disturbing activity or his designated agent. If the plan is not approved, the reasons for not approving the plan shall be provided in writing within 60 days after submittal and communication of completeness. Approval or denial shall be based on the plan's compliance with the requirements of the Grayson Count Stormwater Management Ordinance.

If a plan meeting all requirements of the Stormwater Management Ordinance is submitted and no action is taken with the time required in the Stormwater Management Ordinance for review, the plan shall be deemed approved.

1.9 Stormwater Management Plan Content

Stormwater management plans must comply with the technical criteria set forth in Section 1-6 of the Stormwater Ordinance to the entire land-disturbing activity, consider all sources of subsurface and groundwater flows converted to subsurface runoff, and include the following information:

1. Contact Information

- Owner name, address, telephone and email (if applicable)
- Tax map number for property or properties affected

Discharge Information

- Type and location of stormwater discharge
- Predevelopment and post development drainage areas
- Features to which stormwater is being discharged including, surface waters or karst features

Descriptive Narrative

- Current site conditions
- Final site conditions
- Proposed stormwater management facilities
- Operational mechanism
- Maintenance after completion of construction

2. Information of the proposed stormwater management facilities, including:

- Type of facilities
- Location, including geographical coordinates
- Acres treated
- Surface waters or karst features, if present, into which the facility will be discharged

3. Hydrologic and hydraulic computations, including runoff characteristics

4. Documentation and calculations verifying compliance with the water quality and quantity requirements of Section 1-7 of the Grayson County Stormwater Management Ordinance.

5. Map or maps of the site to depict the topography of the site and includes the following information:

- All contributing drainage areas
- Existing streams, ponds, culverts, ditches, wetlands, other water bodies and floodplains;
- Soil types, geologic formations if karst are present in the areas, forest cover and other vegetative areas

- Current land use including existing structures, roads and locations of known utilities and easements
- Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels;
- Limits of clearing and grading and proposed drainage patterns on the site
- Proposed buildings, roads, parking areas, utilities and stormwater management facilities
- Proposed land use with tabulation of the percentage of surface area to be adapted to various uses, including but not limited to planned locations of utilities, roads, and easements.

If an operator intends to meet the water quality and/or quantity requirements set forth in Section 1-7 of the Stormwater Management Ordinance through the use of off-site compliance options, where applicable, then a letter of availability from the off-site provider must be included. Approved off-site options must achieve the necessary nutrient reductions prior to the commencement of the applicant's land-disturbing activity except as otherwise allowed by § 62.1-44.15:35 of the Code of Virginia.

- (a) Elements of the stormwater management plans that include activities regulated under Chapter 4 (§54.1-400 et seq.) of Title 54.1 of the Code of Virginia shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia pursuant to Article 1 (§ 54.1-400 et seq.) of Chapter 4 of Title 54.1 of the Code of Virginia.
- (b) A construction record drawing for permanent stormwater management facilities shall be submitted to the Administrator. The construction record drawing shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia, certifying that the stormwater management facilities have been constructed in accordance with the approved plan. The Administrator may elect not to require construction record drawings for stormwater management facilities for which maintenance agreements are not required pursuant to Section 1-10 (b) of the Stormwater Management Ordinance.

1.10 Modifications of Approved Plans

Approved stormwater management plans may be modified as follows:

- (1) Modifications to an approved stormwater management plan shall be allowed only after review and written approval by the Administrator. The Administrator shall have 60 calendar days to respond in writing either approving or disapproving such request.
- (2) The Administrator may require that an approved stormwater management plan be amended, within a time prescribed by the Administrator, to address any deficiencies noted during inspection.
 - (a) The Administrator shall require the submission of a construction record drawing for permanent stormwater management facilities. The Administrator may elect not to

require construction record drawings for stormwater management facilities for which recorded maintenance agreements are not required pursuant to Section 1-10 (b) of the Stormwater Management Ordinance.

1.11 Stormwater Pollution Prevention Plans.

The Stormwater Pollution Prevention Plan (SWPPP) that must be prepared before a VSMP Permit may be issued must include the following:

- A. An approved erosion and sediment control plan consistent with the requirements of the Virginia Erosion and Sediment Control Law and regulations must be designed and implemented during construction activities.
- B. A approved stormwater management plan consistent with the requirements of the Virginia Stormwater Management Act and regulations must be designed and implemented during construction activities.
- C. A pollution prevention plan that identifies potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges from the construction site and describe control measures that will be used to minimize pollutants in stormwater discharges from the construction site must be developed before land disturbance commences.
- D. In addition to the requirements of subsections A through C of this section, if a specific WLA for a pollutant has been established in an approved TMDL and is assigned to stormwater discharges from a construction activity, additional control measures must be identified and implemented by the operator so that discharges are consistent with the assumptions and requirements of the WLA.
- E. The stormwater pollution prevention plan must address the following requirements as specified in 40 CFR 450.21, to the extent otherwise required by state law or regulations and any applicable requirements of a state permit:
 - a. Control stormwater volume and velocity within the site to minimize soil erosion;
 - b. Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion;
 - c. Minimize the amount of soil exposed during construction activity;
 - d. Minimize the disturbance of steep slopes;
 - e. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle sizes expected to be present on the site;
 - f. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible;
 - g. Minimize soil compaction and, unless infeasible, preserve topsoil;
 - h. Stabilization of disturbed areas must, at a minimum, be initiated immediately whenever any clearing, grading, excavating, or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. Stabilization must be completed within a period of time determined by the

Administrator. In arid, semiarid, and drought-stricken areas where initiating vegetative stabilization measures immediately is infeasible, alternative stabilization measures must be employed as specified by the Administrator; and

- i. Utilize outlet structures that withdraw water from the surface, unless infeasible, when discharging from basins and impoundments.

G. The SWPPP shall be amended whenever there is a change in design, construction, operation, or maintenance that has a significant effect on the discharge of pollutants to state waters and that has not been previously addressed in the SWPPP.

The SWPPP must also comply with all requirements of 9VAC25-880-70, which sets forth the General Permit for Discharges of Stormwater from Construction Activities Authorization to Discharge under the Virginia Stormwater Management Program and the Virginia Stormwater Management Act, and which are appended to this Manual.

1.12 Pollution Prevention Plan

The pollution prevention plan that is required to be developed as part of the stormwater pollution prevention plan shall be developed, implemented, and updated as necessary. The pollution prevention plan shall detail the design, installation, implementation, and maintenance of effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented and maintained to:

1. Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge.
2. Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater.
3. Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

(B) The pollution prevention plan shall include effective best management practices to prohibit the following discharges:

- Wastewater from washout of concrete, unless managed by appropriate control
- Wastewater from washout and cleanout of stucco, paint form release oils, curing compounds, and other construction materials
- Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance
- Soaps or solvents used in vehicle and equipment washing

(C) Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls.

1.13 Monitoring and Inspections

1. A certified operator shall conduct periodic inspections of stormwater facilities, monitor and reports shall be provided to the Administrator.
2. The Administrator or duly authorized agent will inspect the land-disturbing activities during the construction in conjunction with the Erosion and Sediment Control Inspection for compliance with the stormwater management plan.
3. The Administrator or duly authorized agent will check for compliance with approved erosion and sediment control and stormwater management plans.
4. The Administrator or duly authorized agent must ensure development, updating, implementation of a pollution prevention plan and any additional control measures necessary to address a TMDL.
5. Stormwater site inspections check lists will be used to monitor the conditions of the project.
6. Annual reports from the operator will be maintained and reported to the Administrator.
7. The Administrator will inspect stormwater management facilities at a minimum once every five (5) years or until General Permit coverage has been terminated.
8. The Administrator will determine the provisions for long term maintenance of stormwater management facilities and other techniques required to manage the quality and quantity of runoff in accordance with Section 1-10 of the _____ summary.

1.14 Long Term Facilities Requirements (BMPs)

Prior to the issuance of any permit that has a stormwater management facility as one of the requirements of the permit, the permittee or owner of the site must execute an access easement agreement and a formal maintenance agreement that shall be binding on all subsequent owners of land served by the stormwater management facility.

In the Stormwater Management Ordinance Section 1-10 (2), the maintenance of all stormwater management facilities (BMPs) remains with the property owner or responsible party and shall pass to any successor or owner.

The agreement will provide for access of stormwater inspections at reasonable times for periodic inspections by the Administrator, duly authorized agent, or operator and for regular assessments of land owners to ensure that the facility is maintained in proper working condition to meet design standards and any other provisions established by the Stormwater Management Ordinance, and shall be recorded in the Grayson County Clerk's Office.

Maintenance of stormwater management facilities is the responsibility of the permittee during construction until all work is completed, including final clean up and site stabilization, to the satisfaction of the Administrator. At the completion of construction,

maintenance of stormwater management facilities becomes the responsible party or land owner's responsibility in accordance with the executed Maintenance Agreement.

The County is not responsible for maintaining private stormwater management facilities.

The property owner or responsible party is responsible for the proper operation, inspection, maintenance, and repair of stormwater management facilities, after the completion of construction, in accordance with the applicable maintenance agreement. All inspection, maintenance, and repair activities shall be documented, and must be conducted by a person who is licensed as a engineer, architect, landscape architect, or land surveyor pursuant to Article 1 (§ 54.1-400 et seq.) of Chapter 4 of Title 54.1; a person who works under the direction and oversight of the licensed professional engineer, architect, landscape architect, or land surveyor; or a person who holds an appropriate certificate of competence from the State Board.

Post construction inspections of stormwater management facilities are required by the provisions of the Grayson County Stormwater Management Ordinance and shall be conducted pursuant to the County's adopted and State Board approved inspections program, and shall occur, at minimum, once every five years thereafter. The County may utilize the inspection reports of the Owner if the inspection is conducted by a person who is licensed as a professional engineer, architect, landscape architect, or land surveyor pursuant to Article 1 (§ 54.1-400 et seq.) of Chapter 4 of Title 54.1; a person who works under the direction and oversight of the licensed professional engineer, architect, landscape architect, or land surveyor; or a person who holds an appropriate certificate of competence from the State Board. This information must be mailed *to*:

Grayson County
Building Department/Stormwater
P.O. Box 217
Independence, VA 24348
Attn: BMP Inspection & Maintenance Records

See Appendix B for the Stormwater Maintenance Agreement included in this manual.

1.15 Enforcement and Violations

1. If the Administrator determines that there is failure to comply with the VSMP authority permit conditions or determines there is unauthorized discharge the following notice shall be served as follows:
 - a. Verbal warnings.
 - b. Inspection reports
 - c. Notices of corrective actions

- d. Consent special orders and civil charges as applicable
- e. Notices to comply

Written notices shall be served by registered or certified mail to the address specified in the permit application or by delivery at the site of the development activities to the agent or employee supervising such activities.

2. Notices shall specify the measures needed to comply with the permit conditions and shall specify the time within which measures shall be completed. Upon failure to comply within the time specified, a stop work order may be issued in accordance with §62.1-44.15:48 of the Code of Virginia or the permit may be revoked by the Administrator.
3. If the permittee fails to comply with a notice issued within the time specified the Administrator may issue an order requiring the owner, permittee, person responsible for carrying out an approved plan, or the person conducting the land disturbing activities without an approved plan or required permit to cease all land-disturbing activities until the violation of the permit has ceased, or an approved plan and required permits are obtained, and specified corrective measures have been completed.
4. Such orders shall be issued in accordance with § 62.1-44.15:48 Code of Virginia. Such orders shall become effective upon service on the person by certified mail, return receipt requested, sent to his address specified in the land records of the locality, or by personal delivery by an agent of the Administrator. However, if the Administrator finds that any such violation is grossly affecting or presents an imminent and substantial danger of causing harmful erosion of lands or sediment deposition in waters within the watersheds of the Commonwealth or otherwise substantially impacting water quality, it may issue, without advance notice or hearing, an emergency order directing such person to cease immediately all land-disturbing activities on the site and shall provide an opportunity for a hearing, after reasonable notice as to the time and place thereof, to such person, to affirm, modify, amend, or cancel such emergency order. If a person who has been issued an order is not complying with the terms thereof, the Administrator may institute a proceeding for an injunction, mandamus, or other appropriate remedy in accordance with Subsection (c) of this article.
 - (a) In addition to any other remedy provided by the Stormwater Management Ordinance, if the Administrator or his designee determines that there is a failure to comply with the provisions of the Stormwater Management Ordinance, they may initiate such informal and/or formal administrative enforcement procedures in a manner that is consistent with, §62.1-44.15:48 Code of Virginia.
 - (b) Any person violating or failing, neglecting, or refusing to obey any rule, regulation, ordinance, order, approved standard or specification, or any permit condition issued by

the Administrator may be compelled in a proceeding instituted in Circuit Court of Grayson County to obey same and to comply therewith by injunction, mandamus or other appropriate remedy.

(c) Any person who violates any provision of the Stormwater Management Ordinance or who fails, neglects, or refuses to comply with any order of the Administrator, shall be subject to a civil penalty not to exceed \$32,500 for each violation within the discretion of the court. Each day of violation of each requirement shall constitute a separate offense.

(1) Violations for which a penalty may be imposed under this Subsection shall include but not be limited to the following:

- No state permit registration;
- No SWPPP;
- Incomplete SWPPP;
- SWPPP not available for review;
- No approved erosion and sediment control plan;
- Failure to install stormwater BMPs or erosion and sediment controls;
- Stormwater BMPs or erosion and sediment controls improperly installed or maintained;
- Operational deficiencies;
- Failure to conduct required inspections;
- Incomplete, improper, or missed inspections; and
- Discharges not in compliance with the requirements of Section 9VAC25-880-70 of the general permit.

(2) The Administrator may issue a summons for collection of the civil penalty and the action may be prosecuted in the appropriate court.

(3) In imposing a civil penalty pursuant to this Subsection, the court may consider the degree of harm caused by the violation and also the economic benefit to the violator from noncompliance.

(4) Any civil penalties assessed by a court as a result of a summons issued by Grayson County shall be paid into the treasury of Grayson County to be used for the purpose of minimizing, preventing, managing, or mitigating pollution of the waters of Grayson County and abating environmental pollution therein in such manner as the court may, by order, direct.

(d) Notwithstanding any other civil or equitable remedy provided by this Section or by law, any person who willfully or negligently violates any provision of the Stormwater Management Ordinance, any order of the Administrator, any condition of a permit, or any

order of a court shall, be guilty of a misdemeanor punishable by confinement in jail for not more than 12 months or a fine of not less than \$2,500 nor more than \$32,500, or both.

1.16 Establishment of Board of Appeals; Officers and Qualifications of Members

The Board of Appeals is authorized to conduct formal hearings in accordance with Section 1-12 of the *Code of Virginia*, and Section 1-12 of the Stormwater Management Ordinance. The Board of Appeals shall consist of five (5) members. Members of the Board of Appeals shall be selected by the Grayson County Board of Supervisors in the basis of their ability to render fair and competent decisions regarding application of the VSMP and shall to the extent possible, represent different occupational or professional fields relating to the industry. At least one member shall be an experienced builder; at least one member shall be a Registered Design Professional, and at least one member shall be an experienced property manager. Employees or officials of Grayson County shall not serve as members on the Board of Appeals. The Board of Appeals shall annually select one of its regular members to serve as chairman. When the chairman is not present at an appeal hearing, the members present shall select an acting chairman. Grayson County or the Chief executive officer of Grayson County shall appoint a secretary to the Board of Appeals to maintain a detailed record of all proceedings.

1.17 Conduct of Members

No member of the Board of Appeals shall hear an appeal in which that member has a conflict of interest in accordance with the State and Local Government Conflict of Interests Act (Section 2.2-3100 et seq. of the Code of Virginia). Members shall not discuss the substance of an appeal with any other party or their representatives prior to any hearing.

1.18 Right of Appeal; Filing of Appeal Application

Any permit applicant or permittee aggrieved by any action of Grayson County taken without a formal hearing, or by inaction of the County, may demand in writing a hearing before the Board of Appeals. The applicant shall submit a written request for appeal to the Board of Appeals within 30 calendar days of the receipt of the decision being appealed. The application shall contain the name and address of the owner of the permit, the name and address of the person appealing, when the applicant is not the owner. A copy of the decision being appealed or a state of the inaction shall be submitted along with the application for appeal and maintained as part of the record. The application shall be marked by the Board of Appeals to indicate the date received. Failure to submit an application for appeal within the time limit established by the Grayson County

Stormwater Management Ordinance shall constitute acceptance of the Administrators decision. Fees may be levied by the local governing body in order to defray the cost of such appeals.

1.19 Formal Hearing Procedures

Any applicant or permittee entitled to a hearing before the Board of A appeals board shall be heard within 30 calendar days after the date of receipt of the application for appeal, except that a longer time period shall be permitted if agreed to by all parties involved in the appeal.

A notice indicating time and place of the hearing shall be sent to the parties in writing to the address listed in writing to the address listed on the application at least 14 calendar days prior to the date of hearing, except that a lesser time period shall be permitted if agreed to by all the parties involved in the appeal.

A simple majority of 3 members of a quorum shall be required to conduct the Board's business. When a quorum of the appeals board is not present at a hearing to hear the appeal, the appeals board shall reschedule the appeal within 30 calendar days of the postponement, except that a longer time period shall be permitted of agreed to by all the parties involved in the appeal.

All hearings before the Board of Appeals shall be open meetings and the appellant, the appellant's representative, Grayson County representative and any person whose interests affected by the decision in question shall be given an opportunity to be heard. The chairman shall have the power and duty to direct the hearing, rule upon the acceptance of evidence and oversee the record of all proceedings. The Board of Appeals shall have the power to uphold, reverse or modify the decisions of the Administrator by a concurring vote of a majority of those present. Decisions of the Board of Appeals shall be final if no further appeal is made.

The appeals board shall consider evidence and opinion presented by the aggrieved applicant and agent. After considering the evidence and opinions, the Board of Appeals may affirm, reverse, or modify the action. The Board of Appeals decision shall be final, subject only to review by the Circuit Court of Grayson County, provided an appeal is filed within 30 days from the date of decision.

A verbatim record of the proceedings of such hearings shall be taken and filed with the Board of Appeals. Depositions may be taken and read as in actions at law.

The Board of Appeals shall have power to issue subpoenas and subpoenas duces tecum, and at the request of any party shall issue such subpoenas. The failure of a witness without legal excuse to appear or to testify or to produce documents shall be acted upon

by the Board of Appeals, whose action may include the procurement of an order of enforcement from the circuit court. Witnesses who are subpoenaed shall receive the same fees and reimbursement for mileage as in civil actions.

1.20 Appeals to the Circuit Court

Any aggrieved permit applicant or permittee, and any party to a formal hearing may appeal to the Grayson County Circuit Court provided an appeal is filed within 30 days from the date of the decision being appealed.

1.21 Obtaining and Releasing of Bonds

The County of Grayson may, at its discretion, require the submittal of a performance security or bond with surety, cash escrow, letter of credit or other acceptable legal arrangement, all which shall be in a form approved by Grayson County, prior to the issuance of a permit in order to ensure that the stormwater practices are installed by the permittee as required by the approved stormwater management plan.

The amount of the installation performance security shall be 20% of the total estimated construction cost.

1.22 Reporting and Record Retention

The Grayson County Building Department shall retain a record of applications received, permits, plans, notices, orders issued, fees collected and reports of inspections in accordance with The Library of Virginia's General Schedule Number Six.

1.23 Fee Schedule

(Fees to cover costs associate with the implementation of a VSMP related to land disturbing activities and issuance of general permit coverage and VSMP authority permits shall be imposed in accordance with the fee schedules as follows:

TABLE 1:

	Total fee to be paid by Applicant (includes both VSMP authority and Department portions where applicable)	Department portion of “total fee to be paid by Applicant” (based on 28% of total fee paid*)
Agreement in lieu of a Stormwater Management Plan- for a single family residence not in a common plan of development disturbing less than 1 acre.	\$60	\$0
General / Stormwater Management - Small Construction Activity/Land Clearing (Areas within common plans of development or sale with land disturbance acreage less than 1 acre.)	\$290	\$81
General / Stormwater Management - Small Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 1 acre and less than 5 Acres)	\$2,700	\$756
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 5 acres and less than 10 acres)	\$3,400	\$952

General / Stormwater Management – Large Construction Activity/Land Clearing [Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 10 acres and less than 50 acres]	\$4,500	\$1,260
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 50 acres and less than 100 acres)	\$6,100	\$1,708
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 100 acres)	\$9,600	\$2,688

Notes to Table 1:

- (a) When a site or sites has been purchased for development within a previously permitted common plan of development or sale, the Applicant shall be subject to fees in accordance with the disturbed acreage of their site or sites according to Table 1, column 1, "Total fee to be paid by applicant."
- (b) In accordance with Section 1-4(h) of the Stormwater Management Ordinance, for proposed land disturbing associated with a single-family residence, separately built, disturbing less than one acre but part of a common plan of development or sale, no payment of the Department portion of the permit fee is required, provided that a stormwater management plan implemented for the larger common plan of development or sale provides permanent control measures encompassing the proposed residence.

TABLE 2: Fees for the modification or transfer of registration statements for the General Permit for Discharges of Stormwater from Construction Activities

Type of Permit	Fee Amount
General / Stormwater Management – Small Construction Activity/Land Clearing (Areas within common plans of development or sale with land disturbance acreage less than 1 acre)	\$20
General / Stormwater Management – Small Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 1 and less than 5 acres)	\$200
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 5 acres and less than 10 acres)	\$250
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 10 acres and less than 50 acres)	\$300
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 50 acres and less than 100 acres)	\$450
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 100 acres)	\$700

Notes to Table 2:

Transfers of General Permit registration statements and modifications to stormwater management plans (other than minor modifications) shall be subject to the fees imposed in Table 2. The fee assessed shall be based on the total disturbed acreage of the site. In addition to the modification fee set forth in Table 2, modifications resulting in an increase in total disturbed acreage shall pay the difference in the initial permit fee paid and the permit fee that would have applied for the total disturbed acreage in Table 1. The fees specified in this Subsection go to Grayson County.]

TABLE 3: Permit maintenance Fees.

Type of Permit	Fee Amount
General / Stormwater Management – Small Construction Activity/Land Clearing (Areas within common plans of development or sale with land disturbance acreage less than 1 acre)	\$50
General / Stormwater Management – Small Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance equal to or greater than 1 acre and less than 5 acres)	\$400
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 5 acres and less than 10 acres)	\$500
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 10 acres and less than 50 acres)	\$650
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 50 acres and less than 100 acres)	\$900
General / Stormwater Management – Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater 100 acres)	\$1,400

Notes to Table 3:

General permit coverage maintenance fees shall be paid annually to Grayson County by the anniversary date of general permit coverage. No permit will be reissued or automatically continued without payment of the required fee. General permit coverage maintenance fees shall be required until a Notice of Termination is effective. Annual permit maintenance fees include fees imposed on expired permits that have been administratively continued. The fees specified in this Subsection go to Grayson County.

No general permit application fees will be assessed to:

- (1) Permittees who request minor modifications to general permits as defined in Section 1-2 of the Grayson County Stormwater Management Ordinance. Permit modifications at the request of the permittee resulting in changes to stormwater management plans that require additional review by the Administrator shall not be exempt pursuant to this Section.

- (2) Permittees whose general permits are modified or amended at the initiative of the Department, excluding errors in the registration statement identified by the Administrator or errors related to the acreage of the site.

All incomplete payments will be deemed as non-payments, and the applicant shall be notified of any incomplete payments. Interest may be charged for late payments at the underpayment rate set forth in §58.1-15 of the Code of Virginia and is calculated on a monthly basis at the applicable periodic rate. A 10% late payment fee shall be charged to any delinquent (over 90 days past due) account. Grayson County shall be entitled to all remedies available under the Code of Virginia in collecting any past due amount.

APPENDIX A

STORMWATER MANAGEMENT FACILITIES INSPECTION REPORT FORM

Stormwater Management Facilities Inspection Report Form

Inspector Name: _____

Inspection Date: _____

Site Address/Project Name: _____

Watershed: _____ Tax Map or Parcel ID No: _____

Maintenance Agreement: YES/NO As-built Plans: YES/NO Site Plans: YES/NO

Type of Stormwater BMP or Structure

- Pond (Dry Pool) Pond (Permanent Pool)
 Underground Detention (Other Describe) _____

Item Inspected	Maintenance Required (Y/N)	Observations/ Remarks
Embankment (*Image # _____)		
Are there signs of settling, cracking, bulging, or other structural deterioration?		
Is there woody vegetation growth that may interfere with the stability of the embankment?		
Are there signs of erosion?		
Is there evidence of animal burrows or sink holes?		
Are there bare areas that need seeding or sodding?		
Is there evidence of oil or other pollutant spills?		
Riser/ Outlet Control Structure (* Image # _____)		
Is the structure clean of debris and sediment, free of damage, and working?		

Is the emergency spillway clear of obstructions, debris, and vegetation?		
Is there evidence of seepage?		
Receiving Channel/ Outflow Channels (* Image # _____)		
Are point(s) of discharge from the stormwater structure will armored and functioning?		
Is there accumulation of sediment, debris, or trash?		
Is there evidence of erosion?		
Is there vegetation growth that may interfere with flow?		
Culverts, Storm Drains, or other Inflow Channels		
Inflow Point 1 (*Image # _____)		
Is the storm drain filled more than 25% with debris, sediment, or trash?		
Is there evidence of structural failure of the culvert pipe?		
Is there evidence of erosion?		
Are there signs of settling, cracking, or misalignment of the storm drain pipe?		
Inflow Point 2 (*Image # _____)		
Is the storm drain filled more than 25% with debris, sediment, or trash?		
Is there evidence of structural failure of the culver pipe?		
Is there evidence of erosion?		
Are there signs of settling, cracking, or misalignment of the storm drain pipe?		
Basin (*Image# _____)		
Is there accumulation of debris, litter, or sediment?		

(For detention ponds) Is there standing water in the pond?		
Are there bare areas which need seeding or sodding?		
Do the vegetated areas need mowing or is there a buildup of clipping that could clog the facility?		
(For Wet Ponds) Is there excessive algae growth or other vegetation?		
Is there evidence of oil or other pollutants in the pond?		
Do any of the safety devices, fences, gates, or locks need repair?		
Other		
Is there sediment, debris, litter, oil, or trash that needs to be cleared for aesthetic or functional reasons?		
Is there standing water where there should not be standing water?		
Is there structural damage to concrete structures?		
Are there signs of erosion at the entrance or exit?		
Are the valves, sluice gates, and other mechanical devices operational?		
Has adequate access to the pond been provided?		

*See attached photos of each inspected item

NOTE TO PROPERTY OWNER: The inspection and maintenance of all stormwater management facilities is the responsibility of the property owner, all facilities shall be inspected annually. A report documenting the inspection results and pond maintenance activities shall be submitted to the county on or before December 31 of each calendar year. ***Please send inspection reports to the following address:***

County of Grayson
 Building Department/Stormwater
 P.O. Box 217
 Independence, VA 24348

APPENDIX B

STORMWATER MANAGEMENT MAINTENANCE AGREEMENT

STORMWATER MANAGEMENT/BMP FACILITIES MAINTENANCE AGREEMENT

THIS AGREEMENT, made and entered into this ____ day of _____, 20____,

between _____,

(Insert Full Name of Company/Corporation/Partnership Name)

hereinafter call the "Owner", and the Board of Supervisors of Grayson County, Virginia, hereinafter called the "County". WITNESSETH, that WHEREAS, the owner is the proprietor of certain real property described as:

_____,
(Grayson County Tax Map/Parcel Identification Number)

_____,
(Grayson County Tax Map/Parcel Identification Number)

_____,
(Grayson County Tax Map/Parcel Identification Number)

hereinafter called the "Property";

WHEREAS, this tract of land is the site of a stormwater management facility being a stormwater management and /or water quality BMP facility and accompanying structures, a plat and stormwater facilities maintenance schedule of which is attached hereto;

WHEREAS, the Landowner is proceeding to build on and develop the property; and
WHEREAS, the Site Plan, Subdivision Plan known as

(Name of Plan/Development)

hereinafter called the "Plan", which is expressly made a part hereof, as approved or to be approved by the County, provides for treatment of stormwater within the confines of the property; and

WHEREAS, the County and the Landowner, its successors and assigns, including any homeowners association, agree that the health, safety, and welfare of the residents of Grayson County, Virginia, require that on-site stormwater management/BMP facilities be constructed and maintained on the Property; and

WHEREAS, the County requires that on-site stormwater management/BMP facilities as shown on the Plan be constructed and adequately maintained by the Landowner, its successors and assigns, including any homeowners association.

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

1. The on-site stormwater management /BMP facilities shall be constructed by the Landowner, its successors and assigns, in accordance with the plans and specifications identified in the Plan.

2. The Landowner, its successors and assigns, including any homeowners associations, shall adequately maintain the stormwater management/BMP facilities. This includes all pipes and channels built to convey stormwater to the facility, as well as all structures, improvements and vegetation provided to control the quantity and quality of the stormwater. Adequate maintenance is herein defined as good working condition so that these facilities are performing their design functions and maintaining required water quality and quantity treatments.

3. The Landowner, its successor and assigns, shall periodically inspect the stormwater management BMP facilities. The purpose of the inspections to assure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structure, pond areas, access roads, etc. Deficiencies shall be noted in the inspections report. Pond areas shall be inspected at least one time per year.

4. The Landowner, its successors and assigns, shall document all inspections, maintenance activities and repairs that are performed on the stormwater management BMP facilities. Documents shall be maintained for a minimum period of five (5) years and they shall be made available for review by, or copies shall be provided to the County upon request.

5. The Landowner, its successors and assigns, hereby grant permission to the County, its authorized agents and employees, to enter upon the Property and to inspect the stormwater management /BMP facilities periodically and whenever the County deems necessary. The purpose of inspection is to verify that proper maintenance is occurring and/or to follow-up on reported deficiencies and/or to respond to citizen complaints. The County shall provide the Landowner, its successors and assigns, copies of the inspection findings and a directive to commence with the maintenance or repairs if necessary.

6. In the event the Landowner, its successors and assigns, fails to maintain the stormwater management/BMP facilities in good working condition acceptable to the County, the County may enter upon the Property and take whatever steps necessary to correct deficiencies identified in the inspection report and to charge the costs of such repairs to the Landowner, its successors and assigns. This provision shall not be construed to allow the County to erect any structure of permanent nature on the land of the Landowner outside of the easement for the stormwater management/BMP facilities. It is expressly understood and agreed that the County is under no obligation to routinely maintain or repair said facilities, and in no event shall this Agreement be construed to impose any such obligation in the County.

7. The Landowner, its successors and assigns, will perform the work necessary to comply with the attached maintenance schedule, including sediment removal, and as otherwise required to keep these facilities in good working order as appropriate.

8. In the event the County pursuant to this Agreement, performs work of any nature, or expends any funds in performance of said work for labor, use of equipment, supplies, materials, and the like, the Landowner, its successors and assigns, shall reimburse the County upon demand, within thirty (30) days of receipt thereof for all actual costs incurred by the County hereunder.

9. This Agreement imposes no liability of any kind whatsoever on the County and the Landowner agrees to hold the County harmless from the liability in the event the stormwater management/BMP facilities fail to operate properly.

10. This Agreement shall be recorded among the land records of Grayson County, Virginia, and shall constitute a covenant running with the land, and shall be binding on the Landowner, its administrators, executors, assigns, heirs and any other successors in interests, including any homeowner association.

IN WITNESS of all which the parties hereto have caused this agreement to be executed on their behalf.

Legal Names:

Principal

Developer: _____
(Insert Full Name of Company/Corporation/Partnership Name)

By: _____
(Duly Authorized Officer Signature)

As: _____
(Duly Authorized Officer Title)

Notary Statement:

State of: _____:

County of: _____, to wit:

The foregoing instrument was acknowledged before me this:

_____, day of _____, 20 _____,

By: _____ as _____
(Duly Authorized Officer Printed Name) (Duly Authorized Officer Printed Title)

on behalf of _____
(Insert Full Name of Company/Corporation/Partnership Name)

_____/_____
(Notary Public Signature) (Notary Public Printed Name)

My Commission expires: _____ Registration # _____

Approved as to Form:

Board of Supervisors of
Grayson County, Virginia

By: _____
Stormwater Program Administrator

State of: Virginia :

County/City of: Grayson :

This foregoing instrument was acknowledged before me this:

_____, day of _____, 20____,

by Stormwater Program Administrator, on behalf of the Board of Supervisors of Grayson County, Virginia.

_____/_____
(Notary Public Signature) (Notary Public Printed Signature)

My Commission expires: _____ Registration # _____

BMP Type: _____

Required Action	Maintenance Objective	Frequency of Action
Inspections		
Vegetation Management		
Slope, Embankment, and Outlet Stabilization		
Debris and Litter Control		
Mechanical Components		
Insect Control		
Access Road and Area Maintenance		
Sediment and Pollutant Removal		
Component Repair and Replacement		
Other		

APPENDIX C

STORMWATER MANAGEMENT PLAN REVIEW CHECKLIST



STORMWATER MANAGEMENT PLAN REVIEW CHECKLIST

This checklist must be completed and part of the Land Disturbing Permit submittal for review if the acreage disturbed is one (1) acre or more:

I. SUPPORTING DATA

Narrative describing storm water management strategy including all assumptions made in the design.

A. Drainage Area Map

- _____ Site and drainage area boundaries
- _____ Off-site drainage areas
- _____ Pre-and post-development land uses with corresponding acreage
- _____ Existing and proposed topographic features
- _____ Drainage area appropriated of BMP

B. Soils Investigation

- _____ Soils map with site and drainage area outlined
- _____ Geotechnical report with recommendations and earthwork specifications
- _____ Boring locations
- _____ Borrow area
- _____ Basin pool area
- _____ Embankment area: centerline principal spillway, emergency spillway, abutments
- _____ Boring logs with Unified Soils Classifications, soil descriptions, depth to seasonal high groundwater table, depth to bedrock, etc.
- _____ Compaction requirements specified
- _____ Additional geophysical investigation and recommendations in Karst environment

II. COMPUTATIONS

A. Hydrology

- _____ Runoff curve number determinations: pre-and post-developed conditions, with worksheets.
- _____ Time of concentration: pre-and post-developed conditions, with worksheets,
- _____ Hydrograph generation: pre- and post -developed condition for appropriate design and safety storms (SCS methods or modified rational-critical storm duration method)

B. Hydraulics

- _____ Safety assumptions and coefficients used.
- _____ Stage-storage table or curve
- _____ Riser structure and barrel
- _____ Weir/orifice control analysis for riser structure discharge openings.
- _____ Weir/orifice control analysis for riser crest
- _____ Barrel: inlet/outlet control analysis
- _____ Riser/Outlet Structure flotation analysis (factor of safety = 1.25 min.)
- _____ Anti-seep collar or filter diaphragm design
- _____ Outlet protection per VE&SCH Std.. & Spec. 3.18.
- _____ Provisions for use as a temporary sediment basin riser with clean out schedule and instructions for conversion to a permanent facility
- _____ Emergency spillway adequacy/capacity analysis with required embankment freeboard
- _____ Stage-discharge table and curve (provide equations and cite references.
- _____ Storm drainage and hydraulic grade line calculations
- _____ Reservoir routing of post-development hydrographs for appropriate design storms (2yr.,10yr.,or as required by watershed conditions) and safety storms (100-yr or as as required).

C. Downstream Impacts

- _____ Danger reach study
- _____ 100 year floodplain impacts
- _____ "Adequate channel" calculations for receiving channel
- _____ Provide downstream hydrographs at critical study points
- _____ Storm drainage plans for site areas not draining to BMP
- _____ Safe conveyance-MS-19
- _____ Areas compensated for in water quality performance- based criteria calculations

D. Water Quality

- _____ Impervious cover tabulation
- _____ Technology-based criteria: proper selection of BMP based on impervious cover
- _____ Performance-based criteria: pre- and post-developed pollutant load and pollutant removal requirement calculations (provide worksheets)
- _____ Water quality volume for retention basin I, II, or III permanent pool
- _____ Water quality volume for ext. detention and ext. detention enhanced with drawdown calculations
- _____ Proper surface area/depth allocations for permanent pool/shallow marsh/constructed wetland
- _____ Constructed storm water wetland/shallow marsh
- _____ Adequate drainage area and/or base flow
- _____ Adequate pool volume
- _____ Adequate surface area

- _____ Allocation of surface area to depth zones
- _____ Maximum ponding depth over pool surface specified

III. PLAN REQUIREMENTS

A. General Items

- _____ Plan view drawn at 1"=50' or less (40', 30', etc.)
- _____ North arrow
- _____ Legend
- _____ Location plan and vicinity map
- _____ Property lines
- _____ Existing & proposed contours (2' contour interval min.)
- _____ Existing features & proposed improvements (including utilities and protective measures)
- _____ Locations of test borings
- _____ Earthwork specifications
- _____ Construction sequence for SWM basin and E&S controls
- _____ Temporary erosion & sediment control measures
- _____ Conveyance of base flow during construction
- _____ Temporary and permanent stabilization requirements
- _____ Emergency spillway
- _____ Basin side slopes
- _____ Delineation of FEMA 100 year floodplain
- _____ Plans sealed by a qualified licensed professional

B. BMP Plan Views

- _____ Dimensions of basin features: perm. Pool, sediment forebay, embankment, etc.
- _____ Location of all conveyance system outfalls into basin
- _____ Proper orientation to avoid short-circuiting
- _____ Outlet protection per VE&SCH
- _____ Top of bank & basin bottom elevations
- _____ Elevations of permanent pool, water quality volume and max. design water surface elevations for all appropriate design storms and safety storms
- _____ Side slope (H:V) of basin storage area and embankment (upstream and downstream slopes)
- _____ Proper length-to-width ratio as specified in BMP design criteria
- _____ Pervious low flow channel
- _____ Sediment. forebay
- _____ Basin bottom slope
- _____ Maintenance access to sediment fore bay, riser structure, and one side of the basin ponding area
- _____ Peripheral ledge for safety
- _____ Aquatic Bench
- _____ Shoreline protection

- _____ Safety fence
- _____ Riser and barrel materials and dimensions labeled
- _____ Constructed storm water wetland/shallow marsh
- _____ Basin liner specifications
- _____ Pool depth zones identified on plan
- _____ Pool geometry -wet/dry weather flow path

C. BMP-Section Views & Related Details

1. Embankment (or dam) and Ponding Areas

- _____ Elevations of permanent pool, water quality volume and max. design water surface elevations for all appropriate design storms and safety storms
- _____ Top of dam elevations- constructed height and settled height (10% settlement).
- _____ Adequate freeboard
- _____ Top width labeled

- _____ Elevation of crest of emergency spillway
- _____ Emergency spillway w/side slopes labeled.
- _____ Emergency spillway inlet, level, and outlet sections labeled
- _____ Existing ground and proposed improvements profile along center line of embankment

- _____ Existing ground and proposed improvements profile along center line of principal spillway
- _____ Typical grading section through pond including typical side slopes with aquatic bench, safety ledge shoreline protection, etc.
- _____ Existing ground and proposed improvements along center line of emergency spillway
- _____ Dimensions of zones for zoned embankment

2. Seepage Control

- _____ Impervious lining
- _____ Phreatic line(4:1 slope measured from the principal spillway design high water).

a. Anti-seep Collar

- _____ Anti-seep collar (detail required..).
- _____ Size (based upon 15% increase in seepage length).
- _____ Spacing & location on barrel (at least 2'from pipe joint).

b. Filter Diaphragm

- _____ Design certified by a professional geotechnical engineer.

3. Foundation Cut Off Trench or Key Trench

- _____ Materials labeled
- _____ Bottom width (4' min or greater per geotech. report).
- _____ Side slopes labeled (1:1 max. steepness).
- _____ Depth (4' min.or as specified in geotechnical report)

4. Multi Stage Riser and Barrel System

- _____ Materials labeled _____ Basin drain pipe
- _____ Bedding or cradle details provided
- _____ Gauge & corrugation size for metal pipes specified
- _____ Barrel diameter, inverts, and slope (%) labeled
- _____ Outlet protection per VESCH, Std. & Spec. 3.18, 3.19 w/filter cloth underlayment
- _____ Crest elevation of riser structure shown
- _____ Inverts and dimensions of control release orifices/weirs shown
- _____ Structure dimensions shown
- _____ Control orifice/weir dimensions shown
- _____ Extended detention orifice protection (detail required for construction)
- _____ Riser trash rack or screen (detail required for construction).
- _____ Riser anti-vortex device (detail required for construction).
- _____ Proper riser structure footing.
- _____ Access to riser structure interior for maintenance.

D. Landscape Plan

- _____ Planting schedule and specifications (transport / storage / installation / maintenance)
- _____ Plant selection for planting zones 1 thru 6
- _____ Preservation measures for existing vegetation
- _____ Top soil/planting soil included in final grading

E. Maintenance Items

- _____ Person or organization responsible for maintenance.
- _____ Maintenance narrative which describes the long-term maintenance requirements of the facility and all components.
- _____ Facility access from public R/W or roadway.

COMMENTS: _____

By: _____ Date: _____

III. CERTIFICATIONS

- _____ Certification's from manufacturers for materials used
- _____ Seeding tickets and specifications
- _____ Certification statement and seal by licensed professional indicating the as-built drawing is accurate, complete and constructed per the approved plan