

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

September 1, 2006

The Etowah Aquatic 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 Aquatic 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. On August 25, 2006, the Steering Committee added an exemption and variance procedure to the grading policy. 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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July, 2005. Revised July 2006 to include grading provisions; revised September 2006 to include variance procedures; revised April 30, 2007, for consistency in terminology across documents.

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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 Aquatic 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 Aquatic 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 Aquatic 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 Aquatic 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 Aquatic 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 Aquatic HCP all have strengths and weaknesses in managing erosion and sedimentation. The approach of the Etowah Aquatic 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 Aquatic 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 Aquatic 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 Aquatic 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 Aquatic 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 Aquatic 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 Aquatic 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 Aquatic 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 Aquatic 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 Aquatic 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 G-1). 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 G-2 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 Aquatic 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 G-3). 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 G-5 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. On August 25, 2006, the Steering Committee added an exemption to this limitation for exceptionally large commercial and industrial projects. In addition, they added a general variance procedure.
- 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 G-4). 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 Aquatic 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 Aquatic 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.

Literature Cited

- Berkman, H. E., and C. F. Rabeni. 1987. Effect of siltation on stream fish communities. *Environmental Biology of Fishes* 18: 285-294.
- Burkhead, N. M., and H. L. Jelks. 2001. Effects of suspended sediment on the reproductive success of the tricolor shiner, a crevice-spawning minnow. *Transactions of the American Fisheries Society* 130: 959-968.
- Dunne, T. and L.B. Leopold (1978). *Water in Environmental Planning*. San Francisco: W. H. Freeman.
- Georgia Department of Audits and Accounts. 2001. Performance Audit: Georgia Erosion and Sedimentation Control Program in <http://www.audits.state.ga.us/internet/pao/paorpts/pao-01-0145full.pdf>, ed.
- Newcombe, C. P., and D. D. MacDonald. 1991. Effects of suspended sediments on aquatic ecosystems. *Canadian Journal of Fisheries Management* 11: 72-82.
- Paul, M. J. and J.L. Meyer (2001). "Streams in the urban landscape." *Annual Review of Ecology and Systematics* 32: 333-365.
- Randhir, T. (2003). "Watershed-scale effects of urbanization on sediment export: assessment and policy." *Water Resources Research* 39: 1169-81.
- Sweka, J. A., and K. J. Hartman. 2003. Reduction of reaction distance and foraging success in smallmouth bass, *Micropterus dolomieu*, exposed to elevated turbidity levels. *Environmental Biology of Fishes* 67: 342-347.
- Trimble, S.W. (1997). Contribution of stream channel erosion to sediment yield from an urbanizing watershed. *Science* 278:1442-1444.
- Walters, D. M., D. S. Leigh, M. C. Freeman, B. J. Freeman, and C. M. Pringle. 2003. Geomorphology and fish assemblages in a Piedmont river basin, USA. *Freshwater Biology* 48: 1950-1970.
- Wood, P. J., and P. D. Armitage. 1997. Biological effects of fine sediment in the lotic environment. *Environmental Management* 21: 203-217.

Appendix G-1
Bartow County Semi-monthly Reporting Form

Appendix G-2
Forsyth County Inspection Protocol

Appendix G-3
City of Kennesaw Bonding Documents

Appendix G-4
BMP Guidance Document

Appendix G-5 Model Grading Ordinance

Etowah Aquatic 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, except that for non-residential development in which the combined footprint of all structures and impervious surfaces to be constructed in a single phase exceeds 17 acres, the surface area of exposed material at one time may equal the combined footprint of all structures and impervious surfaces. [The jurisdiction's planning department] may grant a variance request from this provision when the shape, topography, or other existing physical condition prevents land development consistent with this ordinance and the applicant provides documentation of the inability to develop the property without a variance. If a variance request is granted, [the jurisdiction's planning department] shall inform the applicant in writing of the maximum surface area of material permitted to be exposed at one time for the site. The following factors will be considered in determining whether to grant a variance:

- 1) the shape, size, topography, slope, soils, vegetation and other physical characteristics of the property that may prevent any land development;
- 2) the locations of all streams on the property, including along property boundaries;
- 3) whether alternative designs are possible which allow for land development that is consistent with this provision; and
- 4) whether the applicant can demonstrate to the satisfaction of [the jurisdiction] that granting of the variance will be at least as protective of water quality as strict adherence to this provision.

Note: The variance provision provided here is OPTIONAL, for those jurisdictions that wish to include it. Also note that local governments must place an upper ceiling on the allowable amount of surface area of exposed material at one time for a site when a variance is issued. Alternatively, a local government may choose to place such an upper ceiling in the ordinance itself rather than making site-by-site determinations. For example, the third sentence above may be amended to read: "If a variance request is granted, the maximum surface area of material permitted to be exposed at one time under no circumstances shall not exceed ___ 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 Aquatic 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.