

**Standard Operating Procedure for
Erosion and Sedimentation Control
and
Grading Ordinance**

July 13, 2006



The Etowah HCP Standard Operating Procedure for Erosion and Sedimentation Control and Grading was developed in two phases by two Technical Committees composed of professionals and local government staff from the Etowah watershed. The first phase, which took place throughout 2003 and 2004, included the development of the Erosion and Sediment Control Standard Operating Procedure (SOP). The HCP Steering Committee approved the Technical Committee's recommendations for erosion and sedimentation control and included the SOP in the Etowah Habitat Conservation Plan on July 23, 2004. In addition to creating the SOP the Technical Committee also recommended developing a grading ordinance to regulate potentially harmful grading activities. The Grading Technical Committee was convened and met throughout 2005 and 2006, and that committee's recommendations were approved by the Steering Committee on June 9, 2006. The Erosion and Sedimentation SOP and Grading Ordinance were approved by the Steering Committee with the understanding that these policies, once implemented, would help minimize and mitigate take of imperiled aquatic species in the Etowah Watershed, and that the policies would be implemented prior to receiving an Incidental Take Permit from US Fish and Wildlife Service.

Technical Committee Members

The following individuals served on the Erosion and Sedimentation Control and Grading Technical Committees. Members of the committees provided feedback on the documents via a series of meetings, which took place from May to December, 2004, and August 2005 through June 2006, and via written or verbal comments to the Technical Committee staff.

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Executive Summary

The Erosion and Sedimentation (E&S) Control Technical Committee was convened in May, 2004 to provide recommendations for improving E&S management as part of the Etowah Habitat Conservation Plan. The goal of all E&S control programs is superficially quite simple: keep dirt out of streams. In practice, however, this goal is very difficult to achieve. The approach of the Etowah HCP E&S Control Technical Committee was to identify the best practices among the jurisdictions of the Etowah Basin and develop these into a "Standard Operating Procedure" (SOP) for all participating counties and municipalities. The goal is to bring all jurisdictions to a higher level of erosion and sedimentation control.

The Technical Committee's recommendations were approved by the HCP Steering Committee on July 23, 2004 with the understanding that the adoption of the SOP would help minimize and mitigate take of imperiled species in the Etowah basin. These procedures will be implemented by participating jurisdictions prior to receiving an Incidental Take Permit pursuant to the Etowah Habitat Conservation Plan.

The SOP includes six elements:

- two required preconstruction meetings
 - early meeting with the site planner and relevant E&S professionals to identify problem areas before site plans are finalized
 - subsequent meeting with the utilities, engineers, developer, E&S installation crew, and owner to review where and how E&S control measures will be installed
- semi-monthly reporting requirements
- a bonding program
- a minimum inspection frequency requirement
- a brief E&S checklist for building inspectors
- designation of emergency on-call E&S personnel from each development.

The Technical Committee also created an educational document on E&S best management practices (BMPs) and made recommendations about the allocation of E&S permit fees, proposed E&S BMP training opportunities, and the development of a mass grading ordinance.

Following the E&S Technical Committee's recommendations, HCP staff convened a Grading Technical Committee in August, 2005. This committee's goal was to develop a regulation for grading activities that would help minimize erosion problems from large, cleared areas with inadequate ground cover or stabilization. After several meetings and reviewing grading policies from across the United States, the committee concluded that an effective model was unavailable, and decided to develop a grading regulation from scratch. Experts from within the state of Georgia were brought in to advise the committee and after several proposals an agreeable planning-based regulatory approach was identified. The committee's final recommendations were approved by consensus and include a five-step approach for developing grading plans and two limitations to grading activities.

The five-step approach to developing grading plans includes:

- Step 1.** Identify important site characteristics including soil infiltration classes, hydrologic features, geologic features, specimen trees and slopes greater than or equal to 25%, among other characteristics, on the grading plan.

Step 2. Identify non-gradable areas including riparian buffers, wetlands, populations of and habitat for endangered species and 30% of slopes greater than or equal to 25% slope that will remain undisturbed throughout and after the development process.

Step 3. Identify stormwater infiltration areas.

Step 4. Identify areas to be graded.

Step 5. Delineate 17 acre phased grading plan.

The limitations on grading activities include:

- No more than 17 acres of disturbed area shall exist on a site at any one time.
- 30% of all slopes equal to or greater than 25% slope must remain undisturbed during and after development of the site.

Introduction

Sedimentation is one of the most serious threats to the aquatic species covered under the Etowah Habitat Conservation Plan. An excess of fine sediments can blanket the bottom of a stream, degrading the physical habitat, impeding spawning (Berkman and Rabeni 1987) and reducing populations of invertebrates on which fish feed (Wood and Armitage 1997). Suspended sediment in the water may also impair spawning (Burkhead and Jelks 2001), reduce feeding effectiveness (Sweka and Hartman 2003) and cause direct physical impacts to fish (Newcombe and MacDonald 1991). In recent studies in the Etowah, researchers found a link between sedimentation and the number and types of fish present in a reach of stream (Walters et al. 2003).

Sedimentation may originate from a range of sources, including:

- Construction sites, which are arguably the largest source of sedimentation in the Etowah basin, and are the focus of this document.
- Utility and road crossings, which will be addressed with a separate set of recommendations.
- Stream channel erosion, which increases with high storm flows associated with urbanization. This is addressed through stormwater management, discussed in a separate document.
- Agriculture and forestry, which are generally exempted from most of the provisions of the Etowah HCP.
- Historical land uses that left “legacy sediment” in streams and rivers.

Sedimentation from construction sites is regulated through Georgia’s Erosion and Sedimentation Act, which in most cases is administered by local jurisdictions that have been delegated enforcement authority. A 2001 audit of the state Erosion and Sedimentation Control Program by the Georgia Department of Audits and Accounts found that the provisions of the Erosion and Sedimentation Act form a good basis for effective local programs, but many counties and municipalities lack the resources and political will to adequately enforce the rules (Georgia Department of Audits and Accounts 2001). Therefore, to better control erosion and sedimentation it is not necessary to make major regulatory changes, but rather to find ways to better enforce the existing rules.

One area in which additional regulations may be warranted is in the large-scale grading (sometimes called mass grading) of development sites. Erosion and sedimentation control best management practices (BMPs) are not fail-safe, and some sedimentation may occasionally occur even when properly installed and maintained. The probability of such failures, and the magnitude of failures, tends to increase as the amount of disturbed area increases. Therefore, a policy that minimizes the amount of grading will reduce the potential for erosion and sedimentation and increase the success rate of erosion control BMPs.

While grading usually only takes place for a short period of time on an individual development site, on a basin-wide scale the combined effect of multiple exposed sites can create a chronic erosion threat. As one disturbed site is stabilized, another site, or multiple sites, may be graded elsewhere in the same basin. While development professionals in the Etowah basin take great care to prevent erosion problems on their sites, some failure is considered inevitable and the aggregate effects of small upstream failures are felt downstream. The result of ongoing development activities upstream is often a persistent state of high turbidity and habitat degradation downstream. A grading ordinance has the potential to significantly reduce erosion potential and improve aquatic habitat on a basin-wide scale.

The jurisdictions participating in the Etowah HCP all have strengths and weaknesses in managing erosion and sedimentation. The approach of the Etowah HCP Erosion and Sedimentation Control and Grading Technical Committees has been to identify the best practices among the jurisdictions and develop these into a “Standard Operating Procedure” (SOP) for all the counties and municipalities and to give guidelines which would help improve planning regarding grading activities. This is intended to eliminate weaknesses and bring all jurisdictions and development projects to a higher level of erosion and sedimentation control. Adoption and implementation of the SOP and grading ordinance is a requirement of the Etowah HCP.

Committee Process

Erosion and Sediment Control Standard Operating Procedure Technical Committee

In May 2004, the Erosion and Sedimentation Control Technical Committee was convened to address post-development stormwater issues for the Etowah Habitat Conservation Plan. The committee was composed of technical staff from local governments, developers, engineers, and consultants working in the Etowah watershed. Members of the committee were selected because of their expertise in the field of E&S and their experience with recurring E&S problems in the watershed.

The committee decided to focus on developing a SOP to be used by the Erosion and Sedimentation Control offices in the Etowah counties and cities, and creating a guidance document regarding the proper installation and maintenance of E&S BMPs commonly used in the watershed.

A series of meetings was held between May and December 2004 to develop and evaluate these documents. The documents were revised based on input from the committee members as well as input from focus groups occurring during this time in the watershed. The final recommendations of the Technical Committee are summarized below. These recommendations were approved by the HCP Steering Committee on July 23, 2004 for inclusion in the Etowah Habitat Conservation Plan with the understanding that they will serve as a means of minimizing and mitigating take of imperiled species in the Etowah Watershed and that they will be implemented prior to receiving an incidental take permit from USFWS.

Grading Technical Committee

The Grading Technical Committee was composed of development industry professionals, local government staff engineers and erosion control officers, and elected officials from across the Etowah basin. The committee met several times throughout 2005 and 2006 to discuss the need for, and components of, a model grading ordinance for the Etowah HCP. Technical committee meetings were lively, as committee members with diverse perspectives and objectives felt strongly about the structure the final ordinance should take. Two main issues drove debate among committee members.

First, in 2005 Athens-Clarke County—a county near, but outside the Etowah basin and not included in the Etowah HCP—adopted a “mass-grading” ordinance that was seen by many elected officials involved in the HCP as an ideal mechanism for protecting viewsheds and

serving constituents' requests to slow growth, while being perceived as burdensome by many development industry professionals. The Technical Committee began discussions regarding regulating grading by reviewing the Athens-Clarke County ordinance. It became clear through review of the Athens-Clarke ordinance that the policy would not meet the conservation goals of the HCP and an alternative regulation was necessary. However, debate regarding the Athens-Clarke ordinance set a divisive tone among committee members that was difficult to overcome.

Second, after discarding the Athens-Clarke ordinance the Technical Committee asked HCP staff to review grading ordinances across the United States to identify an approach that might be more effective in the Etowah. During this search it became clear that most grading ordinances across the country were not designed to protect aquatic species and habitat, and a model was unavailable. It became clear that the HCP Grading Technical Committee was embarking on a new path and the broad array of potential approaches, each with benefits and disadvantages, sparked energetic debate among members. As a result, the Committee asked HCP staff members to provide further justification for a grading ordinance and identify local experts who could serve as advisors to the committee.

After providing justification (see "Introduction" to this report) that a grading ordinance was a necessary component of the HCP, staff identified two approaches—a planning phase approach, and a performance standard approach—for developing an ordinance and experts to help with each. Jerry Weitz, a planning consultant who facilitates the development of comprehensive plans and other environmental regulations for rural communities across Georgia, offered expertise for developing an ordinance based on slope, that would require grading considerations be included in the creation of a site's development plan. Billy Hall of Newfields Engineering, an Atlanta-based engineering firm renowned for environmental sensitivity on major development projects around the country, offered expertise on the latter approach.

HCP staff worked with both advisors to develop regulations that were then presented to the Grading Technical Committee. After considering the implications of each approach the Technical Committee agreed that a planning phase approach was the only approach that could garner support of all committee members. Staff then developed several alternative planning-based regulatory approaches over several committee meetings. Eventually, consensus was reached on the approach included in this document, which was integrated into a model ordinance for the Etowah HCP.

It is important to note that while there was full consensus among technical committee members that the policy presented in this document should be recommended for inclusion in the Etowah HCP, there was not full agreement that this policy would provide a complete solution to sedimentation problems associated with grading. Upon implementation of the Etowah HCP, there will be periodic review of the incidence of grading failures to determine whether sites with extensive grading contribute disproportionately to sedimentation. If this is found to be the case, a technical committee may need to be reconvened to consider a more restrictive grading policy to be adopted as part of the adaptive management phase of the HCP.

Upon approval of the ordinance by the Technical Committee, the policy was presented to, and approved by, the Steering Committee on June 9, 2006 for inclusion in the Etowah HCP.

Standard Operating Procedure (SOP)

The six elements of the SOP cover all stages of development: design stage meetings, pre-disturbance meetings, on-site inspection and self-policing during disturbance, required stabilization after disturbance, and continued developer involvement through a bonding program until one year after completion of the project. These programs are designed to be adopted as a whole, that is, none of them by themselves adequately address E&S problems.

1. Required Pre-Construction Meetings

Many E&S problems can be avoided through proper planning and coordination of construction activities, so that each actor in the process is aware of where, when, and how E&S BMPs will be installed and maintained. Therefore, the SOP requires two pre-construction meetings.

The first meeting shall include the developer, site planner, site engineer, and local E&S inspector very early in the site planning stages, before the site plan is finalized or approved. The purpose of this meeting is to give these professionals a chance to identify problem areas before significant resources are invested in finalizing the site plan and designs are completed, placing engineers in the “no-win” situation of having to design BMPs on a site that may contain significant barriers for successful implementation.

The second meeting shall take place before a land-disturbing permit is granted, and shall include the landowner, developer, engineer, builder, grader, utilities representatives, and government officials. The purpose of the meeting is to review the finalized site plan, including location and type of E&S BMPs. This meeting is based on a similar one currently required in Pickens County. The purpose of this meeting is to clearly communicate and coordinate among the different entities working on a project. One major component of this pre-development meeting is to address how on-site staff can avoid destructive practices in potentially sensitive areas, and can avoid damaging the E&S BMPs directly. This meeting also gives government officials a chance to point out areas of concern and identify what areas will be more intensively monitored.

These pre-construction meetings may be conducted simultaneously with the pre-construction meetings required by the HCP Stormwater Ordinance.

2. Bi-Weekly Self-Reporting Requirement

An important aspect of E&S control is acknowledging and reporting violations. The SOP includes a self-reporting program which requires land-disturbing permit holders to monitor E&S controls on their sites and document the status, including maintenance and violations, of their E&S control practices. To discourage misreporting, these written reports must be accompanied by photographs, digital or film, of critical areas within the development identified by a local government E&S inspector as potentially problematic or indicative of other E&S problems on-site. Such areas may include: any place where concentrated flow is leaving the site, retention pond outfalls, construction exits, steep slopes, and BMPs in close proximity to a stream. All reports must be kept on-site for review by local issuing authority E&S inspectors for the duration of the land-disturbance permit.

This requirement is based on Bartow County’s practice of requiring semi-monthly reports (Appendix A). The form used by Bartow County will serve as a template for the HCP-required reports with the notable addition of a space to attach photographs. The semi-monthly reports should be kept on-site and signed by local E&S inspectors at the appropriate time during their site visits.

3. Minimum Bi-Weekly Inspections by Certified Local Agents

Consistent and frequent inspection by certified agents will ensure that E&S problems resulting from storm events will be monitored quickly and the impact of these events evaluated. An adequate inspection program will be pro-active, preventing problems before they occur rather than simply reacting after sediment has reached streams. This inspection protocol is designed to ensure an adequate minimum inspection frequency while encouraging more frequent inspections of sites that certified E&S inspectors deem to be at greatest risk.

There are two components to the inspection requirement:

- 1) The **average** frequency of visits to active sites shall be at least weekly. That is, in a given week, the number of site visits should be the same as the number of active sites in a jurisdiction.
- 2) The **minimum** frequency of visits to active sites shall be every two weeks.

This allows inspectors to can visit some sites more frequently than others, as they deem necessary, as long as these requirements are met. For example, if a county has two active sites, one could be visited twice a week while the other is visited twice a month. Similarly, if a county has twenty active sites, inspectors should be making twenty site visits every week, although not all sites will be visited in all weeks.

Active sites are defined as: 1) sites with on-going construction activity, *i.e.* the disturbance of soils associated with clearing, grading, excavating, filling of land, or other similar activities which may result in soil erosion; or 2) sites containing areas where less than 100% of the soil surface has been permanently stabilized. Stabilization may be achieved by establishing permanent vegetation with a density of 70% or greater, or through equivalent permanent stabilization measures.

These inspection requirements are the minimum. More frequent inspections may be needed during periods of frequent or heavy rain events or seasonal increases in construction activity, or when inspectors have concerns about a site for other reasons such as site conditions or the developer's history of E&S compliance.

Many local governments in the watershed already have an internal policy requiring weekly site visits (see Appendix B for Forsyth County's inspection protocol). However, while some E&S control officers in the Etowah already visit their sites an average of once a week or more, others average visits once every two weeks or less. The purpose of this requirement is to ensure that all issuing authorities meet a minimum standard of site visitation, while giving officers the flexibility and discretion to determine which sites need more or less attention. To track their progress, issuing authorities should log each visit in a simple Excel spreadsheet and determine the average frequency of site visits each month for the past month. A sample spreadsheet will be provided.

Inspectors should document functioning or problematic BMPs in the same areas as the photographic documentation required in the self-reporting program. This provision will ensure satisfactory inspections are taking place, ensure pro-active maintenance is occurring, and provide evidence that may be used in court if necessary.

Counties or municipalities that do not have adequate staff to fill this requirement will need to allocate the funds necessary to hire the additional personnel required.

4. Short E&S Checklist for Building Inspectors

Building inspectors are in a unique position to issue permits at various stages in a project's development. In many cases, although E&S control is not their primary responsibility, building inspectors' job descriptions allow for inspection of E&S control structures. Building inspectors should be directed to perform a brief E&S inspection, using a concise checklist, at each site visit. Given building inspectors' focus on residential and commercial buildings, this checklist should address lot-level E&S controls as opposed to subdivision-level controls. The checklist should contain, at a minimum, the following questions:

- Are all perimeter sediment control devices properly installed and maintained?
- Are slopes adequately stabilized?
- Are stormwater conveyance channels adequately stabilized with channel lining and outlet protection?
- Do all operational storm sewer inlets have adequate inlet protection?
- Have sediment-trapping BMPs been adequately maintained?
- Are soil and mud being kept off all public roadways?
- Is there evidence of sediment leaving the site and affecting downstream property?

The building inspector is not required to attend formal training on E&S control installation and maintenance. Rather, if the building inspector identifies a possible E&S control problem, he or she shall alert the local E&S official who will examine the problem in detail, or, if appropriate, provide expertise to the permittee on the best way to remedy the problem. The building inspector will have the freedom to grant or deny the building permit based on current E&S performance. The building inspector shall not approve the final certificate of occupancy unless all E&S controls are in place and functioning properly and the site is permanently stabilized.

5. Mandatory Bonding Program

According to the Erosion and Sedimentation Act of 1975, local issuing authorities may require an applicant for a land disturbance permit to post an erosion bond prior to the issuance of the permit. An erosion bond is used to guarantee that E&S BMPs constructed under the permit will be adequately maintained throughout the life of the bonding period, with local issuing authorities having the power to call on all or any part of the bond if an applicant does not comply with the Act or with the conditions of the permit. This maintenance and performance bond protects counties against situations where a bad actor leaves E&S problems that the county or municipality does not have adequate resources to remediate.

Due to the impact that neglected erosion control practices have on imperiled aquatic species, an E&S bonding program is mandatory for the jurisdictions participating in the Etowah HCP. The bonding program must include:

- 1) establishment of the total dollar amount required for the bond;
- 2) specification of the length of the bond
- 3) the requirements for notice of defect or lack of maintenance
- 4) provision for release of the bond.

The City of Kennesaw currently requires an erosion bond which remains in effect until one year after the final certificate of occupancy for the project is issued; this program should serve as the model for the bonding program to be adopted by the counties and municipalities participating in the HCP (Appendix C). To see other municipalities' sample bonds:

http://www.stormwatercenter.net/Manual_Builder/Maintenance_Manual/3Performance_Bonds/performance%20bond%20intro.htm

6. Emergency On-Call Personnel Requirement

The committee and various focus groups around the watershed voiced concerns about the failure of some developers to have a contact person available at all times to respond to an E&S problem, and failure of E&S inspectors to contact developers when violations are identified.

Developers must identify a person who can be called by an inspector any time an E&S violation has been observed. This gives enforcement officials a way to make someone aware of the problem as soon as possible after it occurs, giving the responsible party a chance to fix the problem before valuable time has passed and significant damage is done.

The enforcement official shall call the development's contact person immediately upon discovery of any E&S problem, or upon issuance of a fine or citation. For developers, this provision alleviates the "stop-work surprise" the morning after a "blowout" has occurred.

Grading Recommendations

The grading component of the HCP erosion control program includes a mandatory five-step approach to developing grading plans and two limitations to grading activities. These recommendations have been written into a model ordinance included as Appendix E in this report.

The five-step approach to developing grading plans includes:

Step 1. Applicant shall identify the following important site characteristics on the grading plan's site map:

- a. Property boundaries;
- b. All streams, rivers, lakes, wetlands and other hydrologic features;
- c. Topographic contours of no less than 2-foot intervals and all areas that contain slopes equal to or greater than 25% over a contiguous area of at least 5000 ft.²
- d. Relevant geological features, such as rock outcroppings;
- e. Soil infiltration classes, pursuant to the National Cooperative Soil Survey or a more recent soil survey, whichever is more accurate for the site;
- f. Trees with a diameter of fifteen inches or more; and
- g. Existing roads and structures.

Step 2. Applicant shall identify areas that are not gradable. These areas may include but are not limited to:

- a. Areas subject to local and state riparian buffer requirements;
- b. Wetlands that meet the definition used by the Army Corps of Engineers pursuant to the Clean Water Act;
- c. Populations of endangered or threatened species, or habitat for such species;
- d. Archaeological sites, cemeteries and burial grounds; and
- e. At least 30% of slopes equal to or greater than 25% over a contiguous area of at least 5000 ft.², pursuant to Section 5 of this ordinance. Other areas identified in step 2 may not be included when delineating the at least 30% of these slopes that will remain ungraded.

Step 3. Applicant shall identify the locations of all structural and nonstructural infiltration BMPs, if any, required under the applicant's stormwater management plan for the site.

Step 4. Applicant shall identify all areas of the site that will be graded.

Step 5. Applicant shall separate the area that will be graded into phases and identify those phases on the grading plan's site map so that the surface area of erodible material at one time shall not exceed 17 acres, pursuant to the **[local government's]** Erosion and Sedimentation Control Ordinance.

The limitations to grading activities include:

- the surface area of erodible material at one time shall not exceed 17 acres.
- at least 30% of all areas of a site that contain slopes equal to or greater than 25% over a contiguous area of at least 5000 ft.² shall be left ungraded. Calculation of slope shall be based upon a contour interval of 2 ft. or less.

Other components of the Model Grading Ordinance, such as applicability, definitions, and enforcement mechanisms directly follow those in the state of Georgia's erosion and sedimentation law.

Other Technical Committee Recommendations

Fee Allocation

The 2003 amendments to Georgia's Erosion and Sedimentation Act of 1975 require an E&S permittee to pay an \$80 fee, half of which is allocated to Georgia's Environmental Protection Division and half of which is allocated to the local issuing authority (LIA). Section 4 of House Bill 285 also added Georgia Code Section 12-5-30(g) which reads, in part, "The General Assembly further declares its intent that the amount of funds provided by such permit fees will not be utilized for any purposes other than the administration of Chapter 7 of this title...[the Erosion and Sedimentation Act of 1975]." The portion of permit fees allocated to the LIA, therefore, should be explicitly designated for an E&S fund within that LIA, and should not go into the local government's general fund. By creating a specific fund for E&S fees, the LIA guarantees the increased revenue generated by the fees will be used for E&S purposes, not subject to redistribution among other departments within the local jurisdiction. This is both an equitable and efficient use of permit fees, because the fees are directly applied to monitoring and enforcing compliance with the permits that are their source.

BMP Guidance Document

The BMP Guidance Document identifies common mistakes and how to avoid them when installing and maintaining BMPs (Appendix D). The document emphasizes BMP maintenance, starting from the premise that BMPs are often simply not maintained.

This information should be included as part of the E&S permit application packet, and displayed in local E&S control and planning offices. The BMP Guidance Document is based upon Technical Committee discussion, the Georgia Soil and Water Conservation Commission's *Manual for Erosion and Sediment Control in Georgia* (the "Green Book,") and the following sources:

California Stormwater Quality Association
<http://www.cabmphandbooks.com/Construction.asp>

Florida Stormwater, Erosion, and Sedimentation Control Inspector's Manual
<http://www.broward.org/dni00835.htm>

Urban BMPs – Water Runoff Management – USDA/NRCS
<http://www.wsi.nrcs.usda.gov/products/UrbanBMPs/water.html>

Construction Site Stormwater Runoff Control – EPA
http://cfpub.epa.gov/npdes/stormwater/menuofbmps/con_site.cfm

Soil Erosion Prevention and Sediment Control – University of Tennessee, Knoxville
<http://www.engr.utk.edu/research/water/erosion/index.html>

Urban Small Sites Best Management Practice Manual – Minnesota
<http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm>

BMPs for Construction Activities – Utah
<http://www.pweng.slco.org/pdf/construction/brrc.pdf>

Catalog of Stormwater Best Management Practices – Idaho
http://www.deq.state.id.us/water/stormwater_catalog/index.asp

Educational Opportunities

The E&S Control Technical Committee recommended to staff that they explore the development of additional educational opportunities for E&S professionals in the Etowah watershed. The Etowah HCP Advisory Committee will evaluate the need for additional E&S courses after the Georgia Soil and Water Conservation Commission begins the new statewide E&S certification program mandated by House Bill 285 of 2003. This comprehensive program is expected to begin in 2005.

Etowah HCP Development Study

The Grading Technical Committee recommended that a comprehensive study of all HCP ordinances be conducted. The goal of this study would be to evaluate the financial implications of the HCP and necessary changes to local development project review and permitting processes. This study would be conducted by simulating the general site development process used by developers to evaluate the resource costs and gains associated with developing a particular piece of property in the Etowah basin. Members of the technical committee offered in-kind, technical services associated with the project and the Council for Quality Growth and Greater Atlanta Homebuilders' Association offered financial support. Benefits of this study would be primarily educational. The results would inform local governments of the implications of the HCP in terms of funding and staffing, as well as implications for the local development industry. The study would also inform members of the development community regarding how development will occur under the new regulations.

Works Cited

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Appendix A
Bartow County semi-monthly reporting form



135 West Cherokee Avenue, Suite 124; Cartersville, GA 30120

*** CERTIFICATION ***

SEMI-MONTHLY EROSION & SEDIMENT CONTROL REPORT

This form shall be prepared by a qualified professional registered in the State of Georgia. This report is required to be submitted the 1st and 15th day of each month. If this report is not received by 5:00 p.m. on said days, a Stop Work Order may be issued for the project.

Date

Ray A. Sullivan, Bartow County Zoning Administrator
Bartow County Zoning Department
135 West Cherokee Avenue, Suite 124
Cartersville, Georgia 30120

Re: Semi-Monthly Erosion and Sediment Control Report
Project Name:
Bartow County Land Disturbance Permit Number:

Based on a site inspection of the referenced project on Date of Inspection, I, Name, a qualified registered professional engineer/architect/landscape architect/surveyor/CPESC in the State of Georgia, do certify that the referenced project is/is not in compliance with the approved erosion and sediment control plan and the "Manual for Erosion and Sediment Control in Georgia" and that all erosion and sedimentation measures have/have not been properly installed and maintained.

A copy of this certification has been sent to the owner/developer/contractor below as notification for the following measures to be taken to bring this site into compliance with the approved erosion and sediment control plan and the Manual for Erosion and Sediment Control in Georgia.

Supplementary page included for additional measures that need to be taken.

Signature

SEAL

P.E./Architect/Landscape Architect/Surveyor/CPESC
Circle One

Registration Number

CC: Owner /Developer/Contractor

**It shall be the responsibility of the owner or developer to properly address all measures noted on the report within 5 days of the date of this certification to maintain compliance with the Erosion and Sedimentation Control Ordinance and the Manual for Erosion and Sediment Control in Georgia.

Appendix B
Forsyth County inspection protocol

Forsyth County Dept. of Engineering

Order of Precedence For Soil Erosion Inspections

1. Erosion complaints filed with the Department of Engineering receive first priority.
2. Commercial/ Industrial Developments or any other site for which a Land Disturbance Permit was issued shall be inspected once a week.
3. Residential/ Single Family sites for which a Land Disturbance Permit was issued shall be inspected once a week.
4. Individual lots and other sites that do not have Land Disturbance Permits will be inspected once every two weeks.

Field Reports will be filed for all Soil Erosion Inspections.

Appendix C
City of Kennesaw Bonding Documents



Memorandum

Department of Planning and Development City of Kennesaw, Georgia

To: All Developers and Owners

The City of Kennesaw (City) is the Issuing Authority for Erosion and Sedimentation Control permits within the jurisdictional boundaries of the City. Consistent with the Georgia Erosion and Sediment Control Act of 1975 (as amended), and Section V.b(5a), Application Requirements of the City of Kennesaw Erosion and Sedimentation Control Ordinance, authorized the City to require an erosion control performance bond for any development activities permitted within the City limits. Specifically:

“The issuing Authority shall require the permit application to post a bond in the form of government security, cash, irrevocable letter of credit, or any combination thereof up to, but not exceeding, \$3,000 per acre or fraction thereof of the proposed land disturbing activity, prior to issuing a permit. If the applicant does not comply with this ordinance or with the conditions of the permit after issuance, the Issuing Authority may call the bond or any part thereof to be forfeited and may use the proceeds to hire a contractor to stabilize the site of the land-disturbing activity and bring it into compliance. These provisions shall not apply unless there is in effect an ordinance or statute providing for hearing and judicial review of any determination or order of the Issuing Authority with respect to alleged permit violations.”

An Erosion and Sedimentation Control Performance Bond:

1. Shall be required of all sites that disturb 1 acre or more during development activities.
2. Shall be required of all sites that contain designated “State Waters” as defined by the Ordinance.
3. May be required on sites disturbing less than 1 acre when, in the opinion of the City of Kennesaw, residential or commercial areas are located in close proximity to the planned activity, or the potential for impacts to sensitive environments exists.

The required amount of the Performance Bond will be a minimum of \$1,000.00 per acre or fraction thereof, of the proposed land-disturbing activity, but under no circumstances more than \$3,000.00. In general, this shall be calculated on the overall size of the project site. In limited cases, a reduction in the overall site area may be approved if the applicant demonstrates that tree protection or buffer areas are up gradient of construction areas and have no possibility of being impacted from improper erosion control management activities.

The Erosion Control Maintenance/ Performance Bond form is included as an attachment to this memorandum. Contact the City of Kennesaw at 770-421-8582 if you have any questions.





**EROSION AND SEDIMENT CONTROL
MAINTENANCE/PERFORMANCE BOND**

Bond No. _____

KNOW ALL MEN BY THESE PRESENTS: That we _____ of _____ County, State of _____ as Principal and _____ as Surety, are held and bound unto City of Kennesaw, Georgia in the sum of \$ _____ lawful money of the United States of America, for the payment whereof well and truly to be made, we bind ourselves, our heirs, executors, successors and assigns, jointly and severally, firmly by these presents. The condition of the foregoing obligations is such that,

WHEREAS, the Principal will inspect and maintain the operational characteristics of the erosion and sedimentation control measures on the facility in accordance with the approved Development Plans, and the City of Kennesaw Erosion and Sediment Control Ordinance, as determined by the City of Kennesaw, and such that the facility complies with the requirements of the Development Regulations during the period of construction covered by said permit.

WHEREAS, the Principal shall maintain the erosion and sedimentation control Best Management Practices in accordance with the Manual for Erosion and Sediment Control in Georgia. The escape of sediment from the site shall be prevented by the installation of erosion and sediment control measures and practices prior to, and concurrent with, land-disturbing activities. If full implementation of the approved plan does not provide for effective erosion control, additional erosion and sediment control measures shall be implemented by the Principal to control or treat the sediment source.

WHEREAS, the maintenance of all soil erosion and sedimentation control measures and practices, whether temporary or permanent, shall be at all times the responsibility of the Principal.

WHEREAS, the City of Kennesaw, as Issuing Authority, has the authority to required the Principal to post a bond in the form of a government security, cash, irrevocable letter of credit, or any combination thereof up to, but not exceeding \$3,000 per acre or fraction thereof of the proposed land-disturbing activity, prior to issuance of a permit. Said bond being provided and made available to the City of Kennesaw in the event that the Principal fails to maintain compliance with the provisions of this bond and the City of Kennesaw elects to hire a contractor to stabilize the project site and otherwise bring the site into compliance;

WHEREAS, this agreement shall be governed by the laws of the State of Georgia.

NOW THEREFORE, if the Principal shall well and truly perform the terms and conditions of said contract, then this obligation shall be void, otherwise, to remain in full force and effect. Upon failure of the Principal in the performance of the terms and conditions of said contract, then the Surety shall be liable in payment to the City of Kennesaw of a sum not to exceed \$ _____, which is calculated as \$ _____ per acre over a total of _____ acres. The bond value is to be used to cover the cost of completing the terms and conditions set forth under the contract entered by the Principal with the City of Kennesaw. The bond shall remain in full force and effect until permanent stabilization and satisfactory removal of temporary erosion control measures, as determined solely by the City of Kennesaw, or 6 months from issuance of Final Certificate of Occupancy (C.O.).

SIGNED, SEALED AND DELIVERED THIS _____ day of _____, 20_____, in the presence of:

ATTEST:

Corporate Secretary

BY: _____(SEAL)
Principal Signature

Printed Name and Title

BY: _____
Printed Surety Name

ATTEST:

Corporate Secretary

_____(SEAL)
Signature

Printed Name and Title



Appendix D
BMP Guidance Document

BMP Guidance Document

BMP

Common Mistakes

Keys to Success

Vegetated waterway or stormwater conveyance channel (Wt)

Vegetation is not established before flows are introduced

Fall plantings resulting in spring erosion problems

Clogging with sediment and debris reduces effectiveness

Soil is inadequately prepared for vegetation

Timing for installation of the BMP is essential as vegetation must be established before stormwater can be directed through the channel or else channel erosion will occur

Trapezoidal or parabolic channels are preferred to triangular

Avoid installation where erosive forces may overcome vegetative stability

Topsoiling (Tp)

Excavated topsoil is mixed with fill dirt rather than storing the topsoil for later application

Uncertainty about the quality of topsoil is a disincentive for use

Stockpiles are inadequately stabilized

Generally underused even though it may provide economic benefits through cost savings on fertilizer and lime while aiding in establishment of vegetation

Can be used beneficially by providing sound and dust barriers for adjacent landowners

Create smaller stockpiles that may be easier to respread and can be located closer to where they will be used

Avoid applying topsoil to subsoil with contrasting textures

Determine whether existing topsoil has friable texture, high organic matter content, and neutral acidity to justify selective handling

Surface roughening (Su)

Graded areas left smooth for aesthetic reasons

Excessive compaction, particularly when roughening with tracked machinery

Lack of maintenance after storms as many forms of roughening are only effective for light rains

Works well with matting

Even "tracking" perpendicular to the slope contour with heavy machinery helps to prevent washout at the base of the slope although the overuse of heavy machinery causes compaction

Build a berm at the top of the slope away from the slope's edge to divert runoff

Storm drain outlet protection (St)

Improper installation of the filter fabric under riprap resulting in washout

Apron is not constructed on a stable grade

Riprap not extended far enough to dissipate runoff velocity resulting in erosion past the apron

Essential for reducing erosion at storm drain outlets

Rip rap works better than paving as it is less expensive, easier to install and effectively reduces the high stormwater velocities

A check dam near the outlet is helpful for slowing the water and collecting sediment

BMP

Common Mistakes

Keys to Success

Temporary sediment basin (Sd3)

Site is damaged more during the creation of the basin than during construction

Slumping of the embankment due to steep side slopes, use of poor quality fill material, and/or inadequate compaction

Lack of maintenance resulting in a build-up of sediment leaving inadequate storage

No designated sediment disposal area

Real-world performance is highly variable

Basin is not removed when finished or causes a large disturbance when it is removed

During design of the basin, select smaller design particles to closer resemble reality

Design for extra storage to prevent sediment displacement during larger storms, improve performance during small storms, and require less maintenance

Provide wet and dry stage storage

Use floating skimmers or a perforated riser with a gravel jacket

On smaller projects, less costly erosion control BMPs may suffice

Decrease incoming sediment loads through on-site erosion control

Routine inspection and maintenance is essential for successful performance

Inlet sediment trap (Sd2)

Excessive ponding from clogged inlets result in flooding and subsequent failure of the device

Lack of maintenance resulting in clogging, reduced performance, displacement of the trap, and erosion of unprotected areas

Protection device not located close enough to the inlet resulting in sediment entering the inlet or erosion and undercutting of the inlet

Post and fabric not supported at the top resulting in collapse of the structure

New products such as the Dandy Bag, Siltsack, and FiltR Fence are being introduced into the market and need to be utilized

Frequent inspections indicate when debris removal, sediment clearing, and filter replacement is necessary

Install controls before disturbance occurs in the drainage area

Use inlet protection measures in combination with other measures, such as small impoundments or sediment traps

Sediment barrier (Sd1)

Improper silt fence and straw bale installation commonly involving the lack a trench to bury the fabric or bale

Lack of maintenance on all types of barriers allowing too much sediment to accumulate and subsequent failure of the barrier

Too long and steep of an upstream slope or drainage area for the barrier to handle the drainage

Poor planning resulting in barrier locations across drainageways where flows may exceed the capability of the barrier

Damage by construction equipment

Installation of barrier along contour lines
Brush barriers are recommended for slow velocity areas as they are cost effective and work well

Install with 8" x 8' trenches in order to function properly

Use orange silt fence and, when possible, a buffer between the construction site and the silt fence to avoid vehicle damage

Plan reviewers should designate areas that silt fence should not be used

Bend the "wings" of the silt fences inward to prevent water from escaping around the fence

BMP

Common Mistakes

Keys to Success

Level spreader (Lv)

Space constraints often limit use as it needs a large, level ground surface not commonly found in undeveloped land in the Etowah counties

“Short circuiting” where the flow concentrates into small streams rather than functioning as sheetflow over the spreader

A section of the level spreader is not level thus causing the entire system to fail

Used on fill material rather than undisturbed soil

High sediment loads often overwhelm the system

Vegetation needs to be established on spreader before it will reduce sediment loads

During installation and maintenance, collect the sediment and debris from the downslope side of the spreader for optimum performance

Install a forebay before the runoff reaches the spreader can allow particles to drop out and lower velocity

Filter ring (Fr)

Inadequate sizing leading to the ring filling up quickly with sediment

Placement too close to the outlet or inlet to be functional

Undersizing stone resulting in displacement

Maintenance rarely occurs because the area around the filter ring is often wet and muddy

Use in combination with other structures such as filter cloth that will remove the finer particles such as silt or clay

Geotextile underliner prevents migration of soil and stone particles

Essential to clean out trap periodically after rain events

Permanent downdrain structure (Dn2)

Temporary downdrain structure (Dn1)

Physical obstructions reduce the drain’s effectiveness

Insufficient anchoring causing displacement erosion problems at the top of the slope

Structure not extended to stable grade resulting in outlet erosion

Overtopping of the diversion by a clogged or undersized pipe

Erosion when pipe separates from slope creating voids and seepage

Use downdrain on fill areas that have been compacted or stable enough to hold anchors

Dissipate high flow velocities at the bottom of the pipe to avoid erosion

Need proper monitoring and installation for the inflow and outflow areas with stabilization structures such as riprap, filter rings, or check dams

BMP

Common Mistakes

Keys to Success

Diversion (Di)

Improper soil compaction which may fail and cause erosion

Heavy traffic damaging the berm creating a depression and reduced performance

Excessive grade create runoff velocities that overpower the berm

Diversion may concentrate flow and cause erosion problems downslope of the BMP

Riprap or geotextile can help stabilize outlets

Proper soil compaction and stabilization with soil excavated for the channel

Create broader berms lined with gravel in areas frequently crosses by heavy equipment

Construction road stabilization (Cr)

Construction exit (Co)

Roads are often treated as a construction exit because the transition between the construction site and public right-of-way is not clear

Improper drainage causes sediment to wash onto public right-of-way

Gravel is displaced through heavy use and/or becomes muddy as the gravel is pressed into the soil

Exit is not sufficiently flared creating damage to the edge

Use geotextile fabric underneath to stabilize the aggregate unless it's on a slope where the aggregate will slide off the geotextile

Establish a wash station at the site entrance where sediment may be removed before vehicles leave the site

Innovative products such as GeoGrid/GeoWeb (net-shaped fiber mats that interlock with the aggregate and stabilize the pad) work well

Identify parking or staging areas as particularly sensitive due to increased use

Design roads to accommodate the heaviest vehicle that may be used

Construction road stabilization (Cr)

Construction exit (Co)

Roads are often treated as a construction exit because the transition between the construction site and public right-of-way is not clear

Improper drainage causes sediment to wash onto public right-of-way

Gravel is displaced through heavy use and/or becomes muddy as the gravel is pressed into the soil

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Identify parking or staging areas as particularly sensitive due to increased use

Design roads to accommodate the heaviest vehicle that may be used

BMP

Common Mistakes

Keys to Success

Channel stabilization (Ch)

Haybales are sometimes used

Riprap is installed without concern for cheaper and more effective alternatives

Timing is crucial as stabilization is often done late in the construction process

Use of concrete lined channels which increase runoff speed and sediment transport

Scouring may occur beneath the length of riprap or at the concrete channel because of improper soil compaction

Riprap should be carefully placed to not create a blockage in the channel

Use innovative types of turf reinforcement matting which are cost-effective, help to encourage vegetation establishment and can withstand heavy stormflow velocities

Plan and construct open channels to follow land contours so natural drainage is not disrupted

Check dam (Cd)

Used as a sediment trap (rather than reducing flow velocity) and sedimentation often results in clogging of the check dam and ponding behind the structure

Areas immediately past the check dam are not stabilized resulting in downstream erosion

Dams built too high causing flooding upslope of the BMP

Sediment trapped behind the dam becomes re-suspended and transported downslope if it is not maintained

Haybales installed without trenching allowing undercutting and end flow

Maintenance is essential once sediment reaches half the dam height or large debris limits performance

Particular care needs to be taken during removal of the dams in grassed channels as sediment will be released and erosion will occur if the area occupied by check dam is not stabilized

Overflow areas should be stabilized to reduce potential for erosion downslope

Use geotextile underneath the dam and extend the fabric past the dam far enough to protect the ground from overflow

Tackifiers and binders (Tb) Polyacrylamide (PAM)

Binders can create impervious areas which will increase flow and possibly lead to downstream flooding and erosion

No maintenance or reapplication after large storm events

Inadequate mixing creating PAM "globs"

Disturbance from humans or wildlife after application reduces performance

PAM causes more fine sediment to precipitate out of suspension and can overwhelm other sedimentation BMPs

Since water quality impacts are unknown, care should be taken not to apply chemical stabilizers too close to streams

PAM is more effective when applied to damp soil

Use with mulch to extend the reapplication period to a few months

With proper training and preparation, chemical binders can be used in settling basins to increase sediment flocculation

BMP

Common Mistakes

Keys to Success

Erosion Control Matting and Blankets (Mb)

Lack of full coverage results in erosion and areas where vegetation is not easily established

Inadequate securing of the mat leading to loss of mat growing material during rain events or times of high wind

Use of "preseeded" mats are not recommended as the seed bed frequently shifts during shipping creating inadequate vegetation growth

Blankets should be loose-laid, not stretched, in the direction of the flow before being secured

Use organic matting for temporary stabilization and synthetic materials for permanent stabilization

Roughen the slope before installation

Combine matting with a berm at the top of the slope to reduce stormwater volume that must be treated by the BMP

Test for compaction on cut/fill slopes prior to installation

Dust Control on Disturbed Areas (Du)

Overwatering creates muddy conditions where vehicles may track mud onto public roads

Watering prevents dust for only a short period of time and needs to be applied frequently for it to be effective

Mass grading which exposes large amounts of bare soil at one time creating dust problems

Administrative control over activities such as traffic speed or reducing work activities with increasing wind speeds can prevent dust problems

Avoid the need for dust control altogether by creating smaller sites with phased clearing rather than mass grading

Particular attention should be paid to runways

If watering, regular light watering is more effective than infrequent heavy watering

Disturbed Area Stabilization (sodding, permanent veg, temporary seeding, mulching only) (Ds)

Seed bed is inadequately prepared

If a starter or nurse crop is used, it is often applied at too high of a rate and outcompetes the desired perennial cover crop

Mulch is not appropriately tacked or secured to the soil thus causing loss of both the mulch and seed during storm or wind events

Seasonal grass is planted in the wrong season

Overseeding resulting in excessive plant demands and decreased establishment

A plan for vegetation establishment should be developed on-site as each site is different

Use surface roughening and diversions to help establish the seed bed

Enforcement officials can use vegetation establishment in conjunction with performance bonds to ensure long-term stabilization

Test the soil to make sure the pH is between 6.0 and 6.5 for good growth

Appendix E
Model Grading Ordinance

Etowah HCP Grading Policy

A. Amendments to the Local Government's Erosion and Sedimentation Laws

The following provisions shall be added to the local government's erosion and sedimentation control ordinance through an amendment. If the locality has adopted a form of the state's Model Soil Erosion and Sedimentation Control Ordinance, it is recommended that these provisions be added to subsection C of the section entitled "Minimum Requirements for Erosion and Sedimentation Control Using Best Management Practices." These requirements are modeled after those found in the Cherokee County, Georgia, Code of Ordinances, Chapter 26, Article III, entitled "Erosion and Sedimentation Control."

1. The surface area of exposed material at one time shall not exceed 17 acres.
2. All areas of erodible earth material shall be exposed no longer than seven consecutive days, regardless of whether this period includes weekends and/or holidays, before the area is stabilized according to the approved methods found in the *Manual for Erosion and Sediment Control in Georgia*. The stabilization of new exposed areas shall occur weekly.

B. Model Grading Ordinance

GRADING

Section 1. Purposes

These regulations are adopted for the following purposes:

- A. To promote the public health, safety, and welfare of the citizens of **[local government]** without preventing the reasonable development of land;
- B. To promote building and site planning practices that are consistent with **[the local government's]** natural topography, soils, and vegetative features while recognizing that certain factors, such as disease, proximity to existing and proposed structures and improvements, interference with utility services, and protection of scenic views may require the removal of certain trees and ground cover;
- C. To encourage site development on public and private property, including clearing, excavation, and filling in such a manner as to minimize hazards to life, health, and property;
- D. To minimize impacts from soil erosion on aquatic habitats during grading activities by keeping natural ground cover intact and grading the minimum amount of land that necessary for the construction of buildings and associated infrastructure.
- E. To take a proactive approach to erosion control by reducing the amount of erodible material that is exposed to erosive forces at any given time and therefore, prevent the possibility of erosion from occurring in the first place.
- F. To control the cumulative effects of grading on a basin-wide scale, which include persistent effects from ongoing development activities and aggregate effects from multiple erosion control failures.
- G. To reduce sedimentation in the streams, lakes, rivers, storm sewer systems, and waterways;
- H. To minimize the need for additional storm drainage facilities;
- I. To protect fish, wildlife and their habitats and promote the retention and restoration of vegetation;

- J. To control and minimize the adverse impacts of erosion and sedimentation as part of the Etowah Habitat Conservation Plan, the purpose of which is to protect the imperiled species of the Etowah watershed pursuant to the federal Endangered Species Act;
- K. To allow for the reasonable development of land.

Section 2. Definitions

Applicant: A person applying for a permit to conduct grading activities under the provisions of this ordinance.

Grading: Altering the shape of ground surfaces to a predetermined condition; this includes stripping, cutting, filling, stockpiling and shaping or any combination thereof and shall include the land in its cut or filled condition.

Larger Common Plan of Development or Sale: A contiguous area where multiple separate and distinct construction activities are occurring under one plan of development or sale. For the purposes of this paragraph, "plan" means an announcement; piece of documentation such as a sign, public notice or hearing, sales pitch, advertisement, drawing, permit application, zoning request, or computer design; or physical demarcation such as boundary signs, lot stakes, or surveyor markings, indicating that construction activities may occur on a specific plot.

Permit: The authorization necessary to conduct a grading activity under the provisions of this ordinance.

Person: Any individual, partnership, firm, association, joint venture, public or private corporation, trust, estate, commission, board, public or private institution, utility, cooperative, state agency, municipality or other political subdivision of this State, any interstate body or any other legal entity.

Site: The parcel of land being developed, or the portion thereof on which the land development project is located.

Section 3. Exemptions

1. Surface mining, as the same is defined in O.C.G.A. 12-4-72, "Mineral Resources and Caves Act";
2. Granite quarrying and land clearing for such quarrying;
3. Such minor land-disturbing activities as home gardens and individual home landscaping, repairs, maintenance work, fences, and other related activities which result in minor soil erosion;
4. The construction of single-family residences, when such construction disturbs less than one acre and is not a part of a larger common plan of development or sale with a planned disturbance of equal to or greater than one acre and not otherwise exempted under this paragraph;
5. Agricultural operations as defined in O.C.G.A. 1-3-3, "definitions", to include raising, harvesting or storing of products of the field or orchard; feeding, breeding or managing livestock or poultry; producing or storing feed for use in the production of livestock, including but not limited to cattle, calves, swine, hogs, goats, sheep, and rabbits or for use in the production of poultry, including but not limited to chickens, hens and turkeys; producing plants, trees, fowl, or animals; the production of aquaculture, horticultural, dairy, livestock, poultry, eggs and apiarian products; farm buildings and farm ponds;

6. Forestry land management practices, including harvesting;
7. Any project carried out under the technical supervision of the Natural Resources Conservation Service of the United States Department of Agriculture;
8. Construction or maintenance projects, or both, undertaken or financed in whole or in part, or both, by the Department of Transportation, the Georgia Highway Authority, or the State Tollway Authority; or any road construction or maintenance project, or both, undertaken by any county or municipality;
9. Any land-disturbing activities conducted by any electric membership corporation or municipal electrical system or any public utility under the regulatory jurisdiction of the Public Service Commission, any utility under the regulatory jurisdiction of the Federal Energy Regulatory Commission, any cable television system as defined in O.C.G.A. 36-18-1, or any agency or instrumentality of the United States engaged in the generation, transmission, or distribution of power;
10. Any public water system reservoir; and
11. Conservation subdivisions developed pursuant to the **[local government's]** Conservation Subdivision Ordinance.

Section 4. Application Requirements

1. No person shall conduct any grading activity within the jurisdictional boundaries of **[local government]** without first obtaining a permit from **[local government]** to perform such activity.
2. The application for a permit shall be submitted to **[local government]** and must include the grading plan and supporting data, as necessary. The grading plan shall include, as a minimum, the data specified in Section 6 of this ordinance. The plan shall conform to the provisions of Section 5 of this ordinance.

Note: The local government may choose to issue a separate permit for grading, or to use its existing land disturbance permit and require applicants to submit their grading plans as part of the application for that permit.

Section 5. Minimum Requirements for Grading

At least 30% of all areas of a site that contain slopes equal to or greater than 25% over a contiguous area of at least 5000 ft.² shall be left ungraded. Calculation of slope shall be based upon a contour interval of 2 ft. or less.

Section 6. Grading Plan Requirements

As part of the grading plan, the applicant shall document use of the following process in determining the layout of the proposed areas for grading.

- (1) Step 1: Identify site characteristics. Applicant shall identify the following important site characteristics on the grading plan's site map:
 - a. Property boundaries;
 - b. All streams, rivers, lakes, wetlands and other hydrologic features;
 - c. Topographic contours of no less than 2-foot intervals and all areas that contain slopes equal to or greater than 25% over a contiguous area of at least 5000 ft.²
 - d. Relevant geological features, such as rock outcroppings;

- e. Soil infiltration classes, pursuant to the National Cooperative Soil Survey or a more recent soil survey, whichever is more accurate for the site;
- f. Trees with a diameter of fifteen inches or more; and
- g. Existing roads and structures.

(2) Step 2: Identify non-gradable areas. Applicant shall identify areas that are not gradable pursuant to local, state, or federal law. These areas may include but are not limited to:

- a. Areas subject to local and state riparian buffer requirements;
- b. Wetlands that meet the definition used by the Army Corps of Engineers pursuant to the Clean Water Act;
- c. Locations of populations of endangered or threatened species, or habitat for such species;
- d. Archaeological sites, cemeteries and burial grounds; and
- e. At least 30% of slopes equal to or greater than 25% over a contiguous area of at least 5000 ft.², pursuant to Section 5 of this ordinance. Other areas identified in step 2 may not be included when delineating the at least 30% of these slopes that will remain ungraded.

(3) Step 3: Identify infiltration BMPs. Applicant shall identify all structural and nonstructural infiltration BMPs, if any, required under the applicant's stormwater management plan for the site.

(4) Step 4: Identify areas that will be graded. Applicant shall identify all areas of the site that will be graded.

(5) Step 5: Delineate grading phases. Applicant shall separate the area that will be graded into phases and identify those phases on the grading plan's site map so that the surface area of erodible material at one time shall not exceed 17 acres, pursuant to the **[local government's]** Erosion and Sedimentation Control Ordinance.

Section 7. Violations, Enforcement, and Penalties.

Any action or inaction which violates the provisions of this ordinance or land use permit, may be subject to the enforcement actions outlined in this Section. Any such action or inaction which 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.

7.1 Notice of Violation.

If the **[local government]** determines that an applicant or other responsible person has failed to comply with the terms and conditions of a permit, an approved stormwater management plan or the provisions of this ordinance, it shall issue a written notice of violation to such applicant or other responsible person. Where a person is engaged in activity covered by this ordinance without having first secured a permit therefore, the notice of violation shall be served on the owner or the responsible person in charge of the activity being conducted on the site.

The notice of violation shall contain:

- (1) The name and address of the owner or the applicant or the responsible person;

- (2) The address or other description of the site upon which the violation is occurring;
- (3) A statement specifying the nature of the violation;
- (4) A description of the remedial measures necessary to bring the action or inaction into compliance with the permit, the stormwater management plan or this ordinance and the date for the completion of such remedial action;
- (5) A statement of the penalty or penalties that may be assessed against the person to whom the notice of violation is directed; and,
- (6) A statement that the determination of violation may be appealed to the **[local government]** by filing a written notice of appeal within thirty (30) days after the notice of violation (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient).

7.2 Penalties.

In the event the remedial measures described in the notice of violation have not been completed by the date set forth for such completion in the notice of violation, any one or more of the following actions or penalties may be taken or assessed against the person to whom the notice of violation was directed. Before taking any of the following actions or imposing any of the following penalties, the **[local government]** shall first notify the applicant or other responsible person in writing of its intended action, and shall provide a reasonable opportunity, of not less than 72 hours (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient) to cure such violation. In the event the applicant or other responsible person fails to cure such violation after such notice and cure period, the **[local government]** may take any one or more of the following actions or impose any one or more of the following penalties.

- (1) **Stop Work Order** -The **[local government]** may issue a stop work order which shall be served on the applicant or other responsible person. The stop work order shall remain in effect until the applicant or other responsible person has taken the remedial measures set forth in the notice of violation or has otherwise cured the violation or violations described therein, provided 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.
- (2) **Withhold Certificate of Occupancy** - The **[local government]** may refuse to issue a certificate of occupancy for the building or other improvements constructed or being constructed on the site 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.
- (3) **Suspension, Revocation or Modification of Permit** - The **[local government]** 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 (upon such conditions as the **[local government]** may deem necessary) to enable the applicant or other responsible person to take the necessary remedial measures to cure such violations.
- (4) **Civil Penalties** - 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 72 hours, or such lesser period as the **[local government]** shall deem appropriate (except, that in the event the violation constitutes an immediate danger to public health or public safety, 24 hours notice shall be sufficient) after the **[local government]** has taken one or more of the actions described above, the **[local government]** may impose a penalty not to exceed \$1,000 (depending on the severity of the violation) for each day the violation remains unremedied after receipt of the notice of violation.

- (5) **Criminal Penalties** - For intentional and flagrant violations of this ordinance, the **[local government]** may issue a citation to the applicant or other responsible person, requiring such person to appear in **[appropriate municipal, magistrate or recorders]** court to answer charges for such violation. Upon conviction, such person shall be punished by a fine not to exceed \$1,000 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.