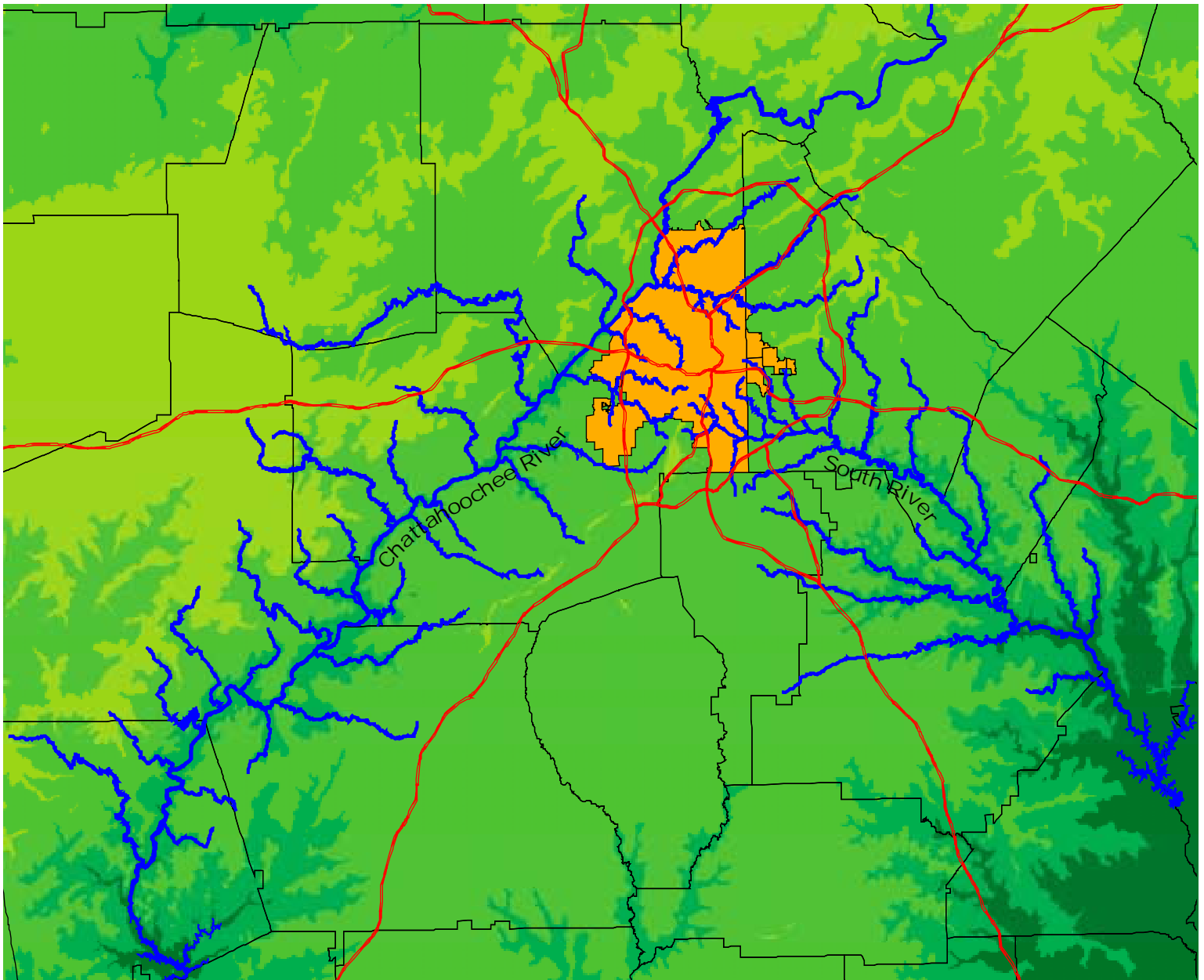


# CITY OF ATLANTA FINAL APPROVED GREENWAY ACQUISITION PLAN



Prepared by



**US Infrastructure,  
Inc.**

Under contract with:



a joint venture

**Approved by  
EPA/EPD on  
March 29, 2001**

## EXECUTIVE SUMMARY

### OVERVIEW

In January 1999, the City of Atlanta embarked on a \$25 million Greenway Acquisition Project consisting of a program to acquire and maintain greenway areas along Designated Streams. The term “Designated Streams” is defined in the Combined Sewer Overflow (CSO) Consent Decree to include the following streams: “(i) The Chattahoochee River corridor from the crossing of Interstate 75 in Fulton County to the crossing of U.S. 27 in Heard County, including all tributary streams in that corridor; (ii) All tributaries of the Chattahoochee River originating in or flowing through the City of Atlanta from their headwaters or the point they enter the City to their confluence with the Chattahoochee River, including, but not limited to Peachtree Creek, Nancy Creek, Proctor Creek and Utoy Creek; (iii) The South River corridor for its entire length, including all tributary streams in that corridor; and (iv) All tributaries of the South River originating in or flowing through the City of Atlanta from their headwaters or the point they enter the City to their confluence with the South River, including, but not limited to, Intrenchment Creek.”

The Greenway Acquisition Project was undertaken in connection with the settlement of an enforcement action taken jointly by the United States Environmental Protection Agency (EPA), the Georgia Environmental Protection Division (EPD) and Upper Chattahoochee Riverkeeper Fund, Inc., the Chattahoochee Riverkeeper Inc., and W. Robert Hancock, Jr., for violations of the Federal Water Pollution Control Act and Georgia Water Quality Control Act. This Greenway Acquisition Plan has been prepared in accordance with the requirements of Section VIII of the Consent Decree as entered with the U.S. District Court on September 24, 1998. A copy of Section VIII of the Consent Decree is included in Appendix A. As indicated in Article A of Section VIII of the Consent Decree, the provisions of this Greenway Acquisition Plan are incorporated by reference into the Consent Decree. Failure of the City to perform any obligations, or to observe or fulfill any condition of this Greenway Acquisition Plan shall be deemed a failure to comply with the requirements of the Consent Decree. If there is a conflict between the provisions of this Greenway Acquisition Plan and those of the Consent Decree, the provisions of the Consent Decree will govern.

The restrictions listed below apply to properties and conservation easements acquired using the \$25 million set aside for this project. Since no funds from the Greenway Account will be spent on donated properties and conservation easements, the restrictions listed below do not apply to donated properties and conservation easements.

- A. “The primary purpose of this project will be to reduce and/or prevent erosion and non-point source pollution loads from entering the Designated Streams, by setting aside land in perpetuity for the protection of the Designated Streams, such that the Designated Streams may be maintained in, or be restored to, their natural condition.” (Section VIII.B.1)
- B. “The Defendant will hold the Greenway Properties in perpetuity, or for as long as legally permissible, for the purpose of improving, restoring and protecting the water quality of the Designated Streams.” (Section VIII.D.1.b)

- C. “The Defendant hereby agrees to implement the Greenway Acquisition Project for the purpose of reducing or preventing pollution to the Designated Streams, with primary emphasis on non-point sources.” (Section VIII.D.2.a)
- D. “The Greenway Acquisition Plan shall contain or provide...(iv) assurance that no more than ten (10%) percent of the area of Greenway Properties acquired may be developed for public access or use, such as bicycle and hiking paths;..” (Section VIII.D.2.j.iv)
- E. “Any infrastructure for human activity within the Greenway Properties shall be designed and constructed with prevention of non-point source pollution as the primary consideration”. (Section VIII.D.2.m)
- F. “Bicycle and hiking trails, canoe launch ramps, and picnic facilities and other public access facilities located within Greenway Properties shall be designed and constructed with non-point source pollution prevention as a primary consideration. Location and construction of such facilities shall be subject to the approval of EPA/EPD.” (Section VIII.D.2.n)
- G. “The Defendant covenants that it will not take any action pursuant to state or local law, if such action or omission would result in, facilitate or in any way contribute to, any alienation of the Greenway Properties or change their use in a manner that is not consistent with the purpose of the Greenway Acquisition Project as set forth in this Consent Decree and the Greenway Acquisition Plan unless approved by EPA/EPD.” (Section VIII.D.2.o)
- H. “The Defendant shall maintain the Greenway Properties in a manner that preserves environmental value and furthers the purposes of the Greenway Acquisition Project.” (Section VIII.D.2.p)

These restrictions on the Greenway properties shall continue in perpetuity and shall survive the termination of the Consent Decree. Any contract between the City and entities proposing to construct facilities within the Greenway System will indicate that all construction will comply with the requirements of the Consent Decree and the Greenway Acquisition Plan.

**CONSENT DECREE REQUIRED CONTENTS OF THE GREENWAY ACQUISITION PLAN (SECTION VIII.D.2.j, PAGES 56 AND 57 OF THE CONSENT DECREE)**

The following is a summary of the Consent Decree requirements of the contents of the Greenway Acquisition Plan as well as statements in bold indicating where specific requirements are addressed in the Greenway Acquisition Plan.

- “j. The Greenway Acquisition Plan shall contain or provide for the following minimum elements:”
  - “(i) relevant criteria specified in sub-paragraph k of this Paragraph for evaluating properties as candidates for protection;”

**Addressed in Section 3.0 and Appendix D of the Greenway Acquisition Plan**

“(ii) acquisition of interests in or title to Greenway Properties along the banks of the Designated Streams that are contiguous and that generally extend laterally a distance of at least 100 feet from the top of the banks of the Designated Streams;”

**Addressed in Sections 4.0; 9.0; and Appendices E and F of the Greenway Acquisition Plan**

“(iii) restoration of Greenway Properties as necessary to restore or maintain their function as natural open spaces that reduce or prevent pollution;”

**Addressed in Sections 5.0; 6.0; 11.0; and Appendices G, H, and I of the Greenway Acquisition Plan**

“(iv) assurance that no more than ten (10%) percent of the area of Greenway Properties acquired may be developed for public access or use, such as bicycle and hiking paths;”

**Addressed in Sections 7.0; 8.0; 11.0; and Appendices J and K of the Greenway Acquisition Plan**

“(v) assurance that at least fifteen (15%) percent of the funds in the Greenway Account are used to acquire Greenway Properties located along the Chattahoochee River corridor, south of Utoy Creek;”

**Addressed in Sections 4.0; 9.0; 13.0; and 14.0 of the Greenway Acquisition Plan**

“(vi) assurance that if a leasehold or easement is acquired, it must extend for at least one hundred (100) years, or as long as legally permissible;”

**Addressed in Sections 9.0; 10.0; and 11.0; of the Greenway Acquisition Plan**

“(vii) perpetual maintenance of the Greenway Properties as a protected area through deed restrictions or covenants consistent with the Greenway Acquisition Project Program and free from uses that are not consistent with ecosystem protection;”

**Addressed in Sections 10.0 and 11.0 of the Greenway Acquisition Plan**

“(viii) public participation processes that involve the SAC and include minority outreach in the development, implementation, and management of the Greenway Acquisition Project in accordance with Section VIII.C.;”

**Addressed in Section 3.0 and Appendix C of the Greenway Acquisition Plan**

“(ix) budgets for the acquisition and any restoration of Greenway Properties and easements;”

**Addressed in Section 14.0 of the Greenway Acquisition Plan**

“(x) inventory of potentially available Greenway Properties, their size, location, current environmental condition, and any needed restoration work;”

**Addressed in Section 4.0 and Appendices E, F, G, and H of the Greenway Acquisition Plan**

“(xi) estimates of the cost and efficacy of restoring areas suffering from prior environmental degradation with a priority for restoration projects that require natural, nonstructural solutions; and”

**Addressed in Sections 3.0; 4.0; 5.0; 6.0; 14.0; and Appendices G, H, and I of the Greenway Acquisition Plan**

“(xii) schedules for all activities contemplated by the Greenway Acquisition Plan so that the activities are completed on or before March 31, 2007.”

**Addressed in Section 13.0 of the Greenway Acquisition Plan.**

**SECTION 1.0 INTRODUCTION**

Section 1.0 presents an overview of the Greenway Acquisition Plan including the primary purpose; the definition of the term "Designated Streams"; a list of individuals that have served on the SEP Advisory Committee (SAC); a summary of the project approach; a definition of the term "greenway" as used in this Greenway Acquisition Plan; and an overview of how greenways function as buffers or filters for non-point source pollution.

**SECTION 2.0 GOALS AND OBJECTIVES OF THE GREENWAY PROJECT**

Section 2.0 presents the goals and objectives of the Greenway Acquisition Plan. The goals and objectives presented in Section 2.0 were developed by the City, in consultation with the SAC, to guide the Greenway Planning Process. Although this Greenway Acquisition Plan focuses on advancing the primary purpose of the Greenway Acquisition Project as defined in the Consent Decree, other benefits associated with the development of a greenway system have been considered and addressed to the extent that they do not compromise the purpose of the Greenway Acquisition Project. Such benefits include the following:

- Potential to protect aquatic and stream corridor habitats.
- Potential to maintain desirable natural state.
- Potential to preserve existing natural beauty.
- Potential to promote environmental education.
- Potential to control flooding.

- Potential to promote recreation, health, and fitness.
- Potential to improve quality of life.
- Potential to promote environmental justice.

### **SECTION 3.0 GREENWAY PLANNING PROCESS**

Section 3.0 discusses the Greenway Planning Process undertaken to complete the Greenway Acquisition Plan. The Greenway Planning Process consisted of the following three phases: Inventory Phase, Assessment Phase, and Planning Phase. The Inventory Phase was completed during the time period of January 4 through May 17, 1999. Existing, relevant, and available data associated with the major components of the Greenway Planning Process (water quality; land development and planning; vegetation, wildlife, and cultural resources; property and real estate; and environmental justice) was gathered during this phase. The Assessment Phase was completed during the time period of May 18 through November 19, 1999. The Assessment Phase was directed toward determining the attributes associated with properties located within 500 feet of the streambanks for selected stream corridors, evaluating and prioritizing properties, and defining the Preliminary Greenway System Configuration. The Planning Phase commenced on November 20, 1999, following the completion of the Assessment Phase. It involved reviewing the Preliminary Greenway System Configuration Map and preparing the Proposed Greenway System Map, developing the criteria for determining Greenway System widths, determining the widths for various properties located within the Proposed Greenway System, developing the criteria for identifying potential locations for proposed restoration projects, determining potential locations for proposed restoration projects, identifying public access concepts within the Proposed Greenway System, and preparing this Greenway Acquisition Plan.

Appendix D presents summaries of the data gathered and the maps developed during the Inventory Phase and Assessment Phase.

### **SECTION 4.0 PROPOSED GREENWAY SYSTEM**

Section 4.0 presents the Proposed Greenway System, descriptions of Priority 1 Tracts, proposed greenway system widths, definition of the term “top of the streambank”, and guidelines for eligibility of non-prioritized land.

Appendix E presents three tiers of tract priorities (Priorities 1, 2, and 3). Priority 1 Tracts would probably be acquired with the financial resources available for the Greenway Acquisition Project. Priority 2 Tracts go beyond the financial resources available for the Greenway Acquisition Project. However, if significant amounts of land are donated or sold at bargain prices, Priority 2 Tracts could be acquired. The additional prioritization allows the necessary flexibility in implementation and facilitates the voluntary nature of the Greenway Acquisition Project, since the City can readily skip over an otherwise targeted property if a sale cannot be negotiated.

The following paragraphs describe the stream segments identified as Priority 1 Tracts on Map E-1, Appendix E. An inventory of parcels located within Priority 1 Tracts is included in Appendix F.

## **A. CHATTAHOOCHEE RIVER DRAINAGE BASIN**

### **1. Chattahoochee River**

- a. The stream segment of the Chattahoochee River beginning approximately 0.9 miles downstream of Paces Ferry Road and ending at the confluence with Peachtree Creek.

### **2. Nancy Creek**

- a. The stream segment beginning approximately 0.1 miles downstream of the Tilly Mill Road crossing (near Peachtree Industrial Boulevard) and ending at the I-285 crossing.
- b. The stream segment beginning at the upstream end of Murphy Candler Park and ending immediately downstream of Marist School.
- c. The stream segment beginning immediately downstream of the I-75 crossing and ending at the confluence with Peachtree Creek.

### **3. Peachtree Creek**

- a. The stream segment beginning approximately 0.14 miles downstream of the MARTA rail crossing and ending at the confluence with Clear Creek (south side of the stream only).
- b. The stream segment beginning immediately downstream of North Peachtree Road and ending at the upstream side of Atlanta Memorial Park (north side of the stream only).
- c. The stream segment beginning immediately downstream of the Northside Drive crossing and ending immediately upstream of the Howell Mill Road Crossing.
- d. The stream segment beginning immediately downstream of a powerline right-of-way near Hyde Manor Drive and ending at the confluence with the Chattahoochee River.

### **4. South Fork Peachtree Creek**

- a. The stream segment beginning approximately 0.4 mile downstream of the Stone Mountain Freeway crossing and ending just upstream of the second crossing of the Stone Mountain Freeway.
- b. The stream segment beginning immediately downstream of the Valley Brook Road crossing and ending immediately downstream of the South Fork Peachtree Nature Preserve.

- c. The stream segment beginning immediately downstream of Lenox Road and ending immediately upstream of Cheshire Bridge Road.

**5. Clear Creek**

- a. The stream segment beginning immediately downstream of the crossing of Interstate 85 and ending at the confluence with Peachtree Creek.

**6. Proctor Creek**

- a. The stream segment beginning approximately 0.2 mile downstream of the Bankhead Avenue crossing and ending immediately downstream of the Kerry Circle crossing.
- b. The stream segment beginning 0.7 mile upstream of Hollywood Road crossing and ending at the confluence with the Chattahoochee River.

**7. Utoy Creek**

- a. The stream segment beginning immediately downstream of the Beecher Road crossing and ending approximately 1.3 miles downstream of the Fairburn Road crossing.

**8. South Utoy Creek**

- a. The stream segment beginning 0.3 mile upstream of the Delowe Drive crossing and ending immediately downstream of the Cascade Nature Preserve.
- b. The stream segment beginning immediately downstream of the Cascade Nature preserve at the Harbin Road crossing and ending at the confluence with Utoy Creek.

**9. Camp Creek**

- a. The stream segment beginning immediately upstream of the Park Terrace crossing and ending immediately upstream of Camp Creek Parkway (excluding College Park Golf Course).
- b. The stream segment beginning immediately downstream of the I-285 crossing and ending approximately 0.5 mile downstream of the Butner Road crossing.

**10. Bear Creek, East**

- a. The stream segment beginning immediately downstream of the Herndon Road crossing and ending just before the crossing of Hobgood Road.

**11. Sweetwater Creek**

- a. The stream segment beginning immediately downstream of Hiram Lithia Road and ending immediately upstream of Old Alabama Road.

**12. Anneewakee Creek**

- a. The stream segment beginning immediately downstream of Bomar Road and ending approximately 0.1 mile downstream of a powerline right-of-way crossing.

**13. Dog River**

- a. The stream segment beginning immediately downstream of Wert Road and ending immediately upstream of Rock Road.
- b. The stream segment beginning immediately downstream of Liberty Road and ending immediately upstream of Post Road.

**14. North Dog River**

- a. The stream segment beginning immediately downstream of Liberty Road and ending at the confluence of Dog River.

**15. Wolf Creek**

- a. The stream segment beginning immediately upstream of West Carroll Road and ending immediately upstream of State Route 5.

**16. Snake Creek**

- a. The stream segment beginning immediately downstream of Jones Mill Road and ending approximately 1.2 miles downstream of State Route 5.

**B. SOUTH RIVER DRAINAGE BASIN**

**1. South River**

- a. The stream segment beginning immediately downstream of I-75/85 and ending immediately upstream of Lakewood Park.
- b. The stream segment beginning immediately downstream of I-75 and ending immediately upstream of Browns Mill Golf Course.
- c. The segment beginning immediately downstream of Browns Mill Golf Course and ending immediately upstream of Waldrop Road.
- d. The stream segment beginning approximately 0.8 mile upstream of Snapfinger Road and ending approximately 1.5 miles downstream of Snapfinger Road.

## **2. Intrenchment Creek**

- a. The stream segment beginning immediately downstream from the Custer Avenue CSO storage facility and ending at Moreland Avenue.
- b. The stream segment beginning immediately downstream of Key Road and ending at the confluence with the South River.

## **3. Honey Creek**

- a. The stream segment beginning immediately downstream of the Mall Parkway and ending at the confluence with the South River.

### **SECTION 5.0 PROPOSED RESTORATION PROJECTS**

The Consent Decree requires that the Greenway Acquisition Plan contain or provide for “restoration of Greenway Properties as necessary to restore or maintain their function as natural open spaces that reduce or prevent pollution...” Section VIII.D.1.b states that “restoration projects that involve natural, nonstructural solutions shall have a high priority”. Section 5.0 presents descriptions of and potential locations for proposed restoration projects within the Greenway System. The proposed restoration projects include existing wetlands enhancement, constructed wetlands, erosion control and streambank stabilization, retention ponds, and restoration of the riparian zone. The proposed locations for restoration projects will require intensive field review and survey data collection before actual design phases can begin. During the Implementation Phase of the Greenway Acquisition Project, the restoration projects falling under the Consent Decree definition of the term restoration (existing wetlands enhancement, riparian corridor revegetation, and streambank stabilization) will be the primary focus. However, if alternative sources of funding and/or joint funding opportunities arise, the implementation of retention ponds and constructed wetlands will be considered.

### **SECTION 6.0 PROPOSED DESIGN AND CONSTRUCTION STANDARDS FOR RESTORATION PROJECTS**

Section 6.0 presents the proposed design and construction standards for restoration projects. Each proposed location will have specific and unique conditions that may require specialized design considerations rather than conventional standard design. The design and construction specifications presented in Section 6.0 are intended to outline the overall procedures to be followed during the design and construction phases of restoration projects. In all cases, the design and construction specifications may be modified to address each specific site. Appendices M and N present Standard Operating Procedures (SOPs) that should be used as guidelines during the design, construction, and maintenance of restoration projects to ensure the prevention of erosion and non-point source pollution.

Soft engineering techniques (the use of living plants and plant debris) shall be preferred for all restoration activities on Greenway Properties. Hard engineering shall only be used after soft techniques have failed and the failure was due to the inability of soft engineering techniques to address the erosion problems. Improper choice of soft engineering techniques or improper

design, implementation, and/or maintenance shall not be a justification to turn to hard engineering techniques.

## **SECTION 7.0 PUBLIC ACCESS FACILITIES**

Public access projects providing public access to the streams protected through the Greenway Acquisition Project will encourage environmental education as well as community enjoyment and appreciation of the Greenway System. The focus of the Greenway Acquisition Project is on the preservation of land for the purpose of improving water quality, and none of the financial resources available for this project can be used to implement public access projects. The Consent Decree requires that the Greenway Acquisition Plan contain “assurance that no more than ten (10%) percent of the area of Greenway Properties acquired may be developed for public access or use, such as bicycle and hiking paths;” (Section VIII.D.2.j.iv). Public access facilities shall be designed and constructed with non-point source pollution prevention as a primary consideration. Location and construction of public access facilities shall be subject to the approval of EPA/EPD.

For purposes of the above mentioned 10% limitation, public access or use shall include planned public access facilities such as trails, parks, canoe/boat launches, and utility maintenance access facilities. Pedestrian pathways which constitute incidental egress, ingress, or access to utility rights-of-way, public access facilities, or other Greenway Properties will not be included in the 10% limitation provided that such incidental use does not cause or add to non-point source pollution. In the event that such incidental use causes or adds to non-point source pollution, then the non-point source pollution resulting from such incidental use must be rectified by the City by either modifying the incidental use to comply with the Consent Decree and this Greenway Acquisition Plan, or by eliminating the incidental use. Although utility rights-of-way per se will not be included in the land area subject to the 10% limitation, the provisions of Article VIII.D.2.m of the Consent Decree regarding the prevention of non-point source pollution as well as the provisions of Section 11.0 of this document, shall apply to all portions of any utility right-of-way situated on Greenway Property.

The calculation of the land area subject to the 10% limitation shall be determined on a case-by-case basis by the EPA, the EPD, and the City with recommendations from other responsible local governments or agencies.

Section 7.0 is intended to serve as a guide to those who may choose to pursue public access projects on Greenway Properties using alternative sources of funding. Other types of public access projects not discussed in Section 7.0 may be developed as long as they are designed and constructed in accordance with the design and construction guidelines established in Section 8.0 of the Greenway Acquisition Plan.

The City does not propose to construct any public access projects utilizing the financial resources allocated to this project. Site-specific facility locations will be determined as project sponsors emerge. Other local agencies may wish to construct trails or canoe launches on Greenway Property. The City may allow such construction, subject to suitable case-by-case agreement. In all cases, such public access facilities will follow all the requirements of the Consent Decree and of this Greenway Acquisition Plan document, particularly the design and construction guidelines outlined in Section 8.0. Furthermore, the City will ensure that all facilities (including those

implemented by other agencies) comply with the overall 10% limitation on public access. The City will closely monitor public access proposals prior to construction to ensure that the 10% limit imposed in the Consent Decree is not exceeded.

Appendix J presents maps showing existing, proposed, and conceptual public access facilities. These maps have been systematically prepared, drawing on information collected during the Assessment Phase of this project. Public access facilities include trails, canoe and boat launches, parks, outdoor classrooms, and general stream access sites. Issues surrounding the provision of public access have been largely addressed in other sections of the Greenway Acquisition Plan.

## **SECTION 8.0 DESIGN AND CONSTRUCTION STANDARDS FOR PUBLIC ACCESS FACILITIES**

Land acquired for the Greenway System can be used to provide public access facilities as long as such facilities are designed and constructed with non-point source pollution prevention as a primary consideration. Location and construction of public access facilities shall be subject to the approval of the EPA/EPD. Section 8.0 establishes the design guidelines for construction of public access facilities to ensure that the water quality and habitat benefits of the Greenway System are not compromised. Appendices M and N present Standard Operating Procedures (SOPs) that should be used as guidelines during the design, construction, and maintenance of public access facilities to ensure the prevention of erosion and non-point source pollution.

## **SECTION 9.0 PROPOSED LAND ACQUISITION STRATEGIES FOR THE GREENWAY SYSTEM**

A variety of land ownership is envisioned, including fee simple and conservation easement ownership by the City of Atlanta, as well as ownership by other local governments and non-profit organizations.

Every effort will be made to pursue donations or partial donations (bargain sales) of land or easements prior to expenditure of acquisition funds. This emphasis on donations should increase the total amount of land protected as a result of the Greenway Acquisition Project.

Section 9.0 outlines proposed land acquisition strategies for the greenway system. The acquisition process will involve the following steps:

- Establishing target stream corridors.
- Identifying owners of targeted stream corridor properties.
- Making initial contact with affected property owners.
- Obtaining an early understanding with affected property owners.
- Obtaining a title report.
- Performing a Phase 1 Environmental Site Assessment.

- Performing a boundary survey.
- Performing an appraisal.
- Negotiating with property owners.
- Preparing a final agreement.
- Obtaining City approval to close on properties.
- Closing the acquisition transaction.

## **SECTION 10.0 MODEL CONSERVATION EASEMENT**

A conservation easement is a legal agreement a property owner makes to restrict the type and amount of development that may take place on his or her property. Thus, core conservation values (in this case, stream corridor buffers) can be preserved, while the overall property remains in private ownership and under private control. Because each parcel presents a unique set of circumstances, each easement will be individually tailored to ensure that preservation needs are not compromised while allowing appropriate use of the land by the owner.

A Model Conservation Easement for use by the City has been developed as part of the Greenway Acquisition Plan. The Model Conservation Easement was based on the model easement published by the Land Trust Alliance, but has been tailored to meet the specific needs of the Greenway Acquisition Project. The Model Conservation Easement is presented in Appendix L. Key provisions of the easements are outlined in Section 10.0 of the Greenway Acquisition Plan.

## **SECTION 11.0 LAND MANAGEMENT GUIDELINES**

The acquired and donated properties and easements comprising the Greenway System will be held in perpetuity for the purpose of improving, restoring, and protecting the water quality of the streams adjacent to the acquired properties or easements. Acquired properties or easements will be maintained in a natural, vegetative state. The management guidelines presented in Section 11.0 will be universally applied to all Greenway Properties (privately held land as well as properties open to public access) in order to promote the purpose of the Greenway Acquisition Project. Greenway Properties will be inspected periodically by representatives of the City. The inspectors of Greenway Properties will review properties and easements to verify compliance with the guidelines established in the Greenway Acquisition Plan as well as specific agreements established on a case-by-case basis by individual conservation easement negotiations. Section 11.0 presents management guidelines for properties held in fee simple as well as conservation easements held on privately owned property. Appendices M and N present Standard Operating Procedures (SOPs) that should be used as guidelines during the design, construction, and maintenance of restoration projects, public access facilities, and utilities to ensure prevention of erosion and non-point source pollution.

## **SECTION 12.0 PROPOSED CRITERIA FOR MEASURING THE ENVIRONMENTAL AND PUBLIC HEALTH BENEFITS RESULTING FROM THE IMPLEMENTATION OF THE GREENWAY SYSTEM**

With the completion and final realization of the Greenway System, there should be measurable environmental and public health benefits which result. Some of these benefits will be relatively easy to measure, while others will be difficult. Section 12.0 presents criteria, or measurable environmental parameters, which may be of value in assessing these benefits. Some benefits will accrue which will be difficult, if not impossible, to quantify. Following the completion of the Implementation Phase of the Greenway Acquisition Project, the City will prepare a description of readily apparent environmental and/or public health benefits (if any) including a quantification of pollution reduction and other benefits (if feasible). This description will be included in the Greenway Acquisition Project Completion Report due within 120 days following completion of the Implementation Phase. Results obtained through the monitoring or measurement of environmental and public health benefits will not be an indication of the City's compliance with the Consent Decree, nor will the results be indicative of the City's performance in implementing the Greenway Acquisition Project.

## **SECTION 13.0 IMPLEMENTATION PLAN AND SCHEDULE**

Section 13.0 presents an Implementation Plan and schedule including a list of tasks to be completed during the Implementation Phase and a milestone schedule.

The implementation of the Greenway Acquisition Project will involve the acquisition of properties through donations, conservation easements, and/or fee simple purchase as well as the design and construction of restoration projects along acquired properties. Donations of stream corridor properties and/or conservation easements will also be accepted and incorporated into the Greenway System. The City will encourage the participation of public and quasi-public entities to donate part of their stream corridor properties outright or through conservation easements to the City or other responsible local governments or agencies, to manage Greenway Properties within their jurisdictions, and to participate as land acquisition or restoration partners. The following is a suggested procedure for property acquisition: Donations of properties will be sought first. If the property owner is unwilling to donate the property, then a donation of a conservation easement will be sought. If the property owner is unwilling to donate a conservation easement, then the City will attempt to buy a conservation easement at a bargain sale. If the property owner is unwilling to sell a conservation easement at a bargain sale, the City will then attempt to buy the conservation easement at fair market value. If the property owner is unwilling to sell a conservation easement at fair market value, the City will attempt to buy the property at a bargain sale. If the property owner is unwilling to sell the property at a bargain sale, then the City will attempt to buy the property at the fair market value. If the property owner is unwilling to sell the property at fair market value, then the City will proceed to the next prioritized parcel. The proposed budget can be used to acquire properties using any of the methods identified above.

**SECTION 14.0 PROPOSED BUDGET FOR IMPLEMENTATION OF THE GREENWAY ACQUISITION PROJECT**

The financial resources available for the Greenway Acquisition Project consists of \$25 million (plus accrued interest) deposited in the Greenway Account as follows: \$4 million on March 31, 1999 and \$3 million each year for 7 years beginning March 31, 2000 until March 31, 2006. The projected budget for implementation is as follows:

- Preparation of the Greenway Acquisition Plan. . . . . \$2,730,000.00
- Management, coordination, and land acquisition activities. . . . . \$5,207,618.00
- Acquiring properties and conservation easements. . . . . \$20,250,000.00
- \*Implementing restoration projects (restoration projects are subject to approval by EPA/EPD following review and comment by the SAC) . . . . . \$2,250,000.00

\*This is a proposed expenditure as the City has exceeded the 10% budget for development, management, and implementation. The City will not spend any of the \$25 million Greenway Project budget on restoration projects without prior approval from the EPA/EPD following review and comment by the SAC.

**Overall Projected Budget. . . . . \$30,437,618.00**

**NOTE:** The City has exceeded the 10% expenditure limitation as cited in Section VIII.D.2.c of the Consent Decree by \$230,000.00. The \$230,000.00 is not being charged against the Greenway Account. The City has also incurred expenses in excess of \$50,000.00 for work performed by City of Atlanta personnel during the preparation of the Greenway Acquisition Plan. Expenses associated with work performed by City personnel for preparation of the Greenway Acquisition Plan are also not being charged against the Greenway Account.

Since the total amount of accrued interest cannot be realistically projected at the time of the writing of this document, the overall projected budget does not include accrued interest.

The City will ensure that at least 15% of the funds in the Greenway Account, amounting to \$3,750,000.00 (0.15 x \$25,000,000.00), will be used to acquire Greenway Properties located along the Chattahoochee River corridor, south of Utoy Creek. This is consistent with the requirements of Section VIII.D.2.j (v) of the Consent Decree.

Due to the unknown factors regarding acquisition of properties and implementation of restoration projects, the City can only present projected budget estimates as determined through best professional judgement. It is impossible, at this time, to determine the actual costs associated with specific implementation activities. It is probable that the actual costs will differ from the projected budget estimates presented in Section 14.0. The City will, however, make every effort to stay within the budget established in Section 14.0.

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## LIST OF ACRONYMS

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ARC	Atlanta Regional Commission
BFE	Base Flood Elevation
BMPs	Best Management Practices
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COE	Corps of Engineers
CPR	Cardio-Pulmonary Resuscitation
CSO	Combined Sewer Overflow
CWA	Clean Water Act
DBH	Diameter at Breast Height
DNR	Georgia Department of Natural Resources
DO	Dissolved Oxygen
EPA	Environmental Protection Agency
EPD	Georgia Environmental Protection Division
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
GDOT	Georgia Department of Transportation
GIS	Geographic Information System
GSWCC	Georgia Soil and Water Conservation Commission
IBI	Index of Biotic Integrity
IRS	Internal Revenue Service

## LIST OF ACRONYMS CONTINUED

MUTCD	Manual of Uniform Traffic Code Devices
NPDES	National Pollutant Discharge Elimination System
NRA	National Recreation Area
NWI	National Wetlands Inventory
O & M	Operation and Maintenance
QPL	Qualified Product List
RABP	Rapid Bioassessment Protocol
ROW	Right-of-Way
SAC	SEP Advisory Committee
SCS	Soil Conservation Service
SEP	Supplemental Environmental Project
SOPs	Standard Operating Procedures
US	United States
UGA	University of Georgia
USDOT	United States Department of Transportation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

## **1.0 INTRODUCTION**

### **1.1 OVERVIEW**

This Greenway Acquisition Plan has been prepared in accordance with the requirements of Section VIII of the City of Atlanta Combined Sewer Overflow (CSO) Consent Decree (Consent Decree) as entered with the U.S. District Court, on September 24, 1998. A copy of Section VIII of the Consent Decree is included in Appendix A. This Greenway Acquisition Plan will be used as a guide during the Implementation Phase of the Greenway Acquisition Project. As indicated in Article A of Section VIII of the Consent Decree, the provisions of this Greenway Acquisition Plan are incorporated by reference into the Consent Decree as if fully set out in the Consent Decree. Failure of the City to perform any obligation, or to observe or fulfill any condition of this Greenway Acquisition Plan shall be deemed a failure to comply with the requirements of the Consent Decree. Although the management guidelines presented in this Greenway Acquisition Plan may be used to manage donated properties and/or conservation easements, the use restrictions contained in the Consent Decree and this Greenway Acquisition Plan only apply to properties and conservation easements acquired using the \$25 million set aside for the Greenway Acquisition Project. They do not apply to donated properties and donated conservation easements.

The Greenway Acquisition Project was undertaken in connection with the settlement of an enforcement action taken jointly by the United States Environmental Protection Agency (EPA), the Georgia Environmental Protection Division (EPD) and Upper Chattahoochee Riverkeeper Fund, Inc., the Chattahoochee Riverkeeper Inc., and W. Robert Hancock, Jr., for violations of the Federal Water Pollution Control Act and Georgia Water Quality Control Act.

The Greenway Acquisition Project was initiated in January 1999. It consists of a program to acquire and maintain greenway areas along “Designated Streams”. The term “Designated Streams” as defined in the Consent Decree means the following:

- A. The Chattahoochee River corridor from the crossing of Interstate 75 in Fulton County to the crossing of U.S. 27 in Heard County, including all tributary streams in that corridor.
- B. All tributaries of the Chattahoochee River originating in or flowing through the City of Atlanta from their headwaters or the point they enter the City to their confluence with the Chattahoochee River, including, but not limited to Peachtree Creek, Nancy Creek, Proctor Creek, and Utoy Creek.
- C. The South River corridor for its entire length, including all tributary streams in that corridor.
- D. All tributaries of the South River originating in or flowing through the City of Atlanta from their headwaters or the point they enter the City to their confluence with the South River, including, but not limited to, Intrenchment Creek.

Based on the Consent Decree definition of the term “Designated Streams”, the City of Atlanta established the Greenway Acquisition Project Area to include the following fourteen counties: Butts, Carroll, Clayton, Cobb, Coweta, Dekalb, Douglas, Fulton, Gwinnett, Heard, Henry, Newton, Paulding, and Rockdale. A map of the study area hydrology is presented in Appendix B.

The primary purpose of the Greenway Acquisition Project is to reduce and/or prevent erosion and non-point source pollution loads from entering the Designated Streams, by setting aside land in perpetuity for the protection of the Designated Streams, such that the Designated Streams may be maintained in, or be restored to, their natural condition. The City of Atlanta will pursue the purpose of the Greenway Acquisition Project in the following manner:

- A. Acquire interests in selected properties within selected stream corridors adjacent to the Designated Streams.
- B. Protect and restore selected acquired properties and adjacent streams in a manner consistent with the requirements of the Consent Decree and this Greenway Acquisition Plan.
- C. Retain ownership interests in the acquired properties or enter into an agreement with a suitable corporate or government entity that will ensure that the acquired properties are perpetually maintained as protected areas through conservation easements, deed restrictions, or covenants.

The Greenway Acquisition Project will be implemented in accordance with the provisions of this Greenway Acquisition Plan. All participation in the Greenway Acquisition Project is intended to be voluntary, in the sense that the City of Atlanta will make every effort to seek donations, willing sellers, and to reach mutually satisfactory agreements with landowners and corporate and governmental entities.

Immediately following the inception of the Greenway Acquisition Project, the City of Atlanta retained the Joint Venture of CH<sub>2</sub>MHILL and TOC (Joint Venture) to manage the preparation of this Greenway Acquisition Plan. In January 1999, the Joint Venture hired USInfrastructure, Inc., (USI) to develop this Greenway Acquisition Plan. The Joint Venture assisted USI in the overall management of the Greenway Acquisition Project and the coordination of the SEP Advisory Committee and the public. Other entities that assisted USI include: The University of Georgia at Athens, Smith Real Estate Services, and Atlanta Environmental Communications (AEC). The University of Georgia assisted USI in gathering and evaluating data related to aquatic and stream corridor habitats; rare species of plants and animals, including endangered and threatened species as well as species of special concern; and plant species suitable for riparian corridor revegetation. Smith Real Estate Services assisted USI in developing estimates for land values and easement values for properties adjacent to major streams within the Greenway Acquisition Project Area. AEC assisted USI in coordinating public meetings and preparing public information material.

On September 14, 1998, the City of Atlanta appointed a SEP Advisory Committee (SAC) to provide advice to the City of Atlanta regarding the development, management, and implementation of the Greenway Acquisition Project. The SAC has been involved in all aspects of the preparation of this Greenway Acquisition Plan. Table 1-1 presents a list of individuals who have served on the SAC.

<b>Table 1-1 Individuals That Have Served on the SAC</b>	
<b>NAME</b>	<b>NOMINATED BY</b>
Council Woman Clair Muller	City of Atlanta
Council Woman Cleta Winslow	City of Atlanta
Eric Toomer Dr. James Fason	Fulton County
Eric Wilson	City of Atlanta
Gloria Martin	City of Atlanta
Harvey Young	Environmental Protection Division (EPD)
Linda Jordan (Chair)	City of Atlanta
Michael Weaver	City of Atlanta
Sally Bethea	Chattahoochee Riverkeeper
Stacy Patton	Chattahoochee Riverkeeper Fund, Inc

As indicated in Section VIII.C.3 of the Consent Decree, the purpose of the SAC is to: “(a)Review the submissions of the Consultant(s) and provide advice and make recommendations to the Defendant regarding the development, management and implementation of the Greenway Acquisition Project, including the acquisition of land or interest therein and restoration projects; . . . (c)Provide advice and recommendations to the Defendant regarding suggestions from minority neighborhood groups pertaining to the development of the Greenway Acquisition Plan . . . Particular emphasis will be placed on input from minority communities adjacent to the Designated Streams and other streams affected by the discharges from the Defendant’s CSO Control Facilities; and (d) Review and comment on the draft Greenway Acquisition Plan . . . .”

A Public Participation Process was implemented throughout the preparation of this Greenway Acquisition Plan. The Public Participation Process included presentations at community meetings, public workshops, and preparation and distribution to the public of project-related literature. A description of the Public Participation Process is presented in Appendix C.

## **1.2 PROJECT APPROACH**

The preparation of this Greenway Acquisition Plan was accomplished in three phases: Inventory Phase, Assessment Phase, and Planning Phase. The Inventory Phase was performed during the time period of January 4 through May 17, 1999. The Inventory Phase involved the gathering of available existing relevant data, identification of goals and objectives of the Greenway Acquisition Plan, identification of criteria for evaluating and prioritizing properties as candidates for protection by acquisition or by conservation

easements, and identification of stream corridors for further evaluation during the Assessment Phase. The data gathered during the Inventory Phase was grouped into the following categories: water quality; land development and planning; vegetation, wildlife, and cultural resources; property and real estate; and environmental justice.

The Assessment Phase was performed during the time period of May 18 through November 19, 1999. The Assessment Phase involved linking the data gathered during the Inventory Phase to associated stream corridors, performing field reviews of selected stream corridors to verify and supplement the data gathered during the Inventory Phase, developing technical criteria for evaluating and prioritizing properties, evaluating and prioritizing properties located within 500 feet of selected stream corridors, identifying relative priority rankings for various tracts using technical criteria and professional judgement, and defining the Preliminary Greenway System Configuration.

The Planning Phase was started on November 20, 1999 and will continue until this Greenway Acquisition Plan is approved by the EPA/EPD. The Planning Phase involved the identification of the Proposed Greenway System Configuration, identification of potential locations for proposed restoration projects including proposed design and construction standards, identification of public access concepts including proposed design and construction standards, development of proposed land acquisition strategies for the Greenway System, development of a model conservation easement, development of proposed Greenway System management guidelines, development of proposed criteria for measuring environmental and public health benefits resulting from the implementation of the Greenway Acquisition Project, development of an implementation plan and schedule, development of a proposed budget for implementation of the Greenway System, and preparation of this Greenway Acquisition Plan. A detailed description of the project approach is presented in Section 3.0 – Greenway Planning Process.

### **1.3 DEFINITION OF THE TERM “GREENWAY”**

Defining the term “greenway” is a difficult task. This is because of the evolving nature of the concept, its rather recent appearance as a formal non-point source pollution management tool, and the need to tailor greenways to the specific needs of the sponsoring organization. The term “greenway” may mean different things to different people. To some, a greenway is a network of linear open spaces consisting of recreational facilities such as hiking trails, bicycle trails, parks, and nature reserves. The term “greenway”, as used in this Greenway Acquisition Plan, means a network of natural areas in corridors immediately adjacent to rivers or lakes and managed for conservation, non-point source pollution abatement, and protection of aquatic and stream corridor habitats, which are compatible with low impact uses by the public. In other words, the term “greenway” may be interpreted to mean a “natural stream buffer”.

The Greenway System to be implemented under this project allows the implementation of public access facilities such as hiking trails, bicycle trails, and canoe launches. However, only 10 percent of the area acquired under this project may be used for public access or use facilities. Due to the potential for human activities to adversely affect water quality

and habitats, public access or use facilities must be designed, constructed, and managed with non-point source pollution prevention as the primary consideration. As stated in the Consent Decree, “The Greenway Acquisition Plan shall contain or provide for the following minimum elements: . . . (iv) assurance that no more than ten (10%) percent of the area of Greenway Properties acquired may be developed for public access or use, such as bicycle and hiking paths;” (Section VIII.D.2.j.iv). Such public access facilities shall be designed and constructed with non-point source pollution prevention as a primary consideration.

For purposes of the above-mentioned 10% limitation, public access or use shall include any egress, ingress, and access points to a utility right-of-way located on Greenway Property as well as pathways created by pedestrian traffic to, from, or across the utility rights-of-way. Although utility rights-of-way per se will not be included in the land area subject to the 10% limitation, the provisions of Section 11.0, “Greenway System Management Guidelines”, of this Greenway Acquisition Plan shall apply to all portions of any utility right-of-way situated on Greenway Property.

The calculation of land area which is developed for such egress, ingress, access points, and pedestrian pathways shall be determined on a case-by-case basis by EPA, EPD, and the City with recommendations from other responsible entities, except that the pedestrian pathways will be included within the above-mentioned 10% limitation only in the event that they cause or add to non-point source pollution.

### **1.3.1 How Greenways Work**

Attempting to explain the process through which a greenway protects water quality and aquatic and stream corridor habitats in a single document is rather ambitious. The recreational benefits associated with greenways have been known for several years and are well documented; however, the benefits associated with the protection of water quality and aquatic and stream corridor habitats are still unfolding and the full extent of the capacity of greenways to protect water quality and aquatic and stream corridor habitats may not be clear for several years.

Two broad categories of surface water pollution sources are identified under the Clean Water Act: point sources and non-point sources. Point sources include municipal and industrial discharges whose point of entry into surface water systems can be identified. Non-point sources include surface water runoff which enters surface water systems as sheet flow. Surface water runoff has the capacity to move particulate matter (sediments) such as dust or grit on streets, parking areas, or sidewalks; nutrients and organic material on agricultural lands; or clays and sands. Sediments associated with surface water runoff may end up in surface waters such as rivers or lakes. The majority of sediments fall into one of two broad categories depending on origin: organic matter, usually the products of decomposition of animal and plant material; and mineral particles such as clays, silts, and sands. Moving sediments can sorb pollutants along their path of travel and consequently transport them to surface waters.

A greenway established adjacent to a river or lake provides a filter through which surface water runoff passes before reaching the receiving river or lake. As surface water runoff passes through the greenway, its velocity is reduced due to the resistance provided by the vegetation. The reduction in surface water runoff velocity is accompanied by a reduction in kinetic energy of the water. In the process, erosion within the greenway is reduced. The reduction in the suspended solids concentration in surface water runoff is accompanied by a reduction in the concentrations of chemical and biological pollutants. In addition to reducing the flow velocity of surface water runoff, the vegetation in a greenway provides a tortuous path through which the surface water runoff and associated sediments have to travel before reaching the receiving river or lake. In the process sediments in the surface water runoff are intercepted by the vegetation along their path of travel.

The root system in a greenway increases the permeability of the soil within the greenway. As a result, some of the surface water runoff percolates into the soil resulting in less water reaching the receiving river or lake. Some of the nutrients deposited in the root system of the greenway are assimilated by plants within the greenway. Wetlands within a greenway provide a system within which microorganisms oxidize organic pollutants under aerobic/anaerobic conditions. Vegetation within the wetlands provide significant surface area upon which sediments can be intercepted. In addition to oxidation of organic pollutants and interception of sediments, wetlands provide a habitat for a multitude of aquatic organisms.

The establishment of a greenway adjacent to rivers and lakes can be considered as a surface water runoff treatment system with the potential to ensure protection of surface waters. The improved water quality provides a good habitat for aquatic animals and plants. The plant material that falls into the river or lake provides biological matter, essential to the survival of aquatic organisms. The trees along the stream banks also provide a shade that keeps the environment within the greenway and the river or lake relatively cool during the summer months. The cooler temperatures within the greenway and the river or lake provide a relatively comfortable environment for animal and plant life. The lower the temperature, the higher the dissolved oxygen concentration in water. The dissolved oxygen resulting from reduced water temperatures is available for the oxidation of organic material and for the metabolism of aquatic animals and plants.

Other benefits associated with greenways include the following: they protect plant and animal life within the greenway, they distance relatively impervious surfaces from rivers and lakes, they provide space for best management practices (BMPs), they provide effective flood control, and they control erosion. Greenways provide a sanctuary within which living tissue live and multiply in space and time. Some of the species living within greenways are endangered or threatened. Greenways protect riparian corridors from human activities such as development, recreation, and resource extraction. This in return protects species that may be in danger of becoming extinct. Since greenways are natural buffers, the living and non-living tissue function together as an ecosystem which is healthy for humans and the environment.

#### **1.4 IMPLEMENTATION OF THE GREENWAY ACQUISITION PLAN**

The implementation of this Greenway Acquisition Plan will commence within 30 days of approval by the EPA and the EPD. According to the City of Atlanta CSO Consent Decree, the implementation of this Greenway Acquisition Plan must be completed by March 31, 2007. A Greenway Acquisition Project Completion Report will be prepared and submitted to the EPA, EPD, and the Citizen Plaintiffs within one hundred and twenty (120) days following the completion of the implementation of this Greenway Acquisition Plan.

All participation in the Greenway Acquisition Project is intended to be voluntary. The City of Atlanta will make every effort to seek donations and to reach mutually satisfactory agreements with land owners and corporate and governmental entities.

## **2.0 GOALS AND OBJECTIVES OF THE GREENWAY ACQUISITION PLAN**

### **2.1 OVERVIEW**

As indicated in Section VIII of the Consent Decree, the primary purpose of the Greenway Acquisition Project is to reduce and/or prevent erosion and non-point source pollution loads from entering the Designated Streams. The purpose of the Greenway Acquisition Project will be pursued, in part, by acquiring interests in selected portions of land within corridors of selected streams and protecting and restoring acquired lands. The acquired lands will be perpetually maintained as protected areas.

Although the Greenway Acquisition Plan will focus on advancing the primary purpose of the Greenway Acquisition Project, other benefits associated with a greenway project will be considered and addressed to the extent that they do not compromise the purpose of the Greenway Acquisition Project. Such benefits will include potential to protect aquatic and stream corridor habitats; potential to maintain desirable natural state; potential to preserve existing natural beauty; potential to promote environmental education; potential to control flooding; potential to promote recreation, health, and fitness; potential to improve quality of life; and potential to promote environmental justice. The City of Atlanta has adopted the goals identified below to support the purpose of the Greenway Acquisition Project and to serve as the framework for preparing this document. The goals are accompanied by objectives that will be implemented to achieve the stated goals.

### **2.2 WATER QUALITY GOALS AND OBJECTIVES**

#### **2.2.1 Water Quality Goals**

- A. Reduce and/or prevent erosion and non-point source pollution loads from entering selected streams.
- B. Prevent further deterioration of water quality of selected streams.

#### **2.2.2 Water Quality Objectives**

- A. Acquire interests in selected portions of land located within corridors of selected stream segments adjacent to potential sources of non-point source pollution.
- B. Acquire and restore portions of eroded stream corridor lands adjacent to selected stream segments.
- C. Acquire and restore areas with inadequate vegetation along selected stream corridors.
- D. Acquire stream corridor lands to preserve or create wetlands or surface-runoff detention facilities which have the potential to reduce non-point source pollution.

- E. Acquire and restore riparian corridors in urbanized areas adjacent to selected stream corridors.
- F. Acquire stream corridor lands and establish conditions at selected point sources to ensure that surface runoff enters selected streams as sheet flow.
- G. Develop land management guidelines to ensure that acquired properties are maintained in a manner so as to protect water quality and aquatic and stream corridor habitats.
- H. Develop design and construction standards to reduce or eliminate environmental impacts (such as non-point source pollution and erosion) from construction of public access or use facilities, such as utilities, roads, parking areas, hiking trails, bicycle trails, and canoe launches on acquired properties.

## **2.3 LAND DEVELOPMENT AND PLANNING GOALS AND OBJECTIVES**

### **2.3.1 Land Development and Planning Goals**

- A. Protect currently undeveloped land along streambanks in areas expected to develop in order to minimize the potential negative impacts of development on water quality and habitats.
- B. Protect stream corridor lands which are community assets in their natural state, or which could be community assets if appropriately revegetated or restored.
- C. Connect existing community open spaces to one another and to neighborhoods where compatible with the Greenway Acquisition Project.
- D. Provide stream corridor open spaces and environmental opportunities for the citizens of the City of Atlanta and counties covered by the study area, where compatible with the Greenway Acquisition Project.
- E. Promote environmental education opportunities along stream corridors.
- F. Promote alternative transportation and associated health and air quality benefits.
- G. Preserve historic resources and aesthetic resources within selected stream corridors within the City of Atlanta and counties covered by the study area.

### **2.3.2 Land Development and Planning Objectives**

- A. Protect (through acquisition in fee or conservation easements) land adjacent to selected stream corridors which is currently undeveloped but appears to have development potential.

- B. Protect (primarily through conservation easements) land which has already been developed but where a significant portion of a parcel remains in a desirable natural state, or would be a strong candidate for restoration.
- C. Provide stream access sites for environmental education purposes, particularly those sites within walking distance of schools, universities, libraries, and other community facilities with educational programs.
- D. Acquire land located between existing community open spaces and/or neighborhoods.
- E. Acquire land which could potentially provide river access sites, trails, or other opportunities within the City of Atlanta and counties covered by the study area for the enjoyment of natural open space.
- F. Acquire stream corridor lands which have significant historic resources or aesthetic value (including viewsheds).
- G. Acquire land within the stream corridors of the City of Atlanta and counties covered by the study area where public ownership of natural sites would be complementary to other local, state, or federal planning efforts.
- H. Acquire stream corridor lands in selected areas of the City of Atlanta and counties covered by the study area, including urban, suburban, and rural, to ensure benefit for and access by the diverse population.
- I. Acquire land whose acquisition will provide high visibility for the Greenway Acquisition Project.

## **2.4 VEGETATION, WILDLIFE, AND CULTURAL RESOURCES GOALS AND OBJECTIVES**

### **2.4.1 Vegetation, Wildlife, and Cultural Resources Goals**

- A. Protect, restore, and enhance aquatic and stream corridor habitats.
- B. Preserve riparian areas significant to the health of important aquatic ecosystems.
- C. Preserve and restore riparian areas which contain significant cultural resources.

### **2.4.2 Vegetation, Wildlife, and Cultural Resources Objectives**

- A. Acquire and restore lands in riparian areas of selected streams which provide habitat for federally listed endangered species, threatened species, and/or species of concern.

- B. Acquire stream corridor lands and create wetlands which provide habitat for fish, wildlife, and vegetation.
- C. Acquire and restore lands in riparian areas of selected stream corridors significant to the health of aquatic ecosystems.
- D. Acquire and restore lands in riparian areas which contain or protect aquatic ecosystems with significant biodiversity.
- E. Acquire and restore areas along selected stream corridors which have a high potential for clear-cutting or strip-mining.
- F. Acquire and restore riparian areas in selected stream corridors which contain significant cultural resources.
- G. Acquire and restore areas with fragmented landscapes along selected stream corridors.

## **2.5 PROPERTY AND REAL ESTATE GOALS AND OBJECTIVES**

### **2.5.1 Property and Real Estate Goals**

- A. Acquire, restore, and/or maintain property along selected stream corridors within the City of Atlanta and counties covered by the study area efficiently and cost effectively.
- B. Maximize the property protected, preserved, or restored through the Greenway Acquisition Project.

### **2.5.2 Property and Real Estate Objectives**

- A. Develop full database of eligible and prioritized property, in GIS compatible format.
- B. Acquire Greenway Properties in large-acreage clusters to facilitate ease of maintenance.
- C. Maximize use of conservation easements as the preferred method of acquiring Greenway Property.
- D. Seek donations and bargain sales of land and conservation easements.
- E. Seek partnerships with organizations, agencies, and corporations which have complementary goals or which may consider joint projects.
- F. Seek restoration projects which can be jointly funded with other organizations.
- G. Balance individual parcel cost with environmental need to ensure appropriate overall

cost/benefit of the Greenway Acquisition Project.

- H. Acquire properties which have low management cost.

## **2.6 ENVIRONMENTAL JUSTICE GOALS AND OBJECTIVES**

### **2.6.1 Environmental Justice Goals**

- A. Ensure equitable distribution of the benefits associated with the Greenway Acquisition Project across all races and income groups.
- B. Acquire and restore Greenway Properties in areas shouldering a disproportionate share of environmental harm.

### **2.6.2 Environmental Justice Objectives**

- A. Communicate to the public about opportunities to get involved in the Greenway Planning Process.
- B. Hold public meetings and receive public comments.
- C. Acquire Greenway Properties in a manner that ensures equitable distribution of the benefits associated with the Greenway Acquisition Project across all races and income groups.
- D. Acquire Greenway Properties in areas where communities lack political clout, economic means, or awareness of rights and opportunities to participate in environmental decision making.
- E. Acquire Greenway Properties in areas shouldering a disproportionate share of environmental harm.
- F. Acquire Greenway Properties adjacent to minority communities.

## **3.0 GREENWAY PLANNING PROCESS**

### **3.1 OVERVIEW**

This section presents the process undertaken to accomplish the preparation of this document consistent with the requirements of the Consent Decree. The Greenway Planning Process consisted of three phases: Inventory Phase, Assessment Phase, and Planning Phase. The Inventory Phase involved gathering available existing relevant data, identifying goals and objectives of the Greenway Acquisition Plan, identifying criteria for evaluating and prioritizing properties as candidates for protection by acquisition or by conservation easements, and preparing an Inventory Phase Summary. The Assessment Phase involved linking the data gathered during the Inventory Phase to associated stream corridors, performing field reviews of selected stream corridors to verify and supplement the data gathered during the Inventory Phase, developing technical criteria for evaluating and prioritizing properties, evaluating and prioritizing properties located within 500 feet of selected stream corridors, identifying relative priority rankings for various tracts using technical criteria and professional judgement, and defining the Preliminary Greenway System Configuration. Appendix D contains summaries of data gathered and maps developed during the Inventory and Assessment Phases. The Planning Phase involved identifying the Proposed Greenway System Configuration, identifying potential locations for proposed restoration projects including proposed design and construction standards, identifying public access concepts including design and construction standards, developing proposed land acquisition strategies for the Greenway System, developing a model conservation easement, developing proposed greenway management guidelines, developing proposed criteria for measuring environmental and public health benefits resulting from the implementation of the Greenway Acquisition Project, developing an implementation plan and schedule, developing a proposed budget for the implementation of the Greenway System, and preparing this document.

### **3.2 INVENTORY PHASE**

The Inventory Phase was accomplished during the time period of January 4, 1999 through May 17, 1999. Prior to initiating the Inventory Phase, the following five major components of the Greenway Planning Process were identified: Water Quality; Land Development and Planning; Vegetation, Wildlife, and Cultural Resources; Property and Real Estate; and Environmental Justice. The various data required for the completion of the Greenway Acquisition Plan fit in at least one of the five major components. The following are summary descriptions of the five major components of the Greenway Planning Process:

- A. **Water Quality:** This component included consideration of the greenway study area hydrography; watershed boundaries; Georgia Department of Natural Resources (DNR) stream classifications including streams listed as 303 (d) and 305(b); sources of point and non-point source pollution; erosion; flooding; and other environmental issues. Data gathered under this component included reports of previous relevant studies; digitized data of contours, roads and railroads; hydrography; flood plains; municipal boundaries; watershed boundaries; locations

of outfalls; locations of EPA regulated facilities; locations of solid waste landfills; types of soil; and topography.

- B. Land Development and Planning: This component included consideration of land use and development pressure; planning, zoning, aesthetic, and access issues; environmental education; and public health issues. Data gathered under this component included land use data; zoning data; planning documents; population and projected development areas; land use regulations; locations of existing and planned recreational facilities; boundaries of incorporated areas; individual and household income data; and location of educational facilities.
- C. Vegetation, Wildlife, and Cultural Resources: This component included consideration of the locations of wetlands; issues related to vegetation including endangered, threatened, or sensitive species; quality of aquatic habitats; historic resources; and cultural resources. Data collected under this component included reports of previous relevant studies; National Wetland Inventory (NWI) Maps; locations of federally protected threatened and endangered species; locations of species of concern; information on habitat quality; and locations of historical and cultural resources.
- D. Property and Real Estate: This component included analysis of property including merits of acquisition in fee simple or conservation easement. Data collected under this component included property descriptions including such information as tax parcel ID number, owner name, owner address, and relative property values.
- E. Environmental Justice: This component included an analysis of income distribution, racial distribution, and relative degree of environmental harm. Data collected under this component included racial distribution, average household income per census block, and population projections.

Data gathering involved contacting federal, state, and local agencies; public and private organizations; and individuals having potentially relevant data. The data gathered were categorized and reviewed. Wherever possible, maps were prepared to aid in presentation and interpretation of data. Appendix D presents summaries of data gathered and maps prepared during the Inventory Phase.

Following data gathering, review, and mapping, the goals and objectives of the Greenway Acquisition Plan, presented in Section 2.0, were developed. The criteria for evaluating stream corridors as candidates for protection by acquisition or by conservation easements were then developed. An Inventory Phase Summary was then prepared and distributed to all members of the SEP Advisory Committee (SAC) for review and comment.

### **3.2.1 Criteria for Evaluating Stream Corridors as Candidates for Protection by Acquisition or by Conservation Easements**

The following criteria were developed and used during the Inventory Phase, to guide the selection of stream corridors for further evaluation during the Assessment Phase.

#### **A. Water Quality Criteria**

1. Potential to reduce or eliminate non-point source pollution along the following stream segments:
  - a. Stream segments not meeting their designated uses as identified in the State of Georgia 303 (d) list.
  - b. Stream segments not fully supporting their designated uses as listed in the Georgia Section 305 (b) list.
  - c. Stream segments associated with sampling locations where water quality data indicate non-compliance with designated uses.
  - d. Stream segments adjacent to and downstream of combined sewer overflows and other readily identifiable discharge points.
  - e. Stream segments adjacent to potential sources of non-point source pollution such as highly developed areas, densely populated areas, and large impervious areas.
  - f. Stream segments near CERCLA sites and solid waste disposal facilities.
2. Potential to reduce non-point source pollution by restoring eroded areas.
3. Potential to reduce non-point source pollution by protecting stream segments fully supporting their designated use but not expected to continue supporting their designated use in the future.
4. Potential to preserve undeveloped areas with 1% annual chance of flooding adjacent to developed areas.
5. Potential to reduce or eliminate flood damage.

#### **B. Land Development and Planning Criteria**

1. Potential to protect stream corridors adjacent to areas where census projections indicate high rates of growth.

2. Potential to protect stream corridors where adjacent land use, zoning, local land use plans, and subdivision records indicate likelihood of development or resource production.
3. Potential to protect stream corridors where site topography, location relative to regulatory floodplain, and utility availability indicate likelihood of development.
4. Potential to protect stream corridors containing unique or exceptional aesthetic features.
5. Potential to protect stream corridors which have the potential for scientific and educational use.
6. Potential to protect stream corridors which contain National Register or other historic features.
7. Potential to protect stream corridors adjacent to existing or planned greenway projects.
8. Potential to protect stream corridors with significant passive recreational potential which have the potential to be a recreational asset.
9. Potential to connect existing community open spaces to one another and to neighborhoods.
10. Potential to provide visibility for the Greenway Acquisition Project.

**C. Vegetation, Wildlife, and Cultural Resources Criteria**

1. Potential to protect or create wetlands which have the ability to reduce non-point source pollution.
2. Potential to protect or create wetlands which provide habitat for fish, wildlife, and vegetation.
3. Potential to protect riparian areas which provide habitats for federally listed threatened or endangered species, or species of concern.
4. Potential to protect or restore riparian areas which contain significant cultural resources.
5. Potential to protect forested areas which have a high potential for clear-cutting or strip-mining.
6. Potential to protect or restore riparian areas significant to the health of important aquatic ecosystems.

7. Potential to restore natural riparian zones in urbanized areas.
8. Potential to protect riparian areas adjacent to stream segments with significant biodiversity.
9. Potential to protect riparian areas adjacent to stream segments which serve as biological reserves for downstream reaches.
10. Potential to restore fragmented landscapes that are important to the surrounding ecosystems.

**D. Property and Real Estate Criteria**

1. Potential to protect stream corridors which would realize significant environmental benefits for relatively low cost.
2. Potential to protect stream corridors located in areas where there exists a possibility for joint funding.
3. Potential to implement restoration projects which can be jointly funded with other organizations.
4. Potential to protect stream corridors located in areas where there exists the possibility for donations, bargain sales, and conservation easements.
5. Potential to protect stream corridors located in areas where there exists the possibility to develop partnerships with organizations, agencies, and corporations.

**E. Environmental Justice Criteria**

1. Potential to protect stream corridors located in areas where communities lack political clout, economic means, or awareness of rights and opportunities to participate in environmental decision making.
2. Potential to protect stream corridors located in areas shouldering a disproportionate share of environmental harm.
3. Potential to protect stream corridors in a manner that ensures equitable distribution of the benefits associated with the Greenway Acquisition Project across all races and income groups.
4. Potential to protect stream corridors adjacent to minority communities.

### 3.2.2 Stream Corridors Selected for Further Evaluation During the Assessment Phase

Based on the data gathered during the Inventory Phase and the criteria presented above, the following stream corridors were selected for further evaluation during the Assessment Phase (Map F-1 Appendix D).

<b>Table 3-1 Chattahoochee River Basin Streams</b>	
1. Chattahoochee River	15. Bear Creek (East)
2. Nancy Creek	16. Dog River
3. North Fork Peachtree Creek	17. Hurricane Creek
4. South Fork Peachtree Creek	18. White Oak Creek
5. Proctor Creek	19. Snake Creek
6. Sandy Creek	20. Cedar Creek
7. Nickajack Creek	21. Wahoo Creek
8. Utoy Creek	22. Acorn Creek
9. Sweetwater Creek	23. Whooping Creek
10. Camp Creek	24. Hilly Mill Creek
11. Deep Creek	25. Centralhatchee Creek
12. Anneewakee Creek	26. Clear Creek
13. Bear Creek (West)	27. Tanyard Creek
14. Little Pea Creek	28. Wolf Creek

<b>Table 3-2 South River Basin Streams</b>	
1. South River	8. Honey Creek
2. Intrenchment Creek	9. Camp Creek
3. Sugar Creek	10. Big Cotton Indian Creek
4. Doolittle Creek	11. Little Cotton Indian Creek
5. Cobb Creek	12. Walnut Creek
6. Conley Creek	13. Snapping Shoals Creek
7. Snapfinger Creek	

At the completion of the Inventory Phase, an Inventory Phase Summary was prepared and presented to the SAC (May 17, 1999) for review and comment.

### 3.3 ASSESSMENT PHASE

The Assessment Phase was accomplished during the time period of May 18, 1999 through November 19, 1999. The Assessment Phase was directed toward determining the attributes associated with properties located within 500 feet of the streambanks for selected stream corridors, evaluating and prioritizing properties, and defining the Preliminary Greenway System Configuration.

The process of determining the attributes associated with various properties involved reviewing the data gathered during the Inventory Phase, linking the data gathered during the Inventory Phase to associated properties, gathering additional data as needed to supplement the data gathered during the Inventory Phase, performing field reviews to verify data accuracy, and linking field data to associated properties. The evaluation and prioritization of properties involved developing technical criteria and applying them to properties within 500 feet of the selected stream corridors. The Preliminary Greenway System Configuration was defined based on the technical criteria and professional judgement.

### **3.3.1 Preliminary Data Review**

The Assessment Phase started with a preliminary review of the data gathered during the Inventory Phase. This task was performed to aid in determining additional data needs and to aid in determining the best way to use various items of data during the evaluation and prioritization process. During the preliminary data review process, areas within 500 feet of the selected stream corridors were divided into 500-foot by 500-foot squares (pixels), establishing a grid system within 500 feet of each selected stream corridor. The data gathered during the Inventory Phase were then linked to associated pixels. Each selected stream corridor was then assigned to an individual who was responsible for verifying data accuracy, and determining stream segments where additional field data were needed. Following the preliminary data review, the field review and data assessment process commenced.

### **3.3.2 Field Review and Data Assessment**

During the preliminary data review, stream segments where additional field data were needed to adequately characterize various pixels were identified. Lists of additional data needs were developed for each of the five components of the Greenway Planning Process (Water Quality; Land Development and Planning; Vegetation, Wildlife, and Cultural Resources; Property and Real Estate; and Environmental Justice).

#### **3.3.2.1 Water Quality**

The water quality component of the Greenway Planning Process included the consideration of stream classification, water quality, sources of point and non-point source pollution, erosion, slopes, flooding, soil types, and hydrology.

#### **3.3.2.2 Land Development and Planning**

The land development and planning component of the Greenway Planning Process included consideration of the following: growth trends and development potential, such as census projections and the likelihood of an area to experience development and/or redevelopment; aesthetic features; environmental education potential; recreational potential; existing and projected landuse; and visibility.

The land development and planning assessment involved a methodology that varied from data item to data item, depending on the accuracy and scale of the collected inventory data and the degree of accuracy judged appropriate for each type of data collected. Fieldwork was conducted to verify data accuracy and to develop knowledge of a stream's current conditions and surrounding influences. Comments and recommendations received from the public during the public workshops aided in the identification of areas of aesthetic quality, recreational potential, environmental educational potential, conservation, and visibility.

### **3.3.2.3 Vegetation, Wildlife, and Cultural Resources**

The vegetation, wildlife, and cultural resources component of the Greenway Planning Process involved consideration of aquatic and stream corridor habitats of plants and animals including endangered species, threatened species, and species of concern; locations of wetlands; locations of dams and lakes; indices of biotic integrity (IBI); locations of biological reserves; locations of stream confluences; and locations of documented historical and cultural resources. Most of the data relevant to this component were collected during the Inventory Phase. Some of the data collected under this component included locational information pertaining to species and habitats which cannot be reproduced or in any way publicized outside of the project assessment needs for reasons of protection and security. These data were incorporated into the assessment process but were not presented in maps or other formats due to the sensitive nature of this information.

### **3.3.2.4 Property and Real Estate**

The property and real estate component of the Greenway Planning Process included consideration of policy decisions such as the appropriate use of easements versus fee simple purchases, and the role of donations and bargain sales. In addition, property and real estate data were used to develop cost estimates for parcels targeted for the Greenway Acquisition Project. This component of the Greenway Planning Process involved data collection and research. Fieldwork was not applicable due to the nature of the data involved.

The two major types of interest in land under consideration for the Greenway Acquisition Project are fee simple acquisition and conservation easements. Other less common arrangements may be considered, but will not be emphasized. Such arrangements will be made on a case-by-case basis in order to meet the specific needs of individual landowners while promoting the purpose of the Greenway Acquisition Project.

Cost estimates of land within the project area were developed in order to assess the approximate amount of land which could reasonably be purchased with the financial resources available for this project. Cost data were also used as a guide during the definition of the Preliminary Greenway System Configuration. The cost estimates developed during the Assessment Phase are approximations of the amount of money that would have to be paid to acquire an individual parcel of land and approximations of the amount of money that would have to be paid to acquire a conservation easement on

an individual parcel of land. More accurate estimates will be obtained through formal appraisals of individual parcels during the Implementation Phase. Formal appraisals were not performed during the Assessment Phase since they would have been cost prohibitive and would have been accurate for only a short period. Since some time will pass before actual negotiations begin for property and easement sales or donations, formal appraisals would be outdated and reappraisals would be necessary. Therefore, cost approximations of properties and easements within the project areas were deemed cost effective and sufficient for planning purposes.

The cost of land per square foot was estimated for the selected stream corridors. These estimates were developed through consultations with active real estate professionals, using comparable sales in the vicinity of the selected stream corridors. Site-specific cost influences were not taken into account, and the estimated cost of individual parcels should not in any way be relied on. However, taken in the aggregate, these cost estimates should provide an approximation of the potential purchase price of the land along the Proposed Greenway System Configuration.

The purchase price of easements was likewise estimated for the selected stream corridors by active real estate professionals. The cost of easements is difficult to establish, partially because it is somewhat unusual to purchase easements (rather than accepting a donation), but largely because the impact of an easement on the overall value of a parcel depends on a multitude of factors including relative size of the easement in relation to the overall parcel, restrictions and reservations in easement instrument, and current use and development potential of the parcel. For cost estimating purposes, easements were valued at fifty percent (50%) of the estimated purchase cost and were developed on a per square foot basis.

### **3.3.2.5 Environmental Justice**

Environmental justice is defined by the EPA's Office of Environmental Justice as follows: "The fair treatment of people of all races and incomes with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies." According to the Office of Environmental Justice, "fair treatment implies that no person or group of people should shoulder a disproportionate share of negative environmental impacts resulting from the execution of environmental programs." The environmental justice component of the Greenway Planning Process serves to meet the EPA requirement of equality consideration in regards to the geographical distribution of the Greenway System across all races and income levels.

Environmental justice data collected during the Inventory Phase included information pertaining to racial distribution, population components and densities, income levels, and population and income forecasts for the project area. During the Assessment Phase, these data were reviewed and analyzed. Recommendations from minority and low income neighborhoods were solicited and documented, as required by the Consent Decree. Site visits to the recommended areas, where applicable, were conducted as part of the field review. Further, the Environmental Justice Subcommittee of the SAC conducted educational outreach and comment solicitation.

### **3.3.3 Technical Evaluation and Prioritization of Properties**

The purposes of the technical evaluation and prioritization of properties were (1) to ensure that only properties having the potential to advance the purpose of the Greenway Acquisition Project were targeted for acquisition or protection through conservation easements, and (2) to rank properties such that it would be relatively easy to recognize the relative potential for various properties to advance the purpose of the Greenway Acquisition Project.

During the Inventory Phase, the criteria for evaluating stream corridors as candidates for protection by acquisition or by conservation easements were developed. During the Assessment Phase, technical criteria were developed to aid in the technical evaluation and prioritization of properties. The technical criteria consisted of weighted statements that could be linked directly to properties within 500 feet of the selected stream corridors. These weighted statements were developed based on the data gathered during the Inventory Phase and supplemented during the field reviews conducted during the Assessment Phase.

The relative weight assigned to a specific criterion was based on the apparent potential for that criterion to advance the purpose of the Greenway Acquisition Project. The relative weights were assigned in a manner that attempted to balance between protection of relatively pristine stream corridors in suburban and rural areas and restoration of relatively degraded stream corridors in urban areas.

During the Assessment Phase, technical evaluation and prioritization of properties within 500 feet of the selected stream corridors was performed. The technical evaluation involved the determination of the relative priority rankings of various 500-foot by 500-foot pixels based on the sum total of the weights for the associated criteria. Following technical evaluation and prioritization, professional judgement was used to define the Preliminary Greenway System Configuration.

#### **3.3.3.1 Technical Criteria for Evaluating and Prioritizing Properties**

Table 3-3 presents the technical criteria for evaluating and prioritizing properties. The technical criteria include criteria statements and relative weight assignments. The development of the relative weights for various criteria, revealed that precise quantification of all potentially relevant criteria was not reasonably achievable. Therefore, an attempt was made to identify selected readily apparent criteria to be used during the evaluation and prioritization process. Each criterion was stated in a manner to ensure that acquisition of associated properties would advance the purpose of the Greenway Acquisition Project.

In order to facilitate quantitative evaluation and prioritization of properties, the criteria under four of the five components of the Greenway Planning Process (Water Quality; Land Development and Planning; Vegetation, Wildlife, and Cultural Resources; and Environmental Justice) were assigned relative weights with the total adding up to 100 points. The relative weight assigned to the criteria under each of the four components

was based on the apparent importance or significance of that component to the purpose of the Greenway Acquisition Project. A total of 100 points was selected to accommodate the relatively wide variation in quality and value of various technical criteria. The total points assigned to the criteria under each of the four components of the Greenway Planning Process are as follows: Water Quality, 46 points; Land Development and Planning, 24 points; Vegetation, Wildlife, and Cultural Resources, 22 points; Environmental Justice, 8 points. No points were assigned to the Property and Real Estate criteria. The Property and Real Estate criteria were used to assess the cost/benefit of protecting or restoring various stream corridors. Property and Real Estate criteria will also be used to identify potential acquisition partners and to facilitate project implementation. The Technical Criteria Rankings Map presented in Appendix D shows the results of the application of the technical criteria to the 500-foot by 500-foot pixels within 500 feet of the selected stream corridors. Five tiers of priority rankings are identified in the Technical Criteria Ranking Map in Appendix D: Tier 1, Tier 2, Tier 3, Tier 4, and Tier 5. The maximum weight realized after the application of the technical criteria was 65 points.

Mean: 33; Max: 65

Tier 1: Pixels with total points ranging from 42 to 65.

Range: Mean plus 1 standard deviation to maximum value

Tier 2: Pixels with total points ranging from 37 to 41.

Range: Mean plus  $\frac{1}{2}$  standard deviation to mean plus 1 standard deviation

Tier 3: Pixels with total points ranging from 33 to 36.

Range: Mean to mean plus  $\frac{1}{2}$  standard deviation

Tier 4: Pixels with total points ranging from 24 to 32.

Range: Mean to mean minus 1 standard deviation

Tier 5: Pixels with total points ranging from 0 to 23.

Range: Mean minus 1 standard deviation to minimum value

<b>Table 3-3 TECHNICAL CRITERIA FOR EVALUATING AND PRIORTIZING PROPERTIES</b>		
<b>ITEM</b>	<b>CRITERIA</b>	<b>POINTS</b>
<b>A.</b>	<b>WATER QUALITY CRITERIA (MAXIMUM POINTS <u>46</u>)</b>	
1.	Parcels within 500 feet of a 303 (d) or 305 (b) stream segment	7
2.	Parcels adjacent to a tributary receiving combined sewer overflow (CSO) discharges or adjacent to a water reclamation site, from the point of discharge to the confluence with the main stream <b>(Maximum Points <u>7</u>)</b>	
a.	CSO facility	7
b.	Water reclamation site, wastewater treatment plant, or other treatment facility	6
3.	Parcels within 500 feet of the following discharge points <b>(Maximum Points <u>1</u>)</b>	
a.	National Pollutant Discharge Elimination System (NPDES) Outlet	1
b.	Major Outfall	1
4.	Parcels which contain or are within 500 feet of the following potential sources of non-point source pollution <b>(Maximum Points <u>10</u>)</b>	
a.	Agricultural land <b>(Maximum Points <u>8</u>)</b>	
i.	Cropland, Orchard, Nursery, or Pasture	8
ii.	Confined feeding operation	7
b.	Residential land <b>(Maximum Points <u>10</u>)</b>	
i.	Low density residential land	4
ii.	Medium density residential land	8
iii.	High density residential land	10
c.	Industrial facility	5
d.	Commercial facility <b>(Maximum Points <u>8</u>)</b>	
i.	Shopping Center/Mall	8
ii.	Auto facility (dealership, garage, gas station, etc.)	6
iii.	Office complex	4
iv.	Parking lot/deck	5

<b>Table 3-3 Continued</b>		
<b>ITEM</b>	<b>CRITERIA</b>	<b>POINTS</b>
e.	Transportation System ( <b>Maximum Points <u>  8  </u></b> )	
i.	Airport	4
ii.	Highway	8
iii.	Secondary road	6
iv.	Railroad/commuter rail line or rail yard	5
f.	Construction equipment and material storage site	6
g.	Golf course	3
h.	Junk Yard	6
5.	Parcels which contain or are within 500 feet of a sensitive site ( <b>Maximum Points <u>      4      </u></b> )	
a.	CERCLA site	4
b.	Landfill (active, inactive, or abandoned)	3
c.	Mining site (active, abandoned, or inactive)	2
6.	Parcels located within a visually apparent eroded area ( <b>Maximum Points <u>      8      </u></b> )	
a.	Severe erosion	8
b.	Moderate erosion	6
c.	Slight erosion	4
7.	Parcels located in an area inundated by 1% annual chance of flooding (100-year flood plain)	6
8.	Parcels which contain or are within 500 feet of a drinking water supply well	3
<b>B.</b>	<b>LAND DEVELOPMENT AND PLANNING CRITERIA (MAXIMUM POINTS <u>  24  </u>)</b>	
1.	Parcels located in an area where census projections (1990-2010) indicate high rates of population growth ( <b>Maximum Points <u>  5  </u></b> )	
a.	Greater than 50% rate of growth	5
b.	30 to 50% rate of growth	4
c.	10 to 30% rate of growth	3
2.	Parcels located in an area having development potential ( <b>Maximum Points <u>  6  </u></b> )	

<b>Table 3-3 Continued</b>		
<b>ITEM</b>	<b>CRITERIA</b>	<b>POINTS</b>
a.	Parcels located in an area where land use, zoning, local land use plans, and subdivision records indicate likelihood of development	6
b.	Parcels located in an area where topography, location relative to regulatory flood plain, and utility availability indicate likelihood of development (slope<25%, and utilities such as sewer, water roads, power and gas are available within 500 feet)	5
3.	Parcels containing or within 500 feet of unique or exceptional aesthetic features such as cliffs, rock out-croppings, varying landscape, waterfall, etc.	1
4.	Parcels containing or within 2500 feet of an institution of learning such as a school, college, university, etc.	2
5.	Parcels within 5280 feet (one mile) of an existing or planned greenway project	1
6.	Parcels with significant passive recreational potential and with the potential to be a region-wide recreational asset [indicators of passive recreation potential include informal recreation use, slopes less than 25%, within 5280 feet (one mile) of a community, and aesthetically pleasing] ( <b>Maximum Points <u>  2  </u></b> )	
a.	Parcels with passive recreation potential, provides good river access, and/or have existing informal access which can be formalized	2
b.	Parcels with passive recreation potential, and would particularly serve their immediate local area	1
7.	Parcels located within a stream corridor connecting two community open spaces or neighborhoods [5280 feet (one mile) apart]	1
8.	Parcels which would provide visibility to the greenway acquisition project ( <b>Maximum Points <u>  6  </u></b> )	
a.	Parcels within 500 feet of a road, railroad/commuter rail line, or bridge	4
b.	Parcels that are visible from an existing public access point (park, trail, canoe launch, etc) or public building	5
c.	Parcels identified by public interest organizations such as neighborhood groups, community groups, or environmental groups as having conservation value	6
<b>C.</b>	<b>VEGETATION, WILDLIFE, AND CULTURAL RESOURCES CRITERIA (MAXIMUM POINTS <u>  22  </u>)</b>	
1.	Parcels which provide or protect habitats for a federally listed species of special concern	3

<b>Table 3-3 Continued</b>		
<b>ITEM</b>	<b>CRITERIA</b>	<b>POINTS</b>
2.	Parcels which contain or are within 500 feet of a lake, dam, or wetland identified in a National Wetland Inventory (NWI) Map ( <b>Maximum Points <u>4</u></b> )	
a.	Wetlands	4
b.	Dams or lakes	3
3.	Parcels within 500 feet of a stream located in a watershed having the following Indices of Biotic Integrity (IBI): ( <b>Maximum Points <u>4</u></b> )	
a.	≥27	4
b.	15 to 27	3
c.	8 to 15	2
4.	Parcels located in or are within 500 feet of a riparian area which serves as a biological reserve (tributaries with a higher IBI than the main stem)	4
5.	Undeveloped parcels within 500 feet of a stream segment in an incorporated area.	2
6.	Parcels containing or within 500 feet of a stream confluence	3
7.	Parcels containing or within 500 feet of the following: ( <b>Maximum Points <u>2</u></b> )	
a.	National Register, Georgia Register, or other historic feature	2
b.	Cultural resource	1
<b>D.</b>	<b>ENVIRONMENTAL JUSTICE CRITERIA (MAXIMUM POINTS <u>8</u>)</b>	
1.	Parcels located in areas where communities lack political clout, economic means, or awareness of rights and opportunities to participate in environmental decision making ( <b>Maximum Points <u>5</u></b> )	
a.	Census blocks where the average household income is less than \$15,000.00 per year.	5
b.	Census blocks where the average household income is between \$15,000.00 and \$30,000.000	4
2.	Parcels located in predominantly minority communities (Census blocks where the population of minorities is greater than 50%)	3

### **3.3.4 Professional Evaluation of Selected Stream Corridors**

Article 3.3.3 presents the procedures followed during the technical evaluation and prioritization of properties within 500 feet of the selected stream corridors. The technical evaluation and prioritization was directed toward the identification of the relative potential for individual 500-foot by 500-foot pixels, within 500 feet of the selected stream corridors, to advance the purpose of the Greenway Acquisition Project. The potential benefits associated with acquiring sets of contiguous properties along the selected stream corridors were examined using professional evaluation.

A review of the Technical Criteria Rankings Map presented in Appendix D reveals a discontinuity between priority rankings for sets of contiguous pixels along some of the selected stream corridors. Despite the appearance of discontinuity between priority rankings for sets of contiguous pixels, riparian corridors can be identified where the establishment of a continuous greenway system would potentially realize greater benefits than the sum total of the benefits associated with individual pixels. The identification of tracts of riparian corridors that have the highest potential to advance the purpose of the Greenway Acquisition Project was accomplished through the application of professional judgement to the results of the technical evaluation and prioritization.

#### **3.3.4.1 Professional Judgement Process**

The selection of priority tracts for a greenway cannot be accomplished using a technical process alone. As indicated in Article 3.3.3, precise quantification of all potentially relevant criteria is not reasonably achievable. Even the most comprehensive technical criteria cannot address all relevant factors that could be considered during the definition of a greenway system configuration. However, a technical evaluation and prioritization process is needed to give focus to the professional judgement process. In order to identify priority tracts for the Preliminary Greenway System Configuration, professional judgement was applied to the results of the technical evaluation and prioritization (Technical Criteria Rankings Map Appendix D). The professional judgement process involved an examination of the priority rankings associated with various 500-foot by 500-foot pixels and consideration of other potentially unquantifiable factors. The purpose of the professional judgement process was to select stream segments where the establishment of a greenway system would potentially realize the greatest benefits. The selected stream segments are referred to as “targeted stream segments.” All personnel responsible for data collection and assessment were involved in the professional judgement process. Factors considered during the selection of targeted stream segments included the following:

- A. **Technical Priority Rankings:** Stream segments where the technical priority rankings indicated a concentration of highly ranked properties (Tiers 1 and 2) were considered significant to advancing the purpose of the Greenway Acquisition Project. The technical criteria were designed to identify properties having attributes that would qualify a property as a candidate for protection by acquisition in fee simple or conservation easement. Further, the technical criteria were designed in a manner that sought to advance the goals and objectives of the

Greenway Acquisition Project as stated in the Consent Decree. Properties that received low technical priority rankings but are located along stream segments where there was a concentration of highly ranked pixels were included as part of the targeted stream segments. This was done to ensure continuity of targeted stream segments, which would potentially realize greater benefits than the sum total of the potential benefits that would be realized by acquisition of isolated properties.

- B. Nature of Potential Sources of Pollution: The primary purpose of the Greenway Acquisition Project is to protect water quality by reducing and/or preventing erosion and non-point source pollution loads from entering the Designated Streams. Some of the stream segments located in relatively developed areas predominantly receive point-source pollution from adjacent development. The establishment of a stream buffer (greenway) would have no effect in reducing or eliminating point-source pollution. In cases where the source of pollution was determined to be predominantly point source, special attention was given to undeveloped stream corridor properties. The acquisition of these properties may slow down or prevent further degradation of the adjacent stream by reducing and/or eliminating erosion and non-point source pollution from entering the stream during relatively high intensive rainfall events that produce surface water runoff in relatively impervious areas. Undeveloped properties located in relatively developed areas were considered to have imminent development potential which would generate and/or increase non-point source pollution. Properties located in relatively developed areas also provide opportunities for restoration projects, such as stream bank stabilization, revegetation, constructed wetlands, and detention ponds.
- C. Stream Headwaters: Although all stream segments would benefit from the establishment of a greenway, establishing a greenway along stream headwaters may offer the greatest benefits. Human activities around stream headwaters have a disproportionate influence on downstream reaches for several reasons, including the following (Daniel S. Smith and Paul Cawood Hellmund, Ecology of Greenways, University of Minnesota Press, 1993): (1) headwater streams (first-to third-order streams) comprise about 85 percent of the total length of running water, therefore, they make up the bulk of the stream miles in a given watershed; (2) land disturbances are usually closer to headwater streams; consequently, the input of contaminants per unit area of stream corridor is apt to be greater than in higher-order streams; (3) when contaminated headwater drainage moves downstream, it will inevitably affect lower reaches; (4) if pollutants can be filtered out along headwaters, water quality benefits for the watershed as a whole will be substantial. During the professional judgement and prioritization, all tributaries to the Chattahoochee and South Rivers were considered headwaters. Within a given stream, an upstream stretch was considered a headwater to downstream stretches.
- D. Availability of Undeveloped Land Adjacent to the Stream: Although the acquisition of developed properties followed by demolition and restoration of

such properties to natural state has the potential to advance the purpose of the Greenway Acquisition Project, it would require relatively large amounts of money. Therefore, the selection of targeted stream segments focused on areas where there are undeveloped properties which, if acquired, would promote the purpose of the Greenway Acquisition Project. Since the Technical Criteria Rankings Map (Appendix D) does not distinguish developed from undeveloped land, some of the highly ranked properties are located in relatively developed areas with little or no undeveloped properties adjacent to the stream bank. Such areas were not selected as targeted stream segments. Aerial photographs (January 1999) and field review were used to identify undeveloped stream corridor properties.

- E. **Compatibility for Possible Use as a Greenway Property with Utilization of Surrounding Areas:** There are areas that would provide excellent opportunities for reduction and/or elimination of non-point source pollution loads from entering the stream, but where a greenway would be incompatible with the surrounding landuses. Since the technical criteria could not distinguish such areas, this factor was considered during the professional judgement and prioritization. Areas where a greenway would be incompatible with surrounding landuses include stream corridor properties adjacent to streams running through golf courses, residential neighborhoods where relatively small lots back up to the stream bank, airports, and highway/roadway networks where the establishment of a greenway would obstruct visibility. Such areas were eliminated from consideration as targeted stream segments. On the other hand, areas exist where the establishment of a greenway would promote the purpose of the Greenway Acquisition Project while complementing surrounding landuses greatly. Such areas include tracts with existing natural beauty, areas where the Greenway Acquisition Project would provide continuity to another existing or proposed greenway project, areas having recreational potential, areas identified by community interest groups as having conservation value, areas that would provide visibility to the Greenway Acquisition Project, and areas with environmental education potential due to proximity to one or more institution(s) of learning. Although the technical evaluation gave weight to these factors, a closer examination was given to properties providing these opportunities during professional judgement to assess their relative compatibility with the Greenway System.
- F. **Relative Cost:** The relative cost to acquire a given property or set of contiguous properties was weighed against the potential benefits that would be realized by acquiring that property or set of contiguous properties. Although cost alone did not eliminate a property from being included in a targeted stream segment, greater emphasis was placed on stream segments where relatively greater benefits might be realized without spending relatively large sums of money.
- G. **Land Management:** As stated in the Consent Decree, the City of Atlanta “will hold the Greenway Properties in perpetuity, or for as long as legally permissible, for the purpose of improving, restoring, and protecting the water quality of the Designated Streams.” The Consent Decree requires the City of Atlanta to ensure

that Greenway Properties are maintained in perpetuity in a manner consistent with the requirements of the Consent Decree. All properties will, therefore, require some form of periodic inspection and maintenance by the City of Atlanta. If it was determined that the City would not have access to a property, the targeted stream segment where that property was located was either extended to the nearest public access point (e.g. a road), or that property was identified as targeted for protection as a conservation easement, or dropped from consideration as a candidate for acquisition or protection by conservation easement.

- H. Suitability and Availability of Conservation Easements for Potential Greenway Properties: In the majority of instances, conservation easements provide the best, most economical way to protect land. Easements are cheaper than fee simple acquisition, they are easier and cheaper to manage, and they offer the highest degree of land protection. Except for properties that were determined to have public access potential and/or environmental education potential, all other properties within the targeted stream segments were identified as targeted for conservation easements. Highly ranked properties located in publicly owned lands were also identified as candidates for conservation easements where greenway funds would not be expended.

### **3.3.5 Preliminary Greenway System Configuration**

Following the selection of the targeted stream segments, a preliminary estimate of the total cost of land within 100 feet of the targeted stream segments was determined. The purpose of estimating the total cost of land within 100 feet of the targeted stream segments was to assess the relative feasibility of establishing a 100-foot wide greenway system along each side of all targeted stream segments. The preliminary cost estimate revealed that, based on the cost data developed during the Assessment Phase, the financial resources available for the Greenway Acquisition Project would most likely be insufficient to acquire the land within 100 feet of all targeted stream segments. As noted previously, the cost data developed during the Assessment Phase is only an estimate of current land values. Actual values of individual properties can only be determined through appraisals. This level of accuracy would be unnecessary for planning purposes and would be cost prohibitive. The actual cost of individual properties will be determined during the Implementation Phase. The true value of a property will be equal to the price for which the property owner will be willing to sell. The limitations of the cost data developed during the Assessment Phase, coupled with the uncertainties associated with actual costs of properties, make it practically impossible to define a greenway system with an implementation cost equal to the financial resources available for the Greenway Acquisition Project.

Due to the impracticality of defining a greenway system with a known implementation cost, the Preliminary Greenway System Configuration was defined with an estimated implementation cost greater than the resources available for the Greenway Acquisition Project. Various tracts within the targeted stream segments were then ranked in order of priority for acquisition. This approach was taken for the following reasons:

- A. It provides the City of Atlanta with some flexibility to accept donations of land or conservation easements while leaving enough prioritized land for fee simple acquisition, bargain sales of land, or purchase of conservation easements. This would ensure the expenditure of all the funds allocated to the Greenway Acquisition Project as required by the Consent Decree, without having to amend the Greenway Acquisition Plan.
- B. Although the City hopes to generate public support for the Greenway Acquisition Project and to persuade land owners to voluntarily sell or donate their properties, it is likely that some land owners will be unwilling to participate. Prioritizing properties with a total purchase price beyond the funds available has the potential to ensure that the Implementation Phase proceeds smoothly with little or no need to update the Greenway Acquisition Plan.
- C. Some of the targeted stream properties are already publicly owned and/or located in relatively developed areas where the property values are relatively high. It is anticipated that conservation easements on publicly owned properties can be acquired at no cost beyond necessary acquisition related tasks of surveys and legal documentation. Further, conservation easements may be acquired at bargain prices on properties located in relatively developed areas and/or on large properties owned by one individual or entity.

The Preliminary Greenway System Configuration Map developed during the Assessment Phase is presented in Appendix D. At the completion of the Assessment Phase, an Assessment Phase Summary was prepared and submitted to the SAC (November 19, 1999) for review and comment.

### **3.4 PLANNING PHASE**

The Planning Phase commenced on November 20, 1999 following the completion of the Assessment Phase. It involved reviewing the Preliminary Greenway System Configuration Map and preparing the Proposed Greenway System Map, developing the criteria for determining Greenway System widths, determining the widths for various properties located within the Proposed Greenway System, developing the criteria for identifying potential locations for proposed restoration projects, determining potential locations for proposed restoration projects, identifying public access concepts within the Proposed Greenway System, and preparing this Greenway Acquisition Plan. The following section presents the tasks completed during the Planning Phase consistent with the requirements of Section VIII of the Consent Decree.

## **4.0 PROPOSED GREENWAY SYSTEM**

### **4.1 OVERVIEW**

The Proposed Greenway System Configuration is presented on Map E-1, Appendix E. The Proposed Greenway System Configuration reflects what the City of Atlanta, with input from the SAC and the public, has determined to have the greatest potential to improve, restore, and protect water quality by reducing and/or preventing erosion and non-point source pollution loads from entering the Designated Streams. Three levels of tract priorities are shown on Map E-1 (Priorities 1, 2, and 3). Priority 1 Tracts would probably be acquired with the financial resources available for the Greenway Acquisition Project. Priority 2 Tracts go beyond the financial resources available for the Greenway Acquisition Project. However, if significant amounts of land are donated or sold at bargain prices, Priority 2 Tracts could be acquired. The additional prioritization allows the necessary flexibility in implementation and facilitates the voluntary nature of the Greenway Acquisition Project, since the City can readily skip over otherwise targeted property if a sale cannot be negotiated, or if a prioritized property is no longer available for purchase due to development or other reasons.

During the Implementation Phase, Priority 1 Tracts will be targeted first. However, if specific circumstances arise (such as prime partnership or joint funding opportunity), the City will be free to purchase Priority 2 Tracts at anytime. Priority 3 Tracts are provided to guide the City in the event that acquisition of eligible property beyond Priorities 1 and 2 becomes necessary. This approach should minimize the need for extensive updates of the Greenway Acquisition Plan during the Implementation Phase. It is also designed to give the City guidance in determining the order in which properties should be acquired while maintaining the necessary flexibility to take maximum advantage of land acquisition opportunities as they arise.

The Proposed Greenway System will be established through acquisition of land in fee simple, acquisition of conservation easements, and donations of land and/or conservation easements. The proposed acquisition methods for various parcels are included in Appendix F. It is the City's intent to maximize the use of donations and bargain sales.

### **4.2 DESCRIPTIONS OF PRIORITY 1 TRACTS**

The following paragraphs describe the stream segments identified as Priority 1 Tracts on Map E-1, Appendix E. An inventory of parcels located within Priority 1 Tracts is included in Appendix F.

#### **A. CHATTAHOOCHEE RIVER DRAINAGE BASIN**

##### **1. Chattahoochee River**

- a. The stream segment of the Chattahoochee River beginning approximately 0.9 miles downstream of Paces Ferry Road and ending at the confluence

with Peachtree Creek. This stream segment was considered significant due to the following:

1. Adjacent agricultural and medium density residential landuses have the potential to generate non-point source pollution.
2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
3. It includes the confluence of the Chattahoochee River and Peachtree Creek.
4. It has a significant index of biotic integrity and serves as a potential biological reserve to downstream reaches of the Chattahoochee River.
5. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
6. It has readily apparent future development potential.
7. It has significant recreation potential.
8. It has been demonstrated to have public support.
9. It has relatively large undeveloped tracts of land.

## **2. Nancy Creek**

- a. The stream segment beginning approximately 0.1 miles downstream of the Tilly Mill Road crossing (near Peachtree Industrial Boulevard) and ending at the I-285 crossing. This stream segment was considered significant due to the following:
  1. It is a part of the headwaters of Nancy Creek.
  2. It has environmental education potential due to its proximity to institutions of learning.
  3. Adjacent high density residential landuses have the potential to generate non-point source pollution.
  4. It would provide visibility to the Greenway Acquisition Project due to its proximity to major roads.

5. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  6. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
- b. The stream segment beginning at the upstream end of Murphy Candler Park and ending immediately downstream of Marist School. This stream segment was considered significant due to the following:
1. Adjacent high density residential landuses have the potential to generate non-point source pollution.
  2. It has recreation potential due to the adjacent Murphy Candler Park.
  3. It has environmental education potential due to its proximity to institutions of learning.
  4. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
  5. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  6. It would provide visibility for the Greenway Acquisition Project.
  7. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
- c. The stream segment beginning immediately downstream of the I-75 crossing and ending at the confluence with Peachtree Creek. This stream segment was considered significant due to the following:
1. Adjacent medium density residential landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  3. It has environmental education potential due to its proximity to institutions of learning.
  4. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.

5. It has recreation potential.
6. It is adjacent to relatively large tracts of undeveloped land.
7. It contains the confluence with Peachtree Creek.
8. It has readily apparent future development potential.

### **3. Peachtree Creek**

- a. The stream segment beginning approximately 0.14 miles downstream of the MARTA rail crossing and ending at the confluence with Clear Creek (southside of the stream only). This stream segment was considered significant due to the following:
  1. Adjacent medium density landuses have the potential to generate non-point source pollution.
  2. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  3. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  4. It contains the confluence with Clear Creek.
  5. It is adjacent to a relatively large undeveloped tract of land.
  6. It has readily apparent future development potential.
- b. The stream segment beginning immediately downstream of North Peachtree Road and ending at the upstream side of Atlanta Memorial Park (north side of the stream only). This stream segment was considered significant due to the following:
  1. Adjacent high density residential landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  3. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  4. It has recreation potential due to its proximity to the Atlanta Memorial Park.

5. It would provide visibility to the Greenway Acquisition Project due to its proximity to the Atlanta Memorial Park.
  6. It has environmental education potential due to its proximity to institutions of learning.
- c. The stream segment beginning immediately downstream of the Northside Drive Crossing and ending immediately upstream of the Howell Mill Road Crossing. This stream segment was considered significant due to the following:
1. Adjacent medium density residential landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  3. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  4. It would provide visibility for the Greenway Acquisition Project due to its proximity to major roads.
  5. It has recreational potential.
  6. It has environmental education potential due to its proximity to an institution of learning.
- d. The stream segment beginning immediately downstream of a powerline right-of-way near Hyde Manor Drive and ending at the confluence with the Chattahoochee River. This stream segment was considered significant due to the following:
1. It has readily apparent future development potential.
  2. Adjacent high and medium density residential landuses have the potential to generate non-point source pollution.
  3. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  4. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
  5. It contains the confluences of Nancy Creek and the Chattahoochee River.

6. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
7. It has recreation potential due to its proximity to the Standing Peachtree Park.
8. It would provide visibility to the Greenway Acquisition Project.

#### **4. South Fork Peachtree Creek**

- a. The stream segment beginning approximately 0.4 mile downstream of the Stone Mountain Freeway crossing and ending just upstream of the second crossing of the Stone Mountain Freeway. This stream segment was considered significant due to the following:
  1. Adjacent high and medium density residential landuses have the potential to generate non-point source pollution.
  2. It is part of the headwaters of the South Fork Peachtree Creek.
  3. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  4. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  5. It would provide visibility to the Greenway Acquisition Project.
  6. It has environmental education potential due to its proximity to an institution of learning.
  7. It contains wetlands which, if protected, would potentially protect and enhance water quality downstream.
- b. The stream segment beginning immediately downstream of the Valley Brook Road crossing and ending immediately downstream of the South Fork Peachtree Nature Preserve. This stream segment was considered significant due to the following:
  1. Adjacent medium density residential, agricultural, commercial, and transportation-related landuses have the potential to generate non-point source pollution.
  2. It received a public recommendation and is demonstrated to have public support.

3. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  4. It has significant recreation potential due to its proximity to the South Fork Peachtree Nature Preserve.
  5. It has a relatively large undeveloped tract of land.
  6. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  7. It has environmental education potential due to its proximity to an institution of learning.
  8. It contains wetlands which, if protected, would potentially protect and enhance water quality downstream.
- c. The stream segment beginning immediately downstream of Lenox Road and ending immediately upstream of Cheshire Bridge Road. This stream segment was considered significant due to the following:
1. Adjacent high density residential landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  3. It contains wetlands which, if protected, would potentially protect and enhance water quality downstream.
  4. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  5. It has relatively large undeveloped tracts of land.
  6. It has readily apparent future development potential.
  7. It received public nomination and is demonstrated to have public support.

## **5. Clear Creek**

- a. The stream segment beginning immediately downstream of the crossing of Interstate 85 and ending at the confluence with Peachtree Creek. This stream segment was considered significant due to the following:

1. It is a Combined Sewer Overflow (CSO) stream segment which, according to the Consent Decree, should receive particular emphasis.
2. Adjacent industrial and commercial landuses have the potential to generate non-point source pollution.
3. It has wetlands which, if protected, would protect and enhance water quality along downstream reaches of Peachtree Creek and the Chattahoochee River.
4. It contains a relatively large undeveloped tract of land.
5. It contains the confluence with Peachtree Creek.

## **6. Proctor Creek**

- a. The stream segment beginning approximately 0.2 mile downstream of the Bankhead Avenue crossing and ending immediately downstream of the Kerry Circle crossing. This stream segment was considered significant due to the following:
  1. Adjacent high and medium density residential landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  3. It is a CSO stream segment which, according to the Consent Decree, should be given particular emphasis.
  4. It has environmental education potential due to its proximity to institutions of learning.
  5. It has relatively large undeveloped tracts of land.
  6. It has readily apparent future development potential.
- b. The stream segment beginning 0.7 mile upstream of Hollywood Road crossing and ending at the confluence with the Chattahoochee River. This stream segment was considered significant due to the following:
  1. Adjacent medium density residential and transportation-related landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.

3. It is a CSO stream segment which, according to the Consent Decree, should be given particular emphasis.
4. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
5. It has environmental education potential due to its proximity to institutions of learning.
6. It contains the confluence with the Chattahoochee River.
7. It has relatively large undeveloped tracts of land.

## **7. Utoy Creek**

- a. The stream segment beginning immediately downstream of the Beecher Road crossing and ending approximately 1.3 miles downstream of the Fairburn Road crossing. This stream segment was considered significant due to the following:
  1. Adjacent medium density residential landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  3. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  4. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
  5. It has environmental education potential due to its proximity to institutions of learning.
  6. It received public recommendations and is demonstrated to have public support.

## **8. South Utoy Creek**

- a. The stream segment beginning 0.3 mile upstream of the Delowe Drive crossing and ending immediately upstream of the Cascade Nature Preserve. This stream segment was considered significant due to the following:

1. Adjacent high and medium density landuses have the potential to generate non-point source pollution.
  2. It received a public recommendation and is demonstrated to have public support.
  3. It is part of the headwaters of the South Utoy Creek.
  4. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  5. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
  6. It provides connectivity to the Cascade Nature Preserve.
  7. It would provide visibility for the Greenway Acquisition Project due to its proximity to major roads.
- b. The stream segment beginning immediately downstream of the Cascade Nature Preserve at the Harbin Road crossing and ending at the confluence with Utoy Creek. This stream segment was considered significant due to the following:
1. Adjacent medium density residential landuses have the potential to generate non-point source pollution.
  2. It contains the confluence with Utoy Creek.
  3. It has readily apparent development/redevelopment potential.
  4. It has relatively large undeveloped tracts of land.
  5. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
  6. It provides connectivity to the Cascade Nature Preserve.

## **9. Camp Creek**

- a. The stream segment beginning immediately upstream of the Park Terrace crossing and ending immediately upstream of Camp Creek Parkway (excluding College Park Golf Course). This stream segment was considered significant due to the following:

1. Adjacent high and medium density residential and commercial landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  3. It is part of the headwaters of the Camp Creek.
  4. It has recreation potential.
  5. It has a relatively large undeveloped tract of land.
- b. The stream segment beginning immediately downstream of the I-285 crossing and ending approximately 0.5 mile downstream of the Butner Road crossing. This stream segment was considered significant due to the following:
1. Adjacent medium density residential and transportation-related landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  3. It has readily apparent development potential.
  4. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
  5. It has relatively large undeveloped tracts of land.
  6. It would provide visibility to the Greenway Acquisition Project due to its proximity to major roads.

## **10. Bear Creek, East**

- a. The stream segment beginning immediately downstream of the Herndon Road crossing and ending just before the crossing of Hobgood Road. This stream segment was considered significant due to the following:
1. Adjacent agricultural landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.

3. It has readily apparent development potential.
4. It has environmental education potential due to its proximity to an institution of learning.
5. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
6. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.

## **11. Sweetwater Creek**

- a. The stream segment beginning immediately downstream of Hiram Lithia Road and ending immediately upstream of Old Alabama Road. This stream segment was considered significant due to the following:
  1. Adjacent medium density and industrial landuses have the potential to generate non-point source pollution.
  2. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
  3. It has readily apparent development pressure.
  4. It has recreation potential.
  5. It would provide visibility to the Greenway Acquisition Project due to its proximity to major roads.
  6. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  7. It contains locations known to be habitats of endangered species.
  8. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.

## **12. Anneewakee Creek**

- a. The stream segment beginning immediately downstream of Bomar Road and ending approximately 0.1 mile downstream of a powerline right-of-way crossing. This stream segment was considered significant due to the following:

1. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
3. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
4. It has readily apparent development pressure.
5. It has recreation potential.
6. It provides connectivity with a wildlife sanctuary.

### **13. Dog River**

- a. The stream segment beginning immediately downstream of Wert Road and ending immediately upstream of Rock Road. This stream segment was considered significant due to the following:
  1. Adjacent medium density residential, agricultural, and transportation-related landuses have the potential to generate non-point source pollution.
  2. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  3. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
  4. It has readily apparent development pressure.
  5. It is part of the headwaters of Dog River.
  6. It is listed as a stream segment identified as not fully supporting designated uses in the Georgia DNR 305(b) Report.
- b. The stream segment beginning immediately downstream of Liberty Road and ending immediately upstream of Post Road. This stream segment was considered significant due to the following:
  1. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.

2. It has readily apparent development potential.
3. It is listed as a 305(b) stream segment by the Georgia Department of Natural Resources.
4. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.

#### **14. North Dog River**

- a. The stream segment beginning immediately downstream of Liberty Road and ending at the confluence of Dog River. This stream segment was considered significant due to the following:
  1. It is part of the headwaters of Dog River.
  2. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  3. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
  4. It has readily apparent development potential.
  5. It contains the confluence with the Dog River.

#### **15. Wolf Creek**

- a. The stream segment beginning immediately upstream of West Carroll Road and ending immediately upstream of State Route 5. This stream segment was considered significant due to the following:
  1. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  2. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  3. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.
  4. Adjacent silviculture and agricultural landuses have the potential to generate non-point source pollution.

5. It has recreation potential.

## **16. Snake Creek**

- a. The stream segment beginning immediately downstream of Jones Mill Road and ending approximately 1.2 miles downstream of State Route 5. This stream segment was considered significant due to the following
  1. It is listed as a stream segment identified as not fully supporting designated uses in the Georgia DNR 305(b) Report.
  2. It has a significant index of biotic integrity and serves as a potential biological reserve to the Chattahoochee River.
  3. Adjacent silviculture and agricultural landuses have the potential to generate non-point source pollution.
  4. It has recreational potential.
  5. It contains wetlands which, if protected, would potentially protect and enhance water quality along downstream reaches of the Chattahoochee River.

## **B. SOUTH RIVER DRAINAGE BASIN**

### **1. South River**

- a. The stream segment beginning immediately downstream of I-75/85 and ending immediately upstream of Lakewood Park. This stream segment was considered significant due to the following:
  1. Adjacent high density residential landuses have the potential to generate non-point source pollution.
  2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  3. It is part of the headwaters of the South River.
  4. It is a CSO stream segment which, according to the Consent Decree, should be given particular emphasis.
  5. It has relatively large undeveloped tracts of land.
  6. It has environmental education potential due to its proximity to institutions of learning.

- b. The stream segment beginning immediately downstream of I-75 and ending immediately upstream of Browns Mill Golf Course. This stream segment was considered significant due to the following:
  - 1. Adjacent medium density residential landuse has the potential to generate non-point source pollution.
  - 2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  - 3. It is part of the headwaters of the South River.
  - 4. It has recreation potential.
  - 5. It received a public recommendation and is demonstrated to have public support.
  
- c. The stream segment beginning immediately downstream of Browns Mill Golf Course and ending immediately upstream of Waldrop Road. This stream segment was considered significant due to the following:
  - 1. Adjacent medium density residential, industrial, commercial, and transportation-related landuses have the potential to generate non-point source pollution.
  - 2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  - 3. It has readily apparent development/redevelopment potential.
  - 4. It has wetlands which, if protected, would protect and enhance water quality along downstream reaches of the South River.
  - 5. It has environmental education potential due to its proximity to institutions of learning.
  - 6. It would provide visibility to the Greenway Acquisition Project due to its proximity to major roads.
  - 7. It has recreation potential.
  - 8. It has relatively large undeveloped tracts of land.
  - 9. It received public recommendations and is demonstrated to have public support.

- d. The stream segment beginning approximately 0.8 mile upstream of Snapfinger Road and ending approximately 1.5 miles downstream of Snapfinger Road. This stream segment was considered significant due to the following:
  - 1. Adjacent medium density residential and mining landuses have the potential to generate non-point source pollution.
  - 2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  - 3. It has readily apparent development potential.
  - 4. It has recreation potential.
  - 5. It contains wetlands which, if protected, would protect and enhance water quality along downstream reaches of the South River.

## **2. Intrenchment Creek**

- a. The stream segment beginning immediately downstream from the Custer Avenue CSO storage facility and ending at Moreland Avenue. This stream segment was considered significant due to the following:
  - 1. Adjacent medium density residential and industrial landuses have the potential to generate non-point source pollution.
  - 2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.
  - 3. It is a CSO stream segment which, according to the Consent Decree, should receive particular emphasis.
  - 4. It is demonstrated to have public support.
  - 5. It has relatively large undeveloped areas of land.
- b. The stream segment beginning immediately downstream of Key Road and ending at the confluence with the South River. This stream segment was considered significant due to the following:
  - 1. Adjacent medium density residential and industrial landuses have the potential to generate non-point source pollution.
  - 2. It is listed as a 303(d) stream segment by the Georgia Department of Natural Resources.

3. It is a CSO stream segment which, according to the Consent Decree, should receive particular emphasis.
4. It received a public recommendation.
5. It has wetlands which, if protected, would protect and enhance water quality along downstream reaches of the South River.
6. It has readily apparent development/redevelopment potential.

### **3. Honey Creek**

- a. The stream segment beginning immediately downstream of the Mall Parkway and ending at the confluence with the South River. This stream segment was considered significant due to the following:
  1. Adjacent medium density residential and agricultural landuses have the potential to generate non-point source pollution.
  2. It is listed as a stream segment identified as not fully supporting designated uses in the Georgia DNR 305(b) Report.
  3. It contains wetlands which, if protected, would protect and enhance water quality along downstream reaches of the South River.
  4. It has a significant index of biotic integrity and has the potential to serve as a biological reserve to the South River.
  5. It has readily apparent development potential.
  6. It is part of the headwaters of Honey Creek.

## **4.3 PROPOSED GREENWAY SYSTEM WIDTHS**

### **4.3.1 General**

The wide diversity of parcel specific attributes dictates the need to consider the establishment of a Greenway System with varying widths. The optimum width of a stream corridor buffer that would adequately protect water quality and/or aquatic and stream corridor habitats along a specific stream segment is dependent upon the attributes associated with the parcels immediately adjacent to that stream segment including the following: magnitude of slopes, land use, lateral distance between the top of the stream bank and the nearest ridge line, soil types, types and extent of vegetation, relative perviousness/imperviousness, types of potential non-point source pollutants, types and conditions of aquatic and/or stream corridor habitats, stream morphology, stream USGS classification, and area hydrology. Section VIII.D.2.j.ii of the Consent Decree requires

that Greenway properties be contiguous with the stream bank with a width not less than 100 feet. The criteria presented in Article 4.3.3 was used to determine the Level I and Level II Greenway System widths as identified in the Appendix F parcel inventory. These criteria were developed following a review of selected published literature. Width maps for Proctor Creek are also presented in Appendix F as an example illustration of the Level I and Level II widths. A full set of width maps for the Proposed Greenway System is held by the City and is available for review. These maps were developed as a supplement to the width data presented in the Appendix F parcel inventory, to aide in the project implementation; therefore, the maps were not included, beyond the example set, in the Draft Greenway Acquisition Plan.

#### **4.3.2 Review of Selected Published Literature**

The following selected references were reviewed prior to the development of the criteria for determining Level I and Level II Greenway System Widths:

- A. Budd, W.W., P.L. Cohen, P.R. Saunders, and F.R. Steiner. Stream Corridor Management in the Pacific Northwest: Determination of Stream-Corridor Widths. Environmental Management Vol. II, No. 5, pp. 587-597. 1987.
- B. Smith, D.S. and P.C. Hellmund. Ecology of Greenways, Design and Function of Linear Conservation Areas. University of Minnesota Press. Minneapolis. 1993.
- C. Upper Cahaba Study Group Steering Committee. Final Report. Birmingham. 1992.
- D. Schueler, Tom. Site Planning for Urban Stream Protection. The Center for Watershed Protection. Silver Springs. 1993.

The information contained in the references listed above indicate that the width of a greenway system should not be defined arbitrarily and that variable widths are required along the greenway system due to the highly variable conditions along a stream corridor.

According to Smith, D.S. and P.C. Hellmund (Reference B), numerous studies and regulations have tried to set single effective widths for a wide variety of stream types but no consensus or magic number has emerged. The following information regarding stream corridor buffers is documented in the references cited above.

- A. In the Pacific Northwest of the United States, a minimum of 100-foot buffer on each side of the stream bank is recommended in papers cited under Reference A (Budd, W.W., and colleagues).
- B. In the Eastern United States, a 100-foot strip of riparian vegetation has been found effective in the protection of stream ecosystems from the effects of logging (Smith, D.S. and P.C. Hellmund, Reference B).

- C. In Northern California, buffer strips measuring at least 100 feet showed that most or all of the logging impacts on invertebrate life were prevented (Smith, D.S. and P.C. Hellmund, Reference B).
- D. The Washington State Shorelines Management Act protects land within 200 feet of a creek, within the 100-year flood plain, or within the creek's associated wetlands, whichever is greater (Smith, D.S. and P.C. Hellmund, Reference B).
- E. The Maryland Chesapeake Bay Critical Area Commission has designated land within 1,000 feet of the Bay as critical area and requires intensive review of proposed development (Smith, D.S. and P.C. Hellmund, Reference B).
- F. In a paper cited in Reference B (Smith, D.S. and P.C. Hellmund), the author recommends that activities within a zone of 500 feet on both sides of riparian corridors be subject to public and regulatory agency review.
- G. In a study conducted by Budd, W.W. and colleagues (Reference A), a 50-foot buffer width was found to be an adequate barrier for many reaches along Bear-Evans Creek watershed in Maryland.
- H. In a report dated November 20, 1992, the Upper Cahaba Study Group recommended the following standards for development to ensure adequate protection of the Upper Cahaba watershed in Alabama (Reference C).
  - 1. No land disturbing activities nor structures should be allowed within the 100-year flood plain on lakes, rivers, or selected tributaries.
  - 2. A No-Build Zone should be established for lakes, rivers, and all perennial tributaries shown on the current USGS map with a scale of 1:24000.
    - a. No new buildings, above ground structure, subsurface utility type services, nor site grading should be permitted within 200 feet of the flood plain of Lake Purdy, the Cahaba River, or the Little Cahaba River.
    - b. On perennial tributaries, the No-Build Zone should be 50 feet. On tributaries with FEMA established floodplains the No-Build Zone should be measured from the flood plain. On tributaries with no FEMA established floodplains, the No-Build Zone should be measured from the center of the stream.
  - 3. On lakes and rivers, the first 100 feet of the 200-foot No-Build Zone shall be a natural vegetative buffer. On perennial tributaries, the first 35 feet of the 50-foot No-Build Zone shall be a natural vegetative buffer. The only soil disturbance or tree removal allowed within these buffer areas is that which is deemed necessary for safety, access, or service. Any tree 10 inches Diameter at Breast Height (DBH) or greater that is removed in the

No-Build Zone will be replaced with a tree of like species to the surrounding area. One seedling per twenty (20) sq. ft. of canopy opening, uniformly spaced, should be planted in appropriate season.

- I. Most local buffer criteria consists of a single requirement that the buffer be a fixed and uniform width from the stream channel (Reference D). According to a national survey of 36 local buffer programs, urban stream buffers range from 20 to 200 feet in width on each side of the stream with a median of 100 feet (Reference D). Most jurisdictions arrive at their buffer width requirement by borrowing other state and local criteria, local experience, and through political compromise (Reference D). Most communities require that buffers fully incorporate all lands within the 100-year flood plain while others extend the buffer to pick up adjacent wetlands, steep slopes, or critical habitat areas. In general, a minimum base width of at least 100 feet is recommended to provide adequate stream protection.

According to information obtained from Reference B (Smith, D.S. and P.C. Hellmund), recent research indicates that some of the widths recommended under paragraphs A through G above may be insufficient for stream protection. The following are examples of the findings of recent research documented in Reference B (Smith, D.S. and P.C. Hellmund):

- A. Most sediment eroded from cultivated fields in a coastal-plain watershed in Maryland was deposited in a forested buffer strip, but significant deposition extended 265 feet from the forest-field edge. The surface drainage area of the field was about 11.4 acres with an average slope of 2 to 5 percent.
- B. In a study on the coastal plain of North Carolina, slopes of cultivated fields varied from 0 to 7 percent and slopes of an uncultivated buffer adjacent to the flood plain ranged from 0 to 20 percent. In this case, slightly more than 50 percent of the total sediment was deposited within 330 feet of the forest-field boundary.

#### **4.3.3 CRITERIA FOR DETERMINING PROPOSED GREENWAY SYSTEM WIDTHS**

Appendix F presents two sets of widths for parcels located within Priority 1 Tracts (Level I and Level II Greenway System Widths). Both Level I and II widths are to be measured from the top of the streambank. Level I widths are considered as minimum widths that would provide an appreciable level of protection of water quality and aquatic and stream corridor habitats. Level II widths are considered as optimum widths for the protection of water quality and aquatic and stream corridor habitats.

During the Implementation Phase, the land within Level I widths will be targeted for acquisition. However, if the feasibility of acquiring land within Level II widths becomes apparent, for specific properties, the City will attempt to acquire land within Level II widths. The feasibility of acquiring land within Level II widths will be determined during negotiations with individual property owners. Factors that may be used to determine the feasibility of acquiring Level II widths include the willingness of the owner to sell his/her

property at a bargain sale, the willingness of the property owner to donate or sell a conservation easement, the availability of acquisition partners, and the cost of acquisition.

#### **4.3.3.1 Criteria for Determining Level I Greenway System Widths**

The studies and reports cited in this section suggest that stream corridor buffers with widths ranging from 50 feet to 200 feet may be adequate for the protection of water quality and aquatic and stream corridor habitats. The 100-foot minimum width recommended in Section VIII of the Consent Decree is within the second percentile of the 50 feet to 200 feet range of stream corridor buffer widths indicated in the references cited above. During the determination of Level I Greenway System widths presented in Appendix F, a 100-foot uniform width was targeted. However, site specific conditions were identified where parcel specific conditions dictated the need to target a greater or lesser width with a maximum proposed Level I width of 200 feet from the streambank. The criteria listed below was used to determine the Level I Greenway System widths presented in Appendix F.

- A. Whenever the outer boundary of the 100-year flood plain was determined to be more than 100 feet but less than 200 feet from the top of the streambank, the Level I Greenway System widths for affected parcels were set at the outer boundary of the 100-year flood plain.
- B. Whenever it was determined that a stream corridor contained wetland (s), pond (s), or swale (s) that extended to a distance greater than 100 feet but less than 200 feet from the top of the streambank, the Level I Greenway System widths for affected parcels were set to include the area covered by the wetland (s), pond (s), or swale (s).
- C. Whenever it was determined that a stream corridor habitat extended to a distance greater than 100 feet but less than 200 feet from the top of the streambank, the Level I Greenway System widths for affected parcels were set to include the entire stream corridor habitat.
- D. Whenever it was determined that a proposed restoration project required land beyond 100 feet but less than 200 feet from the top of the streambank, the Level I Greenway System widths for affected parcels were set to include the area needed to implement the restoration project.
- E. Whenever it was determined that the ridge line was less than 200 feet from the top of the streambank, the Level I Greenway System widths for affected parcels were set at the ridge line.
- F. Whenever it was determined that the distance between existing development (e.g. roads, railroads, parking lots, or buildings) and the top of the streambank was less than 100 feet, the Level I Greenway System widths for affected parcels were set at approximately 20 feet from existing development. (The need to establish a

width less than 100 feet will be determined on a case-by- case basis during the Implementation Phase).

#### **4.3.3.2 Criteria for Determining Level II Greenway System Widths**

Level II Greenway System widths may exceed the 200-foot maximum selected for Level I Greenway System widths. Widths greater than 200 feet were recommended for parcels where the potential benefits associated with widths greater than 200 feet are likely to be far greater than the potential benefits associated with a width of 200 feet. As indicated above, Level II Greenway System widths will only be pursued if the feasibility of acquiring land within Level II widths becomes apparent.

The criteria for extending Greenway System widths beyond the Level I 200-foot maximum was based on projections to a natural physiographic or man-made feature or extending the coverage of proposed buffer widths to other nearby hydraulically connected off-channel water bodies or wetlands in cases as listed below. In most cases, professional judgement was used to establish the outer boundary of level II Greenway System widths.

- A. Wherever it was determined that a 100-year flood plain boundary was beyond 200 feet, the Level II Greenway System widths for affected parcels were set at 200 feet.
- B. Wherever it was determined that the boundary of a Level I width would terminate on a steep slope ( $\geq 35\%$ ), the Level II Greenway System widths for affected parcels were set at 200 feet.
- C. Wherever it was determined that a small isolated portion of an undeveloped parcel (generally  $\leq 3.0$  acres) would remain if the Greenway width is left at 100 feet, the recommended Greenway System widths for the affected parcel was set to include the remaining portion of that parcel.
- D. Wherever it was determined or suspected that the 100-year flood plain is a wetland or a spring area, the Level II Greenway System widths for affected parcels were set at the outer boundary of the feature plus an additional buffer (generally  $\leq 200$  feet).
- E. Wherever it was determined that segments of the stream corridor were part of a meander belt, which included multiple channels or crescent shaped oxbow backwater areas, the Level II Greenway System widths for affected parcels were set at a distance of 100 to 200 feet (Level I) beyond the two outermost stream features plus the intervening channel area or set at a distance greater than 200 feet based on additional features as with a single channel.
- F. Wherever it was determined that undeveloped isolated areas exist within a meander loop such as steep slopes (meander core) or 100-year flood plains, the recommended Greenway System widths for affected properties were set at the toe

of the significant slope beyond the flood plain or at the ridge line of the meander core.

- G. Wherever it was determined that a Level I width terminates on a steep undeveloped slope ( $\geq 35\%$ ) below a ridge top subdivision or other development, the Level II Greenway System widths for affected parcels were set at the top of the slope.
- H. Wherever it was determined that a tributary or drainage confluence feature such as a slough, wetland, or swamp existed, the Level II Greenway System widths for affected parcels were set at the referenced feature boundary. An additional standard proposed 100- to 200-foot width was added where steep slopes were encountered.
- I. Wherever it was determined that undeveloped, vegetated 100-year flood plain areas adjoin existing industrial facilities, the Level II Greenway System widths for affected properties were set at the boundary between the industrial facility and the undeveloped vegetated area or at the parcel boundary nearest to the developed industrial site.
- J. Wherever it was determined that undeveloped disturbed areas existed between the subject stream and industrial waste/spoil piles with surface runoff entering the subject stream directly, the Level II Greenway System widths for affected parcels were extended beyond the Level I 200-foot maximum to include the area up to the edge of the waste/spoil pile.
- K. Wherever it was determined that the lower segment of a significant tributary, associated with a subject stream confluence, was impacted by apparent or potential erosion, industrial waste/spoil pile runoff, or development pressure, the Level II Greenway System widths for affected parcels were extended beyond the Level I 200-foot maximum up the tributary channel (with associated tributary buffer widths of  $\leq 200$  feet) to a maximum of 1000 feet.

Where streams and rivers are bordered by steep ravines and bluffs, the outer boundary of the Greenway System may be set at the top of the slope or ridge line. The feasibility of setting the outer boundary of the Greenway System at the top of the slope or ridge line will be determined during the Implementation Phase, on a case-by-case basis.

In some cases, whole parcels will need to be purchased to provide space for public access facilities, education facilities, or if the remainder of a parcel, after the eligible part is acquired, would have no viable use for the owner. Final field determination of width limitations will be made on a parcel-by-parcel basis, during the Implementation Phase.

Individual property owners may be willing to sell or donate part of their land whose width (measured from the top of the streambank) is different from the Level I or Level II Greenway System widths presented in Appendix F. If the Greenway System width agreed upon by the City and an individual property owner is different from either Level I or

Level II width, the width agreed upon by the City and the individual property owner will govern.

#### **4.4 DEFINITION OF THE TOP OF THE STREAMBANK**

The top of the streambank will be the starting point for measuring the width of the Greenway System. The top of the streambank, as used for the City of Atlanta Greenway Acquisition Project, is the elevation of the “bankfull” discharge. The bankfull discharge is associated with a momentary maximum flow which, on the average, has a recurrence interval of 1.5 years as determined using a flood frequency analysis (Dunne, T. and L.B. Leopold (1978): Water in Environmental Planning., W. H. Freeman and Co., San Francisco, CA: 818PP.).

In many stream segments, the bankfull stage (top of the streambank) is associated with the flow that just fills the channel to the top of its banks and at a point where the water begins to overflow onto a floodplain (Dave Rosgen, Applied River Morphology, Wildland Hydrology, Pagosa Springs, Colorado, 1996).

The most consistent bankfull stage determination is obtained from identification of the top of the floodplain (Rosgen, 1996). This elevation is where incipient flooding begins for those flows that extend above the bankfull stage. Where floodplains are not well developed, the identification of bankfull stage must be determined by field stage indicators that may be combined as corroborating evidence for and indication of a consistent and common elevation. The following are some visual/ physical indicators that enable field determinations of the bankfull stage (top of the streambank) as identified in Rosgen’s Applied River Morphology, 1996:

- A. The presence of a floodplain at the elevation of incipient flooding.
- B. The elevation associated with the top of the highest depositional features (e.g. point bars, central bars within the active channel). These depositional features are especially good stage indicators for channels in the presence of terraces or adjacent colluvial slopes.
- C. A break in slope of the banks and/or a change in the particle size distribution, (since finer material is associated with deposition by overflow rather than deposition of coarser materials within the active channel.
- D. Evidence of an inundation feature such as small benches.
- E. Staining of rocks.
- F. Exposed root hairs below an intact soil layer indicating exposure to erosive flow.
- G. Lichens and (for some stream types and locales) certain riparian vegetation species.

## **4.5 GUIDELINES FOR ELIGIBILITY OF NON-PRIORITIZED LAND**

Three tiers of tract priorities (Priorities 1, 2, and 3) are identified in the Proposed Greenway System Configuration (Map E-1, Appendix E). These tract priorities were developed through the applications of technical criteria and professional judgement as discussed in Section 3.0. These priority levels provide acquisition guidance and flexibility for the Implementation Phase of the Greenway Acquisition Project, which should minimize the need for extensive updates of the Greenway Acquisition Plan. During the Implementation Phase, circumstances may arise where non-prioritized properties may become eligible for acquisition using the financial resources available for the Greenway Acquisition Project. Non-prioritized properties will be evaluated for inclusion within the Greenway System using the criteria for evaluating and prioritizing properties identified in Section 3.0 and professional judgement. The occurrence of one or more of the following circumstances may trigger consideration of non-prioritized land:

- A. Properties within Tract Priorities 1, 2, and 3 have all been acquired and there exists a remainder of funds.
- B. Negotiations for properties within Tract Priorities 1, 2 and 3 have been exhausted and there exists a remainder of funds.
- C. Future site conditions render previously prioritized properties no longer available or attractive for acquisition, resulting in a remainder of funds.

### **4.5.1 Greenway System Width for Non-Prioritized Land**

The criteria for determining proposed Greenway System widths outlined and detailed in this section apply to any and all non-prioritized properties that may be added to the Greenway System.

### **4.5.2 Land Acquisition Strategies for Non-Prioritized Land**

The acquisition process described in Section 9.0 of this document will guide the procedure and methods of acquisition for any and all non-prioritized properties that may be added to the Greenway System.

## **5.0 PROPOSED RESTORATION PROJECTS**

### **5.1 OVERVIEW**

The Consent Decree requires that the Greenway Acquisition Plan contain or provide for “restoration of Greenway Properties as necessary to restore or maintain their function as natural open spaces that reduce or prevent pollution;...” According to Section VIII.D.1.b, the term restoration “shall mean the planting of native flora and plants to act as natural buffers, the removal of structures and debris and the repair of stream banks impaired by erosion”. Section VIII.D.1.b further states that “restoration projects that involve natural, nonstructural solutions shall have a high priority”. During the Planning Phase of the Greenway Acquisition Project, the City of Atlanta identified areas along selected stream segments where restoration projects could be implemented to improve the condition of the stream and/or aquatic and stream corridor habitats. The process of identifying restoration projects involved a review of the data collected during the Inventory Phase and the Assessment Phase, limited field review of areas targeted for restoration projects, and a review of literature documenting the performance of various types of restoration projects. This section presents descriptions of restoration projects proposed for the Greenway System including the criteria used to select potential locations of specific restoration projects. Some of the proposed restoration projects (retention ponds and constructed wetlands) go beyond the Consent Decree definition of the term “restoration”. During the Implementation Phase of the Greenway Acquisition Project, the restoration projects falling under the Consent Decree definition (existing wetlands enhancement, riparian corridor revegetation, and streambank stabilization) will be the primary focus. However, if alternative sources of funding and/or joint funding opportunities arise, the implementation of retention ponds and constructed wetlands will be considered. The feasibility of implementing retention ponds and constructed wetlands will be evaluated in light of their potential performance in the removal of sediments and dissolved pollutants as well as their potential performance in reducing erosion within the areas downgradient of such facilities and within the receiving water body.

According to published literature, various types of restoration projects have been implemented along stream corridors to serve one or more of the following functions: stormwater runoff control, erosion control, flood control, and protection of aquatic and stream corridor habitats. There are many different types of restoration projects that have been implemented at various locations in the United States, but all are not suitable for every situation. Prior to selecting the restoration project for any situation, it is important to understand the site conditions, the performance of the restoration project under consideration, the technical feasibility, implementation cost, and long-term maintenance requirements and costs. The reliability, performance, and maintenance requirements of some restoration projects have not been well established. Some communities have attempted to implement unconventional restoration projects with varying degrees of success.

Appendix G presents maps showing the locations of proposed restoration projects. Appendix H presents data associated with proposed restoration projects and Appendix I presents

schematics for proposed restoration projects. As indicated in Appendix H, each restoration project has been assigned a priority ranking of 1, 2, or 3. These priority rankings are not related to the priority rankings assigned to various tracts of the Proposed Greenway System. The priority rankings assigned to various restoration projects were based on factors such as the following:

1. The drainage area served and location within the watershed.
2. Severity of erosion.
3. Readily apparent visual indications of sedimentation and turbidity.
4. Safety issues in the immediate vicinity of the proposed project.
5. Surrounding land uses.
6. Potential water quality, erosion control, and flood control benefits.
7. Cost efficacy.
8. Relative ease of construction, maintenance, and monitoring.

The ranking system relied heavily on professional judgement to combine relevant factors and to determine the potential overall benefits of a specific restoration project compared to other restoration projects. Priority 1 restoration projects are likely to realize the greatest benefits. They are also likely to realize substantial reductions in erosion and flooding. Projects assigned priority rankings of 2 and 3 are likely to provide immediate upstream or downstream improvement but their benefits will dissipate as the stream continues downstream.

The feasibility of implementing specific restoration projects will be investigated during the Implementation Phase. The sites identified for restoration work will require intensive review and survey-data collection before actual design phases can begin. The types and locations of specific restoration projects may be modified following the field review and survey-data collection.

Soft engineering techniques shall be the preferred method for all restoration activities on Greenway Properties. Hard engineering techniques shall only be used when soft techniques are judged to be inappropriate for addressing the erosion problem. Improper choice of soft engineering techniques or improper design, implementation, and/or maintenance shall not be a justification to turn to hard-scape techniques. Descriptions of the various types of proposed restoration projects are presented below.

## **5.2 EXISTING WETLANDS ENHANCEMENT**

### **5.2.1 Description**

Section 404 of the 1972 Federal Water Pollution Control Act (the Clean Water Act, CWA) defines wetlands as “areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated conditions.” The regulatory or responsible agency for monitoring the provisions of the Act is the United States Army Corps of Engineers (COE). The COE uses three parameters in classifying areas as natural wetlands. Those criteria involve evaluating the vegetation, the soils, and the hydrology of the site. An area is classified as a natural wetland when indicators are recorded for each of the three parameters. Areas previously identified by the COE have been recorded on National Wetland Inventory (NWI) Maps.

Natural wetlands support different unique plant and animal habitats, therefore, they provide critical habitat and ecosystem services to the environment. The biological processes that occur within natural wetlands also play an important role in water quality and quantity. Nutrients and other organic pollutants are removed or degraded through natural biological processes occurring within a wetland ecosystem. Wetlands also provide water storage which can be important to flood control and sediment removal.

The boundaries of natural wetlands are dynamic and can gradually shift back and forth in response to movement of groundwater and surface water runoff. Natural wetlands also have complex width and depth patterns to maintain aquatic plant and animal habitats. Because natural wetlands are self-maintaining, the plant species and forms are very diverse. Natural wetlands often have 40 to 50 species of trees, shrubs, herbaceous plants, and emergent wetland plants. There is also wide animal diversity within natural wetlands due to the variety of aquatic plants.

Existing wetlands enhancement will involve simple techniques such as supplemental vegetative plantings, removal of intrusive or abundant vegetation, and construction of embankments or structural controls to trap or regulate water levels. The following are some advantages and disadvantages of wetlands enhancement:

- A. Advantages:
1. Maintains an existing natural system having relatively high pollutant removal efficiency.
  2. Preserves, protects, and maintains existing wetlands ecosystems.
  3. Provides habitat for aquatic and stream corridor habitats.

4. Reduces erosion and provides downstream channel protection.
- B. Disadvantage:
1. Can be costly if hand-removal of debris/invasive species and hand-planting of supplemental vegetation is required.

## **5.2.2 Criteria Used to Select Potential Locations for Existing Wetlands Enhancement**

The potential locations for existing wetlands enhancement were selected based on the following criteria:

- A. Natural wetlands identified on the National Wetlands Inventory (NWI) Maps and/or preliminary wetlands indicators noted during field reconnaissance.
- B. Noted degradation or potential endangerment to an existing wetland during field reconnaissance.

## **5.3 CONSTRUCTED WETLANDS**

### **5.3.1 Description**

Constructed wetlands are shallow pools that create enhanced conditions for the growth of marsh plants. They are designed to maximize the removal of pollutants through uptake, retention, and settling of stormwater runoff. The plants in a constructed wetland serve as a medium for biological growth. Constructed wetlands sacrifice space and time in order to treat contaminants without generating large quantities of sludge. Typically, constructed wetlands are not constructed within delineated natural wetlands and do not replicate all the ecological functions of natural wetlands. Natural wetlands are mostly self-maintaining, contain diverse plant species, remove moderate to high amounts of pollutants, and are dominated by groundwater. Constructed wetlands require maintenance, have fewer plant species, have fixed boundaries, and are generally fed by stormwater runoff. Due to the variation in size and frequency of storm events, the design of constructed wetlands must consider cyclic patterns of water level. In addition, constructed wetlands have greater sediment inputs due to the capture and transport of sediment in stormwater runoff.

Constructed wetlands incorporate several designs: shallow marsh systems, pond/wetland systems, extended detention wetlands, pocket wetlands, and fringe wetlands. The selection of a particular wetland design depends on the size of the contributing watershed, available space, and the intended environmental function of the constructed wetland. Each proposed location within the Greenway System will require a detailed analysis of the overall benefits of the type of wetland and the resulting contributions to the affected watershed. The following are advantages and disadvantages of constructed wetlands:

A. Advantages:

1. Relatively high pollutant removal.
2. Relatively long design life.
3. Pollutant removal and performance increases as the wetland ages.
4. Reduces erosion and provides for downstream channel protection.
5. Provides excellent urban habitat for waterfowl and wildlife.

B. Disadvantages:

1. Possible downstream stream warming or natural wetland alteration.
2. Higher construction cost than retention ponds.
3. When improperly maintained, can be unsightly, breed mosquitoes, and cause undesirable odors.
4. May have adverse impacts to existing wetlands or wooded areas.
5. Possible bacterial contamination if waterfowl population is very dense.
6. Performance decreases during non-growing seasons or periods of snow and ice.

### 5.3.2 Criteria for Selecting Potential Locations for Constructed Wetlands

The proposed locations for constructed wetlands were based on the following criteria:

A. Land use:

1. Areas immediately downstream of land use types having the potential to contaminate stormwater runoff with nutrients and/or organic compounds (e.g. farmlands).

B. Topography:

1. Areas where there is existing natural detention and where grading or excavation can be applied to capture runoff without major changes in the affected watershed.

2. Areas where there exists sufficient baseflow to maintain desired water levels.
- C. Geotechnical:
1. Areas where there are no sandy soils, high soil infiltration rates, or high evapotranspiration rates during the summer months.
- D. Environmental:
1. Areas where the construction of a wetland would protect, enhance, or restore a habitat for fish and other aquatic species.
  2. Areas where existing wetlands occur or have been destroyed.
- E. Safety:
1. Areas where the constructed wetland will not pose a health threat or safety hazard.
- F. Maintenance:
1. Areas where the wetland would be accessible for maintenance.
  2. Areas where future monitoring and operation would be feasible.
  3. Areas where the wetland could be abandoned or breached without major restoration being required.
- G. Availability of Land:
1. Areas where land is available to construct a wetland of suitable size.

## **5.4 EROSION CONTROL AND STREAMBANK STABILIZATION**

### **5.4.1 Description**

The kinetic energy of stormwater has the capacity to wash particulate matter from the ground surface and to transport it to the receiving stream. The processes through which stormwater runoff washes particulate matter from the ground surface and transports it to receiving streams is known as erosion. The particulate matter transported into the stream by stormwater runoff contributes to relatively high suspended solids concentrations in the

receiving stream. During periods of wet weather, the quantity and velocity of water within the stream banks may increase. Increased stream-water quantity and velocity have resulted in erosion of some stream banks. Streambank erosion has, in some circumstances, dislocated the original stream channel. Erosion of stream banks also adds suspended solids into the stream. Once in the stream, sediments can be destructive to aquatic life and water quality.

The streams within the Greenway System have tried to stabilize themselves over the years through natural aggregation and degradation in response to increasing development and sediment loadings from urban development. The natural response of a stream to these conditions is to dynamically alter the meander pattern (sinuosity), channel width, channel depth, floodplain width, and profile. As a result, accumulated sediments form point bars, eroded banks, and scour hydraulic structures until a stabilized pattern is formed. Urban streams experience erosion along their banks when there is an increase in the frequency and duration of bank full-flow events. Areas that will be suitable for streambank stabilization include: steep channel reaches, unstable soil conditions, channel bends, and eroded bank conditions. Streambank stabilization offers erosion control, an increase in instream cover, and the maintenance of a natural meander.

Two basic approaches can be taken: “soft” engineering and “hard” engineering. Soft engineering techniques involve the use of living plants and plant debris to stabilize an eroded stream bank, while hard techniques use such materials as concrete and riprap. The National Research Council recommends that soft approaches be used whenever possible, since these lead to faster recovery. In addition, hard technologies may cost four times as much; they do not provide riparian habitat for wildlife and can, in fact, eliminate existing habitats; they may reduce the aesthetic qualities of the stream; and they may not be compatible with adjacent land uses. Soft engineering techniques shall be used for all erosion control and streambank stabilization activities on Greenway Properties. Hard engineering techniques shall only be used after soft techniques have failed and the failure was due to the inability of soft techniques to address the erosion problem. Improper choice of soft engineering techniques or improper design, implementation, and/or maintenance shall not be a justification to turn to hard-scape techniques. In addition, stream type classification systems have been developed to aid in predicting the natural dimension, pattern, and profile of a stream to aid in design attempts for stabilization and restoration. Stream segments at proposed restoration projects will be classified using the Rosgen Stream Classification System during the design phase. The Rosgen Stream Classification System is based on the geomorphic characterization, the morphological description, and the existing state condition of a stream or stream segment. Classifying the stream and predicting the natural state characteristics will increase the potential success of a restoration project within the Greenway System.

Permitting agencies may require specific and unique habitat enhancement plans for the proposed restoration projects that will be dictated by the proposed design, native species, and water quality of the stream segment. Applications of natural materials are being used in other parts of the country to enhance fish habitat and spawning areas. Riffle-pool channels that contain rock clusters or submerged shelters deflect channel flow and high velocities resulting

in improved habitat conditions within the stream. There is very little standardization for habitat improvement structures since every stream is unique. However, most enhancement structures share a common characteristic that involves deflecting the stream flow. Several types of habitat enhancement structures that may be necessary within the Greenway System include plungers, ledges, boulders, bank placed materials, single wing deflectors, floating log covers, and submerged shelters. The suitability of individual habitat enhancement structures will be evaluated on a case-by-case basis with the recommendation of a qualified professional. These enhancement structures will be considered to supplement the proposed stabilization measures used within the Greenway System and will primarily be defined and determined by regulatory agencies.

The erosion control and streambank stabilization measures proposed for the Greenway Acquisition Project will be used at selected locations within the Greenway System to reduce the amount of sediments and pollutants entering receiving waters. The types of proposed erosion control and streambank stabilization measures are discussed below. The following are some advantages and disadvantages to erosion control and streambank stabilization measures:

A. Advantages:

1. Reduces amount of sediment entering the stream.
2. Protects streamside vegetation for shading and temperature moderation.
3. Reduces flooding problems related to bank collapse and debris obstructions.
4. Protects aquatic habitats through sedimentation reduction.
5. Protects against loss of property.

B. Disadvantages:

1. Not all types of streambank stabilization measures are considered aesthetically pleasing.
2. Requires stream disturbance during construction.

#### **5.4.2 Criteria Used to Select Potential Locations for Erosion Control and Streambank Stabilization Projects**

The potential locations for erosion control and streambank stabilization projects were selected based on the following criteria:

A. Land use:

1. Areas immediately downstream of land use types having the potential for increasing the amount of flow and velocity within the stream channel.
  2. Areas immediately downstream of concentrated urban development and unregulated land disturbing activities.
- B. Topography:
1. Areas where the stream channel and floodplain have been encroached upon or relocated by development.
  2. Areas where runoff naturally concentrates.
  3. Areas where the stream channel has been obstructed by debris and/or man-made structures.
- C. Geotechnical:
1. Areas where highly erodible soils are within the stream channel and floodplain.
  2. Areas where scour and bank failure are evident.
- D. Environmental:
1. Areas where the hydrology can be quantified.
  2. Areas where stabilization would not have the potential to adversely impact existing plant and animal habitats within the stream channel and floodplain.
  3. Areas where stabilization would improve the conditions for re-establishing or protecting existing plant and animal habitats.
- E. Safety:
1. Areas where existing bridges, culverts, roadways, and/or homes are threatened by erosion within the channel and/or floodplain.
  2. Areas where improvements would not pose a health threat or safety hazard.
- F. Construction and Maintenance:

1. Areas where stabilization improvements to control degradation can be constructed and maintained without adversely impacting the surrounding area.
2. Areas where stabilization improvements would not require significant maintenance in the future.

G. Stream Characteristics:

1. Areas where the bank slope(s) are often vertical or near vertical and where there is severe toe failure.
2. Areas where the bank is absent of vegetation.
3. Areas where there are standing live or dead trees within the bank line, often leaning toward the center of the stream channel.
4. Areas where the bankline is irregular, sometimes with a scalloped appearance.
5. Areas where the entire stream channel bed is covered with sediment and/or where bars are not stabilized.

### **5.4.3 Energy Dissipators**

The purpose of energy dissipators is to prevent erosion at the outlet of a paved channel or culvert by reducing the velocity of flow. Because the outlets of channels and culverts frequently carry flows that exceed the velocity limitations of the downstream areas, energy dissipators are used at high points of erosion and scour potential. Dissipators absorb the impact of the flow and dissipate the energy to non-erosive levels. Types of dissipators include storm drain outlet protection, grade stabilization structures, and check dams. Where possible, “soft” engineering techniques (the use of living plants and plant debris) will be used to construct energy dissipators within the Greenway System.

#### **5.4.3.1 Storm Drain Outlet Protection**

Riprap-lined aprons are the most common practice used to prevent erosion at storm drain outlets because of the low cost and ease of construction. In addition, riprap aprons may be loose or grouted depending on the existing side slopes of the outlet channel and outlet velocity. Wherever available, stones native to the site area will be collected and used to construct riprap aprons provided that appropriate gradation of the stone is achieved.

#### **5.4.3.2 Grade Stabilization Structures and Check Dams**

Grade stabilization structures are hydraulic weir structures which are used to stabilize channels, control scour holes, and prevent upstream degradation and erosion. Hydraulic weirs may be constructed at locations of significant channel grade changes within the streams. Constructed weirs are barriers that can be built with a variety of materials that include stone, concrete, gabions, or sheet piling. The design of hydraulic weirs must consider the effects upstream of the structure. The height and width of the weir is critical when constructed in large streams. The intent of the hydraulic weirs within the Greenway System will be to serve as velocity reducers with minimum heights and widths.

On a smaller scale, check dams serve as hydraulic weirs that are constructed across swales, ditches, or areas of concentrated flow. Check dams reduce erosion by lessening the slope of the flow. The reduced slope reduces the velocity of flow and traps a small portion of sediment. Check dams are typically used as temporary measures during construction to protect smaller channels from erosion while permanent vegetation is established.

#### **5.4.3.3 Vegetated Waterways**

Vegetated waterways are used to channelize concentrated flow and reduce erosion potential within the watershed. Trapezoidal earthen channels planted with hardy grasses such as tall fescues and sericea can serve as a type of biofilter because the vegetation within the channel will take up some pollutants and help filter sediment and other solid particles out of the runoff. In addition, vegetated waterways provide some stormwater management for small storms by reducing peak flow rates, lowering flow velocities, and by infiltrating runoff water into the soils. Vegetated waterways are aesthetically pleasing, inexpensive to construct and maintain, and provide a low level of sediment removal from stormwater runoff. Vegetated waterways will be located along stabilization projects to concentrate small flows. Wherever possible, vegetated waterways will be constructed using natural contoured cross sections. The feasibility of constructing vegetated waterways using natural contoured cross sections will be evaluated on a case-by-case basis during the Implementation Phase.

#### **5.4.3.4 Natural and Synthetic Linings**

Natural and synthetic linings are used in areas where the establishment of vegetation is hindered by stormwater velocities. The linings usually are manufactured in a mesh network that structurally promotes vegetative growth and captures sediment. Linings are typically used where permanent vegetation is difficult to establish and where erosion potential is great. Linings have been developed to provide protection for steep slopes and high velocities, expedite germination, hold and release moisture, provide temperature control, provide wind protection, and prevent soil erosion. Several types of linings and thicknesses are available that are suitable for different plant species, slopes, and soil conditions. Bio-degradable and non-degradable linings can be used to control erosion within channels, along channel banks, and within a vegetative buffer. Linings will be used along stabilization projects where velocities exceed 4fps or where the channel banks are steep.

#### **5.4.4 Vegetative Streambank Stabilization**

Vegetative streambank stabilization provides erosion protection by reducing stream velocity, binding the soil in place with a root mat, and covering the soil surface when high flows cause the vegetation to flatten against the banks. Vegetative measures also provide habitats for fish and wildlife and are aesthetically pleasing. Vegetative measures along channel banks can provide pollutant-filtering capacity. However, vegetative stabilization can lower the carrying capacity of a channel and cause flooding if not properly designed and maintained.

#### **5.4.5 Structural Streambank Stabilization**

Structural streambank stabilization employs the use of riprap, stone, concrete, gabions, or high-density manufactured plastic components to prevent channel banks from eroding. Structural stabilization is typically used in areas with erosive velocities between 4 fps and 6fps (depending on soil types). Vegetative measures should be used in conjunction with structural streambank measures to provide an aesthetic, “natural” characteristic to the stream. In most cases, structural stabilization will be placed up to the depth of normal bank flow conditions. Vegetative stabilization will be placed above the depth of the normal bank flow. Where available, stones native to the site area will be collected and used to accomplish structural stabilization provided that appropriate gradation of the stone is achieved.

#### **5.4.6 Vegetation**

Vegetative measures are used to provide filters for sediment deposition, wildlife habitat, screening, and to enhance the appearance of the stream corridors. Vegetation provides a natural filter for water quality and surface stabilization at reasonably low construction/installation costs as well as low maintenance costs. Vegetation is typically used in buffer areas, channels, and channel banks. The types of vegetation used include temporary and permanent seeding of grasses, trees, shrubs, vines, and other ground cover. Vegetative measures within the Greenway System will utilize appropriate plant species common to the area.

##### **5.4.6.1 Temporary and Permanent Seeding of Grasses**

Seeding with grass is used to stabilize and prevent erosion from areas immediately surrounding stream corridors. Establishing perennial/annual vegetative cover with seed provides a low-cost reduction in sediment within the streams, therefore, enhancing water quality. Surrounding land use, slopes, soil condition, and climate will be considered when selecting areas for seeding.

##### **5.4.6.2 Permanent Vegetation-Trees, Shrubs, Vines, and Ground Cover**

Trees, shrubs, vines, and other ground cover can be used to stabilize the soil with vegetation, provide food and shelter for wildlife, filter sediment and pollutants, and provide windbreaks or screens. Woody plants and ground covers provide alternatives to grasses. However, they have little capability of providing rapid cover for reduction in erosion. Efforts must first focus on short-term stabilization using densely-growing herbaceous species, mulch, or initial seedlings of grasses to allow trees, shrubs, vines, and ground cover an opportunity to mature.

#### **5.4.7 Bioengineering Techniques**

Bioengineering techniques typically involve using dormant woody vegetation to construct systems that reinforce the soil and provide streambank protection against scour failure. Bioengineering measures differ from conventional vegetative measures in that bioengineering measures include a matrix of vegetation with overlapping root systems with live plant material and non-living components such as rock, timbers, and wooden stakes. Over time, the dormant plants sprout and develop extensive root systems that create a strong subsurface layer. The surrounding plants invade the root systems and strengthen the subsurface layer during each growing season. Bioengineering techniques are very natural in appearance, provide shade, overhanging cover, good riparian habitat, and organic debris for aquatic habitats. Various bioengineering techniques may be used in conjunction with vegetative and structural stabilization forms.

### **5.5 RETENTION PONDS**

#### **5.5.1 Description**

Retention ponds, also referred to as extended detention ponds or wet ponds, are surface impoundments that maintain a permanent pool of water. Retention ponds are designed and constructed to collect and detain stormwater runoff for varying periods of time and to release the detained stormwater runoff, in a controlled fashion, into the receiving water body. Retention ponds have been commonly used within developed areas to reduce post-development stormwater discharges to levels which existed before development. In recent years, retention ponds have been used to enhance the quality of stormwater runoff. The retention periods can vary from several minutes for small ponds receiving relatively high stormwater flows to several days for large ponds receiving relatively small stormwater flows. As the stormwater collects into a retention pond, some of the particulate matter suspended in the stormwater runoff settles to the bottom of the pond through a process called sedimentation. The sedimentation of particulate matter results in the removal of pollutants associated with the particulate matter. Although sedimentation is the major pollutant removal process, biological processes can also substantially reduce concentrations of soluble nutrients by converting them into algae and by providing substrate for bacteria.

The permanent pool of water in a retention pond serves two functions: it shields the settled sediment from resuspension during large storms and provides a body of water that clarifies by settling over the period between runoff events. The performance of a retention pond

depends, in part, on the following factors: pond volume, inlet and outlet configurations, pond depth, and pond shape. Retention ponds require maintenance and periodic cleaning and, therefore, must be accessible to vehicles. Retention ponds are not intended to be animal or plant species habitats, and any such use is incidental to their purposes, and in most cases will be discouraged by proper maintenance. Vegetation used in the retention pond area is intended for ornamental purposes only and shall consist of grass with trees and shrubs. The following are advantages and disadvantages of retention ponds:

A. Advantages:

1. Reduce peak flow downstream.
2. Provide relatively high removal of particulates and soluble urban stormwater pollutants.
3. Serve relatively large drainage areas.
4. Can enhance aesthetics.
5. Can provide recreational benefits.
6. Permanent pool helps prevent scour and resuspension of sediments.
7. Modified retention ponds can create wetlands for animal habitats.

B. Disadvantages:

1. Require considerable space which limits feasibility in highly urbanized areas.
2. Not suitable for hydrologic Soil Conservation Service (SCS) soil groups A and B.
3. When improperly maintained, can be unsightly, breed mosquitoes, and cause undesirable odors.
4. Economically unfeasible for areas of 10 acres or less.
5. Potential safety hazards if not properly designed, constructed, and maintained.
6. May impact downstream aquatic life due to thermal discharge and oxygen depletion.
7. Moderate to high construction and maintenance costs.

### **5.5.2 Criteria Used to Select the Proposed Locations for Retention Ponds**

The proposed locations for retention ponds were selected based on the following criteria:

A. Land Use:

1. Areas where relatively high pollutant levels and runoff are likely to concentrate. These locations include relatively impervious areas such as parking lots, areas immediately downstream of industrial or commercial facilities, and areas immediately downstream of farmland.

B. Topography:

1. Areas where there exists natural detention and where grading or excavation can be applied to capture stormwater runoff without major changes to the natural drainage patterns of the affected watershed.

C. Geotechnical:

1. Areas where rock excavation is limited.
2. Areas where the soil will support a water retention pond.
3. Areas where the soil is relatively impervious.
4. Areas relatively close to good sources of embankment fill.

D. Environmental:

1. Areas where the hydrology can be quantified.
2. Areas where there is free inflow and outflow during a storm event.
3. Areas where inundation by a stream is unlikely.
4. Areas where erosion of embankment toe by a stream is unlikely.
5. Areas where the pond's peak discharge will not coincide with peak river flow.
6. Areas where the construction of a retention pond would have the potential to adversely impact existing plant and animal habitats were avoided

E. Safety:

1. Areas where the pond will not pose a health threat or safety hazard.

2. Areas where catastrophic failure would not endanger people.
- F. Maintenance:
1. Areas where a pond would be accessible for maintenance.
  2. Areas where future monitoring and operation would be feasible.
  3. Areas where the pond could be abandoned or breached without major restoration being required.
- G. Availability of Land:
1. Areas where land is available to construct a pond of suitable size.
- H. Other:
1. Areas where multi-use potential is high such as non-contact recreation, flood control, and pollutant removal.

## **5.6 RESTORATION OF RIPARIAN ZONE**

### **5.6.1 Description**

A review of literature resulted in the utilization of two documents which detail plant species appropriate for planting in Piedmont riparian areas. Information from these two sources have been compiled into a list contained within Table 5-1 of this section. The following documents were used in compiling Table 5-1.

- A. Georgia Soil and Water Conservation Commission (GSWCC). Manual for Erosion and Sediment Control in Georgia. Atlanta, GA: GSWCC, 2000.
- B. Wharton, C.H. The Natural Environments of Georgia. Atlanta, GA: Georgia Department of Natural Resources, 1977.

The first of these documents is currently available from the Georgia Soil and Water Conservation Commission. The second document is a description of the flora and fauna of Georgia and presents the results of vegetation surveys around the state, including within the Chattahoochee and Upper Ocmulgee floodplains and stream valleys. However, the book describes plant assemblages that occurred in relatively undisturbed areas as of the 1970s, which in some cases is significantly different than the pre-Columbian native assemblages. Therefore, species selected based on this source may not originally have been native to the area but now thrive in the wild. Areas appropriate for riparian zone restoration will be

determined on a case-by-case basis during the Implementation Phase and throughout the ongoing and perpetual Greenway System maintenance program.

Table 5-1 lists plant species that would be appropriate for vegetating riparian areas in the Piedmont. For the most part, only woody species (trees and shrubs) are listed. For a listing of appropriate grass species, and additional woody species, refer to the latest edition of the Manual for Erosion and Sediment Control in Georgia.

<b>Table 5-1 Recommended Plant Species For Riparian Revegetation</b>	
<b>SPECIES</b>	<b>COMMON NAME</b>
<i>Acer negundo</i>	Boxelder
<i>Asimina triloba</i>	Pawpaw
<i>Betula nigra</i>	River birch
<i>Vaccinium spp</i>	Blueberry
<i>Carpinus caroliniana</i>	American hornbeam
<i>Carya cordiformis</i>	Bitternut hickory
<i>Carya glabra</i>	Pignut hickory
<i>Carya ovata</i>	Shagbark hickory
<i>Carya tomentosa</i>	Mokernut hickory
<i>Catalpa bignonioides</i>	Catalpa
<i>Celtis laevigata</i>	Sugarberry
<i>Celtis occidentalis</i>	Hackberry
<i>Cephalantus occidentalis</i>	Buttonbush
<i>Chionanthus virginicus</i>	Fringe tree
<i>Clethra alnifolia</i>	Sweet pepper bush
<i>Cornus amomum</i>	Silky dogwood
<i>Cornus stricta</i>	Swamp dogwood
<i>Cornus florida</i>	Flowering dogwood
<i>Diospyros virginiana</i>	Persimmon
<i>Fagus</i>	Beech
<i>Fraxinus pennsylvanica</i>	Green ash
<i>Gleditsia aquatica</i>	Water locust
<i>Gleditsia triacanthos</i>	Honey locust
<i>Ilex decidua</i>	Possumhaw
<i>Ilex opaca</i>	American holly
<i>Ilex verticillata</i>	Winterberry

Juglans nigra	Black walnut
Juniperus virginiana	Eastern red cedar
Kalmia latifolia	Mountain laurel
Leucothoe axillaris	Doghobble
Liriodendron tulipifera	Tulip poplar

<b>Table 5-1 Continued</b>	
<b>SPECIES</b>	<b>COMMON NAME</b>
Liquidamber styraciflora	Sweetgum
Magnolia macrophylla	Bigleaf magnolia
Magnolia tripetala	Umbrella magnolia
Magnolia virginian	Sweetbay
Nyssa sylvatica	Blackgum
Ostrya virginiana	Hop hornbeam
Oxydendrum arboreum	Sourwood
Pinus taeda	Loblolly pine
Platanus occidentalis	Sycamore
Populus deltoides	Eastern cottonwood
Quercus alba	White oak
Quercus borealis	Northern red oak
Quercus coccinea	Scarlet oak
Quercus falcata	Southern red oak
Quercus lyrata	Overcup oak
Quercus michauxii	Swamp chestnut oak
Quercus nigra	Water oak
Quercus pagodaefolia	Cherrybark oak
Quercus phellos	Willow oak
Quercus rubra	Red oak
Quercus shumardii	Shumard oak
Quercus velutina	Black oak
Salix nigra	Black willow
Rhamnus spp.	Buckhorn
Rhododendrum atlanticum	Coast azalea
Rhododendrum minus	Carolina rhododendron
Rhododendrum viscosum	Swamp azalea
Ulmus rubra	Slippery elm
Viburnum nudum	Swamp haw
Viburnum prunifolium	Black haw

## **6.0 PROPOSED DESIGN AND CONSTRUCTION STANDARDS FOR RESTORATION PROJECTS**

### **6.1 OVERVIEW**

#### **6.1.1 General**

The proposed locations for restoration projects will require intensive field review and survey data collection before actual design phases can begin. The feasibility of the implementation of individual restoration projects will be determined after site-specific data is collected, hydrologic conditions considered, and a preliminary cost estimate determined. Each proposed location will have specific and unique conditions that may require specialized design considerations rather than a conventional, standard design. This section presents some design and construction specifications that are intended to outline the overall procedures to be followed during the design and construction phases of the restoration projects. In all cases, the design and construction specifications may be modified to address each specific site. Two sets of specifications have been provided for retention ponds and constructed wetlands: Standard Specifications and Recommended Specifications. The retention ponds and constructed wetlands will be designed and constructed to meet the Standard Specifications; however, if site-specific conditions allow, the Recommended Specifications shall be followed. Figures I-1 through I-17 (in Appendix I) presents schematics for the proposed restoration projects. Appendices M and N present Standard Operating Procedures (SOPs) that should be used as guidelines during the design, construction, and maintenance of restoration projects to ensure the prevention of erosion and non-point source pollution.

Soft engineering techniques shall be preferred for all restoration activities on Greenway properties. Hard engineering techniques shall only be used after soft techniques have failed and the failure was due to the inability of soft engineering techniques to address the erosion problems. Improper choice of soft engineering techniques or improper design, implementation, and/or maintenance shall not be a justification to turn to hard-engineering techniques.

#### **6.1.2 Relevant Consent Decree Language**

The restrictions listed below apply to properties and conservation easements acquired using the \$25 million set aside for this project. Since no funds from the Greenway Account will be spent on donated properties and conservation easements, the restrictions listed below do not apply to donated properties and conservation easements.

- A. “The primary purpose of this project will be to reduce and/or prevent erosion and non-point source pollution loads from entering the Designated Streams, by setting aside land in perpetuity for the protection of the Designated Streams, such that the Designated Streams may be maintained in, or be restored to, their natural condition.” (Section VIII.B.1)

- B. “The Defendant will hold the Greenway properties in perpetuity, or for as long as legally permissible, for the purpose of improving, restoring, and protecting the water quality of the Designated Streams.” (Section VIII.D.1.b)
- C. “The Defendant hereby agrees to implement the Greenway Acquisition Project for the purpose of reducing or preventing pollution to the Designated Streams, with primary emphasis on non-point sources.” (Section VIII.D.2.a)
- D. “The Greenway Acquisition Plan shall contain or provide...(iv) assurance that no more than ten (10%) percent of the area of Greenway Properties acquired may be developed for public access or use, such as bicycle and hiking paths;...” (Section VIII.D.2.j.iv)
- E. “Any infrastructure for human activity within the Greenway Properties shall be designed and constructed with prevention of non-point source pollution as the primary consideration.” (Section VIII.D.2.m)
- F. “Bicycle and hiking trails, canoe launch ramps, and picnic facilities and other public access facilities located within Greenway Properties shall be designed and constructed with non-point source pollution prevention as a primary consideration. Location and construction of such facilities shall be subject to the approval of EPA/EPD.” (Section VIII.D.2.n)
- G. “The Defendant covenants that it will not take any action pursuant to state or local law, if such action or omission would result in, facilitate or in any way contribute to, any alienation of the Greenway Properties or change their use in a manner that is not consistent with the purpose of the Greenway Acquisition Project as set forth in this consent decree and the Greenway Acquisition Plan unless approved by EPA/EPD.” (Section VIII.D.2.o)
- H. “The Defendant shall maintain the Greenway Properties in a manner that preserves environmental value and furthers the purposes of the Greenway Acquisition Project.” (Section VIII.D.2.p)

These restrictions on the Greenway Properties shall continue in perpetuity and shall survive the termination of the Consent Decree. Any contract between the City and entities proposing to construct facilities within the Greenway System will indicate that all construction will comply with the requirements of the Consent Decree and the Greenway Acquisition Plan.

## **6.2 RETENTION PONDS**

### **6.2.1 General**

The design criteria for retention ponds within the Greenway System are based on the standards and specifications provided in the City of Atlanta, Georgia, Stormwater Management Design Manual, 1996 edition (refer to the latest edition of this manual for

current standards and specification). The 1996 edition of this manual provides criteria for designing retention ponds. The retention pond's treatment (permanent pool) volume shall be adequate to attenuate the post-development peak discharge rates to the pre-development discharge rates for the 2-year through 10-year storms. Routing calculations shall be used to demonstrate that the storage volume is adequate. Smaller storm events shall be investigated for detention to achieve higher levels of particulate removal and downstream erosion protection for more frequent storm events (i.e., detaining 1-year and 2-year storm events). Therefore, the design of retention ponds shall require an analysis of the available volume of detention and the resulting impacts to the entire watershed. Refer to Appendix I, Figure I-1 for typical retention pond details. The proposed specifications for retention ponds are as follows.

#### **6.2.1.1 Standard Design and Construction Specifications for Retention Ponds**

- A. The minimum drainage area shall be 10 acres.
- B. Design shall be based on the ultimate full development upstream conditions for current zoning requirements.
- C. Minimum length to width ratio shall be 3:1; preferably wedge shaped with irregular shorelines.
- D. Minimum depth of permanent pool shall be 3.0 feet; maximum depth shall be 8.0 feet. The average depth shall be 3 to 6 feet.
- E. Minimum side slopes of banks shall be 3:1 if mowed.
- F. Anti-seep collars shall be placed on the barrel of the principal spillway.
- G. Inlet and outlet shall be located to maximize flow length. Baffles shall be used if short-circuiting cannot be prevented with inlet-outlet placement.
- H. Riprap protection shall be provided for the outlet and all inlet structures into the pond.
- I. Emergency spillway shall be designed to pass the 100-year storm event.
- J. One-half foot minimum freeboard shall be provided above the emergency spillway elevation for the embankment.
- K. An emergency drain such as a sluice gate and drawdown pipe shall be provided to allow drawdown within 24 hours.
- L. Anti-clogging devices such as trash racks and filters shall be provided at the outlet.

- M. Impermeable liner shall be provided for ponds with SCS Hydrologic Soil Groups A and B.
- N. Benchmarks shall be provided for sediment removal.
- O. Clean out access for heavy machinery shall be 10 feet wide minimum with slopes less than 15%.
- P. A minimum of 25-foot wide vegetated buffer shall be provided around the pond. Trees shall not be permitted on the embankment. The vegetation on the embankment shall be ground cover only.
- Q. Fences shall be provided on the embankment.

#### **6.2.1.2 Recommended Design and Construction Specifications for Retention Ponds**

- A. Retention ponds shall be designed for multi-objective use such as amenities or flood control.
- B. The recommended length to width ratio shall range from 3:1 to 4:1 (preferably wedge shaped).
- C. Reinforced concrete pipe shall be used instead of corrugated metal pipe for the outlet pipe.
- D. Sediment forebays shall be designed for larger ponds (5-15% of total pond volume). Forebay shall have separate drain for dewatering. Grass biofilters shall be designed for smaller ponds.
- E. Impervious soil boundary shall be provided to prevent drawdown.
- F. Shallow marsh area (25-50% of the pond area) shall be provided around fringe and shall include aquatic vegetation that is unappealing to water fowl and will provide bank protection.
- G. The embankment and side slopes shall be mowed at least twice a year.
- H. Safety bench shall be provided at the toe of the slope (recommended minimum of 10 feet wide).
- I. Oil and grease skimmer shall be provided for sites with high production of such pollutants.
- J. A reserve on-site disposal area, protected from runoff, shall be provided for dredged sediment.

## **6.3 CONSTRUCTED WETLANDS**

### **6.3.1 General**

Constructed wetlands can incorporate several designs: shallow marsh systems, pond/wetland systems, extended detention wetlands, pocket wetlands, and fringe wetlands. The selection of a particular wetland design will depend on the size of the contributing watershed, available space, and the intended environmental function of the constructed wetland. Each potential location within the Greenway System will require a detailed analysis of the overall benefits of the type of wetland and the resulting contributions to the entire watershed. The design criteria for constructed wetlands within the Greenway System will be based on a broad range of requirements depending on the specific location and the type of wetland design applicable. Refer to Appendix I, Figures I-2 through I-5 for typical constructed wetland details. Constructed wetlands should be located in areas immediately downstream of land use types having the potential to contaminate stormwater runoff with nutrients and/or organic compounds (e.g. farmlands). In general, all constructed wetlands within the Greenway System will be designed based on the following criteria:

- A. Pretreatment: The stormwater runoff shall be treated in sediment forebays or micropools to reduce the runoff velocity and trap coarse sediments.
- B. Depth Zones: Depths shall be varied within the wetlands to meet the growing requirements of plant species and to maintain stable water levels.
- C. Plant Species: A diverse, dense, and native wetland plant community shall be designed to establish growing as quickly as possible and limit replantings.
- D. Landscaping: A functional landscape shall be maintained around the wetland to increase pollutant removal, provide a better wildlife habitat, and promote a more natural, pleasing appearance.
- E. Maintenance: The wetlands shall be designed to limit maintenance through periodic inspections, sediment removals, and adjustments to water level and plants.
- F. Permitting Requirements: Depending on the specific location, federal and state permitting requirements may influence the design criteria

The following design criteria and construction specifications were based on Chapter 12 of the City of Atlanta, Georgia, Stormwater Management Design Manual, 1996 edition (refer to the latest edition of this manual for current standards and specification).

#### **6.3.1.1 Standard Design and Construction Specifications for Constructed Wetlands**

- A. The minimum upstream drainage area shall be 25 acres for shallow marsh and pond/wetland designs; 10 acres for extended detention wetland design; and 1 to 10 acres for pocket wetland design.
- B. The inflow of water shall be greater than expected loss rate (so the water elevation can be maintained).
- C. The volume capacity shall be designed for an extended detention time of 24-hours for a 1-year storm.
- D. The surface area of the wetland shall account for a minimum of 3 percent of the contributing drainage area.
- E. The outlet shall be protected against blockage with an anti-clogging device.
- F. The length to width ratio shall be at least 2 to 1.
- G. A soil depth of at least 4 inches shall be used for shallow wetland basins.
- H. Approximately 75 percent of the wetland shall have water depths less than 12 inches, and 25 percent of the wetland shall have depths ranging from 2 to 3 feet.
- I. The outlet structure shall be located in the deeper area of the wetland to prevent sediment buildup from interfering with basin overflow.
- J. A 4 to 6 feet deep forebay shall be established at the pond inflow points to capture larger sediments. Direct maintenance access, with a minimum width of 15 feet and maximum slope of 5:1, shall be provided to the forebay.
- K. If high water velocity is a potential problem, some type of energy dissipation device shall be installed.
- L. Maximized use of pre- and post-grading pondscaping design shall be maintained to create both horizontal and vertical diversity and habitat.
- M. A minimum of 3 aggressive wetland species (primary species) of vegetation shall be established in quantity on the wetland.
- N. Three additional wetland species (secondary species) of vegetation shall be planted on the wetland, although in far less numbers than the primary species.
- O. 30 to 50 percent of the shallow (12 inches or less) area of the basin shall be planted with wetland vegetation.
- P. Approximately 50 individuals of each secondary species shall be planted per acre: set out in 10 clumps of approximately 5 individuals and planted within 6 feet of the edge

of the pond in the shallow area leading up to the ponds edge. The clumps shall be spaced as far apart as possible. Species shall not be segregated to different areas of the wetland.

- Q. Wetland mulch, if used, shall be spread over the high marsh area and adjacent wet zones (-6 to +6 inches of depth) to depths of 3 to 6 inches.
- R. A minimum 25-foot buffer, for all but pocket wetlands, shall be established and planted with riparian and upland vegetation (50-foot buffer if wildlife habitat value is required in the design).
- S. In order to trap sediments and other pollutants and prevent them from entering the wetland, the surrounding slopes shall be stabilized by planting.
- T. A written maintenance plan shall be provided with adequate provision made for ongoing inspection and maintenance.
- U. The wetland shall be maintained to prevent loss of area of ponded water available for emergent vegetation due to sedimentation and/or accumulation of plant material.

#### **6.3.1.2 Recommended Design and Construction Specifications for Constructed Wetlands**

- A. To minimize maintenance as much as possible, it is recommended that wetland basins be installed on stabilized watersheds and not be used for sediment control.
- B. A forested or vegetated buffer shall surround wetlands.
- C. Complex topography shall be maintained by bioengineering methods such as fascines, straw bales, and geotextile rolls.
- D. The frequently flooded zone surrounding the wetland shall be located within approximately 10 to 20 feet from the edge of the permanent pool.
- E. Soil types conducive to wetland vegetation shall be used during construction.
- F. The wetland shall be designed to allow slow percolation of the runoff through the substrate (a layer of clay shall be added for porous substrates).
- G. The depth of the forebay shall be in excess of 3 feet and contain approximately 10 percent of the total volume of the normal pool.
- H. As much vegetation as possible and as much distance as possible shall separate the basin inlet from the outlet.

- I. Of the 75 percent of the wetland that should be 12 inches deep or less, it is recommended that approximately 25 percent be between 6 and 12 inches deep and the remaining 50 percent be 6 inches or less deep.
- J. The water shall gradually get shallower about 10 feet from the edge of the wetland pools.
- K. The planted areas shall be made as square as possible within the overall design of the wetland, rather than long and narrow.
- L. The only site preparation that shall be needed for the actual planting (besides flooding the basin) is to ensure that the substrate is soft enough to permit relatively easy insertion of the plants.

## **6.4 EXISTING WETLANDS ENHANCEMENT**

### **6.4.1 General**

Natural wetlands are very unique and require intensive field review, data collection, and delineation before enhancement techniques can be identified. Areas that have been identified for potential wetland enhancement projects will be submitted to and evaluated by the U.S. Army Corp of Engineers (COE) to determine the two items of interest: if the area is a natural wetland, and if the wetland is jurisdictional. Conclusions by the COE will determine what types of enhancement techniques are required. Enhancement techniques may include constructing small earthen structures to add water or regulate water levels, embankments to trap water, planting native wetland vegetation in specific patterns if the plant populations need to be supplemented, removal of debris, or removal of over-abundant vegetation that is restricting growth of other plant and animal species.

The design criteria and construction specifications for existing wetlands enhancement and restoration shall conform to the standard construction practices for bioengineering techniques and vegetative restoration as outlined in this section and approved by the COE. In addition, standard specifications for structural controls deemed necessary to protect natural wetlands shall conform to those outlined in the most recent editions of The Manual for Erosion and Sediment Control in Georgia and the City of Atlanta, Georgia, Stormwater Management Design Manual.

#### **6.4.1.1 Design Specification for Existing Wetlands Enhancement**

- A. Specific standards vary for each technique and appropriate standards and materials shall be used for design.
- B. Recommended techniques shall include supplemental vegetative plantings, removal of debris, removal of intrusive vegetation, and/or removal or construction of earthen embankments or structures for protection or diversion of water.

- C. Vegetative species shall be limited to those recommended in Table 5-1 of Section 5.0 of this document and the latest edition of the Manual for Erosion and Sediment Control in Georgia.
- D. Planting techniques and patterns shall be varied to accommodate the individual wetlands and water level required.
- E. Vegetative cover shall be established on exposed surfaces of embankments and spillways.

#### **6.4.1.2 Construction specifications for Existing Wetlands Enhancement**

- A. Specific standards vary for each technique and appropriate standards and materials shall be used for construction.
- B. Construction shall be limited to the dormant season for the plant materials.
- C. All plant materials and cuttings shall be from native species.
- D. Cuttings shall be fresh and live.
- E. Flow may need to be diverted during construction of some wetland enhancement techniques.

### **6.5 EROSION AND STREAMBANK STABILIZATION**

#### **6.5.1 General**

“Soft” engineering techniques (the use of living plants and plant debris) shall be the preferred method used to stabilize eroded stream banks. Hard engineering techniques shall only be used after soft techniques have failed and the failure was due to the inability of natural vegetation to address the erosion problem caused by urban development. Improper choice of soft engineering techniques or improper design, implementation, and/or maintenance shall not be a justification to turn to hard engineering techniques. The City will seek recommendations from other responsible local governments and agencies throughout the investigation, design, and construction of all erosion and streambank stabilization projects.

The following design criteria and construction specifications for erosion control and streambank stabilization measures to be used in the Greenway System are based on the Georgia Soil and Water Conservation Commission, Manual for Erosion and Sediment Control in Georgia (2000 edition) and the City of Atlanta, Georgia, Stormwater Management Design Manual (1996 edition). References to the appropriate section(s) of the above noted manuals are listed for each measure. During the design and construction of the erosion control and streambank stabilization measures, the latest editions shall be used.

## 6.5.2 Energy Dissipators

### 6.5.2.1 Storm Drain Outlet Protection

The following design criteria and construction specifications for riprap aprons (e.g. storm drain outlet protection) are based on the standards and specifications provided in the Manual for Erosion and Sediment Control in Georgia (2000 edition) and the City of Atlanta, Georgia, Stormwater Management Design Manual (1996 edition). During the design and construction of the riprap aprons, the latest editions shall be used. Refer to Appendix I, Figure I-6 for typical storm drain outlet protection details.

#### 6.5.2.1.1 Design Specifications for Storm Drain Outlet Protection

- A. Capacity: The capacity shall be designed for peak flow from the 25-year, 24-hour frequency storm, the storm specified in Title 12-7-1 of the Official Code of Georgia Annotated, or the design discharge of the runoff conveyance structure, whichever is greater.
- B. If the depth of the tailwater just below the pipe outlet is less than half the diameter of the pipe it shall be classified as a minimum tailwater condition. If the tailwater depth is greater than or equal to half the pipe diameter it shall be classified as a maximum tailwater condition. The apron length and thickness shall be designed for minimum or maximum tailwater conditions whichever is applicable.
- C. Minimum Width: If the pipe discharges directly into a well-defined channel, the apron shall extend across the channel bottom and up the channel banks one foot above the maximum tailwater depth or the top of the bank (whichever is less). If the pipe discharges into a flat area with no defined channel the width of the channel shall be determined as follows:
  1. The upstream end adjacent to the pipe shall have a width 3 times the diameter of the outlet pipe.
  2. The downstream end for minimum tailwater conditions shall have a width equal to the pipe diameter plus the length of the apron.
  3. The downstream end for maximum tailwater conditions shall have a width equal to the pipe diameter plus 0.4 times the length of the apron.
- D. Minimum Thickness: The maximum stone diameter ( $d_{max}$ ) shall be 1.5 times the median riprap diameter ( $d_{50}$ ). The apron thickness shall be 1.5 times the maximum stone diameter ( $d_{max}$ ) or 6 inches, whichever is greater.
- E. Geotextile shall be used as a separator between the graded stone, the soil base, and the abutments. The geotextile shall be specified in accordance with AASHTO M288-96 Section 7.5, *Permanent Erosion Control Recommendations*.

- F. The apron shall be lined with riprap, grouted riprap, or concrete. The gradation, quality and placement of riprap shall conform to the requirements described in the latest edition of the Manual for Erosion and Sediment Control in Georgia.

#### **6.5.2.1.2 Construction Specifications for Storm Drain Outlet Protection**

- A. The subgrade and riprap shall follow the required lines and grades shown in the construction plan prepared by an engineer licensed to practice in the State of Georgia.
- B. Geotextile shall be properly installed without damage and joints shall be overlapped a minimum of 1 foot.
- C. The apron shall be constructed on zero grade (0:0% grade) with no overfall at the end. If the pipe discharges into a well-defined channel, the side slopes of the channel shall not be steeper than 2:1.
- D. The apron shall be properly aligned with the receiving stream.
- E. All disturbed areas shall be stabilized with vegetation immediately after construction.
- F. The stone selected for riprap shall be from field stone or quarry stone that is hard, angular and highly weather-resistant.
- G. A filter of graded gravel layer or a synthetic filter cloth shall be used to prevent soil movement through the openings in the riprap.

#### **6.5.2.2 Grade Stabilization Structures**

The following design criteria and construction specifications for hydraulic weirs (e.g. grade stabilization structures) are based on the standards and specifications provided in the Manual for Erosion and Sediment Control in Georgia (2000 edition) and the City of Atlanta, Georgia, Stormwater Management Design Manual (1996 edition). During the design and construction of grade stabilization structures, the latest editions shall be used. Refer to Appendix I, Figure I-7 for typical grade stabilization structure (hydraulic weir) details.

##### **6.5.2.2.1 Design Specifications for Grade Stabilization Structures**

- A. Structures shall be designed to be constructed of concrete, rock, masonry, steel, aluminum or treated wood or by soil bioengineering methods. Appropriate geotextile shall be used under stabilization structures such as revetment mats and riprap. Refer to the latest edition of the Manual for Erosion and Sediment Control in Georgia, for the most economical structure selection.

- B. Capacity: Structures shall be designed to protect areas from overbank flow damage up to and including storm frequencies listed in Table 6-1 or the storm frequency specified in Title 12 of the Official Code of Georgia Annotated:

<b>Adjacent Area</b>	<b>Storm Frequency</b>
Residences, commercial buildings, recreation building, etc	100-year, 24-hour storm
Recreation and landscaped areas	25-year <sup>2</sup> , 24-hour storm <sup>1</sup>
Agricultural land	25-year <sup>2</sup> , 24-hour storm <sup>1</sup>

<sup>1</sup>50% of peak flood flow may be carried around island-type structures provided overbank flow damage from erosion and flooding can be tolerated. Peak flood flow shall be determined by methods described in the most recent edition of the Manual for Erosion and Sediment Control in Georgia.

<sup>2</sup> Or the storm frequency specified in Title 12 of the Official Code of Georgia Annotated.

Source: Georgia Soil and Water Conservation Commission. Manual for Erosion and Sediment Control in Georgia. 2000.

- C. Earthfill embankments shall have a minimum top width of 10 feet and side slopes of 3:1 or flatter.
- D. A keyway that is at least 8 feet wide and 2 feet deep shall be constructed along the centerline of the structure and embankment.
- E. All structures shall discharge into stable outlets.

#### **6.5.2.2.2 Construction Specifications for Grade Stabilization Structures**

- A. Excavations shall be dewatered prior to filling.
- B. Structures shall be placed on compacted earthfill in 6-8 inch horizontal lifts and compacted to approximately 95% of the standard density.
- C. The embankment shall be overbuilt 10% in height to allow for settlement.
- D. Embankment surfaces shall be completed to the required lines and grades.
- E. Protective cover shall be applied immediately after completion of the structure. For specifications refer to the *Disturbed Area Stabilization (with Permanent Vegetation)*, *Disturbed Area Stabilization (with Sodding)*, and *Erosion Control Matting and Blankets* sections in the latest edition of the Manual for Erosion and Sediment Control in Georgia.

#### **6.5.2.3 Check Dams**

The following design criteria and construction specifications for check dams are based on the standards and specifications provided in the Manual for Erosion and Sediment Control in Georgia (2000 edition) and the City of Atlanta, Georgia, Stormwater Management Design Manual (1996 edition). During the design and construction of the check dams, the latest editions shall be used. Refer to Appendix I, Figure I-8 for typical stone check dam details. This practice is applicable for use in small open channels and is not to be used in a live stream.

#### **6.5.2.3.1 Design Specifications for Check Dams**

- A. The contributing drainage area to a stone check dam shall not exceed two acres. The contributing drainage area to a haybale check dam shall not exceed 1 acre.
- B. Maximum dam height shall be limited to 2 feet measured to the center of the check dam. The center of the check dam shall be at least 9 inches lower than the outer edges.
- C. Side slopes shall be 2:1 or flatter.
- D. When two or more check dams are used in series the maximum spacing between dams shall be such that the toe of the upstream dam is at the same elevation as the top of the downstream dam.
- E. Suitable geotextiles shall be placed between the rock and its soil base and abutments. The geotextile shall be set into the subgrade soils without voids and extend five feet beyond the downstream toe of the dam.
- F. Material for check dams shall be limited to graded size 2-10 inch stone or haybales. The maximum design life for a haybale check dam is 3 months.

#### **6.5.2.3.2 Construction Specifications for Check Dams**

- A. Stone Check Dams: Stone for check dams shall be limited to graded size 2-10 inch. Stones shall be mechanically or hand placed to insure complete coverage of the entire width of the ditch or swale.
- B. Haybale Check Dams: Staked and embedded haybales may be used as temporary check dams in areas of concentrated flow while vegetation is becoming established. Haybales shall be embedded a minimum of 4 inches. The maximum design life for a haybale check dam is 3 months.

### **6.5.3 Vegetated Waterways**

The following design criteria and construction specifications for vegetated swales (e.g. vegetated waterways) are based on the standards and specifications provided in the Manual for Erosion and Sediment Control in Georgia (2000 edition) and the City of Atlanta, Georgia,

Stormwater Management Design Manual (1996 edition). During the design and construction of the vegetated swales, the latest editions shall be used. Refer to Appendix I, Figure I-9 for typical vegetated waterways (grass swales) details.

#### **6.5.3.1 Design Specifications for Vegetated Waterways**

- A. The minimum capacity shall be that required to convey the peak runoff expected from a 25-year, 24-hour storm or the storm specified in Title 12-7-1 of the Official Code of Georgia Annotated.
- B. The velocity of the flow expected from the design storm shall not exceed the permissible velocity for the type of vegetative lining used. The design velocity shall be well within the limits set forth in the latest edition of the Manual for Erosion and Sediment Control in Georgia.
- C. The cross section of the channel shall be designed at the depth required to keep the design water surface elevation within the channel and prevent overflow. The bottom width of the waterway shall not exceed 50 feet unless multiple or divided waterways are provided to control meandering of low flows within this limit.
- D. A stone center or lined channel shall be constructed when there is base flow.
- E. Suitable geotextile shall be used beneath the riprap of a stone center channel.
- F. The maximum ponding time for a vegetated shall be 24 hours.
- G. Vegetated swales shall be used in relatively level or gently sloping areas where the slope does not exceed 5 percent.
- H. A stable outlet that discharges in such a manner as not to cause erosion shall be provided for all vegetated swales.

#### **6.5.3.2 Construction Specifications for Vegetated Waterways**

- A. The waterway shall be excavated to line, grade, and cross section as required to meet site specific needs and shall be free of bank projections (trees, brush, stumps, obstructions, and other objectionable material).
- B. Applicable vegetative standards shall be followed. Erosion control blankets, matting or sod shall be used to aid in the establishment of vegetation. Grass species shall be limited to those recommended in Section 5.0 of this document and the latest edition of the Manual for Erosion and Sediment Control in Georgia.
- C. Mulching shall be used for all seeded or sprigged channels as described in the latest edition of the Manual for Erosion and Sediment Control in Georgia.

#### **6.5.4 Natural and Synthetic Linings**

The following design criteria and construction specifications for natural and synthetic linings are based on the standards and specifications provided in the Manual for Erosion and Sediment Control in Georgia (2000 edition) and the City of Atlanta, Georgia, Stormwater Management Design Manual (1996 edition). During the design and construction of the natural and synthetic linings, the latest editions shall be used.

##### **6.5.4.1 Design Specifications for Natural and Synthetic Linings**

- A. Materials for waterway standards shall be limited to grass/vegetative and associated linings.
- B. Channel linings shall be required for channels where velocities exceed safe velocities for vegetated lining due to increased grade or a change in channel cross section or where the vegetative lining is adversely affected by seasonal changes.
- C. Channels with slopes greater than 10% shall be lined.
- D. Linings may be rigid or flexible (riprap). Flexible linings or erosion resistant vegetation and rock riprap shall be used instead of rigid (concrete) linings whenever feasible.

##### **6.5.4.2 Construction Specifications for Natural and Synthetic Linings**

- A. In addition to state and local construction standards, individual manufacturer's product construction specifications shall be followed.
- B. Lining material shall extend a minimum of 1 foot from the top of the bank to ensure secure placement.
- C. Linings without impregnated seed shall be vegetated immediately after construction.

#### **6.5.5 Streambank Stabilization**

##### **6.5.5.1 Streambank Stabilization using Permanent Vegetation**

The following design criteria and construction specifications for vegetative streambank stabilization are based on the standards and specifications provided in the Manual for Erosion and Sediment Control in Georgia (2000 edition) and the City of Atlanta, Georgia, Stormwater Management Design Manual (1996 edition). During the design and construction of vegetative streambank stabilization, the latest editions shall be used. Refer to Appendix I, Figure I-10 through Figure I-16 for typical vegetative streambank stabilization (soft-engineering) details.

### 6.5.5.1.1 Design Specifications for Streambank Stabilization using Permanent Vegetation

- A. Vegetative stabilization is allowed on streambanks with a maximum slope of 3:1.
- B. Revegetation includes seeding and sodding of grasses, seeding in combination with erosion control fabrics, and the planting of woody vegetation (shrubs and trees).
- C. Live staking, joint planting, live fascine, brushmattress, live cribwall and branchpacking are acceptable revegetation techniques. Refer to Table 6-2 to select an appropriate planting technique. Table 6-3 lists relative costs and complexity for these methods.

<b>Erosional Problems</b>	<b>Streambank Protection Measures Ranked by Environmental Benefits</b>
General bank scour	<ol style="list-style-type: none"> <li>1. Brushmattress</li> <li>2. Live fascine</li> <li>3. Live staking</li> <li>4. Joint planting</li> </ol>
Toe erosion and upper bank failure	<ol style="list-style-type: none"> <li>1. Live cribwall</li> <li>2. Brushmattress with rock toe</li> <li>3. Joint planting</li> </ol>
Local streambank scour	<ol style="list-style-type: none"> <li>1. Branchpacking</li> <li>2. Live cribwall</li> <li>3. Live fascine with erosion control fabric</li> <li>4. Joint planting</li> </ol>
Overbank runoff	Intercept and divert runoff and repair damage with: <ol style="list-style-type: none"> <li>1. Branchpacking</li> <li>2. Live fascine</li> <li>3. Live staking with erosion control fabric</li> </ol>

Source: Georgia Soil and Water Conservation Commission. Guidelines for Streambank Restoration, 1994.

<b>Measure</b>	<b>Relative Cost</b>	<b>Relative Complexity</b>
Live Stake	Low	Simple
Joint Planting	Low*	Simple*
Live Fascine	Moderate	Moderate
Brushmattress	Moderate	Moderate to Complex
Live Cribwall	High	Complex
Branchpacking	Moderate	Moderate to Complex
Conventional Vegetation	Low to Moderate	Simple to Moderate

Conventional bank armoring (riprap)	Moderate to High	Moderate to Complex
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\* Assumes rock is in place

Source: Georgia Soil and Water Conservation Commission. Manual for Erosion and Sediment Control in Georgia. 2000.

- D. State and federal regulatory agencies shall be contacted to obtain permit(s) if required.
- E. Vegetative species shall be limited to those recommended in Section 5.0 of this document and the most recent edition of the Manual for Erosion and Sediment Control in Georgia.

#### **6.5.5.1.2 Construction Specifications for Streambank Stabilization using Permanent Vegetation**

- A. For planting specifications refer to the *Disturbed Area Stabilization (with Permanent Vegetation)*, *Disturbed Area Stabilization (with Sodding)*, and *Buffer Zone* sections in the latest edition of the Manual for Erosion and Sediment Control in Georgia.
- B. Jute mesh or other geotextiles shall be used to aid in soil stabilization and revegetation. For specifications refer to the *Erosion Control Matting and Blankets* section in the latest edition of the Manual for Erosion and Sediment Control in Georgia.

#### **6.5.5.2 Structural Streambank Stabilization**

The following design criteria and construction specifications for structural streambank stabilization are based on the standards and specifications provided in the Manual for Erosion and Sediment Control in Georgia (2000 edition) and the City of Atlanta, Georgia, Stormwater Management Design Manual (1996 edition). During the design and construction of structural streambank stabilization, the latest editions shall be used. Refer to Appendix I, Figure I-17 for typical structural streambank stabilization details.

##### **6.5.5.2.1 Design Specifications for Structural Streambank Stabilization**

- A. State and federal regulatory agencies shall be contacted to obtain permit(s) if required.
- B. Structural stabilization is allowed on streambanks with a maximum slope of 2:1.
- C. Riprap specifications shall be in accordance with the requirements described in the latest edition of the Manual for Erosion and Sediment Control in Georgia.
- D. Intersecting channels shall be stabilized upstream of the confluence with riprap for a minimum length equal to the bottom width of the channel.

### **6.5.5.2.2 Construction Specifications for Structural Streambank Stabilization**

- A. Where available, stones native to the site area shall be collected and used to accomplish structural stabilization provided that appropriate gradation of the stone, based on the City of Atlanta, Georgia, Stormwater Management Design Manual, and the Manual for Erosion and Sediment Control in Georgia, is achieved.
- B. Construction specifications from the manufacturer shall be followed (for gabion stabilization).
- C. When bedrock is encountered within the limits of the proposed toewall, the toewall shall begin on the bedrock.
- D. Grouted riprap shall be placed in layers approximately 18” thick as follows: grout layer placed on riprap a minimum of 6-inch thick, filter fabric and riprap as needed to maintain a minimum of 9-inch thickness of riprap and final layer of 9-inch riprap in wet grout. Hand placement of grouted riprap shall be required.

### **6.5.6 Disturbed Area Stabilization**

The following design criteria and construction specifications for temporary and permanent seeding of grasses are based on the standards and specifications provided in the Manual for Erosion and Sediment Control in Georgia (2000 edition). During the design and construction of the temporary and permanent seeding of grasses, the latest edition shall be used. Polyacrylamide (PAM) shall not be used within the Greenway System.

#### **6.5.6.1 Disturbed Area Stabilization (with Mulching only)**

##### **6.5.6.1.1 Design Specifications for Disturbed Area Stabilization (with Mulching only)**

- A. Mulch or temporary grassing shall be applied to all exposed areas within 14 days of disturbance.
- B. Mulch may be used as a singular erosion control device for up to six months. Permanent vegetation shall be used in areas requiring erosion control for more than six months. For permanent vegetation specifications, refer to the most recent edition of the Manual for Erosion and Sediment Control in Georgia.
- C. Dry straw, hay, wood waste, or polyethylene film may be used as mulch.

##### **6.5.6.1.2 Construction Specifications for Disturbed Area Stabilization (with Mulching only)**

- A. When mulch is used without seeding it shall be applied to provide full coverage of the exposed area.

- B. For the application specifications see the latest edition of the Manual for Erosion and Sediment Control in Georgia.
- C. Mulch materials shall be anchored immediately after applications.

#### **6.5.6.2 Disturbed Area Stabilization (with Temporary Seeding)**

##### **6.5.6.2.1 Design Specifications for Disturbed Area Stabilization (with Temporary Seeding)**

- A. Mulch or temporary grassing shall be applied to all exposed areas within 14 days of disturbance.
- B. Temporary seeding, instead of mulch, may be used for up to six months. Permanent vegetation shall be used in areas requiring erosion control for more than six months. For permanent vegetation specifications, refer to the most recent edition of the Manual for Erosion and Sediment Control in Georgia.
- C. To ensure long lasting erosion control, select a low maintenance plant from the species recommended in Section 5.0 of this document or the most recent edition of the Manual for Erosion and Sediment Control in Georgia.

##### **6.5.6.2.2 Construction Specifications for Disturbed Area Stabilization (with Temporary Seeding)**

- A. Excessive water run-off shall be controlled by suitable erosion control practices.
- B. Shaping and grading shall not be required in areas to be hand-seeded or where hydraulic seeding equipment is to be used.
- C. Seedbed preparation shall not be required when a hydraulic seeder is used. When using conventional planting the seedbeds shall be scarified in areas of smooth undisturbed cut slopes or where the soil has been sealed by rainfall.
- D. Fertilizer is not required on reasonably fertile soils.
- E. Seed selection, planting rates, and planting dates shall be as described in the most recent edition of the Manual for Erosion and Sediment Control in Georgia.
- F. If irrigation is necessary it shall be applied at a rate not causing runoff and erosion.

#### **6.5.6.3 Disturbed Area Stabilization (with Permanent Vegetation)**

The following design criteria and construction specifications for permanent vegetation are based on the standards and specifications provided in the Manual for Erosion and Sediment Control in Georgia (2000 edition). During the design and construction of the permanent

vegetation, the latest edition shall be used.

#### **6.5.6.3.1 Design Specifications for Disturbed Area Stabilization (with Permanent Vegetation)**

- A. Areas that are at final grade and require erosion control for longer than six months shall be stabilized with permanent vegetation.
- B. Permanent vegetation shall consist of planted trees, shrubs, perennial vines, or other perennial vegetation. Vegetative species shall be limited to those recommended in Section 5.0 of this document and the most recent edition of the Manual for Erosion and Sediment Control in Georgia.
- C. To ensure for long-lasting erosion control and low maintenance, native plants shall be used whenever possible.

#### **6.5.6.3.2 Construction Specifications for Disturbed Area Stabilization (with Permanent Vegetation)**

- A. To allow for safe and efficient operation of planting and maintenance equipment, areas to be planted shall be graded and shaped. Vertical banks shall be sloped to enable plant establishment.
- B. Excessive water run-off shall be controlled by suitable erosion control practices.
- C. Agricultural lime and fertilizer shall be applied as indicated by soil tests.
- D. Seedbeds shall be prepared by tillage for broadcast planting and by excavating holes or furrows for individual plantings.
- E. Vegetative species shall be limited to those recommended in Section 5.0 of this document and the most recent edition of the Manual for Erosion and Sediment Control in Georgia.
- F. All legume seed shall be inoculated with appropriate nitrogen-fixing bacteria.
- G. Mulch is required for all permanent vegetation applications. See the latest edition of the Manual for Erosion and Sediment Control in Georgia for appropriate mulch materials and specifications for applying and anchoring mulch.
- H. Irrigation shall be applied at a rate not causing runoff and erosion.

#### **6.5.6.4 Disturbed Area Stabilization (with Sodding)**

##### **6.5.6.4.1 Design Specifications for Disturbed Area Stabilization (with Sodding)**

- A. Areas that require immediate vegetative cover, drop inlets, grass swales, and waterways with intermittent flow shall be stabilized with the application of sod.
- B. Refer to the latest edition of the Manual for Erosion and Sediment Control in Georgia for sod selection and planting requirements.

#### **6.5.6.4.2 Construction Specifications for Disturbed Area Stabilization (with Sodding)**

- A. The soil surface shall be brought to final grade and cleared of trash, woody debris, stones, and large dirt clods.
- B. Fertilizer and lime shall be applied based on soil tests results.
- C. Sod shall be laid in tight, staggered joints in straight lines.
- D. On slopes steeper than 3:1 the sod shall be anchored with pins or other approved methods.
- E. The sod shall be irrigated to a depth of 4” immediately after installation and for 2-3 week thereafter.

#### **6.5.7 Bioengineering Techniques**

The design criteria and construction specifications for bioengineering techniques shall conform to the specifications for streambank stabilization as outlined in Article 6.5.5.1 of this document and the most recent edition of the Manual for Erosion and Sediment Control in Georgia.

##### **6.5.7.1 Design Specifications for Bioengineering Techniques**

- A. Vegetative species shall be limited to those recommended in Section 5.0 of this document and the most recent edition of the Manual for Erosion and Sediment Control in Georgia.
- B. Recommended techniques include; live staking, joint planting, live fascine, brushmattressing, live cribwalls, and branchpacking. Refer to Table 6.2 for guidance in selecting appropriate protection measures and Table 6.3 to compare cost and complexity of various techniques.
- C. Channel bottoms and slopes shall be stable before stabilizing banks.
- D. Planting techniques shall be varied to accommodate water levels during multiple storm events.

- E. Specific standards vary for each technique and appropriate standards shall be used for design.

#### **6.5.7.2 Construction Specifications for Bioengineering Techniques**

- A. Construction shall be limited to the dormant season for the plant materials.
- B. All plant materials and cuttings shall be from native species.
- C. Cuttings shall be fresh and live.
- D. Flow may need diverting during construction of some bioengineering techniques.
- E. Specific standards vary for each technique and appropriate standards and materials shall be used for construction.

#### **6.6 SELECTED REFERENCES**

- A. Atlanta, Georgia. Stormwater Management Design Manual. 1996.
- B. Charlotte and Mecklenburg County, North Carolina. City of Charlotte and Mecklenburg County Land Development Standards. 1995.
- C. Charlotte and Mecklenburg County, North Carolina. Charlotte Mecklenburg County Storm Water Design Manual. 1993.
- D. Georgia. Soil and Water Conservation Commission. Manual for Erosion and Sediment Control in Georgia. 2000.
- E. Georgia. Soil and Water Conservation Commission. Guidelines for Streambank Restoration. 1994.
- F. North Carolina. Department of Environment, Health and Natural Resources. Division of Environmental Management. Water Quality Section. Storm Water Best Management Practices. 1995.
- G. North Carolina. Department of Environment, Health and Natural Resources. North Carolina Erosion and Sediment Control Planning and Design Manual. 1988.
- H. Rosgen, Dave. Applied River Morphology. Pagosa Springs, 1996.
- I. Schueler, Tom. Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs. Washington: Metropolitan Washington Council of Governments, 1987.
- J. Schueler, Tom. Design of Stormwater Wetland Systems: Guidelines for Creating

Diverse and Effective Stormwater Wetland Systems in the Mid-Atlantic Region.  
Washington: Metropolitan Washington Council of Governments, 1992.

- K. United States. USDA Soil Conservation Service. "Urban Hydrology for Small Watersheds. Technical Release 55". 1986.

## **7.0 PUBLIC ACCESS FACILITIES**

### **7.1 OVERVIEW**

Public access projects allowing public access to the streams protected through the Greenway Acquisition Project will encourage environmental education as well as community enjoyment and appreciation of the Greenway System. The focus of the Greenway Acquisition Project is on the preservation of land for the purpose of improving water quality, and none of the financial resources available for this project can be used to implement public access projects. The Consent Decree requires that the Greenway Acquisition Plan contain “assurance that no more than ten (10%) percent of the area of Greenway Properties acquired may be developed for public access or use, such as bicycle and hiking paths;” (Section VIII.D.2.j.iv). Public access facilities located within the Greenway System shall be designed and constructed with non-point source pollution prevention as a primary consideration. Location and construction of such facilities shall be subject to the approval of EPA/EPD.

For purposes of the above mentioned 10% limitation, public access or use shall include planned public access facilities such as trails, parks, canoe/boat launches, and utility maintenance access facilities. Pedestrian pathways which constitute incidental egress, ingress, or access to utility rights-of-way, public access facilities, or other Greenway Properties will not be included in the 10% limitation provided that such incidental use does not cause or add to non-point source pollution. In the event that such incidental use causes or adds to non-point source pollution, then the non-point source pollution resulting from such incidental use must be rectified by the City by either modifying the incidental use to comply with the Consent Decree and this Greenway Acquisition Plan, or by eliminating the incidental use. Although utility rights-of-way per se will not be included in the land area subject to the 10% limitation, the provisions of Article VIII.D.2.m of the Consent Decree regarding the prevention of non-point source pollution as well as the provisions of Section 11.0 of this document, shall apply to all portions of any utility right-of-way situated on Greenway Property.

The calculation of the land area subject to the 10% limitation shall be determined on a case-by-case basis by the EPA, the EPD, and the City with recommendations from other responsible local governments or agencies.

This section is intended to serve as a guide to those who may choose to pursue public access projects on Greenway properties using alternative sources of funding. Other types of public access projects not discussed in this section may be developed as long as they are designed and constructed in accordance with the design and construction guidelines established in Section 8.0 of this document.

The City does not propose to construct any public access projects utilizing the financial resources allocated to this project. Site-specific facility locations will be determined as project sponsors emerge. Other local agencies may wish to construct trails or canoe launches on Greenway property. The City may allow such construction, subject to

suitable case-by-case agreement. In all cases, such public access facilities will follow all the requirements of the Consent Decree and of this document, particularly the design and construction guidelines outlined in Section 8.0. Furthermore, the City will ensure that all facilities (including those implemented by other agencies) comply with the overall 10% limitation on public access. The City will closely monitor public access proposals prior to construction to ensure that the 10% limit imposed in the Consent Decree is not exceeded.

Appendix J presents maps showing existing, proposed, and conceptual public access facilities. These maps have been systematically prepared, drawing on information collected during the Assessment Phase of this project. Public access facilities include trails, canoe and boat launches, parks, outdoor classrooms, and general stream access sites. Issues surrounding the provision of public access have been largely addressed in other sections of this document. Section 8.0 outlines appropriate facility layouts and design. Section 11.0 outlines appropriate uses; user rules and regulations; health, safety and security issues; and facility maintenance.

The maps presented in Appendix J will provide guidance and, if followed, will help ensure a comprehensive system of trails, canoe and boat launches, and stream access sites for the citizens of the Greenway Acquisition Project area. Implementation of individual public access projects will be the responsibility of local communities since the funding available for the Greenway Acquisition Project cannot be used for public access projects. The public access points and trail systems shown in Appendix J are not the only feasible locations. More detailed studies of individual projects may reveal other opportunities, and the conceptual plans should be refined prior to construction of facilities.

As previously mentioned, the maps in Appendix J include public access projects which are in existence or planned, as well as conceptual projects identified through the scope of the Greenway Acquisition Project. The maps provide an overall view of public access sites within a prioritized stream corridor. Documentation and descriptions of public access sites are limited to those facilities that fall within 500 feet of the prioritized stream segments. The streams and public access facilities are overlaid on USGS 7.5 Minute Series Topographic maps. The age of the topographic maps vary from 1964 to 1993.

## **7.2 CRITERIA USED TO DEVELOP THE PUBLIC ACCESS MAPS**

The following criteria were considered during the development of the public access maps presented in Appendix J.

- A. An attempt was made to consider the entire stream corridor when identifying concepts within prioritized stream segments in order to provide linkages or complements to other public access facilities.
- B. The desired locations are approximate; actual parcels acquired will depend on owner cooperation and final facility design.
- C. Areas with existing public access, whether formal or informal, are included.

- D. Roadway access to the rivers and creeks is critical to the provision of public access. Existing creek and river crossings were given particular attention.
- E. The public access maps identify potential stream access points such as parks, outdoor classroom locations, canoe and boat access points, and general hiking trails. The maps do not suggest the exact type of facility, such as a multi-use trail, that should be developed.
- F. No priorities have been assigned to public access areas, although the acquisition priorities have been superimposed on the access maps. Since public access facilities may be implemented by local jurisdictions, user groups or neighborhood organizations may establish public access facilities outside prioritized sections.

### **7.3 INDEX OF EXISTING, PROPOSED, AND CONCEPTUAL PUBLIC ACCESS FACILITIES**

The following descriptions of existing, proposed, and conceptual public access facilities are intended to guide others as they develop their public access plans. More detailed site assessment should be performed prior to developing these facilities so that they can be implemented in an environmentally friendly manner as outlined in Section 8.0 of this document. None of the \$25 million set aside for the Greenway Acquisition Project can be used to develop public access facilities.

#### **7.3.1 Chattahoochee River Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-1 through J-2 in Appendix J)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of the Chattahoochee River, identified on Maps J-1 through J-2 of Appendix J.
  1. The City has proposed an extension of the Chattahoochee River National Recreation Area (NRA). This proposed Chattahoochee River Regional Park would begin at the NRA and continue south into Fulton County, ending at the Fulton County Airport and would be located, in part, within a Priority 1 stream segment.
  2. The proposed Chattahoochee River Trail would be contained within the proposed Chattahoochee River Regional Park which would be located, in part, within a Priority 1 stream segment. The City plans for the trail to extend from the NRA to the Fulton County Airport and Six Flags Amusement Park across the river. An extension of the trail south to Camp Creek Parkway in Fulton County may be considered.
  3. A canoe/boat launch proposed by the City would be located within the Standing Peachtree Park property that is located within a Priority 1 stream segment.

4. The area informally known by residents as Standing Peachtree Park is not a designated park. This land is owned by the City of Atlanta Water Department and no public recreation is allowed at this time. It is located within a Priority 1 stream segment.
5. The March to the Sea Bicycle Route is proposed by the Georgia Department of Transportation (GDOT) as an on-road bicycle route. This statewide bicycle route travels along Atlanta Road as it crosses the river just below a Priority 1 stream segment. There are no planned improvements for this statewide route; however, GDOT is implementing procedures that will allow future road and bridge designs to accommodate bicyclists and pedestrians.
6. The Chattahoochee Trace Bicycle Route is a statewide route proposed by GDOT that crosses a Priority 3 stream segment. The route travels along Georgia Highway 16/US Highway 27A as it crosses the river and connects Newnan with Carrolton. There are no planned improvements for this statewide route; however, GDOT is implementing procedures that will allow future road and bridge designs to accommodate bicyclists and pedestrians.
7. An existing boat/canoe launch lies within a Priority 3 stream segment along Georgia Highway 16/US Highway 27A in Coweta County.
8. A conceptual park location has been identified within a Priority 3 stream segment just across the river from the launch site, described in Item 7 above, and along GA Highway 16/US Highway 27A, which is also along the proposed Chattahoochee Trace Bike Route. This conceptual park could provide an additional access point in the vicinity of the existing boat/canoe launch site and an additional recreational amenity along the proposed bike route.

**7.3.2 Nancy Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-3 through J-6 in Appendix J)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Nancy Creek, identified on Maps J-3 through J-6 of Appendix J.
  1. The Perimeter Trail is proposed by the PATH Foundation and Dekalb County. The Perimeter Trail would connect with the proposed Dunwoody Trail, as well as several parks, shopping centers, and a MARTA station. The Trail is located adjacent to Priority 1 and Priority 3 stream segments.
  2. Murphy Candler Park is an existing Dekalb County park located on West Nancy Creek Drive, adjacent to a Priority 1 stream segment.

3. The City has planned the North Atlanta Trail along the Georgia 400 corridor from Perimeter Center to the Lindbergh Plaza MARTA station. This planned trail crosses a Priority 2 stream segment.
4. The City has proposed a stream corridor greenway along Nancy Creek. Nancy Creek contains Priority 1, 2, and 3 segments.
5. A proposed bicycle route along Northside Drive is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 2 stream segment.
6. The City has proposed a Northwest Atlanta Greenway Trail. This trail is intended to extend from Atlanta Memorial Park to the Chattahoochee River at Northside Parkway and will cross a Nancy Creek Priority 2 stream segment near Northside Parkway.
7. A proposed bicycle route along Northside Parkway is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 2 stream segment.
8. A proposed bicycle route crossing a Priority 1 stream segment on West Paces Ferry Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project.
9. A proposed bicycle route along West Wesley Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 1 stream segment.

### **7.3.3 Peachtree Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-7 through J-14)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Peachtree Creek, identified on Maps J-7 through J-14 of Appendix J.
  1. The North Fork Peachtree Creek Trail is proposed by DeKalb County and the PATH Foundation. This trail would begin at Mercer University, connect with Doraville and the Henderson Mill area, and follow the stream corridor to connect with the proposed Peachtree Creek Greenway in Atlanta (see Item 2 below). The proposed location runs adjacent to Priority 2 and 3 stream segments.
  2. The City proposes a Peachtree Creek Greenway along the stream corridor within the city limits. The corridor within the city limits includes five Priority 1 stream segments.

3. A proposed bicycle route along Peachtree Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 5-year project. It would cross a Priority 1 stream segment.
4. Atlanta Memorial Park is an existing City regional park located between two Priority 1 stream segments.
5. The City has planned a Fort Peachtree Greenway Trail which would connect Atlanta Memorial Park with Fort Peachtree on the Chattahoochee River. The trail would lie within the proposed Peachtree Creek Greenway along the stream corridor. It is adjacent to two Priority 1 stream segments.
6. A proposed bicycle route is included in the Atlanta Commuter On-Street Bike Plan along Howell Mill Road. The route is considered a 5-year project. It would cross a Priority 1 stream segment.
7. A proposed bicycle route is included in the Atlanta Commuter On-Street Bike Plan along Moores Mill Road. The route is considered a 5-year project. It would cross a Priority 1 stream segment.
8. A proposed bicycle route is included in the Atlanta Commuter On-Street Bike Plan along Ridgewood Road. The route is considered a 15-year project. It would cross a Priority 1 stream segment.
9. The area informally known by residents as Standing Peachtree Park is not a designated park. This land is owned by the City Water Department and no public recreation is allowed at this time. It is adjacent to two Priority 1 stream segments on Peachtree Creek as well as a Priority 1 segment on the Chattahoochee River.
10. The City has proposed an extension of the Chattahoochee River National Recreation Area (NRA). This proposed Chattahoochee River Regional Park would begin at the NRA and continue south into Fulton County, ending at the Fulton County Airport would be located, in part, within a Priority 1 stream segment.
11. The Stone Mountain Trail is not within 500 feet of Peachtree Creek; however, it appears on the map and is relevant because it is an existing trail that is widely used. DeKalb County has plans to restructure the trail so that it is entirely off-road. It runs parallel (but not adjacent to) a Priority 1 stream segment.
12. The Northlake Trail is proposed by DeKalb County and the PATH Foundation. This trail would connect the proposed North Fork Peachtree Creek Trail with the Stone Mountain Trail and would cross a Priority 1 stream segment.

13. The South Peachtree Creek Trail would connect Lenox Road at the county line with North Dekalb Mall. This Dekalb County/PATH proposed trail would run along Priority 1, 2, and 3 stream segments, passing through Emory University and connecting several parks.
14. Medlock Park is an existing Dekalb County park and is adjacent to a Priority 2 stream segment.
15. Daniel Johnson Nature Preserve is an existing City park and is located adjacent to a Priority 3 stream segment.
16. A proposed bicycle route along Lenox Road is included in the Atlanta Commuter On-Street Bike Plan and would cross a Priority 1 stream segment. The route is considered a 5-year project.

**7.3.4 Clear Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-15)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Clear Creek, identified on Map J-15 of Appendix J.
  1. The City's proposed Piedmont Trail would extend from Dekalb Avenue to Interstate 85. This trail would connect Freedom Park with Piedmont Park and the Atlanta-Stone Mountain Greenway Trail and would cross near the beginning of a Priority 1 stream segment.
  2. The North Atlanta Trail is planned along the Georgia 400 corridor from Perimeter Center to the Lindbergh Plaza MARTA station. This trail would provide North Atlanta residents with connectivity to the other trails throughout middle and southern Atlanta as well as to the MARTA system and would cross the beginning of a Priority 1 stream segment.
  3. The City proposes a Clear Creek Greenway along the stream corridor, part of which is a Priority 1 stream segment.
  4. Brookwood Hills Community Club is a members-only recreation facility within 500 feet of a Priority 1 stream segment.

**7.3.5 Nickajack Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-16 through J-17)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Nickajack Creek, identified on Maps J-16 through J-17 of Appendix J.

1. The Silver Comet Trail crosses the creek just downstream from a Priority 2 stream segment. This PATH Foundation trail is planned to extend from Cobb County to Paulding and Polk counties and eventually into Alabama. Although the trail is not completed, this portion of the Silver Comet Trail shown on the map is complete and utilized by many residents.
2. Cobb County has proposed a Nickajack Creek Greenway along the stream corridor beginning at the Silver Comet Trail and extending to the confluence with the Chattahoochee River. There is a Priority 2 and a Priority 3 stream segments within this corridor area.
3. Nickajack Park is an existing Cobb County park located in Mableton. It is located adjacent to a Priority 3 stream segment.

**7.3.6 Proctor Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-18 through J-19)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Proctor Creek, identified on Maps J-18 through J-19 of Appendix J.
  1. The City proposes a Proctor Creek Greenway along the stream corridor. There are two Priority 1 stream segments on the creek.
  2. Grove Park is an existing City community park. It is located adjacent to a Priority 1 stream segment.
  3. A proposed bicycle route along Marietta Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 1 stream segment.
  4. Gun Club Park is an existing City community park located adjacent to a Priority 1 stream segment.
  5. The City's proposed Hollywood Trail would extend from the Hightower MARTA station to the proposed Chattahoochee River Regional Park and would cross a Priority 1 stream segment.
  6. A proposed bicycle route along Hightower Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 5-year project. It would cross a Priority 1 stream segment.
  7. Lincoln Homes Park is an existing City park that is located adjacent to a Priority 1 stream segment.
  8. A proposed bicycle route along Bolton Road is included in the Atlanta

Commuter On-Street Bike Plan. The route is considered a 5-year project on the north side of the stream and a 15-year project on the south side of the stream. It would cross a Priority 1 stream segment.

9. The City has proposed an extension of the Chattahoochee River National Recreation Area (NRA). This proposed Chattahoochee River Regional Park would begin at the NRA and continue south into Fulton County, ending at the Fulton County Airport. It would cross a Priority 1 stream segment.

### **7.3.7 Sandy Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-20)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Sandy Creek, identified on Map J-20 of Appendix J.
  1. A proposed bicycle route along Skipper Drive is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 2 stream segment.
  2. A conceptual trail has been identified beginning behind Harper High School and continuing to Campbellton-Redwine Road at the airport. With three elementary schools and the high school in the vicinity, there is great environmental education potential. In addition, Collier Drive Park is located behind Harper High School, and the trail could potentially connect with the public access concepts as described in Item 3 below. This conceptual trail is located along a Priority 2 stream segment.
  3. A conceptual outdoor classroom has been identified across the highway from Harwell Elementary. There is a large parcel at this site with access from the school on Collier Road. This site would offer education opportunities and connectivity to the conceptual trail described in Item 2 above. This conceptual outdoor classroom is located adjacent to a Priority 2 stream segment.
  4. A conceptual park has been identified near the Fulton County Airport within a large parcel on the northern bank of the stream. In conjunction with the other potential and proposed access facilities, a park would complete the network of facilities along Sandy Creek. A park is also a compatible land use for land adjacent to an airport. This conceptual park location is adjacent to a Priority 2 stream segment.

### **7.3.8 Utoy Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-21 through J-25)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Utoy Creek, identified on Maps J-21 through J-25 of Appendix J.
1. The City has proposed a Utoy Creek Greenway along the stream corridor. There are Priority 1 and Priority 2 stream segments located on the creek.
  2. The Lionel Hampton Greenway Trail is a City trail planned to extend from Greenbriar Mall to the Hightower MARTA station. The segment of the trail from Martin Luther King Jr. Boulevard to Benjamin E. Mays Road is already complete. The remaining proposed trail will connect with the Cascade Nature Preserve on the south fork of Utoy Creek. This crosses a Priority 1 stream segment.
  3. A proposed bicycle route along Peyton Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 1 stream segment.
  4. A proposed bicycle route along Lynhurst Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 1 stream segment.
  5. A proposed bicycle route along Benjamin E. Mays Drive is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 1 stream segment.
  6. A proposed bicycle route along Fairburn Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross both the north and south forks of Utoy Creek and a Priority 1 stream segment.
  7. A proposed bicycle route along Delowe Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 1 stream segment.
  8. A proposed bicycle route along Campbellton Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 1 stream segment.
  9. A proposed bicycle route along Dodson Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 1-year project. It would cross a Priority 1 stream segment.

10. The Lionel Hampton Greenway Trail is a City trail planned to extend from Greenbriar Mall to the Hightower MARTA station. The trail is complete between Martin Luther King Jr. Boulevard and Benjamin E. Mays Road. This section of the proposed trail shown on the map will cross the south fork of Utoy Creek in between two Priority 1 segments.

### **7.3.9 Sweetwater Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-26)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Sweetwater Creek, identified on Map J-26 of Appendix J.
  1. Legion Park is an existing City of Austell community park and is adjacent to a Priority 1 stream segment.
  2. A conceptual canoe launch/boat ramp has been identified at Legion Park. Informal access was noted during field assessments that could be formalized to meet the desire for recreation opportunities. This conceptual canoe launch/boat ramp is located within a Priority 1 stream segment.
  3. A conceptual trail has been identified between Legion Park and Old Alabama Road. The trail would complete the public access system by providing connectivity with the existing park and the conceptual canoe/boat access points. This conceptual trail would be located along a Priority 1 stream segment.
  4. A conceptual canoe launch/boat ramp has been identified at Old Alabama Road. This conceptual facility would be located on a Priority 1 stream segment.

### **7.3.10 Camp Creek West Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-27)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Camp Creek West, identified on Map J-27 of Appendix J.
  1. The Brady Recreation Center is an existing College Park recreational facility located adjacent to a Priority 1 stream segment.
  2. The City of College Park has proposed a multi-use trail which includes stretches along Fairway Drive and through the Brady Recreation Center. This would cross a Priority 1 stream segment.

### **7.3.11 Deep Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-28)**

- A. The following is a description of a public access facility located within 500 feet of prioritized stream segments of Deep Creek, identified on Map J-28 of Appendix J.
  - 1. A conceptual trail has been identified beginning at the closed wastewater treatment plant on Lower Dixie Lake Road to the High Point Road crossing. There is future potential for the trail to be extended to link with a proposed trail (not shown on map) around the furthestmost upstream lake and the Dixie Lakes Park. This conceptual trail is located along a Priority 3 stream segment.

### **7.3.12 Anneewakee Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-29)**

- A. The following is a description of a public access facility located within 500 feet of prioritized stream segments of Anneewakee Creek, identified on Map J-29 of Appendix J.
  - 1. A conceptual trail has been identified from Bomar Road to Anneewakee Road, with the potential to connect with an existing conservation subdivision. Informal access was noted during field assessments that could be formalized to meet the desire for recreation opportunities. Anneewakee Creek is lacking in public access facilities, and there are indications of rapid residential development in this area that would merit more recreation opportunities. This conceptual trail is located along a Priority 1 stream segment.

### **7.3.13 Bear Creek East Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-30 through J-31)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Bear Creek East, identified on Maps J-30 through J-31 of Appendix J.
  - 1. A conceptual trail has been identified behind the Bear Creek Middle School. This trail could provide education potential for both the middle school and the Creekside High School in the area. In the future, the trail could be extended to provide connectivity to Cochran Mill Park and the proposed Bear Creek Nature Preserve and Greenway. This conceptual trail is located along a Priority 1 stream segment.
  - 2. The Cochran Mill Extension Greenway is a linear greenway proposed by the Atlanta Regional Commission (ARC) adjacent to a Priority 2 stream segment. This greenway would provide connectivity between Cochran

Mill Park and the proposed Bear Creek Nature Preserve at the confluence with the Chattahoochee River.

3. The ARC has proposed that the Bear Creek Nature Preserve be located at the confluence of Bear Creek and the Chattahoochee River. It is just outside of a Priority 1 stream segment, but the Preserve is mentioned because of its connectivity potential. The Preserve, combined with the Cochran Mill Greenway, would serve as an extension to the existing Cochran Mill Park.

#### **7.3.14 Bear Creek West Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-32 through J-33)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Bear Creek West, identified on Maps J-32 through J-33 of Appendix J.
  1. A conceptual outdoor classroom location has been identified downstream of Kings Highway on the west side of the streambank, adjacent to a Priority 3 stream segment. Environmental education potential exists due to the sites proximity to Kings Way School.
  2. The ARC has proposed a greenway at the confluence of Bear Creek and the Chattahoochee River, adjacent to a Priority 3 stream segment.

#### **7.3.15 Dog River Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-34 through J-35)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Dog River, identified on Maps J-34 through J-35 of Appendix J.
  1. A conceptual trail has been identified from Liberty Road to North Helton Road, with a possible extension to the end of a Priority 1 stream segment. Informal access at North Helton Road, noted during field assessments, could be formalized to meet the desire for recreation opportunities. There are indications of rapid residential development in this area that would merit more recreation opportunities.
  2. A conceptual trail has been identified from Bankhead Highway to the end of a Priority 2 stream segment, with a possible extension as the residential development expands. There is a historical mill site in this area and an existing subdivision which is planned for expansion. Another possible trail extension could extend from Bankhead Highway to the Dog River Reservoir. Informal access at Bankhead Highway was noted during field assessments and a utility right-of-way also exists at Bankhead Highway at

the beginning of the potential trail.

#### **7.3.16 Wolf Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-36)**

- A. The following is a description of a public access facility located within 500 feet of prioritized stream segments of Wolf Creek, identified on Map J-36 of Appendix J.
1. A conceptual park has been identified approximately one mile northeast of Hutcheson Ferry Road, along a Priority 1 stream segment. Informal access was noted during field assessments that could be formalized to meet the desire for recreation opportunities. There are a swimming pond and small waterfalls in the area. Although there is no formal road for access, there is a dirt road used by the timber company and citizens to gain access to the creek.

#### **7.3.17 Snake Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-37)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Snake Creek, identified on Map J-37 of Appendix J.
1. A conceptual canoe launch/boat ramp has been identified at Banning Mill Road within a Priority 3 segment. There is evidence of tubing and other informal recreation occurring in this area.
  2. A conceptual trail has been identified between Banning Mill Road and Jones Mill Road along a Priority 3 stream segment. The trail could complete a public access facility system by providing connectivity with the conceptual park and the conceptual canoe/boat access points (see descriptions in Items 1, 3, and 4).
  3. A conceptual canoe launch/boat ramp has been identified at Jones Mill Road between Priority 1 and Priority 3 stream segments.
  4. A conceptual park has been identified at a Jones Mill Road location between Priority 1 and Priority 3 stream segments. There is an existing site informally used for swimming, and the potential park location is at the end of the canoe run described in items 1 and 3 above.

#### **7.3.18 Cedar Creek Existing, Proposed, and Conceptual Public Access Facilities**

- A. There were no existing, proposed, or conceptual public access facilities identified within 500 feet of prioritized stream segments on Cedar Creek.

### **7.3.19 Wahoo Creek Existing, Proposed, and Conceptual Public Access Facilities**

- A. There were no existing, proposed, or conceptual public access facilities identified within 500 feet of prioritized stream segments on Wahoo Creek.

### **7.3.20 Centralhatchee Creek Existing, Proposed, and Conceptual Public Access Facilities**

- A. There were no existing, proposed, or conceptual public access facilities identified within 500 feet of prioritized stream segments on Centralhatchee Creek.

### **7.3.21 South River Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-38 through J-43)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of the South River, identified on Maps J-38 through J-43 of Appendix J.
  1. The City's proposed Southtowne Greenway Trail is planned to begin at Atlanta Metropolitan College and Atlanta Vocational Tech and end at Southside Industrial Park. The trail will pass through three parks, including Lakewood Park, and is adjacent to a Priority 1 stream segment.
  2. Joyland Park is an existing City neighborhood park located on a Priority 1 stream segment.
  3. A proposed bicycle route along Pryor Circle is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 1 stream segment.
  4. Perkerson Park is an existing City community park adjacent to a Priority 2 stream segment.
  5. The City proposes a South River Greenway along the stream corridor, which would encompass several Priority 1 and one Priority 2 stream segments.
  6. A proposed bicycle route along Macon Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 5-year project. It would cross a Priority 1 stream segment.
  7. A conceptual park has been identified on the South River headwaters near the confluence with the headwaters tributaries and adjacent to Bromack Road on the south side. This is within a Priority 1 stream segment. One large parcel exists on both sides of the river which, if developed as a park, would provide connectivity with the proposed South River Greenway and Southtowne Greenway Trail. There are also two schools within a mile of

this property.

8. A bicycle route along Browns Mill Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 5-year project. It would cross a Priority 1 stream segment.
9. A proposed bicycle route along Jonesboro Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 15-year project. It would cross a Priority 1 stream segment.
10. A proposed bicycle route along Forest Park Road is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 5-year project. It would cross a Priority 1 stream segment.
11. A conceptual trail has been identified to link Fulton County's proposed South River Greenway with Dekalb County's proposed South River Trail. The South River Trail within Dekalb County would end just west of Intrenchment Creek, so there is potential for a trail to connect with and extend the South River Trail to the county line, linking with the Fulton County South River Greenway. The location is along a Priority 1 stream segment.
12. Dekalb County and PATH have proposed a South River Trail along the South River corridor throughout most of Dekalb County, as well as spur trails off of this main corridor. The trail would begin on the South River just west of Intrenchment Creek and continue along the corridor to Rockdale County. The trail will also continue north along Intrenchment Creek and link with the City's Intrenchment Creek trail in Fulton County. This corridor area encompasses Priority 1 and Priority 2 stream segments.
13. The South River is lacking in formal access points for canoeing or boating. A conceptual canoe launch/boat ramp location has been identified at Panthersville Road near Dekalb Community College's South Campus on a Priority 1 stream segment. This and all other access points within Dekalb County would provide connectivity with the proposed South River Trail. Take-out sites could be located as described in Items 14, 16, and 17 below.
14. A conceptual canoe launch/boat ramp has been identified at Waldrop Road on a Priority 1 stream segment.
15. The Dekalb County Parks Department owns property, which is not a formal park, on a Priority 2 stream segment.
16. A conceptual canoe launch/boat ramp has been identified at Flakes Mill Road, within the Dekalb County Parks Department property referenced in

Item 15 above, on a Priority 2 stream segment.

17. A conceptual canoe launch/boat ramp has been identified at Panola Shoals Road on a Priority 1 stream segment.
18. A conceptual park has been identified at the Panola Shoals mining area. This is an aesthetically pleasing area where informal river access was noted during field assessments. Panola Shoals is a visible and accessible area that could provide a formalized recreation opportunity in conjunction with the potential take-out and the proposed South River Trail described in items 12 and 17. This is within a Priority 1 stream segment.
19. Miners Creek Park is an existing Dekalb County park property located in the Panola Shoals area adjacent to a Priority 1 stream segment.

### **7.3.22 Intrenchment Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-44 through J-45)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Intrenchment Creek, identified on Maps J-44 through J-45 of Appendix J.
  1. The City has proposed an Intrenchment Creek Trail along the stream corridor within the city limits. This encompasses a Priority 1 stream segment.
  2. A proposed bicycle route along Woodland Avenue is included in the Atlanta Commuter On-Street Bike Plan. The route is considered a 5-year project. It would cross a Priority 1 stream segment.
  3. Dekalb County and PATH have plans for the South River Trail to continue along the Intrenchment corridor to connect with the Intrenchment Creek trail from Atlanta adjacent to Priority 1 and Priority 2 stream segments.

### **7.3.23 Sugar Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-46)**

- A. The following is a description of a public access facility located within 500 feet of prioritized stream segments of Sugar Creek, identified on Map J-46 of Appendix J.
  1. Longdale Park is an existing Dekalb County park adjacent to a Priority 2 stream segment.

#### **7.3.24 Doolittle Creek Existing, Proposed, and Conceptual Public Access Facilities**

- A. There were no existing, proposed, or conceptual public access facilities identified within 500 feet of prioritized stream segments on Doolittle Creek.

#### **7.3.25 Conley Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-47)**

- A. The following is a description of a public access facility located within 500 feet of prioritized stream segments of Conley Creek, identified on Map J-47 of Appendix J.
  - 1. Clayton County and the ARC have proposed a system of pedestrian and multi-use trails throughout Clayton County. One of these unnamed pedestrian walkways would cross a Priority 2 stream segment near Rock Cut Road.

#### **7.3.26 Cobbs Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-48)**

- A. The following is a description of a public access facility located within 500 feet of prioritized stream segments of Cobbs Creek, identified on Map J-48 of Appendix J.
  - 1. Meadowdale Park is an existing Dekalb County park adjacent to a Priority 3 stream segment.

#### **7.3.27 Snapfinger Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-49 through J-52)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Snapfinger Creek, identified on Maps J-49 through J-52 of Appendix J.
  - 1. The Snapfinger Trail is proposed by the PATH Foundation and Dekalb County. This trail will follow the Snapfinger Creek corridor from the Stone Mountain Trail to the South River Trail along Priority 2 and Priority 3 stream segments.
  - 2. A conceptual park has been identified within a large tract of undeveloped land north of Snapfinger Woods Drive adjacent to a Priority 3 stream segment. There is very little undeveloped land on this stream, and a park in this area would preserve land, provide connectivity to the proposed Snapfinger Trail, and provide a recreation opportunity for the large residential population.

### **7.3.28 Honey Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Maps J-53 through J-55)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Honey Creek, identified on Maps J-53 through J-55 of Appendix J.
1. The PATH Foundation and Dekalb County have plans for the Arabia Mountain Trail to extend from the Stone Mountain Trail, around the proposed mall area, south to Arabia Mountain Park and the South River Trail. The trail will meet a Priority 1 stream segment in the vicinity of Mall Parkway and continue along the creek to the Dekalb/Rockdale County line.
  2. The proposed on-street Klondike Road Bicycle Route is included in the Rockdale County Master Trails Plan. The route will cross the creek on Klondike Road at a Priority 1 stream segment.
  3. The proposed Flat Shoals Road Bicycle Lane is included in the Rockdale County Master Trails Plan. There is a separate lane planned for bicycle traffic on the existing road. This crosses a Priority 1 stream segment.
  4. A conceptual trail starting at Klondike Road and extending south to the South Rockdale Greenway Trail which provide connectivity between proposed public access facilities in the area has been identified. The trail would begin at the Klondike Road bicycle route and continue south to the Flat Shoals Road bicycle route, which could also provide a breakpoint for the trail should a shorter trail be required. As the trail continues south along the stream corridor, it would join the proposed South Rockdale Greenway Trail described in Item 5 below. Honey Creek is lacking in public access facilities, and there are indications of rapid residential development in this area that would merit more recreation opportunities. This is a Priority 1 stream segment.
  5. Rockdale County proposes the South Rockdale Greenway Trail to be located along a utility easement and to cross the creek around Smyrna Road. This is a Priority 1 stream segment.
  6. The South Rockdale Multi-Purpose Trail is planned along a utility easement and crosses the creek within the Monastery property. It is proposed by Rockdale County and crosses a Priority 1 stream segment.

### **7.3.29 Big Cotton Indian Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-56)**

- A. The following are descriptions of public access facilities located within 500 feet of prioritized stream segments of Big Cotton Indian Creek, identified on Map J-56 of Appendix J.
  - 1. A conceptual canoe launch/boat ramp has been identified at Crumbly Road and at Keys Ferry Road, with the potential to continue to the South River. Big Cotton Indian Creek is lacking in public access facilities, and there are indications of residential development in this area that would merit more recreation opportunities. This is a Priority 3 stream segment.
  - 2. A conceptual canoe launch/boat ramp has been identified at Keys Ferry Road, within a Priority 3 stream segment.

### **7.3.30 Walnut Creek Existing, Proposed, and Conceptual Public Access Facilities**

- A. There were no existing, proposed, or conceptual public access facilities identified within 500 feet of prioritized stream segments on Walnut Creek.

### **7.3.31 Snapping Shoals Creek Existing, Proposed, and Conceptual Public Access Facilities (Refer to Map J-57)**

- A. The following is a description of a public access facility located within 500 feet of prioritized stream segments of Snapping Shoals Creek, identified on Map J-57 of Appendix J.
  - 1. The proposed Lambeth Estates/Henson Village Bike Lanes are included in the Rockdale County Master Trails Plan. There is a separate lane planned for bicycle traffic on the existing road. The route will cross the creek at Old Salem Road at a Priority 3 stream segment.

## **8.0 DESIGN AND CONSTRUCTION STANDARDS FOR PUBLIC ACCESS FACILITIES**

### **8.1 OVERVIEW**

#### **8.1.1 General**

This section presents design and construction standards for public access facilities which, if followed, would ensure that the water quality and habitat benefits of the Greenway System are not compromised. Articles 8.2 and 8.3 establish overall limits for public access and standard setbacks for Greenway properties. Articles 8.4 and 8.5 provide additional detailed standards to guide communities in the development of trails along the Greenway System, as well as to guide the City and other responsible local governments and agencies in their review of setback variance requests. As indicated in Section VIII.D.2.n of the Consent Decree, “Bicycle and hiking trails, canoe launch ramps, and picnic facilities and other public access facilities located within Greenway Properties shall be designed and constructed with non-point source pollution prevention as a primary consideration. Location and construction of such facilities shall be subject to the approval of EPA/EPD.” Figures K-0 through K-32 (contained in Appendix K of this document) present schematics for various public access facilities. Appendices M and N present Standard Operating Procedures (SOPs) that should be used as guidelines during the design, construction, and maintenance of public access facilities to ensure prevention of erosion and non-point source pollution.

#### **8.1.2 Relevant Consent Decree Language**

The restrictions listed below apply to properties and conservation easements acquired using the \$25 million set aside for this project. Since no funds from the Greenway Account will be spent on donated properties and conservation easements, the restrictions listed below do not apply to donated properties and conservation easements.

- A. “The primary purpose of this project will be to reduce and/or prevent erosion and non-point source pollution loads from entering the Designated Streams, by setting aside land in perpetuity for the protection of the Designated Streams, such that the Designated Streams may be maintained in, or be restored to, their natural condition.” (Section VIII.B.1)
- B. “The Defendant will hold the Greenway properties in perpetuity, or for as long as legally permissible, for the purpose of improving, restoring, and protecting the water quality of the Designated Streams.” (Section VIII.D.1.b)
- C. “The Defendant hereby agrees to implement the Greenway Acquisition Project for the purpose of reducing or preventing pollution to the Designated Streams, with primary emphasis on non-point sources.” (Section VIII.D.2.a)

- D. “The Greenway Acquisition Plan shall contain or provide...(iv) assurance that no more than ten (10%) percent of the area of Greenway Properties acquired may be developed for public access or use, such as bicycle and hiking paths;...” (Section VIII.D.2.j.iv)
- E. “Any infrastructure for human activity within the Greenway Properties shall be designed and constructed with prevention of non-point source pollution as the primary consideration.” (Section VIII.D.2.m)
- F. “Bicycle and hiking trails, canoe launch ramps, and picnic facilities and other public access facilities located within Greenway Properties shall be designed and constructed with non-point source pollution prevention as a primary consideration. Location and construction of such facilities shall be subject to the approval of EPA/EPD.” (Section VIII.D.2.n)
- G. “The Defendant covenants that it will not take any action pursuant to state or local law, if such action or omission would result in, facilitate or in any way contribute to, any alienation of the Greenway Properties or change their use in a manner that is not consistent with the purpose of the Greenway Acquisition Project as set forth in this consent decree and the Greenway Acquisition Plan unless approved by EPA/EPD.” (Section VIII.D.2.o)
- H. “The Defendant shall maintain the Greenway Properties in a manner that preserves environmental value and furthers the purposes of the Greenway Acquisition Project.” (Section VIII.D.2.p)

These restrictions on the Greenway Properties shall continue in perpetuity and shall survive the termination of the Consent Decree. Any contract between the City and entities proposing to construct facilities within the Greenway System will indicate that all construction will comply with the requirements of the Consent Decree and the Greenway Acquisition Plan.

**8.2 OVERALL 10% LIMIT ON DEVELOPMENT OF PUBLIC ACCESS FACILITITES ON GREENWAY PROPERTY**

As stated in the Consent Decree, “The Greenway Acquisition Plan shall contain or provide for the following minimum elements. . :(iv) assurance that no more than ten (10%) percent of the area of Greenway Properties acquired may be developed for public access or use, such as bicycle and hiking paths; ...” (Section VIII.D.2.j.iv). Public access facilities shall be designed and constructed with non-point source pollution prevention as a primary consideration. Location and construction of such facilities shall be subject to the approval of EPA/EPD (Consent Decree Section VIII.D.2.n).

For purposes of the above mentioned 10% limitation, public access or use shall include planned public access facilities such as trails, parks, canoe/boat launches, and utility maintenance access facilities. Pedestrian pathways which constitute incidental egress,

ingress, or access to utility rights-of-way, public access facilities, or other Greenway Properties will not be included in the 10% limitation provided that such incidental use does not cause or add to non-point source pollution. In the event that such incidental use causes or adds to non-point source pollution, then the non-point source pollution resulting from such incidental use must be rectified by the City by either modifying the incidental use to comply with the Consent Decree and this Greenway Acquisition Plan, or by eliminating the incidental use. Although utility rights-of-way per se will not be included in the land area subject to the 10% limitation, the provisions of Article VIII.D.2.m of the Consent Decree regarding the prevention of non-point source pollution as well as the provisions of Section 11.0 of this document, shall apply to all portions of any utility right-of-way situated on Greenway Property.

The calculation of the land area subject to the 10% limitation shall be determined on a case-by-case basis by the EPA, the EPD, and the City with recommendations from other responsible local governments or agencies.

### **8.3 SETBACKS ON GREENWAY PROPERTY**

The 1998 amendment to the Georgia Erosion and Sediment Control Act requires a 25-foot horizontal setback on either bank of Georgia streams. Guidelines provided by local governments and other entities may supercede the setbacks provided herein. The Greenway System setback requirements should meet state and local guidelines or the guidelines in this document, whichever are more stringent. Any departure from these required setbacks requires a waiver from the City and other authority having jurisdiction. Waivers considered by the City shall be in accordance with the guidelines presented in Articles 8.4.1-8.4.3.

The following setbacks will be the standard for properties within the Greenway System (Figure K-0):

- A. An 100-foot setback for parking, restrooms, and any similar structures or expanses of pavement.
- B. A 50-foot setback which is to remain largely undisturbed. Canoe and boat launches, soft surface footpaths, as well as occasional specific water access (e.g. for outdoor classrooms) are allowed within the 50-foot setback.
- C. In general no buildings, other structures, or parking lots shall be constructed within 100 feet of the streambank. With the approval of the City and only under exceptional circumstance, a variance may be given to allow such construction inside the 100-foot buffer but in no case shall facilities be constructed within 50 feet of the streambank.

## **8.4 THREE-ZONE BUFFER CONCEPT**

A typical greenway width of 100 feet from each bank is anticipated for the City of Atlanta Greenway Acquisition Project, although this width will vary under certain topographic, ecological, or development conditions. Article 8.3 describes mandatory standards for Greenway properties, but provides for the City to grant waivers when appropriate and necessary. The discussion of buffer zones and setbacks in this Article and Article 8.5 is intended to provide guidance to the City (the City is not bound by these buffer zone standards, but should apply best professional judgement in granting waivers). These buffer zone standards may also be helpful to other agencies desiring environmentally friendly trail and facility design standards outside the Greenway System on a voluntary basis.

The three-zone buffer concept divides the total buffer width into separate zones of varying widths, land uses, and restrictions. These zones are the inner zone, the middle zone, and the outer zone. In a majority of situations, the Greenway System may only encompass the inner zone and the middle zone.

### **8.4.1 Inner Zone**

This streamside zone is particularly sensitive, and should be kept largely undisturbed. The inner zone extends a minimum of 50 feet from the streambank, but should be expanded to include wetlands and critical habitats. This area is only suitable for soft-surface footpaths and limited access to streams for boat docks and canoe launches and limited access to the water. Tree removal should be limited to diseased, infested vegetation, and trees in danger of falling. Extremely limited removal of trees (primarily below 6-inch caliper at one foot above ground level) would be permitted in order to optimize trail location and would be done in a carefully considered manner to ensure preservation of streambank stability.

Within the inner zone, a riparian zone has been defined which should be kept entirely in a natural state except for occasional riverbank access. Generally, the riparian zone would consist of the immediate streambank including slopes and soils which may be unstable, and distinctive streamside vegetation such as reeds. The inner zone also includes the flood way and the one to five year terrace (which varies greatly in width from site to site) and is an important part of stream ecology.

### **8.4.2 Middle Zone**

In most cases, the middle zone will include the remainder of the acquired greenway corridor. This zone begins at the outer edge of the inner zone (50 feet from the streambank), extends at least 50 feet, and includes land in the 100-year flood plain as well as steep slopes (over 25%) to the point of topographic leveling. In a terraced floodplain the middle zone extends to the point of topographic leveling at the top terrace. Potential uses in the middle zone include walking and biking trails, a range of trail surfaces, limited parking, and restroom facilities. Limited clearing and grubbing,

particularly to remove non-native species such as privet, mimosa, and kudzu may be required for passive recreation needs. All public access roads should be sensitively located to avoid steep slope conditions where major earthwork would be required.

### **8.4.3 Outer Zone**

In some stream corridors, a 50-foot inner zone and 50-foot middle zone may adequately protect the most sensitive streambank areas, and leave additional land in an outer zone. Since the acquired land is to be preserved in a natural state, outer zone land in the Greenway System would be subject to the same design guidelines as the middle zone; however, where an outer zone exists, it should be used for the provision of parking and trailhead area if at all possible, leaving the middle zone minimally disturbed. A vegetative buffer should be preserved or installed to separate private property from trails, parking areas, or other public access facilities. Wherever space permits, this buffer should be 25 feet or more and should be preserved or planted in native vegetation to ensure privacy, protection of views, and reduction of noise for private owners (Figure K-1).

Typically, an outer-zone is a “buffer to the buffer”. In cases where the entire Greenway System falls in the middle zone, it would be ideal to work with adjacent landowners to maintain a voluntary 25-foot setback from the Greenway. This 25-foot setback would be suitable for lawn area, gardening, farming, or grazing. Structures and impervious surfaces should be minimized (Figure K-2). In many cases local ordinances already require a larger setback; this voluntary setback will need to be coordinated with local requirements on a case-by-case basis.

## **8.5 PLACEMENT OF FACILITIES WITHIN THE GREENWAY SYSTEM**

Once established, the greenway zones define permitted uses and facility design requirements. The riparian zone should be considered practically inviolate. This immediate edge of the streams should only be penetrated for occasional direct foot access to the creeks, boat dock facilities, and canoe launches (Figure K-3). Wherever possible, this should be at rock outcroppings, sandy beaches, or other relatively stable areas. Boat or canoe launches can also cross the riparian zone in accordance with the other design requirements of this section.

The remainder of the inner zone should also be kept free from built facilities. Soft surface paths developed in accordance with the footpath design standards would be permitted. Minimal impervious surfaces with limited access to the water to accommodate boat docks or canoe launches would also be permitted, when designed in accordance with the design standards presented in this section. Before any public facility is designed for a particular site, an approved and qualified professional knowledgeable of stream ecology must be retained to determine the extent of the inner zone. This will ensure that development of a facility does not encroach on the inner zone.

The middle zone represents an area with greater environmental stability. Facilities should still be developed in a sensitive manner, but a greater range of surfaces can be considered

without compromising the filtering function or ecology of the Greenway System. When designed in accordance with the design standards presented in this section, the middle zone can accommodate limited parking areas, restrooms, picnic areas, and other passive recreation amenities; boat docks, and associated areas; and multi-use trails with a variety of surfaces.

If there is an outer zone, this area would be considered more stable than the middle zone. All middle zone facilities would be permitted and adherence to the design standards presented in this section would be required. Where hard surface facilities are desired, the outer zone would be preferred.

## **8.6 SPECIFIC DESIGN AND CONSTRUCTION STANDARDS**

The following articles outline specific standards to be followed for various types of facilities anticipated within the Greenway System. For most of these facilities, no one single design solution can be stipulated. Land conditions vary considerably, and different facility designs will be needed to accommodate this range of conditions. Furthermore, new techniques may be developed which would meet or exceed the standards recommended in this section. Specific designs which meet or exceed the standards set in this section may be substituted. State-of-the-art practices for the design of environmentally friendly facilities should be considered acceptable. These standards are provided to guide the City and other responsible local government or agency in their review of proposed facilities and to guide design professionals in the design process.

The primary goals to be met during facility design are to ensure that non-point source pollution does not enter streams and that habitats are protected. From a design standpoint, this means that clearing should be minimized, impervious surfaces should be minimized, and erosion should be minimized by avoiding erodible soils and steep slopes. In addition, safety, security, and maintenance issues will influence the selection of appropriate design.

Construction supervision of these facilities is also crucially important. An approved and qualified professional knowledgeable of accepted and appropriate construction practices must be retained for construction supervision to ensure compliance and adherence to standards and restrictions set forth in this document.

Where public access is provided, trails and other facilities should be designed to provide the minimum requirements necessary to meet user needs. Footpath trails should be provided by preference; where intensity of use or natural terrain require more developed facilities, soft surfaces should be used by preference. Hard surfaces such as asphalt and concrete will have limited use in the development of public access facilities, and should only be used when truly necessary to prevent erosion or meet specific user needs. Cleared areas and selective thinning should be kept to a minimum (Figure K-4).

Designers of any outdoor recreation facilities should be aware of any applicable Americans with Disabilities Act (ADA) Standards for Accessible Design, as well as recommendations for accessibility. If the facility, such as a trail or park, is considered

accessible, then it should follow that other related features are also accessible. These features may include bridges, restrooms, telephones, etc.

It is the responsibility of the entity proposing to construct a public access facility to determine what permits, plans, or variances are required for construction of a public access facility. For example, the State of Georgia may have requirements under their General Storm Water Permit Program or Fulton County may require a Stream Buffer Variance and a Land Disturbance Activity Permit. Requirements may vary from one jurisdiction to another. Therefore, it is imperative that the entity proposing to construct a public access facility has a clear understanding of local requirements.

At the time of the writing of this document, construction projects that are 5 acres or larger in size require coverage under the State of Georgia NPDES, General Permit GAR100000, for authorization to discharge storm water associated with construction activities. It is the responsibility of the entity proposing to construct a public access facility to determine if they need to apply for coverage under this permit. Application is made by submittal of a Notice of Intent (NOI) and a permit fee to:

Northwest Georgia Regional Office  
Georgia Environmental Protection Division  
Suite 114  
4220 International Parkway, Suite 101  
Atlanta, GA 30354  
Telephone (404) 675-6240

#### **8.6.1 Best Management Practices (BMPs) to be Followed During Construction of Public Access Facilities**

The Manual for Erosion and Sediment Control in Georgia (latest edition) and the BMPs presented in Appendix M of this document and the following guidelines should be referenced before initiating construction of public access facilities.

- A. A construction project shall not alter the flow of a stream.
- B. Heavy equipment shall not be operated in surface waters or wetland areas.
- C. Any exceptions to Items A and B, above, would require approval by the City and other authorities having jurisdiction. In consideration of the exceptions to 8.6.1.A and 8.6.1.B above, the City will ensure that all activities within the Greenway System are in conformance with the purpose of the Consent Decree and the Greenway Acquisition Plan. The City will seek advice and recommendations from the SEP Advisory Committee during the consideration of exceptions during the Implementation Phase. After the completion of the Implementation Phase, the City will seek the advice and recommendations of other responsible local governments or agencies.

- D. All areas disturbed by the construction must be returned to the original topography where feasible, and must be revegetated with native vegetation that will meet the Greenway System purposes.
- E. A maximum number of linear feet along the streambank that can be disturbed within each reach will be designated by the City and other authorities having jurisdiction. The streambank must be returned to natural grade and stabilized with natural vegetation.
- F. Construction start and completion dates will be required by the City and other responsible local government or agency so as to avoid construction activities during the rainy season.
- G. A plan for proactive inspections of construction areas will be developed by the City to check for effectiveness of the implemented BMP measures.

### **8.6.2 Footpath Design**

- A. Width: 4 feet in rural areas, 5 feet in urban areas
- B. Prune branches to a minimum recommended height of 8 feet.
- C. Footpaths should be designed to reduce erosion and saturation.
  - 1. Erosion is caused by channelization of water and occurs on the steepest slopes. Good trail design and drainage are the keys to minimizing erosion.
  - 2. Saturation causes mud and occurs on flat wet places.
- D. Footpaths are best located on soils with 3 plus feet to bedrock. Soil depth should increase as slope and water content increase. With dry, moderately sloped soils, the depth of the soil can be less.
- E. Steep slopes (40% or more) and thin, wet, erodible, and mucky soils should be avoided.
- F. Footpaths are best located where the seasonal high water table is 2-4 feet below the soil surface.
- G. The best slopes for footpaths are less than 15% longitudinally and should only exceed 30% for short distances.
- H. Footpaths should gradually rise up slopes using a side hill footpath. Footpaths should not climb up the slope directly crossing contour lines.
- I. A side-hill footpath is best for erosion and sediment control. It is cut into the

hillside and lets water sheet flow across at 2-4% (Figure K-5).

### **8.6.2.1 Footpath Drainage**

- A. Footpaths should cross water flow at right angles.
- B. The best method to drain a footpath is the outslope method. A 2-4% slope outward is used to sheet flow water across the footpath. Shoring of the outer edge may be necessary where the hillside slope exceeds 30%. Shoring must allow drainage (Figure K-6).
- C. The coweeta dip may be employed to unobtrusively release water from the footpath. An ascending footpath should be leveled every 50-100 feet. The footpath should then dip for about 15 feet to allow water to leave the footpath. The footpath can then continue upward (Figure K-7).
- D. A bleeder is a graded depression with a rise that leaves the downhill side of the footpath at an angle. It is usually a natural feature such as a tree, root, or rock (Figure K-8).
- E. A water bar may be used when the preceding three techniques fail. These are logs or rocks that are placed at a 45° angle to the footpath and across it. This diverts water flow off the footpath. They should be used when water flow is very high. The purpose is to reduce water speed and volume (Figure K-9).
- F. Drainage dips are dirt versions of water bars and are used only on slopes of less than 5% and with lower water flows and velocity.
- G. Rock and wood steps should be built on slopes over 45%.
- H. Bridges may be required to cross tributaries feeding into rivers and creeks. Bridge standards are addressed below.

### **8.6.2.2 Switchbacks**

- A. Switchbacks are sharp turns on footpaths which allow for rapid elevation changes and help reduce erosion. Switchbacks should be engineered to dump water.
- B. Switchbacks should be used when climbing a single face, and should be minimized.
- C. Often switchbacks should contain wood or rock steps and/or water bars as needed to direct and control water flow.
- D. Wheelchair-accessible footpaths should contain long switchbacks.

- E. Because switchbacks tempt people to create shortcuts, the following methods should be used:
  - 1. Hide the switchback with plants or other natural materials.
  - 2. Put a feature at the switchback which will attract the hiker.
  - 3. Make shortcuts difficult.
  - 4. Make switchbacks broad enough so that a shortcut is not desirable.

### **8.6.2.3 Footpath Trail Patterns**

- A. Dead end or linear footpaths are utilized for narrow parcels, as connector spurs, or as a corridor that leads to a feature.
- B. Linear trails are usually less invasive and attract less travel than loop footpaths.
- C. Loop patterns can provide lengthier trails without the need to backtrack, as is necessary on linear trails.
- D. Loop trails provide more versatility for users; however, more land is needed for creation of a loop trail than a linear trail.

### **8.6.2.4 Saturated Areas**

Saturated areas are areas of flat, low, or mucky soils that hold water and become muddy; saturated areas may or may not be wetlands. A qualified professional must determine the presence and extent of wetland areas. Wetland areas are best left undisturbed and not included as part of a public access facility. Disturbance can be minimized by developing the public access facility along the edge of the area or designing a spur trail off the main trail which may reduce the number of visitors. If disturbance of a wetland area occurs, the following guidelines may be used to minimize disturbance:

- A. Drainage Ditch: A 1-foot wide by 1-foot deep trench can be dug to drain the water and dry the soil.
- B. Stepping Stones: Step stones can be placed across a muddy zone.
- C. Mulch: A wood bark, leaf, or pine straw mulch can be laid-in to cover and absorb water/mud.
- D. Gravel: A 4-to-6-inch gravel bed with stones can be placed over saturated areas. This can be either loose or edged.
- E. Causeway: A causeway can be built out of a wood frame and filled with stones.

Often a trench is placed alongside it (Figure K-10).

- F. Puncheon: A puncheon is a log bridge or walk built across a mucky zone. It is not to be used in a flood zone unless suitably anchored because it will float away (Figure K-11).
- G. Boardwalk: A boardwalk should be used over wetlands or other areas with sensitive soils or vegetation (Figure K-12). Construction in jurisdictional wetlands and floodplains may require a permit from the U.S. Army Corps of Engineers and/or other authorities having jurisdiction. It is the responsibility of the entity proposing to construct a public access facility to contact federal, state, and local officials to determine the existence of jurisdictional wetlands and the appropriate wetland regulations.

#### **8.6.2.5 Bridges**

- A. Bridges should be used when the above methods are not sufficient.
- B. Bridges should be used for all stream crossings over 20 feet wide, or where a more environmentally sound approach is needed. Generally bridges should be avoided because of cost.
- C. Bridge height and length are determined by flood stage clearance levels.
- D. On multi-use and bicycle trails, a 2 foot minimum shoulder should be provided as the trail approaches a bridge and on the bridge itself. This can eliminate some problems due to congestion or trail users stopping before or on the bridge.
- E. Bridge dimensions should also be determined by the necessity to accommodate emergency or maintenance vehicles.
- F. Railings should be a minimum height of 3.5 feet high.
- G. Bridges should be located on stream turns for stability and at a 90° angle to the streambank (Figure K-13).
- H. There are at least three types of bridges that can be used:
  - 1. Puncheon: For spans of less than 10 feet in areas of low flood risk (Figure K-11).
  - 2. Single Span Stringer: For spans of less than 40 feet (Figure K-14).
  - 3. Pre-Fabricated Bridges: For longer spans or where uses other than foot traffic are anticipated (Figure K-14).

### **8.6.3 Multi-Use Trail Design**

#### **8.6.3.1 General**

- A. Width: 10 feet in rural areas, 12 feet in urban areas (Figure K-4).
- B. Prune branches to minimum recommended height of 10 feet.
- C. Trails should be placed at the following locations:
  - 1. On the flattest areas possible with hill slopes not to exceed 40%. Generally on natural benches in terraced stream sections (Figure K-15 and K-16).
  - 2. To avoid removal of large caliper trees, or to minimize removal of smaller trees.
  - 3. Where possible, in abandoned railroad rights-of-way (R.O.W.) or other previously disturbed areas. Permission may need to be given by R.O.W. owner to use the R.O.W. (Figure K-17).
- D. Trail surface materials for multi-use trails are classified as soft (native, mulch, gravel, or crushed stone) or hard (asphalt and concrete) with specifications based on the following:
  - 1. Intended use.
  - 2. Intensity of use.
  - 3. Soil structure/slope.
  - 4. Available materials.
  - 5. Proposed maintenance requirements.
- E. Soft surface materials absorb water and allow infiltration, while hard surface materials repel water and allow for surface runoff.
- F. Because soft surfaces generally have less environmental impact, they should be the first considerations for trails. However, the above factors may determine that a hard surface is necessary. If this is the case, the least invasive material should be selected.

#### **8.6.3.2 Soft Surfaces**

- A. Natural surfaces can and are often used for multi-use footpaths. A detailed

description of these surfaces and their applications and construction is available in the “Footpath Design” section of this document (8.6.2). These trails are suitable for light pedestrian and mountain bike uses (Figure K-18).

- B. Shredded wood fiber is used primarily for pedestrian use. These trails consist of graded and compacted earth covered with a 4-inch compacted coarse aggregate, geotextile layer, and a 4-inch crowned wood fiber topping with 2% side slopes. Longitudinal slopes should not exceed 5% (Figure K-19).
- C. Graded aggregate stone trails are used for pedestrian use only. These consist of colored stone, pea gravel, river rock, or coarse sand and are not compacted. These trails should be limited to gently rolling terrain. The existing ground is graded and compacted, and wood edging is installed to hold the aggregate fill. These types of trails can be either above grade or at grade depending upon site conditions. Cross slopes should not exceed 2% and longitudinal slopes should not exceed 5% (Figure K-20).
- D. Granular stone trails are fairly hard and compact and are appropriate for most uses (pedestrian, bicycle, and handicap accessibility). They are made of crushed limestone, sandstone or rock, pea gravel, chert, sand, or fine gravel. These trails are constructed on a compacted subgrade and are usually held in place with edging materials such as wood, steel, aluminum, and small caliper trees. Although infiltration into these materials occurs, a cross slope of at least 2% should be maintained. Longitudinal slopes should not exceed 8%. Maintenance is minimal but occasional weeding may be necessary (Figure K-22).

### 8.6.3.3 Hard Surfaces

- A. Asphalt trails are suitable for most uses where steep slopes or low cost hard surfaces are desired. Asphalt has significant construction impact on the environment and its use should be evaluated carefully. Where appropriate it is the material of choice for low-cost multi-use trails. Asphalt requires a graded, compacted subbase covered with geotextile fabric, 6-inch gravel base coarse and 2-inch asphalt binding course. Asphalt can be used on trails with up to 20% longitudinal slopes. A 2-4% cross slope should be maintained (Figure K-23).
- B. Concrete trails are suitable for most uses and where a permanent, finished look is desired. Concrete is less invasive and very versatile, but more expensive than asphalt. Concrete will also last longer with lower maintenance than asphalt, particularly in areas subject to flooding or with poorly drained soils. Concrete trails are built on graded, compacted subbase and can be poured on a gravel bed or directly on the subbase. To provide skid resistance on concrete, a broom finish or burlap drag surface can be used. Both concrete and asphalt can be used above or at grade as needed (to avoid cutting roots). Cross slopes on concrete should be 2-4% and not exceed 15% (Figures K-24 and K-25).

#### 8.6.3.4 Trail Drainage

- A. For wood fiber, aggregate, and granular stone trails, a swale should be placed upslope with spot drains at appropriate low spots (Figure K-26).
- B. For all hard surfaces, a 2-4% cross slope should be maintained for sheet drainage across the surface.
- C. Under certain conditions sheet drainage may not be possible because of a berm on the stream side of the trail. In this case, a gravel bed or grass swale may be run along the trail and small drainage pipes (generally 8-inches in diameter or less) placed at low points along it. These pipes are to be carried through the berm to empty the water on the streamside (Figure K-26). They should be placed in the outer and middle zones only. These pipes must be carefully placed where erosion will be minimal.
- D. Drainage pipes under the trail may be required in locations where the concentrated volume of water may damage the trail (Figure K-27). The use of pipe drainage should be kept to a minimum to avoid negative impacts associated with pipe discharge.

#### 8.6.3.5 Trail Geometrics

- A. Pedestrian Trails: Pedestrian use can be accommodated on either hard- or soft-surfaced trails. Where wheelchair use is anticipated, the maximum slope should be no greater than 5% and must be no greater than 8.33%. ADA standards require landings and handrails if the slope exceeds 5%. The following geometric standards will provide safe trails limited to pedestrian access:
  - 1. Design speed – 3 to 7 miles per hour.
  - 2. Minimum width – 5 feet.
  - 3. Shoulder width – 2 feet.
  - 4. Vertical clearance – 7 feet.
  - 5. Maximum slope – 1:12 (8.33%).
  - 6. Clear sight distance – 50 feet.
- B. Bicycle Trails: The following geometric standards will provide safe multi-use trails that can accommodate bicycle use:
  - 1. Design speed – 20 miles per hour is the minimum recommended speed on

paved paths, 15 miles per hour is the recommended speed on unpaved paths.

2. Minimum width – 10 feet, 12 feet in high use areas.
3. Shoulder width – 2 feet minimum, 3 feet is recommended to provide a clear area adjacent to walls, fences, trees, and other roadside furniture.
4. Vertical clearance – 8 feet, 10 feet in tunnels and underpasses.
5. Maximum slope – 5% preferred; up to 10% for short stretches where necessary.
6. Clear sight distance – 150 feet.

C. Intersection Design for the Trail/Roadway Interface: Trail/roadway intersection designs should meet the following objectives:

1. Trail crossings should be located at a logical and visible location.
2. Place crossings mid-block where possible.
3. Avoid angled crossings where possible. Crossings should be at a 90-degree angle.
4. Adequate warning of trail crossings should be provided to motorists.
5. Adequate visibility for trail users and motorists should be provided by avoiding placement of obstacles in line of sight.
6. Adequate warning of roadway crossings to trail users should be provided.
7. Whenever possible, intersections and their approaches should be located on relatively gentle slopes to allow easy re-starts.
8. Adequate parking should be provided at trailheads to discourage trail users from parking on the shoulder of roads near crossings and intersections, thereby impeding visibility.
9. When crossings exceed 75 feet measured from curb to curb, a center median refuge area should be provided in compliance with the ADA standards.
10. At crossings where traffic is heavy, a traffic signal that can be activated by bicyclists and pedestrians should be provided.

11. For high speed multi-lane arterial streets and freeways, grade separated crossings should be used.
12. Approach ramps to grade separated crossings must be designed to comply with ADA standards.
13. Underpasses should have adequate width and height and be equipped with vandal-resistant lighting.

#### **8.6.3.6 Rest Areas**

- A. Rest areas with benches should be provided at regular intervals which will vary according to trail type, difficulty, and trail user.
- B. Benches should be set back at least 3 feet from multi-use and bicycle trails.

#### **8.6.4 Boat And Canoe Launches**

Prior to the construction of any canoe launches or boating access facilities within the Greenway System, the construction and design plans of such facilities must be approved by the City with recommendations from other responsible local government or agency.

##### **8.6.4.1 General**

- A. The States Organization for Boating Access (SOBA) has developed the Handbook for the Location, Design, Construction, Operation, and Maintenance of Boat Launching Facilities which provides guidelines for determining demand and need for water access sites as well as access placement and location. The guidelines in the latest edition of the Handbook for the Location, Design, Construction, Operation, and Maintenance of Boat Launching Facilities and the following guidelines should be followed during the design of boat docks and canoe launch facilities. Where the SOBA guidelines and the following guidelines are found to be conflicting, the SOBA guidelines will govern.
- B. Water recreational facilities should ideally be located where accessible by boat or canoe during periods of low flow. Individual site conditions will determine actual locations of facilities. The guidelines established in the latest edition of the Handbook for the Location, Design, Construction, Operation, and Maintenance of Boat Launching Facilities shall be used during the siting of boat and canoe launch facilities.

##### **8.6.4.2 Boat Docking Facility and Boat Ramp**

- A. The siting and design of boat ramps and boat docking facilities will follow the guidelines established in the latest edition of the Handbook for the Location, Design, Construction, Operation, and Maintenance of Boat Launching Facilities

by the States Organization for Boating Access (SOBA) and the following guidelines. Where the SOBA guidelines and the following guidelines are found to be conflicting, the SOBA guidelines will govern (Figure K-28).

- B. A boat dock or boat ramp facility should include the following features: a paved entrance road, a paved parking area, a boat ramp, a floating service pier, trash receptacles, and security lighting.
- C. The paved parking areas should have trailer pull-offs, parking spaces with planted islands, turning radii large enough to accommodate trucks with boat trailers, and should be sheet drained (Figure K-29).

#### **8.6.4.3 Canoe Launch**

- A. A canoe launch facility should include a paved or unpaved entrance road and parking area, trash receptacles, and a paved or unpaved surface trail to the water. The trail should be designed to provide access to the water at all flow levels (Figure K-30).
- B. The parking lot and restrooms should conform to setback requirements of this section as appropriate.
- C. The launch site should be located at the water and should be relatively primitive. It can range from a natural flat sandy spot along the stream to a concrete pad (if necessary for erosion and sediment control). The launch site should ideally be located away from depositional areas of the stream curve or areas where stream banks are eroding.
- D. The launch site should be connected to the parking lot with specially designed trails. These trails must allow easy carrying of the canoe to the water by two people. These trails should run parallel to the slope and be wide enough to accommodate two-way traffic. Switchbacks and short steep segments can be employed to make access easier for the user. A maximum longitudinal slope of 15% should be adhered to. Landings should be constructed every 100 feet if the trail slope is between 8% and 15%; carrying distance should be kept below 750 feet if possible. Paths to the canoe access location at the water should be paved using concrete. Handrails should be provided along the path to allow canoes to be skidded along the rails (Figure K-30).

#### **8.6.4.4 Private Boat Docks**

Private boat docks should be kept to an absolute minimum. Floating docks should use materials that are least susceptible to mechanical damage. Such materials include fully enclosed pontoons, closed cell, extruded polystyrene or polyurethane. There are numerous acceptable design solutions for private boat docks. While one solution may be appropriate for one site, it may not be for another. No one single design solution that is

appropriate for all conditions can be stipulated. However, certain guidelines must be followed in order to minimize disturbance to riparian zone vegetation, erosion to the streambank, and adverse impacts to water quality as well as aquatic and stream corridor habitats. Construction of docks must follow the general construction standards found within this section and Section 11.0 of this document. In addition, private boat dock design and construction must conform to the following guidelines.

- A. Docks must not alter the existing edge of the stream or the streambank.
- B. Tree removal for boat dock sites shall be done only on a limited basis and shall not include trees greater than six inches in caliper at one foot above ground level.
- C. The design, size, location, and orientation of the boat dock shall not disrupt the existing natural stream processes.
- D. Boat docks should parallel the streambank where possible to avoid over-extension into the stream.
- E. Boat docks located on navigable waterways shall not interfere with water traffic.
- F. Boat docks shall be designed and constructed to withstand floodwaters.
- G. Boat docks can be stationary, floating, or a combination of both depending on site conditions and fluctuation of water level.
- H. The size and design of a boat dock must be appropriate to the desired uses (examples: boat docking and fishing).
- I. Boat houses, pavilions, or other roofed structures will not be permitted over the water. Where permitted, location and design of such structures must conform to regulations set forth by FEMA, EPA, COE, the City, local jurisdictions, and other authority having jurisdiction.

To ensure private landowner compliance of these guidelines, design and construction of all private boat docks must be approved by the City with recommendations from other responsible entities.

## **8.6.5 Parking Facilities**

### **8.6.5.1 General**

- A. Parking lots should use existing facilities where possible to minimize new construction. On-street parking should be used where practical.
- B. New parking lots at trailheads should be small (4-6 cars). Small parking lots are

desirable because they do not need a rest room, are easier to manage, and reduce over-use of trails.

- C. Larger parking lots, where needed, should be located to serve multiple facilities when possible to minimize new construction. Location of these parking lots in the outer zone is preferable.
- D. Larger parking lots should include spaces for average vehicles, handicapped parking, bike racks, and canoe/boat trailer spaces where appropriate. Turning radii should be designed to accommodate the design vehicle for that site.
- E. Parking lots and roadways should be sheet drained and at-grade planted islands should be used to increase infiltration.
- F. Inappropriate vehicular, bicycle, and pedestrian access should be prevented by using fences, railings, brush piles, rocks, etc. to block passage (Figure K-31).
- G. Gates should be provided to allow facilities to be closed at night.
- H. The use of natural surfaces instead of paved (except for disabled parking), and 60 degree angled parking spaces for land conservation is preferred.

#### **8.6.5.2 Best Management Practices for Parking Areas**

The design of parking lots and roadways must include Best Management Practices (BMPs) to control runoff. The preferred method for controlling runoff is sheet drainage and at-grade islands with a natural vegetative buffer (Figure K-32). This method spreads the runoff evenly across the affected area, minimizing erosion and promoting infiltration. The necessity for curb and gutter and other drainage structures which have a negative impact through channelization and concentration of water is thereby eliminated. This method is unobtrusive to existing natural vegetation and topography and requires no more land disturbance than the parking lot itself.

Other acceptable BMPs found in the EPA Handbook for Urban Pollution Prevention and Control Planning are listed below. All have been developed based on current state-of-the-art techniques. However, some methods have greater land requirements that can cause much more disturbance to existing natural vegetation and topography and may require a greater amount of maintenance to perform adequately. Acceptable BMPs include the following:

- A. Porous Pavement.
- B. Grassed Swale.
- C. Infiltration Strip/Dry Well.

- D. Filter Strip.
- E. Sand Filters.

Stream corridor standards and techniques are constantly evolving. New techniques recommended by a qualified professional should be considered.

## **8.6.6 Structures**

### **8.6.6.1 Floodplain Structures**

- A. All structures in the floodplain must conform to the Federal Emergency Management Agency (FEMA) regulations and/or to regulations of other authorities having jurisdiction.
- B. Within the actual floodway all structures, fencing, fill, and storage are prohibited.

### **8.6.6.2 Restrooms**

- A. All restrooms should be designed for proper septic function if a sewer is not available. Restrooms on a septic system shall be located in the outer zone.
- B. All restrooms should be placed out of the floodplain.
- C. If possible, restrooms should be tied in with an existing sewer system.

## **8.7 GUIDELINES TO MINIMIZE CONSTRUCTION IMPACTS OF PUBLIC ACCESS PROJECTS**

The construction of public access projects will be performed in a manner that minimizes adverse impacts to water quality and aquatic and stream corridor habitats. The following guidelines will be used during the construction of public access facilities.

- A. Permanent erosion and sediment controls will be incorporated into structural earthwork design. These may include terracing, slope flattening, stone and durable synthetic blankets, bioengineering, indigenous planting, sodding, grassland establishment, and wildflowers.
- B. The project area will be cleared only within the limits of construction or as required for safety clear zone management. Clearing will include selective thinning of woody vegetation, tree trimming, and single-tree removal including dead, blown-down, or uprooted trees. Stumps and debris within the safety zone will be removed. Stumps will be cut off as close to the ground as practicable without disturbing the natural ground.
- C. In areas where trees, shrubs, and groundcover are to remain, the surface will not

be disturbed or compacted. Wherever possible, trees to be removed will be felled away from trees and shrubs to be preserved. Wood chippers may be used to reduce woody materials to chips for mulching, erosion and sediment control, redistribution on the forest floor, or trail construction.

- D. Burning or burying of wastes including wood within the Greenway System will not be allowed.
- E. Whenever feasible, multi-use trails will be aligned horizontally to follow the natural contours of the land, thus reducing the need for cut and fill. Horizontal alignment has the potential to minimize disturbance of native vegetation and to allow construction of flatter side slopes which are less prone to erosion. Whenever feasible, the vertical alignment of trails will be adjusted to reduce the need for importing non-native fill onto the site.
- F. Topsoil will be stockpiled on site following the guidelines presented in Section 11.0. The reuse of stockpiled topsoil will be maximized.
- G. Staging areas will be situated outside environmentally sensitive areas, preferably on public land with direct roadway access.
- H. After completion of construction, the site will be restored as close to its original natural state as possible, utilizing native plants.

## **8.8 SIGNAGE, LIGHTING, AND FENCING**

### **8.8.1 Signage**

- A. A logo for the project should be developed and all signs should be unified.
- B. All signs should be theft, weather, and vandal proof (except handbills, maps, and other paper information).
- C. Educational signs should be placed in kiosks at facilities and trailheads. These signs should contain information on regulations, maps, hazards, etc. These may be posted paper signs or interpretive permanent signs.
- D. Signs displayed at trailheads providing trail information such as trail difficulty, slopes, and surface type would aid users in determining accessibility.
- E. Directional signs should be placed at parking lots, trailheads, and along trails and should be simple with one to two words and an arrow. These signs would have such information as trail names and lengths.
- F. Identification signs should be placed at features along the trail or at facilities and should be simple one to two word signs.

- G. Footpath trails can be marked with paint blazes. These blazes should be spaced about 100 yards apart with only one blaze visible from any given vantage point at a time.
- H. Trails with bicycle facilities should display signs which follow the requirements contained within the Federal Highway Administration's Manual of Uniform Traffic Code Devices (MUTCD).
- I. A patch of colored concrete within 20 feet of a road intersection may be used in conjunction with signs to warn trail users of the approaching intersection.
- J. A rumble strip is useful to warn the visually impaired trail users of an approaching intersection.

### 8.8.2 Lighting

Lighting may be provided at larger parking/rest areas where desirable. Hours of operation will be limited to the time from dawn to dusk, and trails should only be lit, if appropriate, after-hours to maintain safety and security.

### 8.8.3 Fencing

- A. Inappropriate vehicular, bicycle, and pedestrian access should be prevented by using fences, railings, brush piles, rocks, etc. to block passage.
- B. Handrails, rocks, cleared tree logs, and vegetation can be placed along trails to prevent pedestrian access to sensitive sites.
- C. Trailheads can be protected from unauthorized vehicles through the use of bollards and other obstacles such as boulders. If the central bollard is removable, authorized and emergency vehicles should be able to gain access (Figure K-32). A hinged or swinging security gate can also be used to restrict access.

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## **9.0 PROPOSED LAND ACQUISITION STRATEGIES FOR THE GREENWAY SYSTEM**

### **9.1 OVERVIEW**

The donation and acquisition of land for the Greenway System will be a complex proposition. Stream corridor land along the major streams has been prioritized, but conditions have also been given under which other land would be eligible. The priority rankings themselves are not intended to be rigid.

A combination of land ownership is envisioned, including fee simple title and conservation easement ownership by the City of Atlanta, as well as ownership by other local governments and non-profit organizations.

Every effort will be made to pursue donations or partial donations (bargain sales) of land or easements prior to expenditure of acquisition funds. This emphasis on donations should increase the total amount of land protected as a result of this program.

The following strategies are intended to guide the acquisition process, and to ensure a process with sufficient structure to be applied consistently, and with sufficient flexibility to take advantage of opportunities as they arise.

### **9.2 RIGHTS AND INTERESTS IN LAND**

#### **9.2.1 General**

The two types of interest in land under consideration for the Greenway Acquisition Project are fee simple acquisition and conservation easements. Other less common arrangements (such as fee purchase and leaseback, and reserved life estate) may be considered but will not be targeted or emphasized. Such purchase arrangements would be made on a case-by-case basis in order to meet the specific needs of an individual owner while promoting the purpose of the Greenway Acquisition Project. Joint undivided interest (fee or easement) held between the City of Atlanta and other local governments and/or non-profit organizations may also be considered.

#### **9.2.2 Fee Simple Acquisition**

Fee simple acquisition (sometimes simply referred to as acquisition) is the acquisition of all rights and interests in land. Land purchased by fee simple is owned outright, and using this method the City would have full use of the property (subject to the conditions of the Consent Decree), as well as full responsibility for the property.

### **9.2.3 Conservation Easements**

A conservation easement is a partial interest in land. The property remains in private ownership, but the type and amount of development that may take place on the property is restricted. Thus, core conservation values (in this case, stream corridor buffers) can be preserved, while the overall property remains in private ownership and under private control. Because each parcel presents a unique set of circumstances, each easement will be individually tailored to ensure that preservation needs are met while allowing the owner appropriate use of the land.

Typically, a conservation easement would not allow public access. For the purposes of this project, the model conservation easement (Section 10.0) has been drafted so as not to allow public access. For this reason, parcels considered particularly important for public access may be designated for purchase in fee. Fee ownership of publicly accessible land has many advantages, one of which is that the private owner is not burdened with the liability of public access across their land. As with any easement, conservation easements under this project could be tailored to allow public access, or a separate access agreement could be negotiated between the property owner and the City.

### **9.2.4 Subsurface Rights**

In many areas of the Greenway Acquisition Project area, resource extraction is a significant land use. Subsurface (mineral) rights have often been severed, and are no longer held by the owner of the property. In such cases, fee acquisition would only give the City full rights to the parcel as enjoyed by its current owner, but would not convey ownership of subsurface rights to the City. Furthermore, under Georgia's Uniform Conservation Easement Act, subsurface rights are not affected by a conservation easement unless all owners of the interests involved are parties to or give written consent to the terms of the easement. Where purchases involve parcels with existing or potential resource extraction, the City will attempt to obtain ownership of subsurface rights in fee or through a conservation easement enacted by the owner of those rights. If ownership of subsurface rights cannot be obtained, the City will either terminate negotiations with the property owner and proceed to other prioritized parcels or obtain some level of protection through acquisition of the parcel in fee or conservation easement.

### **9.2.5 Other Interests in Land**

There are instances where public agencies or land trusts have found it advantageous to use other interests in land in order to successfully complete a transaction. Such strategies include the use of purchase/leaseback arrangements (public agency takes title but agrees to lease the land back to the original owner, with use restrictions, for a specified period of time), a reserved life estate (public agency takes title, but original owner reserves right to use land for owner's lifetime), or a land exchange (public agency takes title to conservation property in exchange for surplus developable property owned by the agency). Use of these and other

creative strategies is not anticipated, but would be available during implementation of this project if deemed beneficial.

It may be necessary to purchase an entire large parcel, where only a portion is needed or eligible for funding under the Greenway Acquisition Project. Ideally, prior to sale, the desired portion would be legally separated from the main parcel, and only the desired, eligible portion of that parcel would be purchased. However, there may be situations where the landowner would be unwilling to make that parcel split prior to sale. In such an instance, the City would negotiate for an entire legal parcel (whether a small residential lot or a full section of rural land). Where a significant portion of that parcel fell outside the eligible greenway width, the City would split the parcel along the eligibility line. The City would retain the eligible portion of the parcel, and would resell, in its entirety, the remaining portion of the parcel. Proceeds from the sale of ineligible land would be returned to the Greenway Acquisition Project fund. Ideally, this would not be a common event. It is, however, a common acquisition policy for public acquisition projects, recognizing that desired land does not always follow existing property lines and that owners may be unwilling to sell portions of a parcel without selling the entire parcel. This policy provides a mechanism for land outside of the eligible area to be acquired and then resold, if this is the only way to protect the desired eligible land.

Conservation acquisition specialists have developed a portfolio of unusual solutions to the particular needs and concerns of landowners, and while the main goal of this project is to purchase land in fee or by easement, the project will retain the flexibility necessary to structure land deals in a voluntary manner, to the satisfaction of all parties.

### **9.3 ESTABLISHMENT OF TARGET CORRIDORS**

Land along the stream corridors throughout the Greenway Acquisition Project area has been assessed for its potential to promote the purpose of the Greenway Acquisition Project. A priority ranking system has been applied, as described in Section 3.0 of this document. From an implementation standpoint, the proposed Greenway System will be used to guide the selection of target corridors (note that unless otherwise specified, the term acquisition is used to include either the acquisition of property in fee simple or the acquisition of conservation easements).

The acquisition process is expected to progress in a series of phases, with each phase comprising a section of eligible stream corridor. This phasing will allow a manageable number of acquisitions to be approached at any given time. It will also ensure that owners of adjacent land (whether businesses, residents, or other landowners) will be approached in a similar time frame. Each phase should then result in a piece of greenway which provides the environmental benefits of a continuous buffer, a single piece of property that can be effectively managed, and ideally a common ownership structure (i.e. all or mostly all fee simple, or easement, or City held, etc.). This phasing strategy will guide the majority of purchases, but will not preclude the City from responding to urgent opportunities or imminent change in land use counter to the purpose of this project.

### **9.3.1 Pilot Phase**

The initial segments acquired will be considered a pilot phase. The pilot phase will include sections of Priority 1 Tracts (see Appendix E) with a strong probability of success and public acceptability. Stream segments targeted for the pilot phase and other phases are presented in Section 13.0 of this document.

Several factors contributed to the selection of pilot phase stream segments including the following:

- A. Priority 1 Tract.
- B. Community (individuals or businesses) eager to participate.
- C. Partnership opportunity with local jurisdictions or other agencies or funding sources.
- D. Short-term likelihood of development; opportunity to work with developer prior to finalization of development plans or construction.
- E. Property is on the market.

Although early negotiations need to be subtle, the pilot phase stream segments will be publicized at key times. The success and visibility of the pilot phase will be critical to the viability of subsequent phases of the implementation phase.

### **9.3.2 Ongoing Program**

Once the pilot phase is completed, the implementation team will start the acquisition process for the second phase of the program. Throughout the implementation process, land within the Priority 1 and Priority 2 Tracts will be monitored for changing conditions, particularly in relation to development threats, community or landowner responsiveness, and partnership opportunities. This monitoring process will be vital to ensure appropriate timing and phasing of stream segments.

#### **9.3.2.1 Priority 1 Tracts**

Land within Priority 1 Tracts will be the primary initial target of the acquisition process. Priority 1 Tracts were considered the most beneficial and important sections for acquisition. By preference, acquisitions will begin simultaneously along a stream segment, so that contiguous ribbons of stream corridor land are acquired. This approach has the potential to realize the greatest water quality and habitat benefits. It will also provide for ease of land management, improved recreational potential, and viewshed protection.

### **9.3.2.2 Priority 2 Tracts**

Priority 2 Tracts will not be the initial focus for acquisitions. However, Priority 2 Tracts are considered to meet the guidelines of the Greenway Acquisition Project, and are eligible for purchase. Should a specific opportunity arise, the City will pursue purchase of Priority 2 Tracts as if they were designated Priority 1 Tracts. Examples of such an opportunity include joint partnership opportunities with local communities, other local jurisdictions, major landowners, or other agencies (governmental or non-profit). Priority 2 Tracts could be used as a local match for Corps of Engineers flood control or restoration projects; a local community might be interested in spearheading coordinated efforts to implement a multi-faceted greenway; or a major land owner might be willing to protect stream corridor property through the Greenway Acquisition Project at the time they develop a piece of their land. All such projects must comply with the construction and management guidelines of the Greenway Acquisition Project as outlined in Section 11.0 of this document.

Priority 2 Tracts provide additional prioritized land for the City to pursue should it exhaust the possibilities with Priority 1 Tracts. This could happen for at least two reasons: first, if significant acreage is donated, the available funds will purchase well beyond the Priority 1 Tracts; and secondly, if owners of Priority 1 Tracts are unwilling to sell, or the City is unable to negotiate a satisfactory sale price, negotiators will have the option of declining to purchase individual parcels or stretches of stream corridor properties.

### **9.3.2.3 Priority 3 Tracts**

Priority 3 Tracts would be eligible for purchase with the resources available for this project. In general, purchase of Priority 3 Tracts will not be considered until acquisition options for Priorities 1 and 2 Tracts are exhausted. However, Priority 3 Tracts will be considered for acquisition ahead of higher priorities if circumstances change significantly, making it as desirable to purchase as the remaining Priority 1 or 2 Tracts. Examples of such circumstances will include a significant change in development pressure (particularly in rural stretches where the acquisition priority might have been higher had development appeared likely), or a particularly attractive partnership opportunity.

### **9.3.2.4 Non-prioritized Land**

Guidelines for eligibility of non-prioritized land are presented in Section 4.0 of this document.

### **9.3.2.5 Public Land**

Public land (land in existing public ownership) forms an integral part of the proposed Greenway System, often in the form of parks and open space. In most cases, there is no assurance that the land will be preserved in perpetuity consistent with the purpose of the Greenway Acquisition Project. For this reason, it is desirable to obtain conservation easements or equivalent management agreements from the owning agency. As with all easements, these conservation easements on public land would need to be tailored to meet the requirements of the owning agency, including deed restrictions or grant requirements which already govern the use of that land. In some individual cases, an agency may choose to donate fee simple title of the land to the Greenway Acquisition Project.

The City hopes that municipalities and other public owners will form partnerships with the City to ensure long-term preservation of their stream corridor properties. Such partnerships could be through donations of conservation easements to the City or a local non-profit organization. However, if municipalities and other public owners are unwilling to donate conservation easements within prioritized tracts, their properties will still be eligible for acquisition using the financial resources available for the Greenway Acquisition Project.

#### **9.4 FEE SIMPLE VERSUS EASEMENT DETERMINATION**

In general, conservation easements will be the preferred method of land acquisition. Conservation easements are likely to be more acceptable to property owners since in many instances they will not dramatically change the property owner's ability to enjoy his/her property. Easements are also expected to be more cost effective (particularly from a management standpoint), enabling greater portions of the prioritized tracts to be protected and managed long-term.

Final determination of the type of purchase will be made on a stream segment by stream segment basis, as acquisition is contemplated. On larger undeveloped parcels, particularly where a significant portion of a stream segment is under single ownership, a fee simple/easement determination could be made in conjunction with the property owner. Where ownership is more fragmented, wherever possible, the same form of ownership will be used for a single area; landowner input will be needed to determine the appropriate form of ownership, and individual parcels could deviate from the established form where deemed necessary. The following guidelines will aid the formulation of that final decision.

##### **9.4.1 Contiguous Ownership**

Wherever possible, contiguous parcels along a stream segment will be held by a common owner in a common form of ownership. Whether fee simple or easement sale would be available in a certain area will need to be determined by the implementation team as a stream segment is selected for actual acquisition. This will facilitate property management, liability and risk management, and access (for management as well as recreational purposes). It should be noted that it is likely to be more difficult to maintain multiple small, isolated pockets of land owned in fee simple but surrounded by easement-held land maintained by the individual owner.

This goal attempts to avoid a true checkerboard acquisition pattern. However, as discussed below, individual (generally large) parcels could be held in a different ownership form. The anticipated ownership pattern is for the majority of the stream segments to be held by easement, with public access areas, engineered restoration areas, habitat preserves, and other suitable areas purchased in fee simple.

#### **9.4.2 Improvements**

Land which is anticipated for future public access or for engineered restoration projects will be purchased in fee simple, if possible, for liability and management reasons as elaborated in Section 11.0. However, if a stream segment desired for fee simple acquisition is only available by easement, this more limited interest will still be acquired (it would be possible to obtain access easements, or purchase the remainder property rights, at a later date, although this process would require a new coordination and negotiation process, and a separate source of funding). The model conservation easement as written (Section 10.0) does not allow public access. If desired, and acceptable to easement grantor, however, any easement could be negotiated to allow public access or restoration projects.

#### **9.4.3 Revegetation**

Land targeted for revegetation is considered suitable for ownership by easement. The easement would be accompanied by a formal restoration agreement, which clearly establishes the responsibilities of all parties.

#### **9.4.4 Habitat Protection**

Areas with particularly sensitive habitats should have the form of land ownership which would provide the best protection for the resource. In general, conservation easements are expected to afford the most protection on sensitive lands, since public access would be unsuitable and a nearby private owner will often be the best steward of a sensitive resource. Should it be determined during implementation that an alternate ownership pattern would provide an equivalent or better protection, or should the recommended ownership form be unavailable, other ownership forms will be adopted.

#### **9.4.5 Partnership Requirements**

Certain partnership opportunities may dictate the desired form of ownership. For example, the Corps of Engineers requires public access on their projects, and may be unable to fund projects on land held by easement.

### **9.5 BASIC ACQUISITION PROCESS**

Once a target corridor is selected, all acquisitions will follow a similar basic process from identification of owners through requests for donations, formal pre-acquisition studies (title,

appraisal, etc.), final negotiations, and closing. The following articles present the basic acquisition process that will be followed during the implementation phase.

### **9.5.1 Voluntary Program**

The Greenway Acquisition Project is intended to be a voluntary program. The City of Atlanta does have the power of eminent domain, however, it does not intend to condemn property acquired for the Greenway Acquisition Project unless rare and extraordinary circumstances occur meriting condemnation in an individual case. Sufficient land has been prioritized to allow unwilling sellers to opt out of the project.

### **9.5.2 Identification of Owners and Windshield Survey of Target Corridor**

The first task, once a target corridor has been established, will be to identify all of the landowners along the target stream segment, as well as to identify possible opportunities for or stumbling blocks to the acquisition. Initially this will be done using tax assessor's records and a windshield field survey of the property. This process will give the implementation team a good feel for the target corridor, and will allow them to note any major changes in condition since the Planning Phase of the Greenway Acquisition Project.

### **9.5.3 Initial Contact**

Preliminary contact with the owners will be made as early as possible during the acquisition process (owners should hear about upcoming potential acquisitions in person, rather than through the newspaper). A judicious use of small meetings comprised only of potentially affected landowners will be conducted, but will not be used to replace individual personal contact. This initial meeting will be used to explain the purpose of the project, stress its benefits (to the owner) and also its voluntary nature, and explain the steps to be taken. Preliminary discussions will also be used to explain the various options available and benefits of those options, including donations and bargain sales, and the possible use of conservation easements.

### **9.5.4 Early Understanding**

Before proceeding too far with the expensive, detailed formal pre-acquisition studies, the implementation team will attempt to reach a preliminary understanding with the property owner. This understanding will not have to be formal or necessarily detailed, but the implementation team will try to obtain some reasonable assurance that the owner has a good faith intent to follow through with the sale, and that mutually acceptable terms can be negotiated (it is usually helpful at this point to have a rough cost estimate perhaps with assistance from a realtor or appraiser, but probably not involving a full formal appraisal report). If there is any question of legal ownership, a preliminary title report will be obtained at this time.

### **9.5.5 Formal Pre-Acquisition Studies**

Once it appears that a mutually acceptable arrangement is likely, more formal studies will be needed including the following: title report, Phase I Environmental Site Assessment, boundary survey, and appraisal.

#### **9.5.5.1 Title Report**

A full title report and commitment for title insurance will be ordered, and any title issues will need to be resolved. A likely consideration is the issue of mineral rights or timber rights, which are frequently under different ownership than surface rights. Ownership of these rights will be examined carefully by the City to ensure that the proposed acquisition truly protects the land in question. The model conservation easement, in accordance with Georgia's Uniform Conservation Easement Act, requires written consent from the holder of mineral or other rights before they become subordinated to the easement. If a tax deduction is to be claimed for a conservation easement, mineral rights severed subsequent to 1976 must be subordinated to the easement.

#### **9.5.5.2 Phase I Environmental Site Assessment**

A Phase 1 Environmental Site Assessment will be conducted, and if there is any reason to suspect the possibility of environmental liability, a determination will be made by the City on whether or not to pursue acquisition.

#### **9.5.5.3 Boundary Survey**

A boundary survey will be performed since in most cases the land to be acquired or placed under easement will not be a current legal parcel, and precise descriptions of the land will be required.

#### **9.5.5.4 Appraisal**

On any land to be purchased, a single appraisal will be performed by a qualified, pre-approved appraiser. For the appraisal of conservation easements, local appraisers may be the best qualified to conduct the appraisal, but an outside review appraiser experienced in the valuation of conservation easements may be used. The City may consider a landowner's appraisal in negotiating a final sales price. For donated land or easements, the City will not require an appraisal. However, to claim tax benefits the donor will need an appraisal.

#### **9.5.6 Final Agreement**

After formal reports have been received, and any outstanding issues resolved, the implementation team will try to reach a formal agreement with the property owner. For property to be purchased (not donated), or for any transaction where the City will obtain interest in the property (e.g. a donated easement), the proposed purchase contract will be

presented to the City Council for approval prior to committing any funding. Following the City Council's approval, the transaction will be finalized and closed.

## **9.6 PROJECT STAFFING**

The Greenway acquisition program has been designed to maintain a degree of flexibility, which should lead to an optimal greenway system configuration, and a publicly accepted and popular program. However, by retaining flexibility, the complexity of the implementation process increases, and will require continuous professional management. The implementation of the Greenway Acquisition Project will be carried out by the City, and a team of consultants to be retained by the City for this purpose. The roles of the entities to be involved in the implementation process are identified in Section 13.0 of this document.

## **9.7 LAND VALUE, PURCHASE PRICE, AND ASSOCIATED ELIGIBLE COSTS**

The valuation of land for acquisition programs is never simple and the valuation of conservation easements is quite complex. All participation in the Greenway Acquisition Project is intended to be voluntary, in the sense that the City will make every effort to seek donations, willing sellers, and to reach mutually satisfactory agreements with landowners. The City hopes that voluntary participation will go much further, and that the entire community will show its full support for this project and its goals.

### **9.7.1 Fair Market Value**

Whenever a property owner wishes to sell a property in fee simple or conservation easement, a qualified appraiser will establish a value for the parcel in its current state, and then establish a value for the property still owned by the seller after the transaction or, in the case of an easement, the value of the encumbered property. The difference between these two appraised values will be used to determine the value of the property or easement sale (this method is accepted by the IRS when tax deductions are claimed for donations). These appraisals will be done (or at least reviewed) by a qualified appraiser with experience in before and after appraisals (for fee simple purchases) and also with experience in valuing conservation easements specifically (for easements). The maximum price of an easement or land will be set by the appraisal process, outlined above, and in accordance with the City's standard acquisition practices.

### **9.7.2 Donations**

Wherever possible, donations of land or easements will be sought. There are many programs across the country, involving numerous landowners, which have successful land or easement donation programs. The most tangible benefits to owners who formally donate property include income tax deductions (the value of the land or easement, as shown by a formal appraisal, is considered deductible as a charitable donation) as well as estate tax reductions (to the extent a conservation easement reduces the appraised value of an estate, the heir(s) will pay taxes on a reduced estate value compared to the unencumbered land). There are

other benefits also: landowners benefit from the knowledge that their neighbor's property will remain in a relatively natural state over a long period of time, and often enjoy the satisfaction of knowing that their land will be preserved and cared for in the future, beyond their land tenure.

All implementation costs (staffing, appraisal and title work, legal costs, and closing costs) will be eligible for funding for all land transactions including land donations or bargain sales of property which would otherwise be considered eligible for purchase.

### **9.7.3 Bargain Sale**

A landowner who may not be able or willing to fully donate land or an easement may be willing to sell at below market value. This type of sale is known as a bargain sale. As with a full donation, this will benefit the City by reducing the purchase price, and will also benefit the landowner with tax deductions on the donated portion of the land value. All implementation costs will be eligible for funding, as with full donations.

### **9.7.4 Tax Deductions**

It is critical, on all donations where tax benefits are anticipated, to adequately document the value of the donation, and to ensure that all IRS guidelines are met. It is the donor's legal responsibility to document the value of their donation, and generally the recipient of a land donation does not participate in this documentation. All potential donors will be advised to consult with their personal tax advisors, to ensure that anticipated benefits will be realized.

## **9.8 GREENWAY LAND REGISTRY**

A formal Greenway Land Registry could be established for the Greenway Acquisition Project. Potential easement donors who may be uncomfortable with a perpetually binding legal agreement may be willing to participate in a voluntary Greenway Land Registry. Often after participating in this type of land registry, owners are later willing to donate or sell formal easements. The Greenway Land Registry also allows interested property owners outside of the prioritized tracts to participate in the protection of stream corridor property.

### **9.8.1 Greenway Land Registry Mechanism**

The City of Atlanta could establish a Greenway Land Registry. An interested, eligible owner would be required to fill out a simple form. The City would then add their information to the Greenway Land Registry, and issue a certificate to the property owner.

The Greenway Land Registry will acknowledge an owner's commitment to responsible stewardship, and provide limited technical assistance. The Greenway Land Registry would not in any way allow public access to registered land, and would not make publicly available

the locations of registered properties. The financial resources available for the Greenway Acquisition Project will not be spent to bring land into the Greenway Land Registry program. Similarly, registration of land will not affect the eligibility of that land for purchase under the Greenway Acquisition Project.

### **9.8.2 Eligibility to Register**

Any landowner with property adjacent to any stream within the City of Atlanta would be eligible to register. This includes prioritized segments and non-prioritized stream segments. Land to be registered should be in a relatively undisturbed natural state, or be suitably restored by its owner, preserving buffer areas along the stream itself.

### **9.8.3 Voluntary Agreement**

The Greenway Land Registry would be strictly voluntary, and a property owner could withdraw their land from the Greenway Land Registry at any time. Generally, thirty day's notice would be requested.

### **9.8.4 Owner s Commitment**

The owner of registered land would be making the commitment to preserve and protect the registered land to the best of their abilities. The stewardship and design guidelines developed for the Greenway Acquisition Project will be made available to the landowner as a guide, but strict compliance will not be mandatory. Landowners would also be requested to notify the City if they intend to sell or transfer ownership of the property.

The City may occasionally request permission to visit a site to monitor the condition of registered land, and if significant degradation occurs may remove the land from the Greenway Land Registry.

### **9.8.5 Benefits to Owner**

Participating landowners will receive a certificate of participation, and with the landowner's approval they would receive other recognition or publicity in conjunction with the Greenway Land Registry. Owners may also receive technical assistance in preserving their property, such as advice on land management or restoration.

### **9.8.6 Benefits to the City**

The Greenway Acquisition Project would benefit from such a land registry in several ways. It is an excellent way to promote landowner education and awareness, and to encourage responsible individual stewardship. It would afford a level of protection to segments of streams which fall outside prioritized tracts. It may also give landowners the confidence to participate more formally in an easement program at a later time.

## **9.9 ULTIMATE LAND OWNERSHIP**

Title to Greenway System property will be held by the City, a local government, or other non-profit entity, as described below. The City will hold or co-hold easements on all Greenway System property. All properties acquired in fee simple or conservation easement will be counted toward fulfillment of the City's obligations under Section VIII of the Consent Decree.

### **9.9.1 Fee Simple Purchases**

The City will retain title to land purchased in fee simple. A conservation easement on this land will then be donated to a local land trust, thereby ensuring that the purpose of the Greenway Acquisition Project will be met. No additional covenants or deed restrictions will be necessary. The City may allow fee simple title to be held by other local governments or other suitable entities, as long as the City is satisfied that the legal obligation to maintain such property in perpetuity is met.

### **9.9.2 Easement Purchases**

Easements purchased under the Greenway Acquisition Project will be held by a local government and/or a local land trust with the City as co-holder of the easement.

### **9.9.3 Donations**

Donations, whether of fee simple property or of easements, will be held by the City, another local government, or a local land trust.

### **9.9.4 Registered Land**

Ownership of registered land will remain with the private owner. The Greenway Land Registry, if established, will be maintained by the City.

## **9.10 PROGRAM FLEXIBILITY AND GREENWAY ACQUISITION PLAN UPDATES**

This document has been designed for maximum flexibility. The project as proposed has a built-in opportunity to respond to changing situations, and sufficient land has been prioritized at differing levels to accommodate donations, bargain sales, changing land values, or refusals to sell.

However, a plan can never anticipate all possible future scenarios. It may be that opportunities or concerns will arise which will lead to a desire to re-prioritize land, or change project guidelines. Should the need arise to purchase land outside that prioritized, the City may choose to formally update this document, with EPA/EPD approval.

## **10.0 MODEL CONSERVATION EASEMENT**

A conservation easement is a legal agreement a property owner makes to restrict the type and amount of development that may take place on his or her property. Thus, core conservation values (in this case, stream corridor buffers) can be preserved, while the overall property remains in private ownership and under private control. Because each parcel presents a unique set of circumstances, each easement will be individually tailored to ensure that preservation needs are not compromised while allowing appropriate use of the land by the owner.

### **10.1 MODEL CONSERVATION EASEMENT**

A Model Conservation Easement for use by the City has been developed as part of the Greenway Acquisition Plan. The Model Conservation Easement was based on the model easement published by the Land Trust Alliance, but has been tailored to meet the specific needs of the Greenway Acquisition Project. The Model Conservation Easement is presented in Appendix L. Key provisions of the easements are outlined below.

### **10.2 KEY PROVISIONS OF THE MODEL CONSERVATION EASEMENT**

- A. The easement is in the form of a property deed. However, only a partial interest in the land is conveyed, and title to the property is retained by the grantor (person giving the easement).
- B. Individual provisions of the easement can be negotiated on a case-by-case basis. However, any easement administered using the financial resources available for the Greenway Acquisition Project must comply with the requirements of the Consent Decree and this document, to provide adequate environmental protection in perpetuity.
- C. Compensation for granting the easement will be determined on a case-by-case basis. Maximum compensation will be fair market value (based on the appraisal process outlined in Section 9.0 of this document). There may be many cases where an owner will be willing to donate an easement to the Greenway Acquisition Project, either to show support for the program or for the significant tax advantages the donation of an easement may bring. Donation of an easement will be strictly voluntary.
- D. For easements acquired using the financial resources available for the Greenway Acquisition Project, the City may hold the easement alone or jointly with a local land trust and/or local government. Whenever the City holds an easement jointly with one or more entities, all easement holders will have responsibility for easement administration and enforcement.
- E. Conservation aspects of the easement will be judged against a baseline survey conducted at the time of donation.

- F. Where a restoration project is implemented in an easement property using the financial resources available for the Greenway Acquisition Project, the landowner may accept certain specific management responsibilities in relation to the restoration project, but will not be fully responsible for the long-term success or failure of the restoration project, in recognition of the uncertainties involved.
- G. The easement will remain in effect in perpetuity. However, it can be modified by mutual consent, as long as the requirements of the Consent Decree and this document are still met.
- H. The property owner will still have private use of the land. Although development of structures will generally be prohibited, some limited recreation uses may be permitted.
- I. The property owner will reserve the right to sell the land. However, the easement remains with the land, and future owners will be bound by it.
- J. Under Georgia's law, mortgage lenders, subsurface mineral right owners, or other parties with an interest in the property, must agree in writing to the easement if they are to be bound by it.

## **11.0 LAND MANAGEMENT GUIDELINES**

### **11.1 OVERVIEW**

#### **11.1.1 General**

The acquired and donated properties and easements comprising the Greenway System will be held in perpetuity for the purpose of improving, restoring, and protecting the water quality of the streams adjacent to the acquired properties or easements. Acquired properties or easements will be maintained in a natural, vegetative state. The management guidelines presented in this section will be universally applied to all Greenway Properties (privately held land as well as properties open to public access) in order to promote the purpose of the Greenway Acquisition Project as stated in the opening sentence of this section. Greenway Properties will be inspected periodically by representatives of the City. The inspectors of Greenway Properties will review properties and easements to verify compliance with the guidelines established in this document as well as specific agreements established on a case-by-case basis by individual conservation easement negotiations. This section presents management guidelines for properties held in fee as well as conservation easements held on privately owned property. Further, Land Registry participants (if the program is organized) may use the management guidelines as a model on a voluntary basis. Appendices M and N present Standard Operating Procedures (SOPs) that should be used as guidelines during the design, construction, and maintenance of restoration projects, public access facilities, and utilities to ensure prevention of erosion and non-point source pollution.

The City realizes that, in the future, various entities may need to place utilities (including roads) on properties formerly purchased for the Greenway System. There are two ways that utility rights-of-way may be acquired within lands that were formerly purchased Greenway Properties; only condemnation in accordance with prevailing Georgia law, results in the removal of a purchased property from the Greenway System. The first is to secure the approval of all owners of the land and holders of the conservation easement, including the City, for the utility right-of-way purchase. The City's approval of the purchase may only be given after the alternatives analysis process, described in Appendix M, has been followed to demonstrate that there is no feasible alternative to placing the utility in the Greenway System and that the requirements of the Consent Decree are met. The utility must pay fair market value into the Greenway Account for any loss of conservation and Greenway values caused by the project. These funds must be used for Greenway property acquisition along the same stream segment, if possible. For the purchase of utility rights-of-way within a Greenway conservation easement, the entity must negotiate separately with the underlying private property owner for compensation. If any landowners or conservation easement holders do not approve utility right-of-way purchases within Greenway Properties, the second option is

condemnation. Only condemnation in accordance with prevailing Georgia law can remove land from the Greenway System or override a Greenway conservation easement. The value of these lands or conservation easements must be paid for at current fair market value, but no less than the Greenway Project purchase price. These funds must be used for Greenway property acquisition. Every attempt shall be made to make such acquisition along the same stream segment.

At the time of the writing of this document, there is no specific section in the Georgia Code governing the condemnation of public properties. Therefore, the City proposes that condemnation of Greenway Property, if warranted, be referred to the State Commission on the Condemnation of Public Property unless specific authority is granted by the Georgia legislature or specific enabling legislation is adopted by the Georgia legislature.

Any public use for which a Greenway Property is condemned must be shown to be necessary and to provide a greater public benefit than the protection of the stream from erosion and non-point source pollution.

### **11.1.2 Relevant Consent Decree Language**

The restrictions listed below apply to properties and conservation easements acquired using the \$25 million set aside for this project. Since no funds from the Greenway Account will be spent on donated properties and conservation easements, the restrictions listed below do not apply to donated properties and conservation easements.

- A. “The primary purpose of this project will be to reduce and/or prevent erosion and non-point source pollution loads from entering the Designated Streams, by setting aside land in perpetuity for the protection of the Designated Streams, such that the Designated Streams may be maintained in, or be restored to, their natural condition.” (Section VIII.B.1)
- B. “The Defendant will hold the Greenway Properties in perpetuity, or for as long as legally permissible, for the purpose of improving, restoring, and protecting the water quality of the Designated Streams.” (Section VIII.D.1.b)
- C. “The Defendant hereby agrees to implement the Greenway Acquisition Project for the purpose of reducing or preventing pollution to the Designated Streams, with primary emphasis on non-point sources.” (Section VIII.D.2.a)
- D. “The Greenway Acquisition Plan shall contain or provide...(iv) assurance that no more than ten (10%) percent of the area of Greenway Properties acquired may be developed for public access or use, such as bicycle and hiking paths;...” (Section VIII.D.2.j.iv)
- E. “Any infrastructure for human activity within the Greenway Properties shall be designed and constructed with prevention of non-point source pollution as the

- primary consideration.” (Section VIII.D.2.m)
- F. “Bicycle and hiking trails, canoe launch ramps, and picnic facilities and other public access facilities located within Greenway Properties shall be designed and constructed with non-point source pollution prevention as a primary consideration. Location and construction of such facilities shall be subject to the approval of EPA/EPD.” (Section VIII.D.2.n)
- G. “The Defendant covenants that it will not take any action pursuant to state or local law, if such action or omission would result in, facilitate or in any way contribute to, any alienation of the Greenway Properties or change their use in a manner that is not consistent with the purpose of the Greenway Acquisition Project as set forth in this consent decree and the Greenway Acquisition Plan unless approved by EPA/EPD.” (Section VIII.D.2.o)
- H. “The Defendant shall maintain the Greenway Properties in a manner that preserves environmental value and furthers the purposes of the Greenway Acquisition Project.” (Section VIII.D.2.p)

These restrictions on the Greenway Properties shall continue in perpetuity and shall survive the termination of the Consent Decree. Any contract between the City and entities proposing to construct facilities within the Greenway System will indicate that all construction will comply with the requirements of the Consent Decree and the Greenway Acquisition Plan.

### **11.1.3 OVERALL 10% LIMIT ON DEVELOPMENT OF PUBLIC ACCESS FACILITITES ON GREENWAY PROPERTY**

As stated in the Consent Decree, “The Greenway Acquisition Plan shall contain or provide for the following minimum elements: . . .(iv) assurance that no more than ten (10%) percent of the area of Greenway Properties acquired may be developed for public access or use, such as bicycle and hiking paths; . . . .” (Section VIII.D.2.j.iv). Public access facilities located within Greenway properties shall be designed and constructed with non-point source pollution prevention as a primary consideration. Location and construction of such facilities shall be subject to the approval of EPA/EPD.

For purposes of the above mentioned 10% limitation, public access or use shall include planned public access facilities such as trails, parks, canoe/boat launches, and utility maintenance access facilities. Pedestrian pathways which constitute incidental egress, ingress, or access to utility rights-of-way, public access facilities, or other Greenway Properties will not be included in the 10% limitation provided that such incidental use does not cause or add to non-point source pollution. In the event that such incidental use causes or adds to non-point source pollution, then the non-point source pollution resulting from such incidental use must be rectified by the City by either modifying the incidental use to comply with the Consent Decree and this Greenway Acquisition Plan, or by eliminating the incidental use. Although utility rights-of-way per se will not be included in the land area subject to the 10% limitation, the provisions of Article VIII.D.2.m of the Consent Decree

regarding the prevention of non-point source pollution as well as the provisions of Section 11.0 of this document, shall apply to all portions of any utility right-of-way situated on Greenway Property.

The calculation of the land area subject to the 10% limitation shall be determined on a case-by-case basis by the EPA, the EPD, and the City with recommendations from other responsible local governments or agencies.

## **11.2 RESPONSIBILITY**

The City of Atlanta (or the entity with which it co-holds land title or easements) will be responsible for maintenance of those sections of the Greenway System where property is acquired in fee. It is anticipated that these areas will predominantly consist of public access points and areas where restoration projects are implemented. Land with public access may be managed by the parks and recreation department of a city or county having jurisdiction. Where conservation easements are acquired, the responsibility of maintenance will fall with the landowner. In these instances the City will only be responsible for periodic inspections of the property to ensure compliance of the landowner with the requirements of the easement. The management and stewardship guidelines of this document will be incorporated by reference into all conservation easements. The enforcement of the provisions of the conservation easement will be the responsibility of the City or other agency as designated by the City. Although the City may designate other local governments, agencies, or organizations to carry out or enforce these land management guidelines, the City is ultimately responsible for the implementation and enforcement of the provisions of the Consent Decree.

The land management guidelines described in this section will be coordinated with other riparian management programs, such as those conducted by the Corps of Engineers or FEMA, that may be administered in conjunction with the Greenway System.

### **11.2.1 Liability and Risk Management**

Owning land brings potential for liability. The overall goal of a risk management program is to minimize exposure. Establishing a risk management program is a prudent means of reducing the potential for lawsuits, enhancing the safety of properties with public access, reducing the cost of insurance, and providing a reasonably safe facility. Risk management programs need not be complicated or burdensome to be effective.

The greatest risk and exposure to liability will occur where public access and use are permitted. Public access areas will be owned in fee by the City of Atlanta or another local government or agency, to avoid exposure of private owners to liability associated with public use. All agencies implementing public access or use facilities within the Greenway System must develop a risk management program. The managing entity of all public access areas will follow the safety, risk management, and maintenance policies adopted in the risk management program. The following are recommended components of a basic risk management program for the Greenway System:

- A. Inspection: Develop an inspection and maintenance program to assure periodic identification and correction of hazardous situations.
- B. Provide warning of risks: Develop and implement a signage program to advise trail users of potential hazards and risks. Adequate warning of low overhead clearance, periodic flooding, limited visibility, hazardous crossings, poor water quality, and similar hazards can be readily provided by signage.
- C. Medical emergencies: Train staff in basic first aid and CPR. Require two staff members to respond to medical emergencies, one to stay with the victim and one to summon help. Require a written report of all injuries requiring staff intervention.
- D. Documentation: Develop a documentation program to assure adequate documentation of inspections, findings, and responses.

### **11.3 GENERAL MANAGEMENT GUIDELINES FOR GREENWAY PROPERTIES**

#### **11.3.1 Prohibited Activities**

Where other sections of this document may be interpreted to conflict with this article, this article shall prevail. The following activities and/or practices are prohibited within the Greenway System:

- A. All burning of vegetation or the burying or depositing of wastes including trash, debris, or vegetation.
- B. The forestry practice of clearcutting or other timber harvesting practices except the removal of dead/dying/diseased trees posing a threat to human safety or structure(s) or practices necessary to eradicate invasive species or diseased vegetation. Selective harvest in compliance with the requirements established in this section may be allowed. Prohibited activities associated with selective harvesting include mechanical site preparation, herbicides, fertilizers, roads, stream crossings, or landing locations. Skid trails shall not be located in or across stream channels and natural drainage.
- C. The construction of roads other than that allowable under Article 11.1.1.
- D. The operation of wheeled or tracked equipment, except as specifically authorized by the City or other responsible local government or agency, according to the alternatives analysis process (described in Appendix M) as a part of an approved construction plan for utilities. Operation of wheeled or tracked equipment within the streambed, streambanks, or wetlands shall be unauthorized unless it is unavoidable. Wheeled or tracked equipment are allowed as part of an approved tree removal procedure or an emergency rescue operation.

- E. The handling, storage, application, or disposal of hazardous materials.
- F. The dumping of household, gardening, and/or construction debris, litter, waste, or other trash in the streams or water bodies of the Greenway System. This includes compost, dirt, gravel, and sand.
- G. Disturbance of any sort to waters within the Greenway System including any wetland. Disturbance of any waters within the Greenway System due to utility construction may be allowed only after a thorough avoidance, minimization, and compensation assessment has been approved by the City or other responsible local government, in accordance with the alternatives analysis process described in Appendix M.
- H. The purposeful introduction of exotic plants or species.
- I. There will be no unauthorized public entry into Greenway Properties; public access is prohibited except where specifically authorized at public access facilities.
- J. Any building or construction activity including creation of parking areas, recreation areas, jogging trails, boat launches, picnic areas, or any other activity that disturbs Greenway Properties unless such facility is a part of a sewer or public access facility and is properly designed and constructed in accordance with the design guidelines established in this document. An allowance is granted for the construction of septic systems, if the placement of those facilities is located in the outer zone and follows guidelines established in Section 8.0 of this document.
- K. Any activity that results in the alteration of the natural stream channel and/or stream flow, unless the alteration is part of an approved restoration project or is necessary to reduce or eliminate pollution from the construction of utilities and the project complies with Item G, above.
- L. Mowing vegetation, cutting tree limbs, trimming of vegetation, or any other type of vegetation manicuring along the stream side, unless such activity is necessary for utility construction or as a part of a public access facility construction or maintenance.
- M. All livestock and equestrian facilities.

### **11.3.2 Tree Harvesting**

The forestry practice of clearcutting will not be allowed within the Greenway System. Allowable cutting practices include the removal of trees determined to be threatening to human safety or structure(s) and those determined to be diseased. When such removal occurs, directional falling and/or feller-bunchers will be employed to allow removal with little disturbance to other vegetation. Slash and other forestry waste will not be left in the waters within the Greenway System. However, slash from allowable tree removal will be left within

Greenway Properties outside waters within the Greenway System in order to provide any habitat and/or forage benefits. Selective harvesting shall be more than fifty feet from any waters within the Greenway System, including wetlands. The City may authorize selective harvesting on a case-by-case basis, only if specifically requested by a private property owner as part of a conservation easement or if recommended by a qualified professional, due to safety issues noted during greenway inspections. Selective harvesting would be for up to 30% of the stem density, for stems greater than 5" dbh, at a harvest frequency not to exceed one harvest every 15 years; excluding lands the City has purchased as fee simple. Selective harvest shall represent the same variety and composition of the species present in the harvest area. Whenever removal occurs, the area will be replanted immediately with a native mixture of trees, shrubs, and groundcover determined, by a knowledgeable professional, to be appropriate for the particular site. Trees that fall of natural causes and do not extend beyond the Greenway System boundary will be left to provide habitat and in order to recycle nutrients. Reforestation shall be from regeneration hand planting or direct seeding, replenishing the same composition and variety of tree harvested (being the same as what was harvested).

At all times during allowable forestry practices, the BMPs established by the Georgia Forestry Commission in its Georgia's Best Management Practices for Forestry (latest edition, as of this writing the latest edition is dated January 1999) shall be followed.

### **11.3.3 Wetlands Within the Greenway System**

There will be no impact on wetlands within Greenway Properties in public or private ownership, except as specifically authorized by the City with recommendations from other responsible local government or agency following an evaluation of design and construction alternatives in accordance with the alternatives analysis process described in Appendix M, as a part of an approved construction plan for public utilities or as otherwise authorized by the City with recommendations from any other responsible local government and agency. All wetlands impacted will be restored to as close to their original condition as possible. Offsite mitigation shall comply with pertinent regulations and requirements.

### **11.3.4 Enforcement and Penalties**

Once a landowner has signed a conservation easement, he or she is bound to comply with the provisions detailed within that document. The responsibility of maintaining the property in accordance with the provisions of the conservation easement falls with the landowner when an easement has been executed. The responsibility of the City will be to determine if the landowner is indeed complying with the provisions of the easement.

When a landowner is found to be in noncompliance with the provisions of the conservation easement, the landowner will be required to correct the areas not conforming to the provisions of the conservation easement. The City or other responsible local government or agency will work with the landowner to ensure that the corrections are made in a satisfactory and timely manner by offering advice and assistance as needed. However, the burden of expense and correction will be the responsibility of the landowner. The City or other

responsible local government or agency may impose fines as necessary to enforce the correction of any noncompliance. Fines should typically be issued on a per day basis until the noncompliance is rectified to the satisfaction of the City. The amount of the fines should be set by the agency directing inspections. The money collected through imposed penalty fines will be used to pay for the cost of inspections or for education/assistance for landowners participating in the Greenway Acquisition Project.

#### **11.4 VEGETATION WITHIN THE GREENWAY SYSTEM**

Whenever erosion, disease, vandalism, or other conditions result in the loss of vegetation within the Greenway System, the area will be replanted as soon as possible with a mix of native species suited to the particular location. Exotic or foreign species of vegetation will not be used, despite potential positive qualities such as erosion control. Exotic species tend to be invasive and could potentially eradicate existing native vegetation in the area resulting in a loss of habitat and food source for local wildlife. Native vegetation has been found to be the most effective for maintaining water quality and often requires little maintenance. Since the Greenway System is to be left in a natural state, aesthetic qualities will not be of concern as they would be along a recreation-oriented greenway with trails and parks. Therefore, it is not necessary for the City to maintain a manicured landscape within the Greenway System. On the contrary, it is necessary that ecological systems be allowed to change over time in order to remain productive and healthy. The vegetation within the Greenway System will be allowed to grow and mature through the various stages of succession. This includes allowing fallen trees/limbs, which provide habitat and recycle nutrients, to remain in place and allowing species to grow and develop naturally through competitive exclusion with each other. The exceptions to this will be the eradication of diseased vegetation in the interest of ceasing the spread of the disease, the removal of dead/dying trees or limbs, which threaten human safety, or man-made structures, and the eradication of invasive, exotic plants. A knowledgeable professional such as a biologist, botanist, or forester will determine when disease or invasive species are present or when a tree has died and presents a threat. When conducting any selective cutting of vegetation or performing eradication practices, work crews will adhere to the BMPs established by the Georgia Forestry Commission.

The prevention of erosion is an objective of the Greenway Acquisition Project. Therefore, as soon as an unstable or eroded streambank is discovered it will be stabilized and replanted. This will involve using suitable, native species suited to the site conditions and following BMPs. Nonstructural approaches such as those practices used in bioengineering are preferable in order to maintain a natural state within the Greenway. The vegetation within the Greenway System will not be strictly groundcover or grass, especially along the stream bank. Trees are necessary along a stream edge for bank stabilization as well as to provide the needed shade for water temperature control. Shrubs, too, provide more shade and bank stabilization than simple groundcover. Vegetation protects stream corridor habitats and aids in the filtration of surface water runoff. For these reasons, replanting efforts will include a mix of trees and shrubs with groundcover while ongoing maintenance efforts will focus on preserving existing trees and shrubs.

Reforestation shall be from regeneration, hand planting, or direct seeding. Reforestation after an allowable cut shall be of the same composition and variety of tree harvested with the exception of when a disease-prone species has been selectively cut for disease eradication/control and, therefore, an alternative native species should be considered for replanting. Whenever replanting efforts occur, consideration will be given to variety and diversity of vegetation type as well as vegetation species. Planting a mix that includes shrubs, trees, and groundcover will produce a diverse vertical stratification. Vertical stratification provides a mix of habitats in addition to filtering runoff and retaining sediment. Using a variety of species of vegetation provides potential alternative food sources and protects against total vegetative loss if disease occurs within a single species. For information regarding specific species types recommended for use in planting efforts, see Section 5.0.

#### **11.4.1 Circumstances Requiring Revegetation**

Greenway Properties requiring replanting efforts include: areas washed bare due to erosion or other natural conditions; areas where vegetation has been eradicated due to human vandalism or other human interference; areas where disease or fire has killed vegetation; areas where invasive species have been removed leaving unvegetated or sparsely vegetated regions; areas where previous planting efforts have not been successful; areas where, regardless of the reason, vegetation was removed or destroyed leaving unvegetated or sparsely vegetated regions; and any other circumstance as determined by a qualified professional. A qualified professional (forester, biologist, botanist, or other such personnel) will be consulted by the City or other responsible local government or agency before any revegetative efforts are undertaken. Where vegetation is purposefully removed because of its invasive or diseased condition, alternatives to herbicides and pesticides will be used. The use of herbicides and pesticides presents an obvious threat to the water quality and could have the unintended consequence of killing vegetation considered to be beneficial as well as damaging wildlife. Removal of vegetation in the Greenway by selective harvesting, prescribed burn, or other non-chemical method will be used.

### **11.5 MAINTENANCE OF GREENWAY**

#### **11.5.1 Staffing Needs**

##### **11.5.1.1 Maintenance Personnel**

Personnel responsible for the maintenance of the Greenway System must have adequate training, including training in specific management procedures, user safety, stewardship, and emergency procedures. Personnel working in public access locations should have the same training background with the additional education in issues of policing, programming and special events, administration, and risk management. All training provided to personnel will be conducted by fully qualified and experienced land and facility managers. Professional associations and non-profit advocacy groups are often sources of training and can provide leads to suitably qualified consultants.

### **11.5.1.2 Inspectors**

Those conducting inspections will be knowledgeable of the goals and objectives of the Greenway Acquisition Project, as outlined in the Consent Decree and this document, and will have work experience and/or an educational background that provides them with an understanding of the natural functions expected of a riparian ecosystem in the southeastern United States. The inspectors will further be knowledgeable of the composition of easement agreements held on property being inspected. If the City or other responsible local government or agency does not have in-house personnel meeting these requirements, a qualified agency/individual will be retained to perform the inspections.

Public access and use areas and the edge of the Greenway System (both the side along the stream and the side that forms the interface between the Greenway System and the adjacent property) will be the most stressed areas. The stream edge of the Greenway System will receive continual wear from the flow of the stream's water as well as being subject to flooding and natural erosional forces. The edge forming the transitional area from a particular property's land use to the Greenway System will receive various types of environmental pressure depending on the type of land use conducted on the adjacent property. It is on these public access and exterior locations of the Greenway System that inspectors must be especially attentive to vegetation health and stability. It may be necessary to employ special design techniques to the transitional edge such as constructing berms or planting denser vegetation, which has the potential to better withstand sedimentation and runoff impacts.

Preventive maintenance will be stressed as it is of greater benefit to water quality for non-point source pollution problems to be controlled before they become severe. For this reason, problems noted through routine inspection will be immediately addressed through remedial maintenance actions recommended by the Greenway Inspector.

### **11.5.2 Maintenance Schedule-Routine and Remedial Actions**

Greenway Properties will be inspected by the City and/or a responsible local government or agency at a suggested minimum of twice a year. Inspecting the Greenway Properties during the winter, when vegetation has died back, will be important for checking streambank stabilization and potential erosion problems. Inspecting Greenway Properties during mid-summer will be important for checking the amount and vitality of vegetative growth. The City and/or a responsible local government or agency will conduct the minimum yearly inspections at times within the year that is beneficial for the purpose of the inspection and is suitable to the available man power and resources allocated to the Greenway System. Additional inspections would be beneficial as the potential for erosion or vegetation problems exists year round; these additional inspections will occur as time, manpower, and financial resources allow. If a routine inspection results in the recommendation of remedial maintenance actions, additional inspections will be necessary to verify that this work was conducted and completed satisfactorily. Regardless of the time of year during which an

inspection occurs, a set procedure will be followed to ensure that all aspects of a property's health and functions are checked at every inspection. Two types of maintenance practices will be conducted on Greenway Properties: routine maintenance and remedial maintenance.

### **11.5.2.1 Routine Maintenance Practices**

Routine maintenance practices will include the following activities:

- A. The removal of trash and debris that has been illegally dumped (such as household garbage, construction waste materials, used tires, and/or leaf/wood/garden wastes), as well as any similar type debris carried to the property via wind or runoff. All waste removed from the Greenway Properties will be managed in accordance with the regulations established by the Georgia Environmental Protection Division (EPD).
- B. Examination of the general condition of the property including: checking the health and vigor of the overall vegetation; noting any diseased vegetation; noting indications of fire; checking for erosion/sedimentation occurring along property streambank; checking the stability of the property streambank by noting any fallen trees/limbs, unusual sediment deposits, and/or general erosional wear of the bank; checking for the existence of unauthorized structures built on the shore; checking the health of large trees/overhanging limbs near any structure; checking for indications or prominence of non-native/invasive species; checking the condition of any Greenway signage; checking for signs of vandalism and trespassing; and checking for any unauthorized use of, as well as any unacceptable activity occurring on, Greenway property.
- C. Recording the condition of the Greenway Properties through inspection reports and/or a checklist and through photographs or video. All paper and visual materials relating to an inspection will be organized and kept as a log so that the history of a property is established and recorded. When possible, the landowner will accompany the inspector on the walk-through of the property. A copy of the inspection report will be sent to the landowner for his records. If noncompliance with easement agreements is found, then the landowner will be required to return a signed copy of the report as documentation that he/she has been notified of his/her noncompliance. The landowner will also be notified of any penalties as well as the corrective actions needed to remedy the noncompliance.

### **11.5.2.2 Remedial Maintenance Practices**

Remedial maintenance practices will involve the following activities:

- A. Cutting and removing diseased or dying trees/limbs which threaten human safety.

- B. Treating of diseased vegetation by harvesting, prescribed burn, biological controls, or other methods (with the exception of chemical treatment) determined appropriate by the Greenway Inspector.
- C. Replanting of cleared areas with native vegetation.
- D. Conducting bioengineering practices necessary to stabilize a streambank.
- E. Replacing or repairing damaged or lost signage.
- F. Any other major activity not easily conducted during the routine inspection.

All routine maintenance and remedial action measures will be performed following BMPs established by the Georgia Forestry Commission and in accordance with other authorities having jurisdiction.

It will be necessary for the Greenway Inspector to monitor the progress of a remedial action and to return to the site once such work is completed to verify that a noncompliance was corrected and work was conducted satisfactorily. The inspector will document all activities performed during all remedial action practices (see Sample Inspection Report at the end of this section).

### **11.5.2.3 Landowner Participation**

Owners of properties where the City holds a conservation easement will be notified one week prior to a scheduled inspection. The Greenway Inspector will notify the landowner of the date and time for inspection. If the landowner is available at the time of the inspection, he or she will be included on the walk-through of the property. As the person responsible for the upkeep of the property through easement agreements, the landowner will be made aware of conditions and standards that the City is looking for within the property (personally involving the landowner increases an understanding of maintenance responsibility).

If a property changes owners, the previous landowner will be responsible for notifying the realtor and all prospective buyers of the conservation easement and its requirements/restrictions. The landowner, before any final documents of sale are signed, must notify the City in writing of the sale and must name the new landowner. The City will then contact the new landowner and set up an appointment to discuss the easement and its requirements/restrictions.

## **11.6 EDUCATION**

The conservation easement agreement will contain clear language describing the responsibilities of the property owner. The City, or other responsible local government or agency, will provide educational opportunities to the property owners. Such education will focus on instructing the landowner in proper land management practices with an emphasis

on prohibited activities and practices. The education opportunities will also include relevant issues such as determining indications of erosion, diseased vegetation, and unstable stream banks. The landowner will be required to perform the necessary corrective measures once he/she determines that a problem exists within his/her property. As some problems may be beyond the resources of a landowner, such as unstable stream banks or rampant spread of vegetative disease, the City will provide assistance in correcting such problems. Providing instruction and assistance to owners of land within the Greenway System will be a necessary proactive measure towards preventing widespread noncompliance with easement agreements as well as preventing water quality problems. Once the Greenway System is established, the benefits will only be obtained through proper stewardship of these areas. It will be necessary to maintain a positive relationship between the monitoring agency and the landowner. The City, or other responsible local government or agency will make available to the landowner a contact source (inspector name or department name) and contact information (address and phone number) through which landowners can seek assistance.

Education will not be limited to owners of land within the Greenway System. The Greenway System will be advertised to the public in order to gain public support, to increase participation, to avoid trespassing or other violations by the public within Greenway property, and to encourage participating landowners to continue quality maintenance of their property. Public educational programs will focus on providing general information about the benefits of the Greenway System. Further educational efforts will focus on public access issues of establishing appropriate trail use, tolerance among different user groups, and the promotion of compliance with rules and regulations. All of these educational objectives can be obtained through effective use of signs, brochures, media coverage, public service ads, direct outreach to schools and user groups, and through special events.

A signage system within public facilities provides direct outreach to users of the trails and facilities and will be used to post rules and regulations. Major access points such as trailheads and parking facilities will have signs posting hours of operation for the facility as well as rules and regulations. Hours of operation will be limited to the time from dawn to dusk and trails will have specific appropriate and prohibited uses. This information will be prominently displayed on Greenway signage. Greenway signage will additionally promote environmental education and historic interpretation at appropriate sites along trails.

## **11.7 LAND WITH PUBLIC ACCESS FACILITIES**

Greenway properties providing public access, particularly multi-use trails, require the most intensive and sophisticated management and maintenance practices in order to protect and sustain the resource. An experienced parks and open space agency is perhaps best equipped and trained to deal with maintenance, management, and programming aspects of such facilities. The entity that develops a public access facility within the Greenway System will be responsible for maintenance of that facility using its own resources. Joint or cooperative arrangements between managing agencies may be required when the greenway crosses multiple jurisdictions. Maintaining uniform standards, policies, regulations, patrol, and

maintenance is more difficult when multiple jurisdictions are involved, underscoring the need for common management standards and procedures.

Nationally, there is precedent for management of public access facilities within a greenway system by non-profit groups, although this is not a common practice. Typically such groups are charged with the responsibility for management of a single purpose or special use (e.g. hiking or mountain bike) trail or type of public access. Multi-use trails or facilities that involve multiple jurisdictions frequently require policing, regulation, and risk management responsibilities that cannot or should not be delegated to a private entity. Nonetheless, non-profit organizations can provide useful auxiliary and support services to the management effort.

### **11.7.1 Maintenance of Properties with Public Access Facilities**

Maintenance of properties with public access facilities will include assessment and documentation of the condition of land, condition of barriers, condition of furnishings and signage, condition of trails, and other public improvement facilities. The establishment of baseline data regarding these same aspects is necessary to provide a comparison with which inspection findings are compared and contrasted. Maintenance inspection also serves to identify hazardous and potentially hazardous situations, which can be remedied immediately.

Maintenance of public facilities will also include a reporting system whereby users notify maintenance officials of potential problems. Reporting forms and suggestion boxes will be placed at major facilities such as parking areas and/or restroom buildings. The efficacy of this system will be dependent upon the regular checking of the boxes for notifications and the promptness of a response.

#### **11.7.1.1 Occasional Maintenance Requirements**

Occasional maintenance requirements will include the following activities:

- A. **Surface Repair:** Repair of trail surfaces is required to compensate for normal wear and tear and weathering as well as damage attributable to storms and vandalism. Soft surface footpaths will be checked for signs of overuse or erosion. For paved surfaces, subgrade deterioration contributes to surface defects and deterioration.
- B. **Surface Cleaning:** Sweeping and cleaning of paved trail surfaces will be required to remove accumulated debris. It will also be necessary to sweep trail shoulders when they are made of loose materials such as bark or gravel.
- C. **Structural Inspection:** Bridges, underpasses, and other trail structures will be inspected annually to make sure they are in safe condition.

- D. Drainage Systems: Trail drainage systems and structures will be inspected seasonally and following major storms to ensure that they remain functionally effective and free of blockage.
- E. Illumination: Where provided (usually in parking areas, at trail heads, road crossings, tunnels, underpasses, and restroom facilities) lighting fixtures will be periodically cleaned and bulbs replaced to maintain safe levels of illumination.
- F. Sight Distance and Clearance: Maintenance of adequate sight distances and clearance of visual obstructions will be necessary for safety along trails. Trees, shrubs, and other vegetation will require periodic trimming to maintain adequate sight distance and allow for annual growth. In wooded areas, overhead clearance must also be maintained.
- G. Signs and Markings: The condition of signs and trail markings will be periodically inspected for condition and legibility.

#### **11.7.1.2 Routine Maintenance Requirements**

Routine maintenance requirements will include the following activities:

- A. Mowing trail shoulders: Usually required for maintenance of paved multi-use trails to prevent pavement deterioration, obstruction of required clearance, or limitation of safe sight distance. Mowed trail margins will be held to the minimum width required to accomplish the foregoing objectives. In no case will the mowing of trail margins infringe on or otherwise impede or impair riparian buffer functions.
- B. Litter and debris removal: Litter and debris removal will be required on a continual basis to maintain safe conditions for trail use and to prevent the development of dump sites.
- C. Emptying trash receptacles: Emptying of trash receptacles will be done on a regular basis. Full trash receptacles may contribute to littering problems elsewhere on the trail and contribute to a poor public perception of the trail and Greenway program.
- D. Cleaning and maintaining restrooms: Cleaning and maintaining restrooms will be done on a regular basis. Poorly maintained restrooms will contribute to a poor public perception of the trail and the Greenway Project and may invite vandalism, littering, and other abuse of the trail and Greenway System.
- E. Maintaining trail furnishings: Maintaining trail furnishings will be required to protect the value of the investment in rest area furniture, trail signage, interpretive exhibits, and control structures and devices. As is the case in all maintenance items, a well maintained trail and Greenway System will convey the image of a safe and

comfortable place for the public to be and deters vandalism and potential criminal activity.

- F. Spot pruning and vegetation removal: Spot pruning and vegetation removal will be required to remediate vegetative encroachment into safety clearance zones or obstruction of safe sight distance. Pruning and vegetation removal will be performed in a manner that does not impair or destroy vegetative riparian buffer zones.
- G. Removal of fallen trees: Removal of fallen trees will be required to maintain trail user safety and manage risk. Fallen trees that interfere with trail use, required sight distance, or safety clearance areas will be removed as soon as possible to reduce liability for injury to trail users and to avoid adverse impact attributable to user detours around fallen tree obstacles. Fallen trees may be left or placed along footpaths if necessary to deter bicycle use.
- H. Vandalism repair: Vandalism repair will be required to maintain a good perception of the facility by users and to deter copy cat vandalism.

## **11.7.2 Safety and Security**

Providing safe, secure, and comfortable trails and public access facilities will be the principal means of avoiding user conflicts, managing risk, and promoting Greenway stewardship. The more intensively a trail or access facility is used, the greater is its need for safety enhancement. Multi-use, paved trails are at the top of the hierarchy in regards to safety needs. Clearly indicating rules and regulations (including appropriate and prohibited activities) as well as adequate trail design, will assist in separating incompatible uses within multi-use segments of the Greenway System. Fines or other types of enforcement actions that are to be employed within the Greenway System will also be prominently posted. Fines and enforcement actions will be determined by the managing authority with consideration given to local laws and input from a Safety and Security Committee.

### **11.7.2.1 Regulations for Consideration within the Greenway System**

Regulations for consideration within the Greenway System will include the following:

- A. Keep right except when passing.
- B. Travel at a reasonable speed and in a consistent manner.
- C. Look ahead and behind before passing.
- D. Pass slower traffic on the left.
- E. Give a clear warning signal before passing.

- F. Yield to oncoming traffic when passing.
- G. Keep all pets on a short leash.
- H. Be courteous to trail neighbors.
- I. Move off the trail when stopped.
- J. Yield to other users when entering and crossing the trail.
- K. Motorized vehicles are prohibited (except electric wheelchairs).
- L. Alcoholic beverages and illegal drugs are not permitted on Greenway property.
- M. Firearms, fireworks, and fires are not permitted on Greenway property.
- N. Facilities are closed from sunset to sunrise.
- O. Littering is not permitted on Greenway property.
- P. Disturbance of vegetation, destruction of trail facilities and amenities, and any type of vandalism will not be permitted on Greenway property.

Limiting the hours of operation from the time between dawn to dusk with all possible entries gated and locked after-hours will aid in policing efforts. Prohibiting activities such as swimming, motorized vehicles (including motorized watercraft), hunting, consumption of alcohol, and lighting of fires furthers Greenway safety by avoiding potential emergency situations. Trespassing can be avoided through the publication of maps clearly designating the extent of public access from non-accessible Greenway property. These methods will be employed within the public access portions of the Greenway System to promote safety and security.

#### **11.7.2.2 Threats to the Safety of Trail Users**

Threats to the safety of trail users can be attributed to several causes including the following:

- A. Collisions.
- B. Inappropriate or irresponsible behavior.
- C. Poor judgement on the part of users.
- D. Unsafe conditions.
- E. Poor maintenance.

F. Unsafe design.

G. Natural hazards.

Adequate geometric design of trails and other public access facilities will be employed to reduce the risk of collision. Careful design and implementation of signage, trail markings, and warning systems is usually sufficient to protect trail users from unsafe conditions and natural hazards. Threats to user safety attributable to poor judgement, inappropriate behavior, and the irresponsibility of others may require educational, regulatory, and enforcement measures in addition to good design practice.

The design component of user safety on multi-use trails will recognize and allow for the varying requirements of different user types. In urban settings, likely trail users include pedestrians, skaters, runners, and bicyclists. The nature and potential for conflict may vary by user type and trail location. In urban settings user conflicts typically involve interactions among pedestrians, skaters, and cyclists and are a factor of the respective differences in travel speed and physical space required for movement and maneuvering.

Established emergency procedures will be needed for public access facilities. Formal procedures will be established for response to medical emergencies, fires, floods, storms, and other such situations. All staff will be made thoroughly familiar with the procedures as well as individual responsibilities. The procedures will clearly designate responsibilities and lines of authority for response to the various types of situations that may arise. All staff will be trained in basic first aid and Cardio-Pulmonary Resuscitation (CPR). When a medical emergency arises, two staff members will be required to respond, one person to stay with the victim and one to summon assistance. Written documentation will be required of all injuries or situations requiring staff intervention.

The riparian nature of the Greenway System presents the opportunity for users of the trails and facilities to come in contact with surface water and any water borne contaminants that are present. Such contact carries potential health risks. The risk will be managed by regular monitoring of water conditions and providing warning to users of both risks and threats to the public health. In some cases it may be necessary to close a facility to public access. Such monitoring and warning will be the responsibility of the entity that develops the public access facility(s). Specific methods, policies, and procedures for maintaining public health will be developed with input from a Safety and Security Committee as discussed below.

The establishment of a Safety and Security Committee provides a means to include the property owners adjacent to public access facilities with the process of developing the safety and security program. Committee membership will include representatives from neighborhoods, local businesses, police and fire departments, parks department, schools, public health officials, facility users, and other interested individuals. This Committee can take a lead in developing trail user rules and regulations, establishing a "Trail Watch" program, establishing emergency response procedures as well as in developing and

monitoring maintenance and inspection procedures. In addition the Safety and Security Committee may develop and review formal safety procedures, including ongoing review of incidents and reports as well as suggestions for improvement of safety. Any safety procedures developed for use within publicly accessible portions of the Greenway System will be documented in manual form and formally adopted by the entity that develops the public access facility. These manuals will be used in training programs of Greenway staff.

### **11.7.3 Facility Design**

The design of public access facilities must support the objectives of the Greenway Acquisition Project. In general, facilities will be designed to foster resource protection. Where public access is provided, care will be taken in the design of facilities to avoid adverse impact on the protected resources. Good facility design can prevent user conflicts and consequent management problems. The following are some general design guidelines that have proven effective in minimizing user conflicts and preventing resource degradation attributable to inappropriate use of public access facilities:

- A. Provide sufficient trail mileage to meet demand.
- B. Separate user types on different trails, when possible.
- C. Separate user types on the same trail or facility, when possible.
- D. Provide a centerline stripe on heavily trafficked, multi-use trails to help users expect two-way traffic.
- E. Speed control designs are applicable in circumstances where visibility is limited or where mountain bikes share limited trail space with pedestrians. Design treatments intended to control speed include providing variations in the trail surface, adding frequent (but not sharp) turns and eliminating superelevation in turns.
- F. Design trails to provide adequate sight distances.
- G. Design trails wide enough for safe passing. Provide areas for the slowest users to pull off the trail and allow faster users to pass.
- H. Limit vehicular access to Greenway. Where vehicular access is necessary, provide gates and locks, bollards or similar devices to prevent unauthorized vehicular access at night.
- I. Limit access to engineered restoration projects where necessary.
- J. Design trails and facilities to provide suitable access points for emergency medical and rescue units.
- K. Clearly fence and sign potentially dangerous facilities and areas.

- L. Other design considerations include: provision of adequate sight distances, safe curve radii, elimination of hazardous obstacles, adequate trail markings, safety signs, lighting (where needed), and adequate control of vehicular access.

#### **11.7.4 Patrolling of Public Access Locations**

The frequency, nature, and limits for patrol of an area can vary substantially depending on location and facility type. The patrol mission will focus first on protecting public safety and secondly on protection and preservation of the resource. The patrol function can also be used to meet the objectives of public information and education, promotion of stewardship, and Greenway System advocacy. The provision of appropriate and adequate safety and security measures will be the responsibility of the entity that develops the public access facility(s).

In order to achieve any of the foregoing objectives it is necessary to have committed, well funded, properly equipped and motivated safety patrols. The patrol function can be provided by a variety of means. Local law enforcement agencies are usually the initial recourse considered. Traditional law enforcement agencies are well equipped and trained to deal with all the basic public safety and property protection issues that are likely to be encountered in Greenway System management. However, many law enforcement agencies are reluctant to commit scarce manpower resources to patrol when routine demands seem to be more pressing concerns. When local law enforcement agencies are considered for use in patrolling a greenway, the issue of jurisdiction is sometimes a concern. Since the Greenway System, both with and without public access, could be viewed as areas of questionable jurisdiction by officers and agencies, it is necessary to clearly resolve matters related to jurisdictional boundaries and shared responsibilities prior to opening facilities to public access. Such issues are particularly important in the case of public access facilities and trails that cross multiple jurisdictional boundaries. Law enforcement agencies and authorities need to be assured of adequate authority to do the job.

Bicycle police are ideal for public access trails. However, patrolling the Greenway System does not necessarily need to be the exclusive domain of formally trained law enforcement personnel. There are roles that can be fulfilled by volunteers. The entity that develops public access facilities will be responsible for providing appropriate maintenance and security.

#### **11.7.5 Community Involvement**

Public access areas and multi-use trails can benefit substantially from a community involvement program designed to build support for and provide volunteer service to the Greenway Acquisition Project. Landowners adjacent to trails or other public access areas are often initially opposed to public access. Such opposition is often attributable to fear and concern for the apparent threat to personal safety of private property represented by the traffic of “unknown persons” through the area. Such concerns are not well founded in the national experience; rather encouraging trail use by bona fide users has the effect of establishing a neighborhood watch system and actually may serve as a deterrent to crime. Both trail side

residents and local police forces in areas with trails and other greenway access facilities have reported that, at a minimum, trails and other public access facilities do not cause any additional crime.

Resolving the concerns of abutting property owners and those of others in the vicinity of public access facilities is a key component of a successful management strategy. Establishing a Safety and Security Committee provides a means to include the neighbors with the greatest concern in the process of developing the safety and security program. Committee membership should include representatives from neighborhoods, local businesses, police and fire departments, the parks department, and any other interested groups and individuals. The Safety and Security Committee can take the lead in developing trail user rules and regulations, establishing a “Trail Watch” program to promote safety and security, establishing emergency response procedures as well as in developing and monitoring maintenance and inspection procedures. In addition the Committee can provide management information by conducting ongoing research and evaluation to identify any needed or desired changes in established programs.

Volunteers will be an essential adjunct to the management of the public access components of the Greenway System. Potential sources of volunteers include community service organizations, Boy and Girl Scouts, fraternal organizations, students, retired persons, community advocacy groups, and environmental interest groups. Volunteer efforts will be particularly useful in trail maintenance, monitoring, public education, and interpretive programs. Though essential in promoting stewardship of and maintaining interest in the Greenway Acquisition Project, volunteer programs are subject to problems of variability in the availability of volunteers and the quality and consistency of their workmanship and effort. Volunteer programs require effective management and on-going recruitment, supervision, training, and outfitting with tools and other equipment.

A commitment to community involvement will promote stewardship, care, and preservation of the Greenway System. Greenway System stewards should include management agency staff, concerned citizens, community leaders, and elected officials.

## **11.8 MANAGEMENT GUIDELINES FOR RESTORATION PROJECTS**

The following articles detail maintenance guidelines for restoration projects.

### **11.8.1 Maintenance Standards for Retention Ponds**

The following maintenance standard are proposed for retention ponds:

- A. Retention ponds shall be maintained in accordance with the standards defined in the latest edition of the City of Atlanta, Georgia, Stormwater Management Design Manual.
- B. The site shall be inspected and debris removed after every major storm.

- C. Debris shall be removed from inlet and outlet structures and from areas of potential clogging.
- D. Sediment shall be removed when 20% of storage volume of the facility is filled. Benchmarks for sediment will be required. Sediment traps shall be cleaned when filled.
- E. The outlet works and principal spillway shall be kept structurally sound, free from erosion, and functioning as designed.
- F. No woody vegetation shall be allowed to grow on the embankment without special design provisions.
- G. Other vegetation shall be cut when it exceeds 18 inches in height unless it is a part of the planned landscape.
- H. Periodic removal of dead vegetation shall be performed.
- I. An annual inspection shall be performed and reports shall be kept by the City of Atlanta or other responsible local government or agency.

#### **11.8.2 Maintenance Standards for Constructed Wetlands**

- A. Constructed wetlands shall be maintained in accordance with the standards defined in the latest edition of the City of Atlanta, Georgia, Stormwater Management Design Manual.
- B. The site shall be inspected (and debris removed) after every major storm to ensure that the wetland is functioning as designed.
- C. Debris shall be removed from the inlet and outlet structures and from areas of potential clogging.
- D. The sediment forebay shall be cleaned every 2 to 5 years. Sediment from pocket wetlands without sediment forebays shall be cleaned whenever the sediment has accumulated to a depth of six inches or twice annually. Once the sediment is removed, the soil shall be tilled a minimum of 6 inches. Sediment traps shall be cleaned when filled. Periodic drawdowns to expose the soil shall be performed between sediment removals.
- E. The ponded water area shall be maintained by raising the elevation of the water level in the permanent pond by raising the height of the orifice in the outlet structure, or by removing accumulated solids by excavation.

- F. Water levels may need to be supplemented or drained periodically until newly planted vegetation is fully established.
- G. To permanently remove pollutants from the wetland, contaminated sediment shall be removed from the wetland. The bottom and above ground biomass shall be harvested. The contaminated materials shall be disposed of in a proper manner.
- H. No woody vegetation shall be allowed to grow on the embankment. The embankment and access areas shall be moved twice a year.
- I. Banks shall be maintained to prevent erosion.
- J. The outlet works and principal spillway shall be kept structurally sound, free from erosion, and functioning as designed.
- K. Additional reinforcement plants shall be planted after one or two growing seasons to replace species.
- L. Harvesting wetland plants shall be done prior to plant dieback in the fall season. The harvesting process will include the dewatering of the marsh, followed by the manual scything of the plants, and on-site or off-site disposal. This process may require a wetland or storm water permit before performing the harvesting.
- M. Other vegetation shall be cut when it exceeds 18 inches in height unless it is a part of the planned landscape. Planned trees shall be periodically pruned and maintained when needed.
- N. Periodic removal of invasive vegetation shall be performed when necessary.
- O. An annual inspection shall be performed. Inspection reports shall be kept by the City or other responsible local government or agency.

### **11.8.3 Maintenance Standards for Storm Drain Outlet Protection (Riprap Aprons)**

- A. Storm drain outlet protection shall be maintained in accordance with the standards defined in the latest editions of the Manual for Erosion and Sediment Control in Georgia and the City of Atlanta, Georgia, Stormwater Management Design Manual.
- B. Riprap outlet structures shall be inspected after heavy rains to see if any erosion around or below the riprap has taken place or if stones have been dislodged.
- C. Failing structures shall be repaired or replaced immediately.

### **11.8.4 Maintenance Standards for Grade Stabilization Structures (Hydraulic Weirs)**

- A. Grade stabilization structures shall be maintained in accordance with the standards defined in the latest editions of the Manual for Erosion and Sediment Control in Georgia and the City of Atlanta, Georgia, Stormwater Management Design Manual.
- B. During inspections, debris that can cause blockage or turbulence shall be removed. Structures shall be inspected for cracking or evidence of impending failure.
- C. Failing structures shall be repaired or replaced immediately.

#### **11.8.5 Maintenance Standards for Check Dams**

- A. Check dams shall be maintained in accordance with the standards defined in the latest editions of the Manual for Erosion and Sediment Control in Georgia and the City of Atlanta, Georgia, Stormwater Management Design Manual.
- B. Check dams shall be inspected after every storm event to ensure that they are functioning as designed. Repairs shall be made immediately. Stone shall be added as necessary to maintain design height and cross section.
- C. Sediment and debris shall be removed when it reaches a depth of one-half the original dam height or before.
- D. If the area is to be mowed, check dams shall be removed once final stabilization has occurred. Otherwise, the check dam may remain in place permanently. Immediately after the check dam has been removed, the area below the dam shall be seeded and mulched.

#### **11.8.6 Maintenance Standards for Vegetated Waterways (Grassed Swales)**

- A. Vegetated waterways shall be maintained in accordance with the standards defined in the latest editions of the Manual for Erosion and Sediment Control in Georgia and the City of Atlanta, Georgia, Stormwater Management Design Manual. Material for waterways construction shall be limited to grass/vegetative and associated linings.

#### **11.8.7 Maintenance Standards for Natural and Synthetic Linings**

- A. Natural and synthetic linings shall be maintained in accordance with the standards defined the latest editions of the Manual for Erosion and Sediment Control in Georgia and the City of Atlanta, Georgia, Stormwater Management Design Manual.
- B. Natural and synthetic linings shall be maintained in accordance with the standards provided by individual product manufacturers. Inspections shall be performed during the first year after large storm events to repair any damages or to reseed.

#### **11.8.8 Maintenance Standards for Vegetative Channel Stabilization**

- A. Vegetative channel stabilization projects shall be maintained in accordance with the standards defined in the latest editions of the Manual for Erosion and Sediment Control in Georgia and the City of Atlanta, Georgia, Stormwater Management Design Manual.
- B. The channel banks shall be inspected after every high-water event. Gaps in the vegetative cover shall be repaired immediately with new plants. Fresh cuttings from other plants may be used for repairs. Mulching shall be used where necessary.
- C. When fertilizer is applied on the surface, approximately one-half of the quantity desired shall be applied at the time of planting, one-fourth shall be applied when new growth is observed, and one-fourth shall be applied about six weeks later.
- D. Debris and dead vegetation shall be removed as necessary.
- E. High water marks shall be monitored.

#### **11.8.9 Maintenance Standards for Structural Channel Stabilization**

- A. Structural channel stabilization shall be maintained in accordance with the standards defined in the latest editions of the Manual for Erosion and Sediment Control in Georgia and the City of Atlanta, Georgia, Stormwater Management Design Manual.
- B. Periodic inspections shall be performed for signs of undercutting or excessive erosion at transition areas.
- C. Failing structures shall be repaired or replaced immediately.

#### **11.8.10 Maintenance Standards for Temporary Seeding, Permanent Vegetation and Sod**

- A. Temporary seeding, permanent vegetation, and sod shall be maintained in accordance with the standards defined the latest edition of the Manual for Erosion and Sediment Control in Georgia.
- B. Areas closest to the stream shall be maintained with minimal impact.
- C. During periods of drought, as well as during the first year after planting, watering may be necessary. Watering shall be applied at a rate not causing runoff or erosion. The soil shall be thoroughly wetted to a depth that will insure germination of temporary seeding.

- D. Permanent grasses shall not be mowed during quail nesting season, between May and September. Sericea lespedeza shall be mowed only after frost (between November and March) to ensure that the seeds are mature. Bermudagrass, Bahiagrass, and Tall Fescue shall be mowed as desired (except during quail nesting season). At least 6 inches of top growth shall be maintained under any use and management.
- E. New sod shall be mowed sparingly. The grass height shall not be cut less than 2 to 3 inches or as otherwise specified in the latest edition of the Manual for Erosion and Sediment Control in Georgia. Agricultural lime and fertilizer shall be applied to sodded areas as indicated by soil test.
- F. Weeds shall be controlled using the least toxic herbicides or non-chemical mechanisms, where feasible.
- G. The planted areas shall be monitored to determine if any plant materials need to be replaced.

#### **11.8.11 Maintenance Standards for Bioengineering Techniques**

- A. Bioengineered areas shall be maintained in accordance with the standards defined in the latest edition of the Manual for Erosion and Sediment Control in Georgia.
- B. Dead plants shall be replaced after each growing season until the vegetation can maintain itself.
- C. The following functions shall be performed annually: grasses shall be mowed, invasive weeds shall be removed, and trees shall be pruned to ensure that the stabilization techniques are functioning as intended and to control large storm events.

### **11.9 CONSTRUCTION GUIDELINES FOR NEW UTILITIES WITHIN THE GREENWAY SYSTEM**

#### **11.9.1 General**

The Standard Operating Procedures (SOPs) presented in Appendix M shall be followed during the design, construction, and land restoration of new utilities within the Greenway System. The SOPs shall be incorporated into each conservation easement held by the City, or other responsible local government or agency, on all Greenway System property. In the case of construction by the City within the Greenway System, the provisions of this Article shall be followed. In the case of construction by other utilities, whose construction activities are not otherwise subject to City regulations, the City will use its best efforts to obtain the subject utilities' agreement to adhere to the provisions of this section and the SOPs presented

in Appendix M. In the absence of such agreement, an encroachment permit, as described in Appendix M, shall not be issued.

If a situation arises where utility construction activities are causing or adding to non-point source pollution, or are otherwise incompatible with the purpose of the Greenway Acquisition Project, the City shall ensure that the construction activities are modified to satisfy the purpose of the Greenway Acquisition Project or such construction activities shall be terminated.

## **11.10 MAINTENANCE OF EXISTING UTILITIES WITHIN THE GREENWAY SYSTEM**

### **11.10.1 General**

The Standard Operating Procedure (SOPs) presented in Appendix N shall be followed during maintenance of existing utilities within the Greenway System. In the case where a utility has a pre-existing right-of-way on proposed Greenway property, the utility must enter into an agreement with the City to comply with all requirements of this section and the SOPs presented in Appendix N; in the absence of such agreement, the City shall ensure that the property containing the utility right-of-way shall not become part of the Greenway System.

# SAMPLE INSPECTION REPORT

## City of Atlanta Greenway Acquisition Project Monitoring Form

1. Date of Inspection: \_\_\_\_\_
2. Date of Last Inspection: \_\_\_\_\_
3. Parcel Identification: Parcel ID Number \_\_\_\_\_  
Street Address: \_\_\_\_\_  
City County
4. Size (in acres or length and width in feet): \_\_\_\_\_
5. Current Landowner: Name \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone: \_\_\_\_\_
6. Name(s) of Inspector (s): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

### ***INSPECTION FINDINGS:***

7. Did the landowner accompany the inspector on the property inspection?  
 Yes  No
8. Did the inspector note any possible violations of the easement agreement? Be Specific  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
9. Did the inspector record the property inspection with photographs?  
 Yes  No If the answer is yes number and identify with description of each Photograph.

10. Describe the condition of the greenway property: \_\_\_\_\_

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a. Describe appearance of vegetation (note: fallen trees/limbs, indications of diseased vegetation, indications of rampant weed/exotic plant growth, general state of health and growth, indications of natural disturbance-flood, wind, fire damage):

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b. Describe appearance of streambank and stream channel (note: signs of eroding bank, fallen trees, sediment deposits, trash in water, any human or natural disturbances of channel or bank):

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c. Other Remarks: \_\_\_\_\_ indications of vandalism \_\_\_\_\_ trespassing  
\_\_\_\_\_ siting of significant species \_\_\_\_\_ condition of greenway signage  
etc. \_\_\_\_\_

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11. Note current uses of surrounding property: \_\_\_\_\_

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12. Note permitted activities the landowner has conducted on property since last inspection (replanting, bank stabilization, etc.) \_\_\_\_\_

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13. Note activities the monitoring agency/city has conducted on property since last inspection: \_\_\_\_\_

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14. General Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

15. Recommendations for remedial maintenance action(s) based on inspection findings (if any). See also "Recommendations" section at end of report.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

16. Did the inspector(s) conduct any routine maintenance procedures, beyond observation, during this site visit? \_\_\_\_\_ Yes \_\_\_\_\_ No Be specific. (e.g. removal of debris, etc)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

***HISTORICAL DATA:***

17. Date conservation easement on property was acquired: \_\_\_\_\_  
18. Length of time property in present ownership: \_\_\_\_\_  
19. Name of previous owner: \_\_\_\_\_  
20. Note any change in surrounding properties uses: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Inspector(s) Signature: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Landowner's Signature: (if applicable): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**RECOMMENDATIONS:**

If remedial maintenance actions were recommended in Item 15, use the space below to record specifics of actions:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

List actions(s) recommended and problem(s) these actions are to correct:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

If the problem requires major remedial actions (e.g. shoreline stabilization), specify: how City of Atlanta or other government or agency is assisting landowners, any regulations governing the operation and applicable permits, person responsible for managing operation:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Date action(s) begun: \_\_\_\_\_

Date of completion: \_\_\_\_\_

Was the action carried out in a timely manner, following applicable regulations and BMPs, and to the general satisfaction of the inspector? \_\_\_\_\_ Yes \_\_\_\_\_ No

List specific problems, if any. \_\_\_\_\_  
\_\_\_\_\_

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Signature of Inspector(s) of Remedial Maintenance work:

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Did the City of Atlanta, landowner, or other party (name person or agency) conduct the work?

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Other comments: \_\_\_\_\_

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## **12.0 PROPOSED CRITERIA FOR MEASURING THE ENVIRONMENTAL AND PUBLIC HEALTH BENEFITS RESULTING FROM THE IMPLEMENTATION OF THE GREENWAY SYSTEM**

### **12.1 OVERVIEW**

With the completion and final realization of the Greenway System, there should be measurable environmental and public health benefits that result. Some of these benefits will be relatively easy to measure, while others will be difficult. It is the purpose of this section to propose certain criteria, or measurable environmental parameters, which may be of value in assessing these benefits. Some benefits will accrue which will be difficult, if not impossible, to quantify. Article 12.2 presents the proposed criteria for measuring environmental and public health benefits. Following the completion of the Implementation Phase of the Greenway Acquisition Project, the City will prepare a description of readily apparent environmental and/or public health benefits (if any) including a quantification of pollution reduction and other benefits (if feasible). This description will be included in the Greenway Acquisition Project Completion Report due within 120 days following completion of the Implementation Phase. Results obtained through the monitoring or measurement of environmental and public health benefits will not be an indication of the City's compliance with the Consent Decree, nor will the results be indicative of the City's performance in implementing the Greenway Acquisition Project.

### **12.2 PROPOSED CRITERIA FOR MEASURING THE ENVIRONMENTAL AND PUBLIC HEALTH BENEFITS**

The City proposes the criteria presented in Table 12-1 to be used to measure the environmental and public health benefits. There, undoubtedly, will be other benefits that may result after the implementation of the Greenway Acquisition Project. Such benefits may include the following: lowered and more stabilized water temperature, more stabilized pH, clearer streams, more stabilized and higher dissolved oxygen concentrations, reduced risk from water-borne diseases, fewer water-borne fecal coliform bacteria, increased biodiversity of organisms, lower concentrations of non-point source pollutants, increase in the numbers of darters and minnows, recovery of viable populations of federally listed threatened and endangered species, recovery of viable populations of mussels and snails, improved air quality, and improved public health due to increases in recreational activities.

The City realizes that the condition of the water quality and the aquatic and stream corridor habitats will be influenced not only by the Greenway System but also on the types and concentrations of point and non-point source pollutants from upstream sources and the types of activities immediately adjacent to the Greenway System. Although the Greenway System may offer some contribution to the benefits listed above, it is difficult if not impossible to directly link the realization of any of the benefits listed above to the establishment of the Greenway System. Furthermore, any attempt to investigate the contribution of the Greenway System on the benefits listed above would be cost prohibitive and the end result would be meaningless data that cannot be linked directly to the Greenway System. Table 12-1 presents the criterion/condition to be measured, the environmental and public health

benefit associated with each criterion/condition, and the methods of measurement for each criterion/condition.

<b>Table 12-1 Proposed Criteria for Measuring Environmental and Public Health Benefits Resulting from the Implementation of the Greenway Acquisition Project</b>		
<b>Criterion/Condition</b>	<b>Benefit/Method of Determination</b>	<b>Unit of Measurement</b>
Streambank Stabilization	More stabilized stream banks and/or less siltation and sedimentation in the stream beds; measured by visual evidence of streambank vegetation where little or none existed previously and documented via photographs and/or video tapes.	Linear feet
Streambank Vegetation	More native plants in previously sparsely vegetated or denuded stream banks; measured by visual observation and documented via photographs and/or video tapes.	Linear feet
Wetlands	More created wetlands within the Greenway System; measured by visual observation and documented via photographs and/or video tapes.	Square feet
Hiking and Jogging Trails	Establishment of hiking and jogging trails (by other entities) where none existed; measured by visual observation and documented via photographs and/or video tapes.	Linear feet
Canoe/Kayaking Ramps	Establishment of ramps where none existed; measured by visual observation and documented via photographs and/or video tapes.	Number
Aesthetics	Restoration of ecologically impaired areas with little or no aesthetic value to those with enhanced aesthetic value; measured through visual observation and documented via photographs and/or video tapes.	Linear feet
Buffer Zone Vegetation	Healthy vegetation within the Greenway System, measured by visual observation and documented via photographs and/or video tapes.	Linear feet

<b>Table 12-1 Continued</b>		
Bioassessment	Benthic macroinvertebrates measured by EPA's RABP's on three restoration sites (See Article 12.2.1)	Number of species and number of individuals
<b>Criterion/Condition</b>	<b>Benefit/Method of Determination</b>	<b>Unit of Measurement</b>
Sedimentation/Erosion Reduction	Use of rebar stake in streambank, upstream and downstream of three restoration sites	Linear feet

### 12.2.1 Procedures to be Followed for Bioassessment of Benthic Macroinvertebrates

While it is difficult, if not impossible, to directly link any changes in the benthic macroinvertebrate community to the establishment of the Greenway Acquisition Project, the City will attempt a bioassessment of benthic macroinvertebrates at three locations within the Greenway System. During the early stages of the Implementation Phase, three sites acquired for purposes of construction of streambank restoration projects will be selected for a bioassessment survey. Before construction of the selected streambank stabilization projects begins, a survey of benthic macroinvertebrates will be conducted. The benthic macroinvertebrate survey will be conducted by a knowledgeable professional via collection at three locations, along each of the streambanks to be restored, during different seasons of the year. The collection locations will be fixed locations at three different stream cross-sections. The recommended times of year for benthic macroinvertebrate collection are February, June, and October. Once construction of the restoration project is completed and associated vegetation established, the bioassessment survey will be repeated. For procedures of conducting the bioassessment, the City will follow the EPA's Rapid Bioassessment Protocol III (RABP III) for benthic macroinvertebrate fauna. The pre-construction collection results will be compared with the post-construction results and will be included with the other data outlined in Table 12-1 in the Greenway Acquisition Project Completion Report.

### 12.3 REFERENCES

- A. Plafkin, W.S., M.T. Barbour, K.D. Porter, S.K. Gross, and R.M. Hughes. Rapid bioassessment protocols for use in streams and rivers: Benthic Macroinvertebrates and Fish. U.S. Environmental Protection Agency. EPA/440/4-89/001. Assessment and Watershed Protection Division, Washington, D.C. 1989.

## **13.0 IMPLEMENTATION PLAN AND SCHEDULE**

### **13.1 OVERVIEW**

The implementation of the Greenway Acquisition Project will involve the acquisition of properties through donations, conservation easements, and/or fee simple purchase as well as the design and construction of restoration projects along acquired properties. Donations of stream corridor properties and/or conservation easements will also be accepted and incorporated into the Greenway System. The City will encourage the participation of public and quasi-public entities to donate part of their stream corridor properties outright or through conservation easements to the City or other responsible local governments or agencies, to manage Greenway Properties within their jurisdictions, and to participate as land acquisition or restoration partners. The following is a suggested procedure for property acquisition: Donations of properties will be sought first. If the property owner is unwilling to donate the property, then a donation of a conservation easement will be sought. If the property owner is unwilling to donate a conservation easement, then the City will attempt to buy a conservation easement at a bargain sale. If the property owner is unwilling to sell a conservation easement at a bargain sale, the City will then attempt to buy the conservation easement at fair market value. If the property owner is unwilling to sell a conservation easement at fair market value, then the City will attempt to buy the property at a bargain sale. If the property owner is unwilling to sell the property at a bargain sale, then the City will attempt to buy the property at the fair market value. If the property owner is unwilling to sell the property at fair market value, then the City will proceed to the next prioritized parcel. The proposed budget can be used to acquire properties using any of the methods identified above.

Section 4.0 discusses the Proposed Greenway System and Section 5.0 discusses the proposed restoration projects. The estimated cost to acquire all the properties located within the prioritized tracts (Appendix E) plus the estimated cost to design and construct all proposed restoration projects is greater than the financial resources available for the Greenway Acquisition Project. Therefore, it is reasonable to assume that only a part of the prioritized tracts and some of the proposed restoration projects will be in place at the end of the implementation period (December 2000 through March 2007). In order to identify the Greenway System configuration and restoration projects that will be in place at the end of the implementation period, one would have to know the locations and actual costs of properties and conservation easements that will be sold at bargain prices or fair market value, the locations of properties and conservation easements that will be donated, the locations as well as design and construction costs of restoration projects that will be implemented, and the total cost of other activities associated with the implementation of the Greenway System. Since these factors are unknown at this time, the City proposes to establish an implementation schedule identifying time periods when certain stream segments will be targeted for acquisition. Restoration projects will only be considered after a property is acquired. Table 13-1 (found at the end of this section) presents the proposed implementation schedule that will be used as a guide during the Implementation Phase.

The basic acquisition process for properties is presented in Section 9.0. Properties within

Priority 1 Tracts will be the primary target of the acquisition process. The feasibility of implementing a specific restoration project will only be evaluated after the property on which it is to be located is acquired. If it is determined that the construction of a specific restoration project within an acquired property is feasible, the design of that restoration project will commence. “Soft” engineering techniques (the use of living plants and plant debris) shall be the preferred method used to stabilize eroded stream banks. Hard engineering techniques shall only be used after soft techniques have failed and the failure was due to the inability of soft techniques to address the erosion problem. Improper choice of soft engineering techniques or improper design, implementation, and/or maintenance shall not be a justification to turn to hard engineering techniques. The City will seek recommendations from other responsible local governments and agencies throughout the investigation, design, and construction of restoration projects. The budget for implementing restoration projects (see Section 14.0) will not be exceeded without approval from EPA/EPD.

### **13.2 TASKS TO BE COMPLETED DURING THE IMPLEMENTATION PHASE**

The tasks listed below will be completed during the Implementation Phase. The City, at its own discretion, may retain outside firms to assist with the implementation of the Greenway Acquisition Plan and the management of acquired properties. As indicated in Section VIII.C.3 of the Consent Decree, the SAC will review the submissions of the consultant(s) and provide advice and make recommendations to the City regarding the development, management, and implementation of the Greenway Acquisition Project, including the acquisition of land or interest therein and restoration projects. The tasks to be completed include the following:

- A. Contact affected property owners to schedule meetings.
- B. Conduct individual meetings with affected property owners to explain the purpose of the Greenway Acquisition Project and to inform them that their properties are targeted for the Greenway System.
- C. Implement an education/outreach strategy, including preparation and delivery of educational material to affected landowners and their professional advisors, concerning land use and disposition.
- D. Advise affected property owners about the Greenway Acquisition Project and its importance to protecting water quality and aquatic and stream corridor habitats.
- E. Advise affected property owners of the tax benefits of donations of property and conservation easements.
- F. Advise property owners on how they can participate in the Greenway Acquisition Project through donations of properties, donations of conservation easements, selling properties or conservation easements at a bargain sale, or selling properties or conservation easements at fair market value.

- G. Negotiate restrictions and draft acquisition documents with affected property owners.
- H. Perform boundary surveys and appraisals of targeted properties.
- I. Perform Environmental Site Assessments on targeted properties before closing acquisition transactions.
- J. Administer land registry (if established).
- K. Prepare legal descriptions on all acquired properties.
- L. Close and record all acquisition transactions.
- M. Hold title on all fee simple acquisitions.
- N. Hold conservation easements on all properties acquired as conservation easements.
- O. Perform feasibility studies for proposed restoration projects after Priority 1 properties are acquired.
- P. Design and construct restoration projects on acquired properties.
- Q. Perform periodic inspections (as outlined in Section 11.0 of this document) on all acquired properties and conservation easements to ensure that they are maintained in a manner consistent with the purpose of the Consent Decree.
- R. Review and approve all designs and construction activities for public access facilities within the Greenway System.
- S. Review and approve all design and construction activities for utilities within the Greenway System.
- T. Update the database of targeted properties periodically.
- U. Prepare semi-annual progress reports as required by the Consent Decree.
- V. Prepare the Final Greenway Acquisition Project Completion Report as required by the Consent Decree

### **13.3 PROPOSED IMPLEMENTATION SCHEDULE**

Table 13-1 presents the proposed implementation schedule for the Greenway Acquisition Project Implementation Phase. As indicated in Table 13-1, the Implementation Phase has been divided into three phases. Pilot Phase (January 2001 through December 2002), Phase I (January 2003 through December 2004), and Phase II (January 2005 through March 2007). The Greenway Study Area can be divided into three areas in which

the City is to consider acquisition: the South River, the Chattahoochee River upstream of its confluence with Utoy Creek, and the Chattahoochee River downstream of its confluence with Utoy Creek. The Consent Decree specifically requires that at least 15 percent of the acquisition funds be spent within the latter area. During the Pilot Phase, the City will select at least one Priority 1 stream segment within each of these areas in which acquisition is likely to be successful and will actively seek to acquire the necessary property interests within each such stream segment. The proposed implementation schedule is designed such that Priority 1 stream segments will be targeted, for acquisition, in the three areas identified above during each phase of the implementation period. During the Implementation Phase, circumstances may render prioritized lands, within one of the three areas described above, unavailable for acquisition. When this situation occurs, the City will consider land of a lower priority or non-prioritized lands within that area for acquisition without having exhausted prioritized acquisition opportunities in the other two areas. This approach is proposed in order to promote environmental justice and geographic diversity. The City will ensure that at least 15% of the funds in the Greenway Account, amounting to \$3,750,000.00 (0.15 x \$25,000,000.00), will be used to acquire Greenway Properties located along the Chattahoochee River corridor, south of Utoy Creek.

The first two years of the Implementation Phase (Pilot Phase) will be of crucial importance to the success of the Greenway Acquisition Project. The Pilot Phase has the potential to set the precedent for the project's success and public acceptance. Therefore, public outreach and successful ventures will be key in establishing a positive momentum for subsequent acquisition activities.

The proposed implementation schedule presented in Table 13-1 includes an identification of the stream segments to be targeted during each phase of the Implementation Phase. The following criteria was used to determine the acquisition priorities for various stream segments. The more criteria a stream segment met, the higher the acquisition priority it received. The proposed implementation schedule is designed to allow the City maximum flexibility to take advantage of and respond to changing situations. Sufficient Priority 1 properties are available to accommodate donations, bargain sales, changing land values, and refusals to sell.

Priority 1 stream segments to be targeted during each phase have been selected based on the following criteria, beginning with the segments determined to best meet all or most of the criteria:

- A. Stream segments where properties received relatively high points in the technical criteria ranking (received a mean score of 42-65).
- B. Community (individuals or businesses) eager to participate.
- C. Publicity within and visibility to the general public.
- D. Short-term likelihood of development.

- E. Opportunity to work with developer prior to finalization of development plans or construction.
- F. Partnership opportunity with local jurisdictions or other agencies or funding sources.
- G. Little or no potential conflicts with surrounding landuses.
- H. Stream segments within the Chattahoochee River corridor south of Utoy Creek; stream segments within the Chattahoochee River corridor north of Utoy Creek; and stream segments within the South River corridor. Additionally, stream segments should:
  - 1. Contain an attribute essential to the segment's importance as priority, such as endangered/threatened/species of concern; wetlands; potential to reduce nonpoint source pollution; etc.
  - 2. Present the potential of an acquisition that would enhance and support other ongoing or planned water quality, open space, and/or natural resource protection projects.
  - 3. Present the potential of an acquisition that would serve multiple Greenway Acquisition Project objectives and/or multiple projects in addition to the Greenway Acquisition Project (such as those undertaken by other entities that are similar to the Greenway Acquisition Project).
  - 4. Present the potential of an acquisition that would provide or extend continuity of protected streamside property.

<b>TABLE 13-1</b>		<b>PROPOSED IMPLEMENTATION SCHEDULE</b>		
<b>Time Period</b>	<b>Targeted Stream Segments</b>			
	<b>Chattahoochee River Corridor North of Utoy Creek</b>	<b>Chattahoochee River Corridor South of Utoy Creek</b>	<b>South River Corridor</b>	
<b>Pilot Phase:</b> January 2001 Through December 2002	<ul style="list-style-type: none"> <li>● <b>North Utoy Creek:</b> 0.2 mile upstream of Beecher Road to Fairburn Road</li> <li>● <b>Proctor Creek:</b> Bankhead Avenue to Kerry Circle</li> <li>● <b>South Fork Peachtree Creek:</b> Wildwood Urban Forest (located within the segment between Lenox Road and Cheshire Bridge Road)</li> <li>● <b>South Utoy Creek:</b> 0.3 mile upstream of Delowe Drive to the Cascade Nature Preserve</li> <li>● <b>South Utoy Creek:</b> Cascade Nature Preserve to Harbin Road</li> </ul>	<ul style="list-style-type: none"> <li>● <b>Dog River:</b> Wert Road To Rock Road</li> <li>● <b>Sweetwater Creek:</b> Hirman-Lithia Road to Old Alabama Road</li> </ul>	<ul style="list-style-type: none"> <li>● <b>South River:</b> 100-acre woods; I-75 to Brown's Mill Golf Course</li> <li>● <b>South River:</b> Constitution Lakes (Moreland Avenue to the confluence with Intrenchment Creek)</li> <li>● <b>Intrenchment Creek:</b> Downstream of the Custer Avenue CSO facility to Woodland Avenue</li> </ul>	
<b>*Phase I:</b> January 2003 Through December 2004	<ul style="list-style-type: none"> <li>● <b>Chattahoochee River:</b> 0.9 miles downstream of Paces Ferry Road to the confluence with Peachtree Creek</li> <li>● <b>Clear Creek:</b> I-85 to the confluence with Peachtree Creek</li> <li>● <b>Nancy Creek:</b> I-75 to the confluence with Peachtree Creek</li> <li>● <b>Peachtree Creek:</b> Power line R.O.W. near Hyde Manor Drive to the confluence with the Chattahoochee River</li> <li>● <b>Proctor Creek:</b> 0.7 mile downstream of Hollywood Road to the confluence with the Chattahoochee River</li> </ul>	<ul style="list-style-type: none"> <li>● <b>Dog River:</b> Liberty Road to Post Road</li> <li>● <b>Camp Creek:</b> Park Terrace Crossing to Camp Creek Parkway</li> </ul>	<ul style="list-style-type: none"> <li>● <b>Intrenchment Creek:</b> Key Road to the confluence with the South River</li> <li>● <b>South River:</b> Brown's Mill Golf Course to Moreland Avenue</li> <li>● <b>South River:</b> I-75 to Lakewood Park (headwater tributary)</li> </ul>	
<b>*Phase II:</b> January 2005 Through March 2007	<ul style="list-style-type: none"> <li>● <b>Nancy Creek:</b> 0.1 mile downstream of Tilly Mill Road to I-285</li> <li>● <b>Nancy Creek:</b> Beginning at Murphy Candler Park to the end of the Marist School property</li> <li>● <b>Peachtree Creek:</b> Northside Drive to Howell Mill Road</li> <li>● <b>Peachtree Creek:</b> North Peachtree Road to the beginning of Atlanta Memorial Park (north side only)</li> <li>● <b>Peachtree Creek:</b> 0.14 miles downstream of the MARTA crossing to the confluence with Clear Creek</li> <li>● <b>South Fork Peachtree Creek:</b> Lenox Road to Chesire Bridge Road (excluding the Wildwood Urban Forest)</li> <li>● <b>South Fork Peachtree Creek:</b> Valley Brook Road to South Fork Peachtree Nature Preserve</li> <li>● <b>South Fork Peachtree Creek:</b> 0.4 miles downstream of the Stone Mountain Freeway crossing to the second Stone Mountain Freeway crossing</li> </ul>	<ul style="list-style-type: none"> <li>● <b>Anneewakee Creek:</b> Bomar Road to 0.1 mile downstream of the power line R.O.W.</li> <li>● <b>Bear Creek (east):</b> Herndon Road to Hodgood Road</li> <li>● <b>Camp Creek:</b> I-285 to 0.5 mile upstream of Butner Road</li> <li>● <b>North Dog River:</b> Liberty Road to the confluence with Dog River</li> <li>● <b>Snake Creek:</b> Jones Mill Road to 1.2 miles downstream of Route 5</li> <li>● <b>Wolf Creek:</b> West Carroll Road to State Route 5</li> </ul>	<ul style="list-style-type: none"> <li>● <b>Honey Creek:</b> Mall Parkway to the confluence with the South River</li> <li>● <b>South River:</b> Confluence with Intrenchment Creek to Waldrop Road</li> <li>● <b>South River:</b> 0.8 mile upstream of Snapfinger Road to 1.5 miles downstream of Snapfinger Road</li> </ul>	

\*The implementation team will continue with any remaining acquisitions from a previous phase before proceeding to new stream segments.

## **14.0 PROPOSED BUDGET FOR IMPLEMENTATION OF THE GREENWAY ACQUISITION PROJECT**

### **14.1 OVERVIEW**

The financial resources available for the Greenway Acquisition Project consist of \$25 million (plus accrued interest) deposited in the Greenway Account as follows: \$4 million on March 31, 1999 and \$3 million each year for 7 years beginning March 31, 2000 until March 31, 2006. The following tasks are eligible to receive funding from the Greenway Account:

- A. Preparation of the Greenway Acquisition Plan.
- B. Management, coordination, and land acquisition activities.
- C. Acquiring Greenway properties and conservation easements and implementing restoration projects (restoration projects are subject to approval by EPA/EPD following review and comment by the SAC).

Until all the implementation activities are completed, it is impossible to predict the exact amounts of money that will be spent on each of the tasks eligible to receive funds from the Greenway Account. This is due, in part, to the following reasons:

- A. The amount of land or conservation easements that will be donated to the Greenway Acquisition Project is unknown.
- B. The amount and cost of land or conservation easements that will be sold at bargain prices are unknown.
- C. The actual cost of individual properties or conservation easements that will be acquired during the Implementation Phase is unknown.
- D. The actual cost for the design and implementation of restoration projects is unknown.
- E. The actual costs associated with all implementation activities are unknown.

The following articles present the activities to be performed for each of the tasks eligible for funding under the Greenway Acquisition Project. Each task has been assigned a projected budget based on the anticipated level of effort or value associated with the activities to be performed under that task. It is likely that the actual amounts of money spent under individual tasks will be different from the projected budget. During the Implementation Phase, the City will monitor the projected budget closely and, if necessary, make adjustments to ensure that the project is implemented efficiently and cost effectively.

Since the total amount of accrued interest cannot be realistically projected at the time of the writing of this document, the overall projected budget shown at the end of Article 14.4 does not include accrued interest.

## **14.2 PREPARATION OF THE GREENWAY ACQUISITION PLAN**

The preparation of the Greenway Acquisition Plan included the following activities:

- A. Preparing the Draft Greenway Acquisition Plan.
- B. Coordinating the participation of the SAC relating to the Greenway Acquisition and the Stream Cleanup Projects.
- C. Public education and information program along with the environmental justice effort.
- D. Reviewing and incorporating comments from the EPA/EPD into the Final Greenway Acquisition Plan.

**TOTAL BUDGET \$2,730,000.00**

A cost breakdown for the above activities performed during the preparation of the Greenway Acquisition Plan is presented at the end of this section.

## **14.3 MANAGEMENT, COORDINATION, AND LAND ACQUISITION ACTIVITIES**

The management and coordination of all implementation activities will be necessary to ensure the timely and appropriate compliance with the proposed milestone schedule. The acquisition of properties for the Greenway System will involve a procedural process of notification, presentation of information, negotiation, documentation, and reporting. The management, coordination, and land acquisition will include the following activities:

- A. Ensuring that the Greenway Acquisition Project is implemented in accordance with the guidelines established in the Consent Decree and this document.
- B. Coordinating and supporting SAC activities.
- C. Tracking the Greenway Acquisition Project implementation budget.
- D. Tracking the percentage of Greenway area developed for public access or use to ensure compliance with the 10% limitation.
- E. Leveraging with other greenway initiatives.
- F. Updating the data associated with targeted properties.
- G. Contacting affected property owners.

- H. Conducting meetings with affected property owners.
- I. Conducting individual meetings and negotiating restrictions and draft acquisition documents with affected property owners.
- J. Advising owners of stream corridor properties about the tax and other benefits associated with donations of property or conservation easements to the City or other responsible local government or agency.
- K. Performing boundary surveys.
- L. Performing appraisals.
- M. Performing Phase I Environmental Site Assessments.
- N. Closing transactions.
- O. Preparing legal descriptions of acquired properties.
- P. Preparing semi-annual progress reports.
- Q. Monitoring environmental and public health benefits resulting from the implementation of the Greenway System.
- R. Preparing the Final Greenway Acquisition Project Completion Report.

**TOTAL PROJECTED BUDGET \$5,207,618.00**

The projected cost estimates for the activities to be performed during the implementation of the Greenway Acquisition Plan (Pilot Phase, Phase I, and Phase II) is presented at the end of this section.

**14.4 PROJECTED BUDGET FOR ACQUIRING PROPERTIES AND CONSERVATION EASEMENTS AND IMPLEMENTING RESTORATION PROJECTS**

- A. Acquiring properties and conservation easements: \$20,250,000.00
- \*B. Implementing restoration projects (restoration projects are subject to approval by EPA/EPD following review and comment by the SAC): \$2,250,000.00

**TOTAL PROJECTED BUDGET \$22,500,000.00**

**NOTE:** At least \$3,750,000.00 will be spent on the Chattahoochee River corridor south of Utoy Creek in accordance with Article VIII.D.2.j.v of the Consent Decree which states that at least 15% of the funds in the Greenway Account are to be used to acquire

Greenway Properties located along the Chattahoochee River corridor, south of Utoy Creek.

\*This is a proposed expenditure as the City has exceeded the 10% budget for development, management, and implementation. The City will not spend any of the \$25 million Greenway Project budget on restoration projects without prior approval from the EPA/EPD following review and comment by the SAC.

**OVERALL PROJECTED BUDGET    \$30,437,618.00**

Due to the unknown factors regarding acquisition of properties and implementation of restoration projects, the City can only present projected budget estimates as determined through best professional judgement. It is impossible, at this time, to determine the actual costs associated with specific implementation activities. It is probable that the actual costs will differ from the projected budget estimates presented in this section. The City will, however, make every effort to stay within the projected budget estimates presented in this section. The Semi-Annual Progress Reports will contain detailed information on the costs included for various activities performed during the reporting period.

**BUDGET FOR THE CITY OF ATLANTA  
GREENWAY ACQUISITION PROJECT  
PLAN DEVELOPMENT PHASE OF WORK**

**Task A: Preliminary Activities**

Developed a base map with suitable scale for analysis, presentation, and reporting; obtained aerial photographs, tax maps, and ownership database; and obtained and developed a GIS coverage.

**Task Total . . . . . \$77,159.50**

**Task B: Project Planning and Coordination**

Coordinated various work activities; reviewed all information collected; coordinated database, report, and map production; coordinated and assisted with public participation; Coordinated informal input from various groups and agencies; incorporated appropriate public/agency input into plan; and compiled diverse plan components into unified planning document(s).

**Task Total . . . . . \$280,624.00**

**Task C: Water Quality Services**

Investigated non-point sources and erosion to meet water quality goals of the Greenway Acquisition Project. Collected existing available relevant data; developed water quality criteria for evaluating and prioritizing properties; performed a water quality assessment including identifying sources of non-point source pollution within the project area; identified parcel-specific water quality considerations; developed land management guidelines; and developed overall water quality priorities and other benefits.

**Task Total . . . . . \$354,072.63**

**Task D: Land Development and Planning**

Examined land use and development, aesthetic, and access issues and public health issues. Collected existing available relevant data; established land development and planning criteria for prioritizing properties (fee or easement); identified existing land use; identified potential locations of public access projects; identified environmental education opportunities; prepared descriptions of the types of potential public access projects, including design and construction standards to minimize environmental impacts; and performed field reconnaissance of selected areas along designated rivers.

**Task Total . . . . . \$296,670.50**

**Task E: Vegetation, Wildlife, and Cultural Resource Services**

Investigated habitat, vegetation, and wildlife including wetlands, endangered, threatened and/or sensitive species, and quality of aquatic habitat. Collected available relevant existing data, developed habitat and wildlife criteria for prioritizing properties, and developed implementation strategies for habitat/vegetative maintenance needs. Identified vegetative filtering/pollution reduction capacity; identified restoration needs, opportunities, and priorities; developed cost estimates and schedule for proposed restoration projects and maintenance needs; and developed criteria for evaluating vegetation, wildlife, and cultural resources benefits associated with the implementation of the Greenway Acquisition Project.

**Task Total ..... \$132,968.00**

**Task F: Property and Real Estate Services**

Performed detailed analysis of the properties within the identified corridors including an evaluation of the current land use within 500 feet of stream bank and an analysis of the relative merits of fee vs. easement acquisition methods. Developed inventory of parcel size, location, length along watercourse, lateral distance from stream bank, and other relevant parcel-specific data. Developed a Model Conservation Easement; developed management strategies for conservation easements; developed strategy of management of acquisition process; and developed cost estimates for proposed land/easement acquisition.

**Task Total ..... \$123,725.50**

**Task G: Public Participation Services**

Assisted CH2MHILL/TOC, Inc. in the coordination of the SEP Advisory Committee (SAC); attended SAC meetings throughout the duration of the project; coordinated media efforts; made presentations for various groups and organizations; and prepared and reviewed periodic project summaries and updates.

**Task Total ..... \$104,774.00**

**Task H: Preparation of the Greenway Acquisition Plan**

Compiled existing information; prepared inventory maps; established Greenway Corridor boundaries; established overall priority criteria; developed goals and objectives; consolidated inventory and assessment of properties; applied prioritization criteria to properties; identified preferred Greenway Properties targeted for acquisition or protection through conservation easements; prepared

Greenway maps; consolidated design and construction standards for Greenway Corridor; prepared overall implementation strategies; compiled proposed budget and phasing; and prepared Draft and Final Greenway Acquisition Plan.

**Task Total . . . . . \$372,640.75**

**Task I: Documents and Plans to be Prepared**

Prepared analysis maps; prepared maps by drainage basin of proposed Greenway System; prepared maps for use in public participation meetings, SAC meetings, and presentations to the City of Atlanta; and prepared other working documents and maps as needed and requested.

**Task Total . . . . . \$131,961.50**

**Expenses: Printing, travel, reproduction costs, etc. . . . . \$122,209.45**

**Total needed to complete task..... \$ 105,874.17**

Developing and coordinating response to EPA/EPD comments until final plan approval is received.

**GRAND TOTAL FOR PLAN DEVELOPMENT. . . . . \$2,102,680.07**

**SAC Support**

Quarterly Meeting Support.....\$59,625  
 Greenway Acquisition Subcommittee .....\$45,755  
 Projected Cost for SAC Support..... \$20,000  
**Task Total.....\$125,380**

**Environmental Justice Activities**

Community Presentations.....\$29,679  
 Environmental Justice Subcommittee.....\$22,445  
 Projected Cost for Environmental Justice Activities.....\$20,094  
**Task Total.....\$72,218**

**Public Outreach Effort**

Community Workshops/Meetings.....\$ 68,788  
 Educational Materials.....\$156,285  
 Projected Cost for Public Outreach Effort.....\$ 5,000  
**Task Total.....\$230,073**

**Program Management & Subconsultant Coordination.....\$199,648.94**

**Total Expenditures.....\$2,730,000**

**CITY OF ATLANTA GREENWAY ACQUISITION PROJECT IMPLEMENTATION  
TASK AND PROPOSED COST SUMMARY**

	Phase			Task Totals
	Pilot	I	II	
<b>Task A: Project Management and Coordination</b>				
<ul style="list-style-type: none"> <li>• Communicating and reporting Greenway Acquisition activities to the City</li> <li>• Coordinating Greenway Acquisition activities</li> <li>• Data provision and mapping</li> <li>• Monitoring the 10% public access or use limitation</li> <li>• Monitoring the 15% expenditure requirement for the Chattahoochee River corridor south of Utoy Creek</li> <li>• Archiving acquisition data in hard copy and GIS</li> </ul>				
<b>Task A Totals</b>	\$286,320	\$300,636	\$315,668	\$902,624
<b>Task B: Negotiation and Acquisition</b>				
<ul style="list-style-type: none"> <li>• Preparing and sending contact letters</li> <li>• Negotiating donations and conservation easements</li> <li>• Negotiating fee simple acquisitions</li> <li>• Performing title searches</li> <li>• Performing surveys</li> <li>• Performing appraisals</li> <li>• Performing appraisal reviews</li> <li>• Coordinating estimated just compensation</li> <li>• Performing Phase I Environmental Site Assessments</li> <li>• Performing asbestos sampling</li> <li>• Preparing closing documents</li> <li>• Preparing and transmitting completed files</li> </ul>				
<b>Task B Totals</b>	\$284,344	\$298,561	\$313,489	\$896,394
<b>Task C: Public Relations, SAC Coordination, and Fund Raising</b>				
<ul style="list-style-type: none"> <li>• Preparing and distributing brochures</li> <li>• Conducting SAC meetings</li> <li>• Conducting property owner education</li> <li>• Conducting public education</li> <li>• Preparing grant requests</li> <li>• Soliciting private donations</li> </ul>				
<b>Task C Totals</b>	\$141,184	\$148,243	\$155,655	\$445,082
<b>Task D: Restoration Project Implementation</b>				
<ul style="list-style-type: none"> <li>• Performing feasibility studies</li> <li>• Performing design of restoration projects</li> <li>• Performing construction management of restoration projects</li> </ul>				
<b>Task D Totals</b>	\$116,000	\$121,800	\$127,890	\$365,690

**CITY OF ATLANTA GREENWAY ACQUISITION PROJECT IMPLEMENTATION  
TASK AND PROPOSED COST SUMMARY (Continued)**

	Phase			Task Totals
	Pilot	I	II	
<b>Task E: Preparation of EPA/EPD Reports</b>				
• Collecting data needed for the preparation of semi-annual progress reports				
• Preparing semi-annual progress reports and submitting them to the EPA/EPD, Citizen Plaintiffs, City, and public repositories				
• Collecting and analyzing data related to public and environmental health				
• Collecting data needed to prepare a Final Greenway Acquisition Project Completion Report				
• Preparing the Final Greenway Acquisition Project Completion Report and submitting it to the EPA/EPD, Citizen Plaintiffs, City, and public repositories				
<b>Task E Totals</b>	\$59,136	\$62,093	\$65,197	\$186,426
<b>Other Direct Costs</b>				
• Appraisals	\$148,050	\$155,453	\$163,225	\$466,728
• Title and closing	\$88,830	\$93,272	\$97,935	\$280,037
• Negotiations	\$111,037	\$116,589	\$122,418	\$350,044
• Mileage	\$5,000	\$5,250	\$5,513	\$15,763
• Reproduction and transmittal of maps and reports	\$5,000	\$5,250	\$5,513	\$15,763
• Property surveys	\$400,000	\$420,000	\$441,000	\$1,261,000
• Laboratory analysis	\$2,000	\$2,100	\$2,205	\$6,305
• Other miscellaneous expenses	\$5,000	\$5,250	\$5,513	\$15,763
<b>Expense Totals</b>	<b>\$764,917</b>	\$803,164	<b>\$843,321</b>	<b>\$2,411,402</b>
<b>Grand Totals</b>	<b>\$1,651,901</b>	<b>\$1,734,497</b>	<b>\$1,821,220</b>	<b>\$5,207,618</b>
<b>Overall Project Total</b>				<b>\$5,207,618</b>

# **APPENDIX M**

## **CITY OF ATLANTA GREENWAY ACQUISITION PROJECT**

### **STANDARD OPERATING PROCEDURES FOR THE DESIGN, CONSTRUCTION, AND LAND RESTORATION OF NEW UTILITIES WITHIN THE GREENWAY SYSTEM**

**Prepared By:**



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## 1.0 INTRODUCTION

The following Standard Operating Procedures (SOPs) shall guide entities proposing to construct sewers and/or other utilities within the Greenway System. The purpose of these SOPs is to ensure that the design and construction of sewers and/or other utilities is consistent with the requirements of the Consent Decree and the Greenway Acquisition Plan.

This document presents SOPs for the following activities:

- A. Design and construction alternatives analysis process.
- B. Greenway System Encroachment permit.
- C. Design of new utilities.
- D. Construction of new utilities.
- E. Restoration of Greenway Properties disturbed during construction of new utilities.
- F. Training of personnel involved in construction of new utilities within the Greenway System.

These SOPs are designed to minimize erosion and sedimentation within Greenway Properties by:

- A. Focusing on design options that seek to prevent or minimize erosion and sedimentation.
- B. Minimizing the quantity and duration of soil exposure during construction of utilities.
- C. Protecting critical areas during construction by reducing the velocity of and/or redirecting runoff.
- D. Installing and maintaining erosion and sediment control measures during construction.
- E. Restoring disturbed properties by establishing vegetation immediately following completion of construction.
- F. Inspecting the utility rights-of-way and maintaining erosion and sediment control measures as necessary until disturbed properties are restored.

These SOPs do not replace existing utility-specific guidelines for design and construction of new utilities, or restoration of utility rights-of-way after construction, but do establish

minimum requirements for such activities on Greenway Properties. These SOPs do not limit the City, or other responsible local government or agency, from imposing additional or more stringent requirements to control erosion and/or sedimentation.

As stated in Section VIII.D.2.m of the Consent Decree, “Any infrastructure for human activity within the Greenway Properties shall be designed and constructed with prevention of non-point source pollution as the primary consideration”. This does not mean that prevention of non-point source pollution is the sole consideration. This means that cost or other factors will not outweigh non-point source pollution prevention as the primary concern. Only safety design consideration shall be as important as non-point source pollution prevention.

## **2.0 DESIGN AND CONSTRUCTION ALTERNATIVES ANALYSIS PROCESS**

All entities proposing to construct sewers and/or other utilities that infringe on the Greenway System must evaluate the following alternatives before any construction can begin. The evaluation of alternatives should demonstrate to the City, and other responsible local government or agency, that there is no feasible alternative to placing the utility in the Greenway System and that the requirements of the Consent Decree are met. Impacts to the Greenway System must be minimized to the maximum extent. The analysis shall include consideration of alternative routes, tunneling, and force mains (for sanitary sewers). The analysis shall also consider the sensitivity of the property being impacted such as, presence of wetlands, significant habitats, and Greenway acquisition priority.

The following alternatives are listed in order of priority:

1. Construction outside the Greenway System.
2. Tunneling under the Greenway System.
1. Construction in the Outer Zone (100'-greenway boundary) of the Greenway System.
4. Construction in the Middle Zone (50'-100') of the Greenway System.
5. Construction in the Inner Zone (0'-50') of the Greenway System.
6. Construction in the Stream Bed.

The alternative analysis process must implement the Consent Decree provision that the project will be designed with the prevention of non-point source pollution as the primary consideration. This does not mean that prevention of non-point source pollution is the sole consideration. This means that cost or other factors will not outweigh pollution prevention as the primary concern. Only safety design consideration shall be as important as non-point source pollution prevention. If sewers and/or other utilities must be

constructed within the Greenway System, approval must be given by the City and other responsible local government or agency.

If, after the design and construction alternatives have been evaluated, it is determined that there is no feasible alternative to constructing the utility within the Greenway System, an encroachment permit shall be submitted to the City and other responsible local government or agency for review.

### **3.0 GREENWAY SYSTEM ENCROACHMENT PERMIT**

In order to receive approval to construct utilities within the Greenway System, an “Encroachment” permit must be submitted to the City and other responsible local government or agency. The encroachment permit must be approved by the City with recommendations from other responsible local government or agency before any construction can begin. The permit application shall contain the information listed below:

- A. Name, address, and telephone number of the applicant.
- B. A description of the project and project location including stream segment, section, range, and township.
- C. A description of the methods which will be used for erosion and sediment control on the site.
- D. A description, including plans and specifications, of how the site will be restored after construction is completed.
- E. A description of how stormwater will be handled.
- F. A schedule of regular inspections and repair of erosion and sediment control structures.
- G. The Encroachment Permit must include a Land-Disturbing Activity Plan. This plan shall include a brief narrative description of the overall project, detailed maps, drawings and sketches, activity schedule for each phase of land-disturbing activity and supportive data. The Land-Disturbing Activity Plan must also describe the best management practices (BMPs) for erosion and sediment control for the project and demonstrate that the BMPs meet the minimum requirements of this section and the latest edition of the Manual for Erosion and Sediment Control in Georgia, and will be effective for the specific stream corridor conditions of the project. In addition, the Land-Disturbing Activity Plan must include the following:
  1. Required construction start and completion dates to minimize construction during the rainy season.

2. A plan for inspections to ensure BMPs are properly maintained and are effective throughout the project.
3. Installation techniques for BMPs such as silt fence, and requirements to remove any BMPs from the stream or Greenway properties that remain after project completion.

For complete requirements of a Land-Disturbing Activity Plan see the latest edition of the Manual for Erosion and Sediment Control in Georgia.

As part of the Encroachment Permit application process, the applicant must agree to notify the City and other responsible local government or agency before construction begins inside the Greenway System, so City and other responsible local government or agency can inspect the construction site to ensure that adequate erosion and sediment control measures are in place prior to construction and maintained until the project is completed and the site restored.

#### **4.0 DESIGN OF NEW UTILITIES**

The entity proposing to construct a new utility within the Greenway System shall be responsible for the design and preparation of construction contract documents (plans and specifications). All utilities shall be designed with prevention of non-point source pollution as the primary consideration. The construction contract documents shall include drawings and specifications describing erosion and sediment controls that shall be used during construction including best management practices (BMPs) to be implemented. BMPs shall meet the minimum requirements established in this document.

#### **5.0 CONSTRUCTION OF NEW UTILITIES**

##### **5.1 PERMITS, VARIANCES, AND PLANS**

It is the responsibility of the entity proposing to construct new utilities within the Greenway System to determine what permits, plans, or variances are required for construction activities. For example, the State of Georgia may have requirements under their General Storm Water Permit Program or Fulton County may require a Stream Buffer Variance and a Land Disturbance Activity Permit. Requirements may vary from one jurisdiction to another. Therefore, it is imperative that the entity proposing to construct new utilities has a clear understanding of local requirements.

##### **5.1.1 State of Georgia General Storm Water Permitting**

At the time of the writing of this document, construction projects that are five (5) acres or larger in size require coverage under the State of Georgia NPDES, General Permit GAR100000, for authorization to discharge storm water associated with construction activities. One of the construction activities this permit authorizes is the discharge of storm water associated with construction activities from linear construction that will

result in the disturbance of more than five (5) acres. As stated in the permit “‘Linear Construction’ or ‘Linear Construction Project’ means construction activities that are not part of a common development and where the length of the project is at least 25 times longer than the width of the project and the construction activity is being conducted by the Georgia Department of Transportation, by a local government, or by a utility company or utility contractor”. It is the responsibility of entity proposing to construct a new utility within the Greenway System to determine if they need to apply for coverage. Application is made by submittal of a Notice of Intent (NOI) and a permit fee to:

Northwest Georgia Regional Office  
Georgia Environmental Protection Division  
Suite 114  
4220 International Parkway, Suite 101  
Atlanta, GA 30354  
Telephone (404) 675-6240

The NPDES general construction permit requires the use of Best Management Practices (BMPs) to control stormwater runoff for all rainfall events up to and including a 25-year 24-hour rainfall event. BMPs used shall be consistent with, and no less stringent than, those practices contained in the Manual for Erosion and Sediment Control in Georgia published by the State Soil and Water Conservation Commission as of January 1 of the year in which the land-disturbing activity is permitted. For some sites, additional BMPs beyond those identified in the Manual may be necessary for erosion and sediment control for all rainfall events up to, and including, a 25-year 24-hour rainfall events.

To ensure compliance with State water quality standards, the general permit requires inspections of the construction site as well as sampling and analysis of stormwater runoff from the site. The permit also requires daily recording of on-site precipitation. Detailed requirements for inspection and sampling are provided in the general permit. The guidelines set forth in this document and the latest edition of the Manual for Erosion and Sediment Control in Georgia will be used in conjunction with the State general permit to ensure that the best possible procedures are used for erosion and sediment control.

### **5.1.2 Stream Buffer Variance**

The State of Georgia Environmental Protection Division (EPD) enforces minimum stream buffer requirements. At the time of the writing of this document the EPD’s requirements prohibit construction activities within a 25-foot buffer along the banks of all state waters or within a 50-foot buffer along the banks of any state waters classified as ‘trout streams’ (the State of Georgia Department of Natural Resources maintains the most current stream classifications). The Director of the EPD may grant a variance that is at least as protective of natural resources and the environment as provisions described in Title 12-7-6 of the Official Code of Georgia Annotated. The Director of the EPD may also grant a variance where a drainage structure or a roadway drainage structure must be constructed, provided that adequate erosion and sediment control measures are incorporated in the project plans and specifications and are implemented during

construction. The buffer distance is measured horizontally from the point where vegetation has been wrested by normal stream flow or wave action. It is the responsibility of the entity proposing to construct a new utility within the Greenway System to determine if a variance is required from the State of Georgia, the City, or other responsible local government or agency.

### **5.1.3 Land Disturbance Activity Permits (LDP)**

It is the responsibility of the entity proposing to construct a new utility within the Greenway System to determine if a Land Disturbance Activity Permit is required from any authority having jurisdiction. A Land Disturbance Activity Permit may contain the following information:

- A. Name, address, and contact telephone number.
- B. Narrative description of the maintenance activities to be conducted.
- C. Description of BMPs to be used.
- D. A site map.
- E. An activity schedule.
- F. Supportive data.
- G. A plan and specifications for restoring the site to a natural state with permanent vegetation.

The entity proposing to construct a new utility within the Greenway System shall contact the City and other responsible local government or agency for specific Land Disturbance Activity Permit requirements.

## **5.2 SITE CLEARING**

The following SOPs shall be followed during the site clearing phase for construction of new utilities:

- A. All cut and fill activities occurring within the EPD's mandated 25-foot stream buffer (50-foot buffer for trout streams) shall be stabilized with appropriate erosion control matting and blankets.
- B. The area to be cleared shall be clearly delineated to ensure that no clearing occurs beyond the area identified. Except for perpendicular utility crossings, any open cut, grading, clearing, or installation of surface facilities shall be set back from the streambanks to the greatest distance feasible, with a minimum setback of fifty (50) feet. Except for manholes, portals, and the maintenance access to such

facilities, the Greenway System must remain in a natural state even where crossings are perpendicular to the stream. Where feasible utility projects are suggested to have no more than a thirty (30) foot construction width (for projects paralleling the stream) outside the fifty (50) foot buffer.

- C. Vegetation to be preserved shall be identified and clearly marked by flagging before clearing begins. Vegetation to be preserved shall include: vegetation vital to streambank stabilization; vegetation providing food and/or habitat to a federally listed endangered species, threatened species, or species of concern; vegetation that is a federally listed endangered species, threatened species, or species of concern; and vegetation that comprises a wetland ecosystem.
- D. Stemmed vegetation such as brush, shrubs, and trees shall be removed at or near the ground level, leaving the root systems intact.
- E. When pruning is necessary to clear the construction area, pruning cuts shall be made in accordance with the International Society of Arboriculture (ISA) Standards.
- F. Trees shall be felled into the cleared construction area or areas to be cleared and not onto vegetation to be preserved.
- G. Trees which have fallen into water bodies or beyond the construction area shall be removed immediately.

### **5.3 EROSION AND SEDIMENT CONTROL**

#### **5.3.1 Project Planning and Preliminary Grading**

Efforts shall be made during initial planning and whenever possible during construction phases to minimize the amount of area cleared and graded (exposed) as well as the total exposure time. Whenever feasible, preliminary grading operations shall be used to control the flow direction and velocity of runoff water and thereby dissipate energy. Where feasible, swales and diversion berms shall be used to direct runoff water to locations where treatment by sediment barriers can be performed. Where feasible, transverse diversion berms, installed perpendicular to the flow of water down slopes and in drainage channels, shall be used to reduce runoff water velocity. Cleared slopes shall be harrowed with construction equipment to create small diversion channels along the contours of the slope perpendicular to the direction of runoff flow. This action not only reduces flow velocities of runoff water traveling down the slopes, but also reduces flow quantities by increasing the area of exposed soil and thus enhancing percolation of runoff water.

Whenever feasible, small depressions shall be created in appropriate locations during site grading. Graded depressions can reduce flow velocities and can also provide clarification by allowing suspended particles to settle out. They also provide temporary storage of

runoff water, thereby reducing the rate at which water is discharged downgradient. Grading equipment shall cross flowing streams by the means of bridges or culverts, except when such methods are not feasible, provided in any case that such crossings shall be kept to a minimum.

Dust from the disturbed area shall be controlled. Temporary means for controlling dust shall include mulching or vegetative cover with temporary seeding (see the latest edition of the Manual for Erosion and Sediment Control in Georgia). Emergency means for controlling dust shall include tillage or irrigation.

### **5.3.2 Erosion and Sediment Control Practices**

Erosion and Sediment Control Practices must be implemented prior to any land disturbing activities within the Greenway System. Control of factors affecting erosion and sediment can be provided by a number of basic practices. The establishment of a dense strand of vegetation is probably the most effective means of controlling erosion and sediment; however, this control measure is often not practical until the completion of a project. Revegetation can require a substantial amount of time. Prior to and during the construction of utilities within the Greenway System, temporary erosion and sediment control measures shall be implemented and maintained until the construction area is restored as described later in this document.

Soft engineering techniques shall be used for erosion and sediment control. Hard engineering techniques shall only be used after soft techniques have failed and the failure is due to the inability of soft techniques to address the erosion problem. Improper choice of soft engineering techniques or improper design, implementation, and/or maintenance shall not be justification to turn to hard engineering techniques.

Article 8.0 of this appendix presents summaries of techniques, (including their applications) used to control erosion and sedimentation during the construction of utilities within the Greenway System. Erosion and sediment control measures shall be designed and implemented in accordance with the design standards established Article 8.0 and the latest edition of the Manual for Erosion and Sediment Control in Georgia. If a conflict occurs between the design and construction standards presented in Article 8.0 and those presented in the latest edition of the Manual for Erosion and Sediment Control in Georgia, the more stringent design and construction standards shall prevail. The selection of the most appropriate erosion and sediment control measure will be made by the entity proposing to construct a new utility within the Greenway System based on site specific conditions.

## **5.4 CONSTRUCTION METHODS**

After all appropriate erosion and sediment control measures have been installed, the designated construction work can proceed as approved by the City with recommendations from any other responsible local government or agency. All clearing work and construction operations shall be conducted in such a manner as to effectively control soil erosion and prevent non-point source pollution loads from entering streams, ponds,

and/or wetlands. At any time during the construction project, the City with recommendations from any other responsible local government or agency has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow, and fill operations and to direct the entity proposing to construct a new utility within the Greenway System to provide immediate permanent or temporary erosion and sediment control measures to prevent contamination of wetlands or water courses on the Greenway property.

Prohibited construction procedures include, but are not limited to, the following:

- A. Dumping of spoil material into any streams, wetlands, surface waters, or unspecified locations.
- B. Indiscriminate, arbitrary, or capricious operation of equipment in wetlands or surface waters. During the design of sewers and/or other utilities likely to go through existing wetlands, the City, with recommendations from other responsible local government or agency, will explore other alternatives such as construction outside the wetland and/or tunneling. If other methods are feasible, the City or other utility provider will design and construct the sewer and/or other utilities using the method that avoids construction through the wetland.
- C. Pumping of silt-laden water from trenches or excavations into surface waters or wetlands.
- D. Damaging vegetation adjacent to or outside of the construction area limits.
- E. Disposal of trees, brush, debris, plants, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in wetlands, surface waters, or unspecified locations.
- F. Alteration of the flow line of any stream, unless such work is of a temporary nature, has been specifically authorized, and is necessary to divert flow from excavation work so that debris and sediments are not released into streams. Various design and construction alternatives shall be investigated and the cost effective alternative that minimizes the deposition of debris, habitat degradation, and sediments will be utilized.
- G. Open burning of debris within Greenway properties.

All conveyance channels, drainage outlets, and erosion and sediment control measures must be constructed to withstand the expected velocity of flow from a five-year frequency storm without erosion.

## **6.0 RESTORATION OF GREENWAY PROPERTIES DISTURBED DURING CONSTRUCTION OF NEW UTILITIES**

Permanent soil stabilization measures shall be applied to disturbed areas within 30 days after all soil disturbing activities have been completed and the final grade has been reached on any portion of the construction project site. Permanent soil stabilization means that for unpaved areas and areas not covered by permanent structures, at least 70 percent of the soil surface is uniformly covered in permanent vegetation or equivalent permanent stabilization measures (such as the use of riprap, gabions, permanent mulches or geotextiles) have been employed. Until these conditions are satisfied and permanent control measures and facilities are operational, interim stabilization measures and temporary erosion and sediment control measures shall not be removed. Efforts shall be made to return the site to its natural condition. Native vegetation shall be used in such efforts. Acceptable plants and grasses are listed in Section 5.0 of this document and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

Temporary soil stabilization measures shall be applied immediately to disturbed areas that are not at final grade but shall remain dormant for longer than 60 days. Areas that have been stabilized by temporary measures must be permanently stabilized once all soil disturbing activities are complete and the area is at final grade. Also, permanent stabilization measures shall be applied immediately to rough graded areas that will require erosion and sediment control for longer than six months.

### **6.1 PERMANENT VEGETATION**

Permanent vegetation is the planting of perennial vegetation such as trees, shrubs, vines, grasses, or legumes, on exposed areas for permanent soil stabilization. A crop of perennial vegetation appropriate for the region, which is capable of providing a 70 percent coverage within the growing season, shall be used to achieve permanent soil stabilization.

The purpose of establishing permanent vegetation in disturbed areas is to protect the soil surface from erosion, reduce damage from sediment, reduce runoff to downstream areas, improve wildlife habitat and visual resources, and improve aesthetics. Permanent soil stabilization applies to each phase of construction. For linear construction projects on land used for agricultural or silvicultural purposes, permanent stabilization may be accomplished by stabilizing the disturbed land for its agricultural or silvicultural use. For design and construction specifications for disturbed area stabilization with permanent vegetation see Article 8.0 and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

Sod shall be used to establish a permanent vegetative cover on highly erodible or severely eroded lands. Sod establishes immediate ground cover and thereby reduces runoff, erosion, and dust, which results in improved aesthetics; higher land value; stabilized waterways and critical areas; less sediments, nutrients and bugs; less downstream complaints; reduced likelihood of legal action and work stoppage due to legal action; and increased “good neighbor” benefits.

Sod is appropriate for areas that require immediate vegetative covers such as drop inlets, grass swales, and waterways with intermittent flow. Sod can initially be more costly than seed, but the advantages justify the increased initial costs.

The advantages to sod include the following:

- A. Immediate erosion and sediment control, green surface, and quick use.
- B. Reduced failure as compared to seed.
- C. Lack of weeds.
- D. Can be established almost year-round.

Sod is preferable to seed in waterways and swales because of the immediate protection of the channel after application. Sod must be staked in concentrated flow areas. For design and construction specifications for disturbed area stabilization with permanent sod see Article 8.0 and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

## **6.2 EROSION CONTROL MATTING AND BLANKETS**

This stabilization technique provides a protective covering (blanket) or a soil stabilization mat to establish permanent vegetation on steep slopes, channels, or shorelines. The purpose of erosion control matting and blankets is to provide a microclimate that protects young vegetation and promotes its establishment and to reinforce the turf against forces of erosion during storm events.

Matting and blankets shall be applied on steep slopes where the hazard of erosion is high and planting is likely to be too slow in providing adequate protective cover. Concentrated flow areas, slopes steeper than 2.5:1 and with a height of ten feet or greater, and cuts and fills within the stream buffer, shall be stabilized with the appropriate erosion control matting or blanket. On streambanks where moving water is present, matting can be used to prevent new plantings from being washed away. For design and construction specifications for erosion control using matting and blankets see Article 8.0 of this section and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

Benefits of using erosion control blankets include the following:

- A. Protection of seed and soil from raindrop impact and subsequent displacement.
- B. Thermal consistency and moisture retention for seedbed areas.
- C. Stronger and faster germination of grasses and legumes.
- D. Planing off excess stormwater runoff.

- E. Prevention of sloughing of topsoil added to steeper slopes.

Benefits of using erosion control matting include the following:

- A. All benefits gained from using erosion control blankets that are listed above.
- B. Collects soil out of stormwater which becomes the growth medium for the development of roots.
- C. Assists the vegetative root system in forming an erosion-resistant cover resistant to hydraulic lift and shear forces when embedded in the soil of stormwater channels.

## **7.0 TRAINING OF PERSONNEL INVOLVED IN CONSTRUCTION OF NEW UTILITIES WITHIN THE GREENWAY SYSTEM**

Key Personnel involved in construction of utilities within Greenway Properties shall be trained of the requirements of the Consent Decree, the Greenway Acquisition Plan, and these SOPs. The key personnel shall also be trained on the proper installation, implementation, and inspection of erosion and sediment control measures.

A “pre-construction” meeting shall be held between the City, other responsible local government or agency, and key personnel of the utility or construction agency following training in order to ensure that all parties have a common understanding as to how construction will be performed within the Greenway Properties.

## **8.0 TECHNIQUES FOR EROSION AND SEDIMENT CONTROL**

This section presents summaries of techniques, (including their applications) used to control erosion and sedimentation during the construction of utilities within the Greenway System. Erosion and sediment control measures shall be designed and implemented in accordance with the design standards established in this section and the latest edition of the Manual for Erosion and Sediment Control in Georgia. If a conflict occurs between the design and construction standards presented in this section and those presented in the latest edition of the Manual for Erosion and Sediment Control in Georgia, the more stringent design and construction standards shall prevail. The selection of the most appropriate erosion and sediment control measure will be made by the entity proposing to construct a new utility within the Greenway System based on site specific conditions.

### **8.1 CHECK DAM**

#### **8.1.1 Definition**

Small temporary barriers, grade control structures, or dams constructed across a swale, drainage ditch, or areas of concentrated flow.

### **8.1.2 Purpose**

To minimize erosion by reducing the velocity of storm water in areas of concentrated flow.

### **8.1.3 Conditions Where Practice Applies**

This measure is limited to use in small open channels and shall not be used in a live stream. Specific applications include:

- A. Temporary or permanent swales or ditches in need of protection during establishment of grass linings.
- B. Temporary or permanent swales or ditches which, because of their short length of service or other reason, cannot establish a non-erodible lining but still need some protection against erosion.
- C. Other locations where small localized erosion and resulting sedimentation problems exist.

### **8.1.4 Planning Consideration**

Check dams may be constructed of stone or hay bales. The drainage area for a stone check shall not exceed 2 acres. The drainage area for haybales shall not exceed one acre. Most check dams would be constructed of stone, however, stone may not be acceptable in some installations because of aesthetics and hay bales may need to be considered.

Stone checks dams (Figure M-2) are easier to install with backhoes or other suitable equipment. The stone is usually purchased. Stone shall be handled carefully in areas to be mowed. Some stone may be washed downstream and shall be removed before each mowing operation.

Check dams shall be planned to be compatible with the other features such as streets, walks, trails, sediment basins, and rights-of-way or property lines. Check dams may be constructed in series and the dams shall be located at a normal interval from other grade controls such as culverts or sediment basins.

Check dams constructed of hay bales (Figure M-3) have the shortest life of the materials discussed. The maximum design life for hay bale structures is 3 months. Haybale check dams shall not be used where permanent watercourse protection is needed.

### **8.1.5 Design Criteria for Check Dams**

Formal design is not required. The following limiting factors shall be adhered to when designing check dams.

- A. Drainage Area: Stone -2 acres or less  
Haybale – 1 acre or less.
- B. Maximum Height: 2 feet when measured to center of check dam.
- C. Side Slopes: 2:1 or flatter.
- D. Max. Spacing Between Dams: Elevation of toe of upstream dam is at or below elevation of crest of downstream dam (see Figure M-1).
- E. Geotextiles: Suitable geotextiles shall be placed between the stone and its soil base and abutments.

Top of dam, perpendicular to flow, shall be parabolic. The center of the dam must be at least 9 inches lower than the outer edges (see Figures M-2 and M-3).

### **8.1.6 Construction Specifications for Check Dams**

Check dams shall be constructed to be stable throughout their planned life. The dam shall be constructed well into the abutment so that water cannot run around the dam.

- A. Stone check dams shall be constructed of size 2-10 inch stone. Mechanical or hand placement shall be required to insure complete coverage of the entire width of ditch or swale and that the center of the dam is a minimum of 9 inches lower than the outer edges.
- B. Haybale check dams may be used as temporary check dams in concentrated flow areas while vegetation is becoming established. Haybale check dams shall not be used where the drainage area exceeds 1 acre. The haybales shall be embedded a minimum of 4 inches on its upslope side.

### **8.1.7 Maintenance**

Periodic inspection of check dams is necessary. Repair shall be made as soon as possible to minimize damage and expense of repair. Sediment shall be removed when it reaches a depth of one-half the original dam height.

Once areas that require mowing are at final grade and have been permanently stabilization the check dams shall be removed. Otherwise, check dams may remain in place permanently.

Whenever check dams are removed, care shall be taken to minimize disturbance to the remainder of the watercourse. The area where the check dam was removed shall be immediately shaped and smoothed to watercourse dimensions, seeded and mulched. If the area is to be mowed where stone check dams have been used, care shall be taken to remove all stone.

## **8.2 STREAM DIVERSION CHANNEL**

### **8.2.1 Definition**

Stream diversion channels are temporary channels constructed to convey flow around a construction site while a permanent structure is being constructed in the stream channel.

### **8.2.2 Purpose**

The purpose of a stream diversion channel is to protect the streambed from erosion and allow work “in the dry”.

### **8.2.3 Conditions Where Practice Applies**

Temporary stream diversion channels shall be used only on flowing streams with a contributing drainage area less than one square mile. For streams with larger contributing drainage areas, structures or methodology shall be designed by methods which more accurately define the actual hydrologic and hydraulic parameters which will affect the functioning of the structure.

### **8.2.4 Planning Consideration**

In cases where in-stream work is unavoidable, the amount of encroachment and time spent working in the channel shall be minimized. If construction in the streambed will take an extended period of time, substantial in-stream controls or stream diversion channel shall be considered to prevent excessive damage due to sedimentation. To limit land-disturbance, overland pumping of the stream shall be considered in low-flow conditions. Clearing of the streambed and banks shall be kept to a minimum. Refer to Figures M-14a and M-14b for typical stream diversion channel details.

### **8.2.5 Design Criteria for Stream Diversion Channels**

- A. Contributing drainage Area: Temporary stream diversion channels shall not be used on streams with a contributing drainage area greater than one square mile (640 acres).
- B. Size: The bottom width of the stream diversion shall be a minimum of six feet or equal to the bottom width of the existing streambed, whichever is greater.
- C. Side Slopes: Side slopes of the stream diversion channel shall be no steeper than 2:1.
- D. Depth and Grade: The depth and grade may be variable, dependent on site conditions, but shall be sufficient to ensure continuous flow of water in the diversion.

- E. Channel Lining: A stream diversion channel shall be lined to prevent erosion of the channel and sedimentation in the stream. The lining is selected based upon the expected velocity of bankfull flow. Refer to Table M-1 for selection of channel lining material and see the latest edition of the Manual for Erosion and Sediment Control in Georgia for specifications.

<b>Lining Materials</b>	<b>Code</b>	<b>Acceptable Velocity Range</b>
Geotextile, polyethylene film, or sod	Dc-A	0 – 2.5 fps
Geotextile alone	Dc-B	2.5 – 9.0 fps
Class I riprap and geotextile	Dc-C	9.0 – 13.0 fps

Source: the Manual for Erosion and Sediment Control in Georgia, 2000, Georgia Soil and Water Conservation Commission.

- F. Geotextile: Geotextiles shall be used as a protective cover for soil, or if the channel is to be lined with riprap, as a separator between graded stone and the soil base. The geotextile will prevent erosion of the channel and the migration of soil particles from the subgrade into the graded stone. The geotextile shall be specified in accordance with AASHTO M288-96 Section 7.5, *Permanent Erosion Control Recommendations*. The geotextile shall be placed immediately adjacent to the subgrade without any voids.

### **8.2.6 Construction Specifications for Stream Diversion Channels**

- A. The channel shall be excavated, constructing plugs at both ends. Plugs can be constructed of compacted soil, riprap, sandbags or sheet plastic.
- B. A Silt fence or berm shall be placed along the sides of the channel to prevent unfiltered runoff from entering the stream. The berm can be constructed using the material excavated for the stream diversion.
- C. The channel surface shall be smooth (to prevent tearing of the liner) and lined with the material specified in the plans. The outer edges of the geotextile shall be secured at the top of the channel with compacted soil.
- D. The plugs shall be removed when the liner installation is complete, removing the downstream plug first.
- E. As soon as construction in the streambed is complete, diversions shall be replugged and backfilled. The liner shall be inspected for damage and salvaged if possible.

- F. Upon removal of the lining, the stream shall immediately be restored and properly stabilized.

### **8.2.7 Maintenance**

To ensure that the work area stays dry and that no construction materials float downstream, the stream diversion channel shall be inspected at the end of each day to make sure that the construction materials are positioned securely. All repairs shall be made immediately.

## **8.3 DIVERSION**

### **8.3.1 Definition**

A ridge of compacted soil, constructed above, across or below a slope.

### **8.3.2 Purpose**

To reduce the erosion of steep, or otherwise highly erodible areas by reducing slope lengths, intercepting stormwater runoff and safely diverting it to stabilized outlets at non-erosive velocities.

### **8.3.3 Conditions Where Practice Applies**

- A. Where runoff from higher areas may damage property, cause erosion, contribute to pollution, flooding, or interfere with the establishment of vegetation on lower areas.
- B. Where surface and/or shallow subsurface flow is damaging sloping upland, manmade improvements, or unstabilized areas.
- C. Where the slope length needs to be reduced to minimize soil loss.

### **8.3.4 Planning Considerations**

Diversions can be a useful tool for managing surface water flows and preventing soil erosion. On moderately sloping areas, they may be placed at intervals to trap and divert sheet flow before it has a chance to concentrate and cause rill and gully erosion.

Diversions may be placed at the top of cut or fill slopes to keep runoff from upland drainage areas off the slope. Diversions are also typically built at the base of steeper slopes to protect flatter developed areas, which cannot withstand runoff water from outside areas. They can also be used to protect structures, parking lots, adjacent properties, and other special areas from flooding.

Diversions are preferable to other types of man-made stormwater conveyance systems because they more closely simulate natural flow patterns and characteristics. Flow velocities are generally kept to a minimum. When properly coordinated into the landscape design of a site, diversions can be visually pleasing as well as functional.

As with any earthen structure, it is very important to establish adequate vegetation as soon as possible after installation. It is usually important to stabilize the drainage area above the diversion so that sediment will not enter and accumulate in the diversion channel.

### **8.3.5 Design Criteria**

- A. Location: Diversion location shall be determined by considering outlet conditions, topography, land use, soil type, length of slope, seepage (where seepage is a problem), and the development layout. Outlets must be stable after diversions empties stormwater flow into them, therefore, care shall be exercised in the location selection of the diversion and its outlet.
  
- B. Ridge Design: The supporting ridge cross-section shall meet the following criteria.
  - 1. The compacted ridge shall be designed to have stable side slopes, which shall be no steeper than 2:1.
  - 2. The width of the ridge at the design water elevation shall be a minimum of 4 feet.
  - 3. The minimum freeboard shall be 0.3 foot.
  - 4. The design shall include a 10 percent settlement factor.
  
- C. Channel Design: Diversions shall be tailored to fit the conditions of a particular site and local soil type(s). Land slope must be taken into consideration when choosing channel dimensions. Narrow and deep channels may be required on steeper slopes, while broad, shallow channels usually are more appropriate on gentle slopes. The wide, shallow section will be easier to maintain. Since sediment deposition is often a problem in diversions, the designed flow velocity shall be kept as high as the channel lining will permit.

Table M-2 shall be used to select the storm frequency required for the design of the diversion and to determine the required channel capacity, Q (peak rate of runoff).

<b>Table M-2 Diversion Design Criteria</b>				
<b>Diversion Type</b>	<b>Land or Improvement Protected</b>	<b>24-hour Storm Frequency</b>	<b>Freeboard (feet)</b>	<b>Minimum Top Width (feet)</b>
Temporary	Construction areas Building Sites	10 years <sup>1</sup>	0.3	4
Permanent	Landscaped, recreation and similar areas	25 years	0.3	4
	Dwellings, schools, commercial buildings, and similar installation	50 years	0.5	4

<sup>1</sup> Use 10 year or the storm frequency specified in Title 12 of the Official Code of Georgia Annotated.  
Source: the Manual for Erosion and Sediment Control in Georgia, 2000, Georgia Soil and Water Conservation Commission.

The channel portion of the diversion shall be designed according to specifications outlined in the latest edition of the Manual for Erosion and Sediment Control in Georgia.

- D. Outlet: Each diversion shall have an adequate outlet, which will discharge concentrated runoff without erosion. The outlet may be a constructed or natural waterway, a stabilized vegetated area or a stabilized open channel. Protected outlets shall be constructed and stabilized prior to construction of the diversion.
- E. Road and Utility Rights-of-Way: Diversions installed to divert water off a road or right-of-way shall consist of a series of compacted ridges of soil running diagonally across the road at a 30° angle. Ridges are constructed by excavating a channel upstream for this type of diversion (see Figure M-5). Stable outlets shall be provided for each diversion.

A detailed design is not required for this type of diversion. The compacted ridge height shall be 8-12 inches above the original road surface; the channel depth shall be 8-12 inches below the original road surface. Channel bottoms and ridge tops shall be smooth enough to be crossed by vehicular traffic. The maximum spacing between diversions shall be as follows:

<b>Road Grade (%)</b>	<b>Distance Between Diversions (feet)</b>
1	400
2	250
5	125
10	80
15	60
20	50

### **8.3.6 Construction Specifications**

- A. All trees, brush, stumps, obstructions, and other objectionable material shall be removed and disposed of so as not to interfere with the proper functioning of the diversion.
- B. The diversion shall be excavated or shaped to line, grade, and cross-section as required to meet the criteria specified herein and free of irregularities which will impede normal flow.
- C. All fills shall be machine compacted as needed to prevent unequal settlement that would cause damage in the completed diversion.
- D. All earth removed and not needed in construction shall be spread or disposed of so that it will not interfere with the functioning of the diversion.
- E. Diversion channels shall be stabilized in accordance with Channel Stabilization specifications in the latest edition of the Manual for Erosion and Sediment Control in Georgia.

### **8.3.7 Maintenance**

Before the construction site is restored, the diversion shall be inspected after every rainfall. Sediment and debris shall be removed from the ditch line and repairs made as necessary. Seeded areas that fail to establish a vegetative cover shall be reseeded as necessary.

After stabilization, the diversion shall be inspected for erosion following each significant flow. Damaged areas shall be patched with compacted soil and re-vegetated to prevent further erosion. The vegetation shall be fertilized on an annual basis to keep the grass vigorous and protective. The vegetation shall be re-established whenever it does not cover the ground and does not provide protection against erosion damage.

## **8.4 TEMPORARY DOWNDRAIN STRUCTURE**

### **8.4.1 Definition**

A temporary downdrain structure is a pipe used to temporary convey a concentration of storm water down the face of cut or fill slopes without causing slope erosion.

### **8.4.2 Purpose**

The purpose of a temporary downdrain is to safely move storm runoff from one elevation to another without causing slope erosion and allowing the establishment of vegetation on the slope. Refer to Figure M-6 for typical temporary downdrain structure details.

### 8.4.3 Conditions Where Practice Applies

Temporary downdrains shall be used on slopes where concentrated storm water could cause erosion damage. Once a permanent water disposal system has been installed these structures shall be removed.

### 8.4.4 Design Criteria

Formal design shall not be required. A temporary downdrain structure shall be placed on undisturbed soil or well-compacted fill. The pipe diameter shall have sufficient capacity to convey the maximum runoff expected during the life of the drain. Refer to Table M-3 for selecting pipe sizes.

<b>Maximum Drainage Area per Pipe (acre)</b>	<b>Pipe Diameter (inches)</b>
0.3	10
0.5	12
1.0	18

Source: Manual for Erosion and Sediment Control in Georgia, 2000, Georgia Soil and Water Conservation Commission.

The pipe material shall be heavy-duty, flexible material such as non-perforated, corrugated plastic pipe or specially designed flexible tubing. The pipe shall be anchored with hold-down grommets or stakes at intervals not to exceed 10 feet. The outlet of the pipe shall be securely anchored in place. The pipe shall extend beyond the toe of the slope.

Diversions shall be used to route runoff to the downdrain's Tee or "L" inlet at the top of the slope. The entrance shall be sloped ½ inch per foot toward the outlet. To prevent the pipe from being washed out by seepage or piping, the soil around the inlet shall be thoroughly compacted. A stone filter ring or check dam may be placed at the inlet for added sediment filtering capacity.

Riprap shall be placed at the outlet for energy dissipation. For additional protection at the outlet a flared end section, Tee outlet, or other suitable device shall be used in conjunction with the riprap.

### 8.4.5 Construction Specifications

Slope drains often fail due to water saturating the soil and seeping along the pipe. Firm contact between the pipe and the soil at all points will help to eliminate this type of failure. To ensure proper pipe-soil contact, back-filling around and under the pipe shall be performed with stable soil material, hand compacting in 6-inch lifts.

- A. Slope drains shall be placed on undisturbed soil or well-compacted fill as indicated on the plans.
- B. The section of pipe under the dike toward the outlet shall be slightly sloped.
- C. The soil under and around the entrance section shall be hand tamped in lifts not to exceed 6 inches.
- D. The fill over the drain at the top of the slope shall have minimum dimensions of 1.5-foot depth, 4 feet top width and 3:1 side slopes.
- E. All slope drain connections shall be watertight.
- F. All fill material shall be well-compacted and the exposed sections of the drain shall be securely fasten with grommets or stakes spaced no more than 10 feet apart.
- G. The drain shall be placed slightly diagonally across the slope and extend beyond the toe of the slope. The outlet shall be curved uphill and adequately protected from erosion.
- H. If the drain is conveying sediment-laden runoff, the flow shall be directed into a sediment trap or sediment basin.
- I. The settled, compacted dike ridge shall be no less than 1 foot above the top of the pipe at every point.
- J. All disturbed areas shall be stabilized immediately following construction.

#### **8.4.6 Maintenance**

The slope drain and supporting diversions shall be inspected after every rainfall. Any necessary repairs shall be made promptly. Once the disturbed area has been permanently stabilized the slope drains shall be removed. The slope drain material shall be disposed of properly and all disturbed areas shall be stabilized appropriately.

### **8.5 ROCK FILTER DAM**

#### **8.5.1 Definition**

A rock filter dam is a permanent or temporary stone filter dam installed across a small stream or draingeway.

#### **8.5.2 Purpose**

This structure serves as a sediment filtering device in drainageways and in come cases, it may also reduce the velocity of stormwater flow through a channel. A rock filter dam is

not intended to substantially impound water. All appropriate agencies and local officials shall be contacted before installing any structure in a flowing stream.

### **8.5.3 Conditions Where Practice Applies**

When used in conjunction with other appropriate sediment control measures, rock filter dams may reduce the amount of sediment reaching a water body. A rock filter dam may be used in small channels that drain 50 acres or less.

Rock filter dams shall be used as an additional sediment control measure below construction projects such as culvert installations, dam construction, or any project that may involve grading activity directly in a stream. Rock filter dams may also be used at the upstream end of ponds or lakes to trap incoming sediment loads.

### **8.5.4 Design Criteria**

Although formal design is not required, a qualified engineer shall be consulted before a structure of any kind is installed in a flowing stream.

- A. Drainage Area - The drainage area contributing to a rock filter dam shall not exceed 50 acres
- B. Height - The height of a rock filter dam shall not be higher than the channel banks or exceed the elevation of the upstream property line. The center of the dam shall be at least 6 inches lower than the outer edge of the dam (see Figure M-7).
- C. Side slopes - Side slopes shall be 2:1 or flatter.
- D. Location - A rock filter dam shall be located as close to the source of sediment as possible and so that it will not cause water to back up on upstream adjacent property.
- E. Stone Size - The stone size for a rock filter dam shall be determined by the design criteria set forth in the latest edition of the Manual for Erosion and Sediment Control in Georgia. For additional filtering effect, the dam shall be faced with the smaller stones on the upstream side. However, this may make the dam more prone to clogging.
- F. Top Width - The top of a rock filter dam shall be no less than 6 feet wide.
- G. Geotextile – To prevent the migration of soil particles from the subgrade into the graded stone, geotextiles shall be used as a separator between the graded stone, the soil base, and the abutments. The geotextile shall be specified in accordance with AASHTO M288-96 Section 7.5, *Permanent Erosion Control Recommendations*. The geotextile shall be placed immediately adjacent to the subgrade without any voids. To prevent scour the geotextile shall extend five feet beyond the downstream toe of the dam.

### **8.5.5 Construction Specifications**

The rock filter dam shall extend completely across the channel and securely ties into both channel banks. Rocks shall be placed by mechanical methods or by hand placement. The center of the dam shall be at least 6 inches lower than the outer edge of the dam (see Figure M-7). Gabions that have been sized and installed according to specification outlined in the latest edition of the Manual for Erosion and Sediment Control in Georgia may serve as a rock filter dam.

### **8.5.6 Maintenance**

Periodic inspection and required maintenance shall be provided. Sediment shall be removed when it reaches a depth of one-half of the original height of the dam. Rock filter dams shall be removed once the disturbed areas have been stabilized.

## **8.6 SEDIMENT BARRIER/FENCE**

### **8.6.1 Definition**

A sediment barrier/fence is a temporary structure typically constructed of a silt fabric supported by steel or wooden posts. Other barrier materials may include sandbags, straw bales, brush piles, or other filtering mediums.

### **8.6.2 Purpose**

To prevent sediment carried by sheet flow from leaving the site and entering natural drainage ways or storm drainage systems by slowing storm water runoff and causing the deposition of sediment at the structure.

### **8.6.3 Conditions Where Practice Applies**

Sediment barriers shall be installed where runoff can be stored behind the barrier without damaging the fence or the submerged area behind the fence. Silt fence shall not be installed across streams, ditches, waterways, or other concentrated flow area.

### **8.6.4 Planning Consideration**

Silt fences are usually preferable to hay bales because silt fences can trap a much higher percentage of suspended solids. The success of silt fences depends on a proper installation so as to develop maximum efficiency of trapping. Silt fences as well as hay bales shall be carefully installed to meet the intended purpose

Sediment barriers shall be used on all construction development sites. They shall be installed on the contour so that flow will not concentrate and cause bypassing, overtopping and/or failure. Sediment barriers shall remain in plane and maintained until the disturbed areas have been permanently stabilized.

The primary sediment barrier is a silt fence. A silt fence is specifically designed to allow water to pass through while retaining sediment on the site. Silt fences shall be installed to be stable under the flows expected from the site. Silt fences are composed of woven filter fabric supported between steel or wooden posts. Silt fences are commercially available with geotextile attached to the post and can be rolled out and installed by driving the post into the ground. This type of silt fence is simple to install, but more expensive than some other installations. Silt fences must be trenched in at the bottom to prevent rills from developing under the fence (see Figures M-8a and M-8b).

Hay bale barriers are the next most common sediment barrier. Hay bales are laid end to end along the contour and anchored in place by driving wooden stakes through the bales into the soil. To prevent water from going under the barrier, the bales shall be embedded into the soil four inches (see Figure M-9). Sediment barriers shall be of sufficient length to eliminate end flow whenever it is constructed across a swale or ditch line. The plan configuration shall resemble an arc or horseshoe with ends oriented upstream (see Figure M-3).

### 8.6.5 Design Criteria

- A. Silt fences may be premanufactured or built on site with post, wire and fabric. Silt fence fabric shall be selected from the approved fabrics listed in the Georgia Department of Transportation Qualified Products List #36 (QPL-36).
- B. Where all runoff is to be stored behind the fence (where no stormwater disposal system is present), the maximum slope length behind a silt fence shall not exceed those shown in Table M-4 and the latest edition of the Manual for Erosion and Sediment Control in Georgia. The drainage area shall not exceed ¼ acre for every 100 feet of silt fence.

<b>Table M-4 Criteria for Silt Fence Placement</b>	
<b>Land Slope (%)</b>	<b>Maximum Slope Length Above Fence (feet)</b>
<2	100
2 to 5	75
5 to 10	50
10 to 20	25
>20*	15

\*In areas where the slope is greater than 20%, a flat area length of 10 feet between the toe of the slope to the fence shall be provided.

Source: Manual for Erosion and Sediment Control in Georgia, 2000, Georgia Soil and Water Conservation Commission.

- C. Types of Silt Fence
  - 1. Type A silt fence has filter fabric that is 36 inches wide. A type A silt fence shall be used on developments where the life of the project is expected to be greater than or equal to six months.

2. Type B silt fence has filter fabric that is 22 inches wide. Type B silt fence shall be limited to use on minor projects, such as residential home sites or small commercial developments where permanent stabilization will be achieved in less than six months.
  3. Type C silt fence has wire reinforced filter fabric that is 36 inches wide. This type fabric allows almost three times the flow rate as Type A silt fence. Type C silt fence shall be used where runoff flows or velocities are particularly high or where slopes exceed a vertical height of 10 feet.
- D. A riprap splash pad or other outlet protection device shall be provided for any point where the flow may top the sediment fence, such as natural depressions or swales. At protected reinforced outlets the maximum height of the fence shall not exceed 1 foot and the fence support post spacing shall not exceed 4 feet.

### **8.6.6 Construction Specifications**

- A. Sandbags: Shall be approved by local issuing authorities. Sandbags shall be installed such that flow under and between the bags is minimal. If the structure height exceeds two bags, it shall be anchored in place with steel rods.
- B. Hay or Straw Bales: Shall be approved by local issuing authorities. Bales shall be placed lengthwise on the contour in a single row and embedded in the soil a minimum depth of 4 inches. Bales shall be securely anchored in place by stakes, bars or other acceptable means (see Figure M-9). Stakes for hay bale barriers shall be nominal 2 inch by 2 inch wood. The wood shall be sound with a minimum length shall be 3 feet. The stakes shall be driven into the ground 18 to 24 inches. Equivalent metal rods or steel bars may be used.
- C. Brush Barrier: Shall be used only during timber clearing operations. Brush obtained from clearing and grubbing operation may be piled in a row along the perimeter of disturbance. Brush barriers shall not be used in developed areas or where aesthetics are a concern.

Brush shall be wind-rowed on the contour as nearly as possible. If compaction is necessary, construction equipment may be used for compaction operations. The brush barrier shall have a base width between 5 and 10 feet, and a height between 3 and 5 feet. To achieve greater filtering capacity, filter fabric shall be placed on the side of the brush barrier receiving sediment-laden runoff. The lower edge of the fabric shall be buried in a 6-inch deep trench immediately uphill from the barrier. The upper edge of the fabric shall be stapled, tied or otherwise fastened to the brush barrier. Edges of adjacent fabric pieces shall overlap each other.

#### D. Silt Fence

1. The filter fabric shall have an approved color mark yarn woven into the fabric or the manufacturer label and fabric name printed on the fabric every 100 feet.
2. The temporary silt fence shall be installed according to these specifications, as shown on construction plans or as directed by an engineer. For fabric installation specifications see Figures M-8a and M-8b and the latest edition of the Manual for Erosion and Sediment Control in Georgia.
3. Post installation shall start at the center of the low-point (if applicable) with the remaining posts spaced 6 feet apart for Type A and B silt fences and 4 feet apart for Type C silt fence. Wood and steel post may be used with Type A and Type B silt fences. Only steel post shall be used with Type C silt fence. For post size requirement see Figures M-8a and M-8b and the latest edition of the Manual for Erosion and Sediment Control in Georgia.
4. The filter fabric shall be securely fastened to the fencing with staples or nails or other fasteners made for this purpose (see Figure M-8a for fastener specifications). The bottom of the filter fabric shall be installed in a trench. The trench shall then be filled with the soil and compacted.
5. Along stream buffers and other sensitive areas, two rows of Type C silt fence or one row of Type C silt fence backed by haybales shall be used.

#### 8.6.7 Maintenance

Sediment barriers shall be inspected immediately after each rainfall and at least weekly during normal construction activities and daily during prolonged rainfall. Any needed repairs shall be made immediately. Fabric shall be replaced whenever it has deteriorated to such an extent that the effectiveness of the fabric is reduced (approximately six months).

Sediment deposits shall be removed when the deposits reach one-half the original height of the barrier. Any sediment deposits remaining after the sediment barrier is no longer required shall be smoothed to conform to the natural topography and the area restored as described earlier in Article 6.0.

### 8.7 INLET SEDIMENT TRAP

#### 8.7.1 Definition

An inlet sediment trap is a temporary protective device formed around a storm drain drop inlet to trap sediment.

### **8.7.2 Purpose**

Inlet sediment traps shall be used until the disturbed areas are permanently stabilized to prevent sediment from leaving the site, or from entering storm drainage systems.

### **8.7.3 Conditions Where Practice Applies**

Inlet sediment traps shall be installed at or around all storm drain drop inlets that receive runoff from disturbed areas.

### **8.7.4 Design Criteria**

The drainage area contributing to an inlet sediment trap shall be no greater than one acre. A variety of sediment filtering devices that can serve as temporary sediment traps are shown in Figures M-10a through M-10e. Sediment traps shall be self-draining unless they are otherwise protected in an approved manner that will not present a safety hazard.

A temporary dike shall be constructed on the down slope side of a sediment trap where runoff may bypass the protected inlet. Stone filter rings may be used on the up slope side of the inlet to slow runoff and filter larger soil particles. Refer to the latest edition of the Manual for Erosion and Sediment Control in Georgia for stone filter ring specifications.

Where additional sediment storage is required, an excavation shall be created around the inlet sediment trap. The excavated area shall be sized to provide a minimum storage capacity calculated at 67 cubic yards per acre of drainage area. All excavated sediment traps shall provide a minimum of 1.5 feet of sediment storage and shall not have side slopes steeper than 2:1.

### **8.7.5 Construction Specifications**

Sediment traps shall be constructed on natural ground surface, on an excavated surface, or on machine compacted fill provided they have a non-erodible outlet.

- A. Fabric Frame Inlet Sediment Traps: Filter fabric fitted around a supporting frame shall be used for inlet protection where the inlet drains a relatively flat area (slope no greater than 5 percent) and the inlets do not receive concentrated flows. The frame shall be constructed from Type C filter fabric supported by steel posts (see Figure M-10a). Stakes shall be spaced evenly around the perimeter of the inlet a maximum of 3 feet apart and securely driven into the ground approximately 18 inches deep. The fabric shall be entrenched 12 inches and backfilled with crushed stone or compacted soil. Fabric shall be securely fastened to the posts, and fabric ends shall be overlapped a minimum of 18 inches or wrapped together around a post.
- B. Baffle Box: A baffle box inlet sediment trap shall be used for inlets receiving runoff with a higher volume or velocity. The baffle box shall be constructed of 2”

x 4" boards spaced a maximum of 1 inch apart or of plywood with weep holes. The weep holes shall be 2 inches in diameter spaced approximately 6 inches on center vertically and horizontally. The entire box shall be wrapped in Type C filter fabric. The filter fabric shall be entrenched 12 inches and backfilled. Gravel shall be placed outside the box, all around the inlet, to a depth of 2 to 4 inches (see Figure M-10b).

- C. Block and Gravel Drop Inlet Sediment Traps: Block and gravel drop inlets shall be used where heavy flows are expected and where an overflow capacity is necessary to prevent excessive ponding around the structure. On each side of the structure one block, in the bottom row, shall be placed on its side to allow the pool to drain (see Figure M-10c). The foundation shall be excavated at least 2 inches below the crest of the storm drain. The bottom row of blocks shall be placed against the edge of the storm drain for lateral support and to avoid washouts when overflow occurs. When needed, lateral support shall be provided to subsequent rows by placing 2" x 4" wood studs through the block openings. To hold gravel in place, hardware cloth or comparable wire mesh with ½ inch openings shall be carefully fitted over all block openings. Clean gravel shall be placed to a height of 2 inches below the top of the block on a 2:1 slope or flatter and smoothed to an even grade. Georgia DOT #57 washed stone is recommended.
- D. Gravel Drop Inlet Sediment Traps: Gravel drop inlet protection shall be used where heavy concentrated flows are expected. The slope toward the inlet shall be no steeper than 3:1. To prevent gravel from entering the inlet, an area of level stone, that is a minimum of 1 foot wide, shall be placed between the structure and around the inlet. Stone that is 3 inches or larger in diameter shall be used on the slope toward the inlet. On the slope away from the inlet, #57 (½" to ¾" diameter) washed stone shall be placed in a layer at least one foot (1') thick (see Figure M-10d).
- E. Sod Inlet Protection: Sod inlet protection shall be used at the time of permanent seeding to protect inlets from sediment and mulch material until the permanent vegetation becomes established. The sod shall be placed to form a turf mat covering the soil for a distance of 4 feet from each side of the inlet structure. Sod strips shall be staggered so that adjacent strip ends are not aligned. Refer to Figure M-10e for sod inlet protection details.

### **8.7.6 Maintenance**

Sediment traps shall be inspected daily and after each rain. Repairs shall be made as needed. Sediment shall be removed when the sediment has accumulated to one-half the height of the trap. For excavated inlet sediment traps, sediment shall be removed when one-half the storage capacity has been lost due to sediment accumulation. Sediment that is removed from sediment traps shall be properly disposed of and stabilized so that it will not enter the inlet or any waters bodies. Sediment shall not be washed into the inlet. Sod inlet protection shall be maintained as specified in the latest edition of the Manual for Erosion and Sediment Control in Georgia.

Sediment traps shall be removed when the contributing drainage area has been adequately stabilized. All materials and any unstable soil shall be salvaged or properly disposed of. The disturbed area shall be brought back to proper grade then smoothed and compacted. All bare areas around the inlet shall be permanently stabilized.

## **8.8 TEMPORARY SEDIMENT BASIN**

### **8.8.1 Definition**

A temporary sediment basin is created by the construction of a barrier or dam across a concentrated flow area, by excavating a basin, or by a combination of both. Temporary sediment basins usually consist of a dam, a pipe outlet, and an emergency spillway. The size of the structure depends on the location, size of contributing drainage area, soil type, and rainfall pattern.

### **8.8.2 Purpose**

The purpose of a temporary sediment basin is to protect properties and drainage ways from damage caused by excessive sedimentation and debris from erodible areas. The water is temporarily stored and the bulk of the sediment carried by the water drops out and is retained in the basin before the water is automatically released.

### **8.8.3 Conditions Where Practice Applies**

This practice applies to critical areas where physical site conditions, construction schedules, or other restrictions preclude the installation or establishment of erosion and sediment control practices to satisfactorily reduce runoff, erosion, and sedimentation. The structure may be used in combination with other practices and shall remain in effect until the sediment-producing area is permanently stabilized.

This standard applies to the installation of temporary (to be removed within 18 months) sediment basins on sites where: (1) failure of the structure would not result in loss of life or interruption of use or service of public utilities, and (2) the contributing drainage area does not exceed 150 acres.

### **8.8.4 Design Criteria**

- A. Compliance with Laws and Regulations: Design and construction shall comply with federal, state, and local laws, ordinances, rules and regulations.
- B. Location: The sediment basin shall be located to obtain the maximum storage benefit from the terrain and for ease of cleanout of the trapped sediment. It shall also be located to minimize interference with construction activities and construction of utilities. Sediment basins shall be located so that storm drains discharge into the basin. They shall never be placed in live streams.

- C. Volume of Basin: The sediment storage volume of the basin, as measured to the crest elevation of the principal spillway, shall be at least 67 cubic yards per acre of disturbed area draining to the basin (67 cubic yards is equivalent to ½ inch of sediment per acre of drainage area). The entire contributing drainage area shall be used for this computation, rather than the disturbed area alone. The sediment shall be removed once approximately one-third of the storage volume of the basin has been lost to sediment accumulation
- D. Surface Area: Studies (Barfield and Clar, 1985) indicate that the following relationship between surface area and peak inflow rate gives a trapping efficiency from greater than 75 percent for clay loam to 96 percent for loamy sandy soils.

$$A = 0.01q$$

where A is the basin surface area in acres and q is the peak inflow rate in cfs. The area is measured at the crest of the principal spillway riser. The minimum peak inflow rate shall be determined from a 2-year, 24-hour storm.

- E. Shape of the Basin: To maximize detention time within the basin the designer shall incorporate features as listed below:
1. The length to width ratio shall be greater than 2:1 where length is the distance between the inlet and the outlet. Computation methods are described in the *Procedure for Determining or Altering Sediment Basin Shape* in the latest edition of the Manual for Erosion and Sediment Control in Georgia.
  2. A wedge shaped basin with the inlet located at the narrow end.
  3. Baffles or diversions.
- F. Spillways: Runoff shall be computed by the method outlined in the latest edition of the Manual for Erosion and Sediment Control in Georgia. Other approved equivalent methods may also be used. Runoff computations shall be based upon the worst soil-cover conditions expected to prevail in the contributing drainage area during the anticipated effective life of the structure. The combined capacities of the principal and emergency spillway shall be sufficient to pass the peak rate of runoff from a 25-year, 24-hour frequency storm. An emergency spillway shall be included in the design, even if the principal spillway is designed to convey the peak rate of runoff from a 25-year, 24-hour storm,
1. Principal Spillway: A spillway consisting of a vertical pipe or box type riser joined (watertight connection) to a pipe that extends through the embankment and outlet beyond the downstream toe of the fill shall be provided. The metal gauge thickness of the principal spillway shall comply with Georgia DOT or NRCS specification. The discharge shall be

based on a 2-year, 24-hour storm for the total drainage area without causing flow through the emergency spillway. The appropriate disturbed soil cover condition shall be used. The minimum pipe size shall be 8 inches in diameter. Refer to the *Pipe Flow Chart for Corrugated Metal Pipe Drop Inlet Principal Spillway Conduit* table and the *Weir Flow (Q) Over Riser Crest for Circular Risers with Trash Rack* table, in the latest edition of the Manual for Erosion and Sediment Control in Georgia, to determine the proper sizing of the principal spillway, the riser, and the trash rack.

- a. Crest Elevation: The crest elevation of the riser shall be a minimum of one foot below the elevation of the control section of the emergency spillway (see Figure M-11a).
- b. Watertight barrel assembly: The riser and all pipe connections shall be completely watertight except for the inlet opening at the top or dewatering openings, and shall not have any other holes, leaks, rips or perforations.
- c. Dewatering the basin: Retention time within the basin is an important factor in effective sedimentation retention. The method used to dewater the sediment basin shall be selected from the following;
  1. Perforated Riser Pipe: The lower half of the riser shall be perforated with ½ inch holes spaced approximately 3 inches apart. The riser pipe shall then be covered with two feet of 3 to 4 inch stone (see Figure M-11a).
  2. Skimmer Outlet: The skimmer-type dewatering device operates at the surface of the ponded water and will not withdraw sediment from the submerged volume of the basin. Skimmers discharge 45 percent less sediment mass than conventional perforated risers. However, skimmers are mechanically more complex and shall require frequent inspection and maintenance in order to operate as designed.
- d. Trash rack and anti-vortex device: A trash rack and anti-vortex device shall be securely installed on top of the riser as detailed in the latest edition of Manual for Erosion and Sediment Control in Georgia.
- e. Base: The riser shall have a base attached with a watertight connection and shall have sufficient weight to prevent flotation of the riser. A concrete base 18” thick with the riser embedded 9” in the base is recommended. The minimum factor of safety shall be

1.20 (downward forces = 1.20 x upward forces). Refer to Table M-5 for volume of concrete required for risers and Figure M-11b for concrete riser base details.

<b>Table M-5 Concrete Volume Required to Prevent Flotation of Riser</b>		
<b>Riser Pipe Diameter (inches)</b>	<b>Buoyant Force (lbs./Vertical Foot of Riser Height)<sup>1</sup></b>	<b>Volume of concrete per Vertical Foot of Riser Height (c.f./V.F.) Needed to Prevent Flotation<sup>2</sup></b>
12	49.0	0.69
18	110.3	1.54
21	150.1	2.10
24	196.0	2.75
30	306.3	4.29
36	441.1	6.18
48	784.1	10.98
54	992.4	13.90
60	1225.2	17.16

<sup>1</sup>The weight of the riser pipe is negligible.

<sup>2</sup> Includes a factor of safety of 1.2.

Source: *Manual for Erosion and Sediment Control in Georgia*, 2000, Georgia Soil and Water Conservation Commission.

- f. Anti-Seep Collars: One anti-seep collar shall be installed around the pipe, near the center of the dam, when any of the following conditions exist:
1. The settled height of the dam is greater than 15 feet.
  2. The conduit is smooth pipe larger than 8” in diameter.
  3. The conduit is corrugated metal pipe larger than 12” in diameter.

Use an anti-seep collar with an 18-inch projection for heads (H) less than or equal to 10 feet and a 24-inch projection for heads (H) greater than 10 feet. The anti-seep collar and its connection shall be watertight.

- g. Outlet: An outlet shall be provided, including a means of conveying the discharge in an erosion-free manner to an existing stable area. Where discharge occurs at the property line, drainage

easements shall be obtained in accordance with local ordinances. Adequate notes and references shall be shown on the erosion and sediment control plan. Protection against scour at the discharge end of the pipe spillway shall be provided. Measures may include excavated plunge pools, riprap, impact basins, revetments, or other approved methods. For storm drain outlet protection specifications refer to the latest edition of the Manual of Erosion and Sediment Control in Georgia.

2. Emergency Spillway: The entire flow area of the emergency spillway shall be constructed in undisturbed ground (not fill). The emergency spillway cross-section shall be trapezoidal with a minimum bottom width of eight feet. This spillway channel shall have a straight control section of at least 20 feet in length and a straight outlet section for a minimum distance equal to 25 feet.
  - a. Capacity: The minimum capacity of the emergency spillway shall be that required to pass the peak rate of runoff from the 25-year, 24-hour frequency storm, less any reduction due to flow in the principal spillway. The appropriate disturbed soil cover condition shall be used. Emergency spillway dimensions shall be determined by using the method described in the latest edition of the Manual for Erosion and Sediment Control in Georgia.
  - b. Velocities: The velocity of flow in the exit channel shall not exceed 5 feet per second for vegetated channels. For channels with erosion protection other than vegetation, velocities shall be within the non-erosive range for the type of protection used. Vegetation, riprap or concrete shall be provided to prevent erosion. For channel stabilization specifications refer to the latest edition of the Manual for Erosion and Sediment Control in Georgia.
  - c. Freeboard: Freeboard is the difference between the design high water elevation in the emergency spillway and the top of the settled embankment. The freeboard shall be at least one foot.
- G. Entrance of Runoff Into the Basin: The points of entrance of surface runoff into excavated sediment basins shall be protected to prevent erosion and sediment generation (for specifications refer to the latest edition of the Manual for Erosion and Sediment Control in Georgia). Dikes, swales or other water control devices shall be installed as necessary to direct runoff into the basin. To maximize travel time, the points of runoff entry shall be located as far away from the riser as possible.

### 8.8.5 Construction Specifications

- A. Site Preparation: The areas under the embankment and under structural works shall be cleared, grubbed, and stripped of topsoil. All trees, vegetation, roots and other objectionable material shall be removed and disposed of by approved methods. In order to facilitate clean-out or restoration, the pool area (measured at the top of the pipe spillway) shall be cleared of all brush and trees.
- B. Cut-off Trench: A cut-off trench shall be excavated along the centerline of earth fill embankments. The minimum depth shall be 2 feet. The cut-off trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be 4 feet, but wide enough to permit operation of compaction equipment. The side slopes shall be no steeper than 1:1. Compaction requirements shall be the same as those for the embankment. The trench shall be drained during the backfilling and compaction operations.
- C. Embankment: The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) shall be placed in the downstream section of the embankment. Areas on which fills are to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction. Fill material shall be placed in six-inch to eight-inch thick continuous layers over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of the fill is traversed by at least one wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 5 percent higher than the design height to allow for settlement.
- D. Principal Spillway: The riser shall be securely attached to the pipe or pipe stub by welding the full circumference making a watertight structural connection. The pipe stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between pipe sections must be achieved by approved watertight band assemblies. The pipe and riser shall be placed on a firm, smooth foundation of impervious soil as the embankment is constructed. Breaching the embankment is unacceptable. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collar. The fill material around the pipe spillway shall be placed in four-inch layers and compacted under and around the pipe to at least the same density as the adjacent embankment. Care must be taken not to raise the pipe from firm contact with its foundation when compacting under the pipe hunches. A minimum depth of two feet of hand compacted backfill shall be placed over the pipe spillway before crossing it with construction equipment.

- E. Emergency Spillway: The emergency spillway shall be installed on undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and shall be constructed within a tolerance of  $\pm 0.2$  feet. If the emergency spillway requires erosion protection other than vegetation, the lining shall not compromise the capacity of the emergency spillway.
- F. Vegetative Treatment: The embankment and all other disturbed areas shall be stabilized in accordance with the appropriate permanent vegetative measure immediately following construction. In no case shall the embankment remain unstabilized for more than seven (7) days. For disturbed area stabilization techniques refer to Articles 8.10 through 8.14 and the latest edition of the Manual for Erosion and Sediment Control in Georgia.
- G. Erosion and Pollution Control: Construction operations shall be carried out in such a manner that erosion and water pollution will be minimized. State and local law concerning pollution abatement shall be complied with.
- H. Safety: State and local requirements shall be met concerning fencing and signs warning the public of hazards of soft sediment and floodwater.

#### **8.8.6 Maintenance**

All damages caused by soil erosion or construction equipment shall be repaired at or before the end of each working day. Sediment shall be removed from the basin when it reaches the specified distance below the top of the riser. This sediment shall be placed and stabilized in such a manner that it will not erode from the site. Sediment shall not enter adjacent streams or drainageways during sediment removal or disposal. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain.

#### **8.8.7 Final Disposal**

When temporary structures have served their intended purpose and the contributing drainage area has been properly permanently stabilized, the embankment and resulting sediment deposits shall be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the embankment and trapped sediment shall be removed, safely disposed of, and backfilled with a structural fill. When the basin area is to remain open space, the pond shall be pumped dry, graded and backfilled.

#### **8.8.8 Plan Information to be Submitted**

Sediment basin designs and construction plans shall be submitted for review to the City,

the Soil and Water Conservation District and/or other agencies. The erosion and sediment control plan shall include the following:

1. The specific location of the basin showing existing and proposed contours.
2. Maintenance equipment access points.
3. Figures detailing the cross-section of the dam, principal spillway and emergency spillway, and the profile of the emergency spillway.
4. Details of the trash rack, concrete riser base, and outlet structure assembly.

The following shall be submitted on 8 ½” x 11” attachments;

1. A hydrological study, including information regarding state/storage relationship.
2. A temporary sediment basin design sheet
3. Figures detailing the cross-section of the dam, principal spillway and emergency spillway, and the profile of the emergency spillway.

#### **8.8.9 Procedure for Determining or Altering Sediment Basin Shape**

As specified in the latest edition of the Manual for Erosion and Sediment Control in Georgia, the pool area at the elevation of the principal spillway crest shall have a length to width ratio of at least 2:1. The purpose of this requirement is to minimize the “short-circuiting” effect of the sediment laden inflow to the riser and thereby increasing the effectiveness of the sediment basin. This procedure provides alternative parameters and methods of determining and modifying the shape of the basin.

The length of the flow path (L) is the distance from the point of inflow to the riser (outflow point). The point of inflow is the point that the stream enters the normal pool (level at the riser crest elevation). The pool area (A) is the area of the normal pool. The effective width ( $W_e$ ) equals the area (A) divided by the length (L). The length to width ratio (L:W) is found by the equation:

$$L : W = L / W_e \text{ where, } W_e = A / L.$$

In the event there is more than one inflow point, any inflow point which conveys more than 30 percent of the total peak inflow shall meet the length-width ration criteria.

The required basin shape may be obtained by proper site selection, by excavation, or by constructing a baffle in the basin. The purpose of the baffle is to increase the effective flow length from the inflow point to the riser. Baffles shall be placed mid-way between the inflow point and the riser. The baffle length shall be as required to provide the minimum 2:1 length-width ratio. The effective length ( $L_e$ ) shall be the shortest distance

the water must flow from the inflow point around the end of the baffle to the outflow point. Then:

$$L : W = L_e / W_e \text{ where, } W_e = A / L_e$$

See Figure M-11c for examples of sediment basin baffles. Note that the special case shown in Example C is allowable only when the two flow paths are equal.

The dimensions necessary to obtain the required basin volume and surface area shall be clearly shown on the plans to facilitate plan review, construction, and inspection.

## **8.9 TEMPORARY SEDIMENT TRAPS**

### **8.9.1 Definition**

A small, temporary ponding basin formed by constructing an earthen embankment with a control outlet, generally constructed of rock or gravel.

### **8.9.2 Purposes**

To detain sediment-laden runoff from small disturbed areas long enough to allow the majority of the sediment to settle out.

### **8.9.3 Conditions Where Practice Applies**

- A. Sediment trap shall be used no longer than 18 months.
- B. The sediment trap shall be constructed either independently or in conjunction with a temporary diversion dike.
- C. Sediment traps shall be used only for small drainage areas. If the contributing drainage area is greater than 5 acres refer to Article 8.8 and the latest edition of the Manual for Erosion and Sediment Control in Georgia, for temporary sediment basins design and construction specifications.
- D. Sediment shall be periodically removed from the trap. Plans shall detail how this sediment is to be disposed of, such as by use in fill areas on site or removal to an approved off-site dump
- E. Sediment traps, along with other perimeter controls, shall be installed before any land disturbance takes place in the drainage area.

### **8.9.4 Design Criteria**

- A. Drainage area for a sedimentation trap shall not exceed 5 acres.
- B. Storage capacity: The sediment trap shall have an initial storage volume of 67

yd<sup>3</sup>/acre of disturbed area, measured from the low point of the ground to the crest of the gravel outlet. Sediment shall be removed from the basin when the volume is reduced by one-half.

For a natural basin, the volume may be approximated as follows:

$$V = 0.4 \times A \times D.$$

Where:

V = the storage volume, ft<sup>3</sup>

A = the surface area of the flooded area at the crest of the outlet, ft<sup>2</sup>

D = the maximum depth, measured from the low point in the trap to the crest of the outlet, ft.

- C. Excavation: If excavation is necessary to attain the required storage volume, side slopes shall be no steeper than 2:1.
- D. Outlet: The outlet for the sediment trap generally consists of a crushed stone section of the embankment located at the low point in the basin. The minimum length of the outlet crest shall be 6 feet times the acreage of the drainage area. The crest of the outlet shall be at least 1.0 foot below the top of the embankment, to insure that the flow will travel over the stone and not the embankment.
- E. Embankment Cross-Section: The maximum height of the sediment trap embankment shall be 5 feet as measured from the low point. The minimum top widths (W) and outlet heights (H<sub>o</sub>) for various embankment heights (H) are shown in Table M-6. The side slopes of the embankment shall be 2:1 or flatter (see Figure M-12).

<b>Table M-6 Minimum Top Width and Outlet Height Requirements for Temporary Sediment Traps</b>		
<b>Embankment Height (H)</b>	<b>Outlet Height (H<sub>o</sub>)</b>	<b>Minimum Embankment Top Width (W)</b>
1.5	0.5	2.0
2.0	1.0	2.0
2.5	1.5	2.5
3.0	2.0	2.5
3.5	2.5	3.0
4.0	3.0	3.0
4.5	3.5	4.0
5.0	4.0	4.5

Source: City of Atlanta, Georgia – Stormwater Design Manual, 1996.

### **8.9.5 Construction Specifications**

- A. The area under the embankment shall be cleared, grubbed, and stripped of any vegetation and root mat. To facilitate cleanout, the pool area shall be cleared.
- B. Fill material for the embankment shall be free of roots or other woody vegetation, organic material, large stones, and other objectionable material. The embankment shall be compacted in 8-inch layers by traversing with construction equipment.
- C. The earthen embankment shall be seeded with temporary or permanent vegetation within 7 days of construction.
- D. Construction operations shall be carried out in such a manner that erosion and water pollution are minimized.
- E. All cut and fill slopes shall be 2:1 or flatter.

### **8.9.6 Maintenance**

Temporary sediment traps shall be inspected after each period of significant rainfall. Sediment shall be removed and the trap restored to its original dimensions when the sediment has accumulated to one-half the design depth of the trap. The sediment removed shall be placed in the designated disposal area. The contaminated part of the gravel facing shall be replaced.

The structure shall be checked for damage from erosion or piping. The depth of the spillway shall be checked periodically to ensure it is a minimum of 1.0 ft below the low point of the embankment. Any observed settlement of the embankment shall be filled immediately to slightly above design grade. Any riprap displaced from the spillway shall be replaced immediately.

After all sediment-producing areas have been permanently stabilized, the structure and all unstable sediment shall be removed. The area shall be smoothed to blend with the adjoining areas and restored as described later in this document.

## **8.10 DISTURBED AREA STABILIZATION (WITH MULCHING ONLY)**

### **8.10.1 Definition**

Application of a protective layer of plant residues or other suitable materials produced on the site if possible, to the soil surface.

### **8.10.2 Purpose**

Applying mulch to disturbed areas may reduce runoff and erosion, conserve moisture, prevent surface compaction or crusting, control undesirable vegetation, modify soil temperature, and increase biological activity in the soil.

### 8.10.3 Requirement for Regulatory Compliance

Mulch or temporary grassing shall be applied to all exposed areas within 14 day of disturbance. Mulch can be used as a singular erosion and sediment control device for up to six months, but shall be applied at the appropriate depth, anchored, and have a continuous cover over at least 90 percent of the soil surface. Maintenance shall be required to maintain appropriate depth and 90 percent coverage. If the area will require erosion and sediment control for less than six months, temporary vegetation may be used instead of mulch. If an area will require erosion and sediment control for more than six months, permanent vegetative techniques shall be used. For temporary and permanent vegetation specification see Articles 8.11 through 8.13 and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

### 8.10.4 Specifications

Mulching Without Seeding: This standard applies to grades or cleared areas where seedlings may not have a suitable growing season to produce an erosion retardant cover, but which can be stabilized with a mulch cover.

#### A. Site Preparation

1. Necessary grading shall be performed to permit the use of equipment for applying and anchoring mulch.
2. Erosion and sediment control measures such as dikes, diversion, berms, terraces and sediment barriers shall be installed as needed.
3. Compacted soil shall be loosened to a minimum depth of 3 inches.

#### B. Mulching Materials

1. Dry straw or hay shall be applied at a depth of 2 to 4 inches providing the soil is completely covered.
2. Wood waste (chips, sawdust or bark) shall be applied at a depth of 2 to 3 inches. Where feasible, organic material from the clearing stage of development shall remain on site, be chipped, and applied as mulch. This method of mulching can greatly reduce erosion and sediment control costs.
3. Polyethylene film shall be secured over banks or stockpiled soil material for temporary protection. This material can be salvaged and re-used.

#### C. Applying Mulch

1. Dry straw or hay mulch and wood chips shall be uniformly applied by hand or by mechanical equipment.

2. If the area will eventually be covered with perennial vegetation, 20-30 pounds of nitrogen per acre in addition to the normal amount shall be applied to offset the uptake of nitrogen caused by the decomposition of the organic mulches.
3. Apply polyethylene film on exposed areas.

D. Anchoring Mulch

1. Straw or hay mulch may be pressed into the soil using a disk harrow with the disk set straight or with a special “packer disk.” The disks shall be smooth or serrated and shall be 20 inches or more in diameter and spaced 8 to 12 inches apart. The edges of the disks shall be dull enough not to cut the mulch but to press it into the soil leaving much of it in an erect position. Straw or hay mulch shall be anchored immediately after application.
2. Appropriately sized netting shall be used to anchor wood waste. The openings of the netting shall not be larger than the average size of the wood waste chips.
3. Polyethylene film shall be anchored by trenching at the top and incrementally as necessary.

### **8.10.5 Maintenance**

All mulches shall be inspected periodically, and after rainstorms to check for rill erosion, dislocation, or failure. Where erosion is observed, additional mulch shall be applied. If washout occurs, the slope grade shall be repaired, reseeded, and the mulch reinstalled. Inspections shall continue until the permanent vegetation has been firmly established.

## **8.11 DISTURBED AREA STABILIZATION (WITH TEMPORARY SEEDING)**

### **8.11.1 Definition**

Planting rapid growing seeds to provide initial, temporary cover for erosion and sediment control on disturbed and denuded areas.

### **8.11.2 Purpose**

The purpose of temporary seeding is to reduce erosion, sediment and runoff damages to downstream resources until permanent vegetation or other erosion and sediment control measures can be established. In addition, it provides residue for soil protection and seedbed preparation and reduces problems of mud and dust production from bare soil surfaces during construction. Other purposes may include improvement of wildlife habitat, aesthetics, tilth, infiltration, and aeration.

### 8.11.3 Requirement for Regulatory Compliance

Mulch and temporary grassing shall be applied to all exposed areas within 14 days of disturbance. Temporary grassing, instead of mulch, can be applied to rough graded areas that will be exposed for less than six months. If an area will require erosion and sediment control for longer than six months, permanent perennial vegetation shall be used. If optimum planting conditions for temporary grassing is lacking, mulch can be used as a singular erosion and sediment control device for up to six months but it shall be applied at the appropriate depth, anchored, and have a continuous cover over at least 90 percent of the soil surface. For mulch specifications refer Article 8.10 and to the latest edition of the Manual for Erosion and Sediment Control in Georgia.

### 8.11.4 Conditions Where Practice Applies

On any cleared, bare, or sparsely vegetated soil surfaces where vegetative cover is needed for up to six months, or until establishment of finished grade or a permanent vegetative cover. Applications of this practice include diversions, dams, temporary sediment basins, temporary road banks, and soil stockpiles. Temporary vegetative measures shall be coordinated with permanent measures to assure economical and effective stabilization. Some species of temporary vegetation are not appropriate as companion crop for permanent vegetation because of their potential to out-compete the permanent species. Contact the NRCS of the local SWCD for more information.

### 8.11.5 Specifications

- A. Grading and Shaping: Slopes that can be stabilized by hand-seeded vegetation or with hydraulic seeding equipment may not require shaping or grading. Erosion and sediment control practices such as closed drains, ditches, dikes, diversions, sediment basins and others shall be installed for areas where excessive water run-off needs to be controlled.
- B. Seedbed Preparation: Good seedbed preparation is essential to successful plant establishment. A good seedbed is well pulverized, loose, and smooth. Sealed or crusted surfaces shall be loosened just prior to seeding to provide a place for seeds to lodge and germinate. Soil that is sealed or crusted shall be pitted, trenched or otherwise scarified by disking, raking, harrowing, or other suitable methods.

When hydroseeding methods are use, seedbed preparation shall not be required. When using conventional or hand seeding is used and the soil material is loose and not sealed by rainfall, seedbed preparation is not be required.

- C. Lime and Fertilizer: Soils shall be tested to determine if fertilizer is needed. Fertilizer shall not be required on reasonably fertile soils or soil material. For soils with very low fertility, 500 to 700 pounds of 10-10-10 fertilizer or the equivalent shall be applied per acre. To better incorporate the fertilizer into the soil, the fertilizer shall be applied before land preparation procedures occur.

Agricultural lime is required unless soil tests indicate otherwise. Apply agricultural lime at a rate of one ton per acre. Graded areas require lime application.

- D. Seeding: A grass or grass-legume mixture suitable to the area and season of the year shall be selected from the Plants, Planting Rates, and Planting Dates for Temporary Cover or Companion Crops Table, in the latest edition of the Manual for Erosion and Sediment Control in Georgia. Seed shall be uniformly applied by hand, cyclone seeder, drill, cultipacker-seeder, or hydraulic seeder (slurry including seed and fertilizer). Drill or cultipacker-seeders shall normally place seed one-quarter to one-half to one inch deep. Appropriate depth of planting is ten times the seed diameter. Soil shall be “raked” lightly to cover the seed with soil if seeded by hand.
- E. Mulching: In most cases temporary vegetation can be established without the use of mulch. Mulch without seeding may be considered for short-term protection. For disturbed area stabilization with mulch see Article 8.10 and the latest edition of the Manual of Erosion and Sediment Control in Georgia.
- F. Irrigation: During times of drought, water shall be applied at a rate that will not cause runoff and erosion. The soil shall be thoroughly wet to a depth that will insure germination of the seed. Subsequent applications shall be made when needed.

## **8.12 DISTURBED AREA STABILIZATION (WITH PERMANENT VEGETATION)**

### **8.12.1 Definition**

Planting perennial vegetation such as trees, shrubs, vines, grasses, or legumes, on exposed areas for final permanent stabilization. Permanent perennial vegetation shall be used to achieve final stabilization.

### **8.12.2 Purpose**

The purpose of establishing permanent vegetation in disturbed areas is to protect the soil surface from erosion, reduce damage from sediment and runoff to downstream areas, improve wildlife habitat and visual resources and improve aesthetics.

### **8.12.3 Requirement for Regulatory Compliance**

This practice or sod shall be applied immediately to rough graded areas that will require erosion and sediment control for longer than six months or to all areas at final grade. For disturbed area stabilization using sod refer to Article 8.13 and the latest edition of the Manual for Erosion and Sediment Control in Georgia. Final stabilization means that all soil disturbing activities at the site have been completed, and that for unpaved areas and areas not covered by permanent structures, at least 70 percent of the soil surface is

uniformly covered in permanent vegetation or equivalent permanent stabilization measures (such as the use of riprap, gabions, permanent mulches or geotextiles) have been employed.

Permanent vegetation is the planting of perennial vegetation such as trees, shrubs, vines, grasses, or legumes, on exposed areas for permanent soil stabilization. A crop of perennial vegetation appropriate for the region which is capable of providing a 70 percent coverage within the growing season shall be used to achieve permanent soil stabilization. Acceptable plants and grasses are listed in Section 5.0 of this document and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

#### **8.12.4 Conditions Where Practice Applies**

Permanent perennial vegetation shall be used to provide a protective cover for exposed areas including cuts, fills, dams, and other denuded areas.

#### **8.12.5 Planning Considerations**

- A. Conventional planting methods shall be used where possible.
- B. To aid in the establishment of permanent cover, companion crops shall be used. This technique is especially helpful during marginal planting periods.
- C. Following a summer or winter annual cover crop, no-till planting shall be used. An excellent procedure is to use no-till planting of sericea lespedeza into stands of rye.
- D. Block sod provides immediate cover and shall be used to control erosion adjacent to concrete flumes and other structures. For disturbed area stabilization using sod specifications refer Article 8.13 and the latest edition of the Manual for Erosion and Sediment Control in Georgia.
- E. Irrigation shall be used when the soil is dry or when summer plantings are done.
- F. To ensure long-lasting erosion and sediment control, low maintenance native plants shall be used.
- G. Mowing shall not be performed during the quail nesting season, (September to April).
- H. In critical area plantings wildlife plantings shall be included.

**Wildlife Plantings** – Commercially available plants beneficial to wildlife species include the following:

Mast Bearing Trees – Beech, Black Cherry, Blackgum, Chestnut, Chinkapin, Hackberry, Hickory, Honey Locust, Native Oak, Persimmon, Sawtooth Oak and Sweetgum. All trees that produce nuts or fruits are favored by many game species. Hickory provides nuts used mainly by squirrels and bear.

Shrubs and Small Trees – Bayberry, Bicolor Lespedeza, Crabapple, Dogwood, Huckleberry or Native Blueberry, Mountain Laurel, Native Holly, Red Cedar, Red Mulberry, Sumac, Wax Myrtle, Wild Plum and Blackberry. Plant in patches without tall trees to develop stable shrub communities. All produce fruits used by many kinds of wildlife, except for lespedeza which produces seeds used by quail and songbirds.

Grasses, Legumes, Vines, and Temporary Cover – Bahiagrass, Bermudagrass, Grass-Legume mixture, Partridge Pea, Annual Lespedeza, Orchardgrass (for mountains), Browntop Millet (for temporary cover) and Native grapes. Provides herbaceous cover in clearings for a game bird brood-rearing habitat. Appropriate legumes such as vetches, clovers and lespedezas may be mixed with grass, but they may die out after a few years.

#### **8.12.6 Construction Specifications**

- A. Grading and Shaping: Slopes that can be stabilized by hand-seeded vegetation or with hydraulic seeding equipment may not require shaping or grading. Vertical banks shall be sloped to ensure plant establishments.

When using conventional seeding and fertilizing the slope shall be graded and shaped, where feasible and practical, so that equipment can be used safely and efficiently during seedbed preparation, seeding, mulching, and maintenance of the vegetation.

Concentrations of water that will cause excessive soil erosion shall be diverted to a safe outlet. Erosion and sediment control practices shall conform to the appropriate standards and specifications contained in this section and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

- B. Lime and Fertilizer

1. Rates and Analysis: In areas where permanent vegetation is to be established, agricultural lime shall be applied as indicated by soil test or at a rate of one to two tons per acre. Graded areas require lime application. Agricultural lime shall not be required in areas to be planted with only trees. If lime is applied within six months of planting permanent perennial vegetation, additional lime shall not be required. Agricultural lime shall be within the specifications of the Georgia Department of Agriculture.

Lime spread by conventional equipment shall be “ground limestone.” Ground limestone is calcitic or dolomitic limestone that has been ground so that 90 percent of the material will pass through a 10-mesh sieve, not less than 50 percent will pass through a 50-mesh sieve, and not less than 25 percent will pass through a 100-mesh sieve.

Agricultural lime spread by hydraulic seeding equipment shall be “finely ground limestone.” Finely ground limestone is calcitic or dolomitic limestone ground so that 98 percent of the material will pass through a 20-mesh sieve and not less than 70 percent will pass through a 100-mesh sieve.

Refer to the Fertilizer Requirements table in the latest edition of the Manual for Erosion and Sediment Control in Georgia for initial fertilization, nitrogen, topdressing, and maintenance fertilizer requirements for a particular species or combination of species.

2. Application: When hydraulic seeding equipment is used the initial fertilizer shall be applied in a mixed slurry of seed, inoculant (if needed), and wood cellulose or wood pulp fiber mulch. The slurry mixture shall be kept thoroughly mixed throughout the application and shall be uniformly spread over the area within one hour after being placed in the hydroseeder.

Finely ground limestone will be mixed with water and applied immediately after mulching is completed or in combination with the top dressing.

When conventional planting is used the lime and fertilizer shall be applied uniformly in one of the following ways:

- a. Apply before land preparations so that it will be mixed into the soil during seedbed preparation
- b. Mix with the soil to be used to fill the holes or distribute in furrows
- c. Broadcast after steep surfaces are scarified, pitted or trenched
- d. A fertilizer pellet shall be placed at root depth beside each pine tree seeding.

- C. Plant Selection: For approved species refer to Section 5.0 and the Plants, Planting Rates, and Planting Dates for Permanent Cover, Durable Shrubs and Ground Covers for Permanent Cover, and Trees for Erosion Control tables in the latest edition of the Manual for Erosion and Sediment Control in Georgia. Before using any species not listed, it shall be approved by the State Resource Conservation of the Natural Resources Conservation Service.

Plants shall be selected on the basis of species characteristics; site and soil conditions; planned use and maintenance of the area; time of year of planting; method of planting and the needs and desires of the land user.

Some perennial species are easily established and can be planted alone. Other perennials are slow to become established and shall be placed with another perennial species. The additional species will provide quick cover and ample soil protection until the target perennial species becomes established.

Plant selections may also include annual companion crops. Annual companion crops shall be used only when the perennial species are not planted during their optimum planting period. Care shall be taken in selection of companion crop species and seeding rates because annual crops will compete with perennial species for water, nutrients and growing space. Ryegrass shall not be used in any seeding mixtures containing perennial species due to its ability to out-compete desired species chosen for permanent perennial cover.

Seed Quality - The term “pure live seed” is used to express the quality of seed. Pure live seed, PLS, is expressed as a percentage of the seeds that are pure and will germinate. The percent of PLS helps to determine the amount of seed needed. For further information and an example of calculating PLS refer to the Disturbed Area Stabilization (with Permanent Vegetation) section in the latest edition of the Manual for Erosion and Sediment Control in Georgia.

- D. Seedbed Preparation: Seedbed preparation may not be required where hydraulic seeding and fertilizing equipment is to be used. When using conventional seeding, seedbed shall be prepared as follows:
- E. Broadcast plantings: Minimum tillage shall adequately loosen the soil to a depth of 4 to 6 inches; alleviate compaction; incorporate lime and fertilizer; smooth and firm the soil; allow for the proper placement of seed, sprigs, or plants; and allow for the anchoring of straw or hay mulch if a disk is to be used. Tillage shall be performed with any suitable equipment. Where feasible, tillage shall be done on the contour. Where slopes are too steep for the safe operation of tillage equipment, the soil surface shall be pitted or trenched across the slope with hand tools to provide two places 6 to 8 inches apart in which seed may lodge and germinate. Hydraulic seeding may also be used
- F. Individual plants: In areas where individual plants are to be set, the soil shall be well prepared by excavating holes, opening furrows, or dibble planting. When using nursery stock plants, holes shall be large enough to accommodate roots without crowding.

Four to six months prior to planting pine seedlings, the area shall be subsoiled 36 inches deep on the contour. Subsoiling shall be done when the soil is dry, preferably in August or September.

- G. Inoculants: All legume seed shall be inoculated with appropriate nitrogen-fixing bacteria. The inoculant shall be a pure culture prepared specifically for the seed species and used before the expiration date. A mixing medium recommended by the manufacture shall be used to bond the inoculant to the seed. All inoculated seed shall be protected from the sun and high temperatures and shall be planted the same day inoculated.

For conventional seeding, two times the amount of inoculant recommended by the manufacturer shall be used. For hydraulic seeding, four times the amount of inoculant recommended by the manufacture shall be used. No inoculated seed shall remain in the hydroseeder longer than one hour.

H. Planting

Hydraulic seeding: A slurry consisting of seed, inoculant, fertilizer, wood cellulose or wood pulp fiber mulch, and water shall be uniformly applied to the area to be treated. Apply within one hour after the mixture is made.

Conventional seeding: Seeding shall be done on a freshly prepared and firmed seedbed. To insure uniform distribution of the seed during broadcast planting, a cultipacker-seeder, drill, rotary seeder, other mechanical seeder, or hand seeding shall be used. The seed shall be covered lightly with 1/8 to 1/4 inch of soil for small seed and 1/2 to 1 inch for large seed when using a cultipacker or other suitable equipment.

No-till seeding: This application is permissible into annual cover crops when planting is done following maturity of the cover crop or if a temporary cover stand is sparse enough to allow adequate growth of the permanent species. Seed shall be uniformly distributed and planted at the proper depth. No-till seeding shall be performed with appropriate no-till seeding equipment.

Individual plants: Shrubs, vines and sprigs shall be planted with appropriate planters or hand tools. Pine trees shall be planted manually in the subsoil furrow. Nursery stock plants shall be planted at the same depth or slightly deeper that they grew at the nursery. The tips of vines and sprigs shall be at or slightly above the ground surface. Where individual holes are dug, fertilizer shall be placed in the bottom of the holes, followed by the addition of two inches of soil and setting of the plant. All plants shall be set in a manner that will avoid crowding of the roots.

- I. Mulching: Mulch shall be used on all permanent vegetation application. Mulch applied to seeded areas shall achieve 75 percent soil cover.

Mulching material and rate of application shall consist of one of the following:

1. Dry straw or dry hay : Straw or hay that is dry, of good quality and free of weed seeds shall be used. Straw shall be applied at the rate of 2 tons per acre. Hay shall be used at a rate of 2 1/2 tons per acre.

2. Wood cellulose mulch or wood pulp fiber: Wood cellulose or wood pulp fiber shall be used with hydraulic seeding. It shall be applied at the rate of 500 pounds per acre. Dry straw or dry hay shall be applied (at the rate indicated in item 1 above) after hydraulic seeding.
3. One thousand pounds of wood cellulose or wood pulp fiber, which includes a tackifier, shall be used with hydraulic seeding on slopes 3/4:1 or steeper.
4. Sericea lespedeza hay containing mature seed shall be used at a rate of three tons per acre.
5. Pine straw or pine bark – Shall be applied at a thickness of 3 inches for bedding purposes. Other suitable materials in sufficient quantity may be used where ornamentals or other ground covers are planted. Pine straw or pine bark shall not be used on seeded areas.
6. When using temporary erosion control blankets or block sod, mulch is not required.
7. Bituminous treated roving may be applied on planted areas on slopes, in ditches or dry waterways to prevent erosion. Bituminous treated rowing shall be applied within 24 hours after an area has been planted. Application rates and materials must meet Georgia Department of Transportation specifications.

Wood cellulose and wood pulp fibers shall not contain germination or growth inhibiting factors. They shall be evenly dispersed when agitated in water. The fibers shall contain a dye to allow visual metering and aid in uniform application during seeding.

- J. Applying Mulch: Straw or hay mulch shall be spread uniformly using blower-type spreading equipment, other spreading equipment or by hand within 24 hours after seeding and/or planting. Approximately 75 percent of the soil surface shall be covered. Wood cellulose or wood fiber mulch shall be applied uniformly with hydraulic seeding equipment.
- K. Anchoring Mulch: Straw or hay mulch shall be anchored immediately after application by one of the following methods:
  1. Hay and straw: The hay or straw mulch shall be pressed into the soil immediately after it is spread. Special “packer disks” or disk harrows that are 20 inches or more in diameter, set straight, 8 to 12 inches apart, and with smooth or serrated edges shall be used. The edges of the blade shall be dull enough to press the mulch into the ground without cutting it, leaving much of it in an erect position. Mulch shall not be plowed into the soil.

2. Synthetic tackifier or binder: Synthetic tackifier or binders approved by GDOT shall be mixed according to the manufacturer's specifications and applied in conjunction with or immediately after the mulch is spread. For tackifiers and binders specifications refer to the latest edition of the Manual for Erosion and Sediment Control in Georgia.
  3. Rye or wheat: To stabilize the mulch, rye or wheat can be included with the Fall and Winter plantings. They shall be applied at a rate of one-half to one-quarter bushel per acre.
  4. Plastic mesh or netting: Plastic mesh or netting may be needed to anchor straw or hay mulch on unstable soils and areas receiving concentrated flow. The mesh or net openings shall be no larger than one inch by one inch. These materials shall be installed and anchored according to manufacturer's specification.
- L. Bedding Material: Mulch shall be used as a bedding material to conserve moisture and control weeds in ornamental beds, around shrubs, and on bare areas on lawns.
  - M. Irrigation: Irrigation shall be applied at a rate that will not cause runoff and erosion.
  - N. Topdressing: Topdressing shall be applied on all temporary and permanent (perennial) species planted alone or in mixtures with other species. For recommended rates of application see the Fertilizer Requirements table in latest edition of the Manual for Erosion and Sediment Control in Georgia.
  - O. Second Year and Maintenance Fertilization: For recommended second year fertilizer rates and maintenance fertilizer see the Plants, Planting Rates, and Planting Dates for Permanent Cover table in the latest edition of the Manual for Erosion and Sediment Control in Georgia.
  - P. Lime Maintenance Application: One ton of agricultural lime shall be applied every 4 to 6 years or as indicated by soil tests.

### **8.12.7 Use and Management**

Mowing shall not take place during quail nesting season, between May and September. *Sericea lespedeza* shall be mowed only after the seeds have become mature. Mowing shall occur only after frost, between November and March. Bermudagrass, Bahiagrass and Tall Fescue shall be mowed as desired. At least 6 inches of top growth shall be maintained under any use and management. Moderate use of top growth is beneficial after establishment.

## **8.13 DISTURBED AREA STABILIZATION (WITH SOD)**

### **8.13.1 Definition**

A permanent vegetative cover using sods on highly erodible or critically eroded lands.

### **8.13.2 Purpose**

The purpose of using sod is to establish immediate ground cover, reduce runoff and erosion, improve aesthetics and land value, reduce dust and sediments, stabilize waterways and critical areas, filter sediments, nutrients and bugs, reduce downstream complaints, reduce the likelihood of legal action, reduce the likelihood of work stoppage due to legal action, and increase “good neighbor” benefits.

### **8.13.3 Conditions Where Practice Applies**

This application is appropriate for areas which require immediate vegetative covers, drop inlets, grass swales and waterways with intermittent flow.

### **8.13.4 Planning Considerations**

Sod can initially be more costly than seeding, but the advantages justify the increased initial costs.

Advantages are:

- A. Immediate erosion and sediment control, green surface, and quick use.
- B. Reduced failure as compared to seed as well as the lack of weeds.
- C. Can be established nearly year-round.

Sod is preferable to seed in waterways and swales because of the immediate protection of the channel after application. Sod must be staked in concentrated flow areas (see Figure M-13).

### **8.13.5 Construction Specifications**

- A. Soil Preparations: The soil surface shall be brought to final grade. The soil surface shall be cleared of trash, woody debris, stones and clods larger than 1”. The sod shall be applied to soil surface only and not frozen surfaces, or gravel type soils. Topsoil, which has not recently been treated with herbicides or soil sterilants, may be applied to help guarantee a good stand.

Fertilizer shall be mixed into the soil surface at a rate indicated by soil tests. Agricultural lime shall be applied based on soil tests or at a rate of 1 or 2 tons per acre.

- B. Installation: The sod shall be laid with tight joints and in straight lines. The joints shall be staggered and not overlapping. On slopes steeper than 3:1 the sod shall be anchored with pins or other approved methods (See Figure M-13).

After installation, the sod shall be rolled or tamped to insure good contact between sod and soil. The sod and underlying soil shall be irrigated to a depth of 4 inches immediately after installation. Irrigation shall also be used to supplement rainfall for a minimum of 2-3 weeks.

### **8.13.6 Materials**

Sod shall be certified and selected from a source that is grown in the general area of the project.

- A. Sod shall be machine cut and contain  $\frac{3}{4}$ " (+ or -  $\frac{1}{4}$ ") of soil.
- B. Sod shall be cut to the desired size within + or - 5%. Torn or uneven pads shall be rejected.
- C. Sod shall be cut and installed within 36 hours of digging.
- D. Planting shall be avoided when there is a threat of frost or hot weather if irrigation is not available.
- E. The sod type shall be shown on the plans and installed according to the Sod Planting Requirements table in the latest edition of the Manual for Erosion and Sediment Control in Georgia.

### **8.13.7 Maintenance**

Areas where adequate stands of sod are not obtained shall be re-sodded. New sod shall be mowed sparingly. The grass height shall not be cut less than 2"-3". Fertilizer shall be applied at a rate indicated by soil tests. Agricultural lime shall be applied based on soil tests or at a rate of one ton per acre every 4 to 6 years.

## **8.14 EROSION CONTROL MATTING AND BLANKETS**

### **8.14.1 Definition**

A protective covering (blanket) or soil stabilization mat used to establish permanent vegetation on steep slopes, channels or shorelines.

### **8.14.2 Purpose**

The purpose of erosion control matting and blankets is to provide a microclimate which protects young vegetation and promotes its establishment and to reinforce the turf to resist

forces of erosion during storm events.

### 8.14.3 Conditions Where Practice Applies

Matting and blanket shall be applied on steep slopes where the hazard of erosion is high and planting is likely to be too slow in providing adequate protection cover. In concentrated flow areas, all slopes steeper than 2.5:1 and with a height of ten feet or greater, and cuts and fills within the stream buffer, shall be stabilized with the appropriate erosion control matting or blanket. On streambanks where moving water is present, matting can prevent new plantings from being washed away.

### 8.14.4 Planning Considerations

- A. Temporary Erosion Control Blankets: includes temporary “combination” blankets (rolled erosion control blankets – RECB) consisting of a plastic netting which covers and is intertwined with a natural organic or manmade mulch; or a jute mesh which is typically homogeneous in design and can act alone as a soil stabilization blanket.

Temporary blankets as a minimum shall be used to stabilize concentrated flow areas with a velocity less than 5 ft/sec and slopes 2.5:1 or steeper with a height of 10 feet or greater. Temporary blankets will deteriorate in a short period of time and provide no enduring erosion protection.

Benefits of using erosion control blankets include the following:

1. Protection of seed and soil from raindrop impact and subsequent displacement
2. Thermal consistency and moisture retention for seedbed areas.
3. Stronger and faster germination of grasses and legumes.
4. Planing off excess stormwater runoff.
5. Prevention of sloughing of topsoil added to steeper slopes.

- B. Permanent Erosion Control Matting: consists of permanent non-degradable, three-dimensional plastic structures, which can be filled with soil prior to planting. These mats are also known as permanent soil reinforcing mats (turf reinforcement matting). Roots penetrate and become entangled in the matrix, forming a continuous anchorage for surface growth and promoting enhanced energy dissipation. Matting shall be used when a vegetative lining is desired in stormwater conveyance channels where the velocity is between five and ten feet per second.

Benefits of using erosion control blankets include the following:

1. All benefits gained from using erosion control blankets.
2. Causes soil to drop out of stormwater and fill the matrix with fine soils which become the growth medium for the development of roots.
3. Acts with the vegetative root system to form an erosion resistant cover which resist hydraulic lift and shear forces when embedded in the soil within stormwater channels.

#### **8.14.5 Materials**

All blankets and matting materials shall be on the GDOT Qualified Products List (QPL #62 for blankets, QPL #49 for matting). All blankets shall be nontoxic to vegetation and to the germination of seed and shall not be injurious to the unprotected skin of humans. At a minimum, the plastic netting shall be intertwined with the mulching material/fiber to maximize strength and provide for ease of handling.

Temporary Blankets: Machine produced temporary combination blankets shall have a consistent thickness with the organic material evenly distributed over the entire blanket area. All combination blankets shall have a minimum width of 48 inches. Machine produced combination blankets include straw blankets, excelsior blankets, coconut fiber blankets, wood fiber blankets and jute mesh.

Permanent Matting: Permanent matting shall consist of a lofty web of mechanical or melt bonded polymer nettings, monofilaments, or fibers which are entangled to form a strong and dimensionally stable matrix. Polymer welding, thermal or polymer fusion, or the placement of fibers between two high strength, biaxially oriented nets bound securely together by parallel lock stitching with polyolefin, nylon or polyester threads are all appropriate bonding methods. Mats shall maintain their shapes before, during and after installation, under dry or water saturated conditions. Mats must be stabilized against ultraviolet degradation and shall be inert to chemicals normally encountered in a natural soil environment.

#### **8.14.6 Site Preparation**

After the site has been shaped and graded to the approved design, prepare a friable seedbed relatively free from clods and rocks more than one inch in diameter, and any foreign material that will prevent contact of the soil stabilization mat with the soil surface. Surface must be smooth to ensure proper contact of blankets or matting to the soil surface. If necessary, redirect any runoff from the ditch or slope during installation.

#### **8.14.7 Staples**

The following are considered appropriate stapling and staking materials.

- A. Temporary Blankets: This includes straw, excelsior, coconut fiber, and wood fiber blankets. Staples shall be used to anchor temporary blankets. U-shaped wire (11 gauge or greater) staples with legs at least 6 inches in length and a crown of one inch or appropriate biodegradable staples can be used. Staples shall be of sufficient thickness for soil penetration without undue distortion.
- B. Permanent Matting: Sound wood stakes, 1 x 3 inches stock sawn in a triangular shape, shall be used. Depending on the compaction of the soil, select stakes with a length from 12 to 18 inches. U-shaped staples shall be 11 gauge steel or greater, with legs at a minimum of 8 inches in length and a 2 inch crown.

#### **8.14.8 Planting**

Lime, fertilizer, and seed shall be applied in accordance with seeding or other type of planting plan completed prior to installation of temporary combination blankets or jute mesh. For permanent mats, the area must be brought to final grade, plowed, limed, and fertilized. After the permanent mat has been installed and backfilled, the entire area shall be grassed.

#### **8.14.9 Maintenance**

All erosion control blankets and matting shall be inspected periodically following installation, particularly after rainstorms to check for erosion and undermining. Any dislocation or failure shall be repaired immediately. If washouts or breakage occurs, reinstall the material after repairing damage to the slope or ditch. Continue to monitor these areas until they become permanently stabilized.

### **8.15 SPECIFIC EROSION AND SEDIMENT CONTROL MEASURES**

#### **8.15.1 Overland Control Structures**

##### **8.15.1.1 Longitudinal Slopes**

- A. Diversions shall be installed as indicated in Figure M-4a. Where required, temporary diversions shall be installed as soon as possible following the clearing operation.
- B. Silt fences or hay bales shall be installed at the outlet end of diversions as indicated in Figure M-8a, Figure M-8b and Figure M-9 where vegetation is not sufficient to provide adequate filtration.
- C. Silt fences shall be installed as required at the bases of slopes adjacent to road and stream crossings.

**8.15.1.2 Side Hill Runoff Control Measures**

- A. Excavation operations shall be used to create swales/berms on the downhill side of the construction disturbance limits whenever necessary in conjunction with silt fences or hay bales in order to intercept runoff.
- B. Discharge points shall be protected with silt fences and/or hay bales.
- C. Silt fences and/or hay bales shall be installed at the downstream side of the right-of-way directly across (perpendicular to flow) small swales servicing small drainage basins.
- D. Silt fences and/or hay bales shall be installed along swales and intermittent stream bank (parallel with flow) when the stream is serviced by a larger drainage basin.
- E. Silt fences or hay bales shall be installed along the downgradient side of the disturbed area upslope of any stream, lake, or pond which is adjacent to or parallel to the construction right-of-way. As much width as possible of natural vegetation shall be maintained (as a filter strip) between the edge of clearing and the edge of the water body. Silt fences and/or hay bales shall be required in all cases where the limits of the disturbed area extend to within the following distances of streams, ponds, or other areas to be protected:

<u>Length of Vegetative</u> <u>% Slope</u>	<u>Filter Strip</u>
< 15%	50 ft.
15 – 30%	75 ft.
>30%	100 ft.

**8.15.2 Temporary Stream Crossings**

**8.15.2.1 Staging Areas**

- A. Staging areas shall be located at least 50 feet back from the stream bank, where topographic conditions permit.
- B. The size of the staging areas shall be limited to the minimum needed for storage and prefabrication of construction material/equipment for stream crossings.
- C. Chemicals, fuels, lubrication oils, or refuel construction equipment shall not be stored within 100 feet of the stream bank.

**8.15.2.2 Spoil Pile Placement/Control**

- A. Trench spoil shall be placed beyond the limits of stream banks at all stream crossings.

- B. Spoil piles located beyond the limits of stream banks shall be protected with silt fences and/or hay bales.
- C. Spoil material shall not be stored along stream banks where it could be washed away by high stream flows.
- D. Where possible, spoil material or other soils on site shall be used to create small embankments/berms or other measures which control the direction and velocity of overland flow.

### **8.15.2.3 Crossing Procedures**

All stream crossings shall provide means for passage of aquatic life forms. Either shoal type (overflow) crossings or bridge or culvert crossings (dry traffic surface with the flow passage opening beneath) are acceptable. In no event will the City approve a crossing (for example, of porous limerock base) which relies on seepage as a method for passing stream flow (seepage is not capable of providing acceptable passage for aquatic biota).

- A. Crossings shall be constructed as nearly perpendicular to the axis of the stream channel as engineering and routing conditions permit. The City shall be provided a set of drawings in advance of construction and a monthly notification during construction indicating the location (stationing) where construction, including stream crossings, is projected to occur in the coming monthly period.
- B. The pipe size shall be large enough to convey the full bank flow of the stream without appreciably altering the stream flow characteristics (see Table M-7). The structure shall be designed to withstand flows from a 10-year, 24-hour frequency storm or other storm specified in Title 12-7-1 of the Official Code of Georgia Annotated. Structures shall be protected from washouts by elevating the bridges above adjacent floodplain lands, crowning of the fill over the pipes or by use of diversions, dikes or island type structures.

<b>Contributing Drainage Area (acres)</b>	<b>Average Slope of Watershed</b>			
	<b>1%</b>	<b>4%</b>	<b>8%</b>	<b>16%</b>
1 – 25	24	24	30	30
26 – 50	24	30	36	36
51- 100	30	36	42	48
101 – 150	30	42	48	48
151 – 200	36	42	48	54
201 – 250	36	48	54	54
251 – 300	36	48	54	60
301 – 350	42	48	60	60
351 – 400	42	54	60	60
401 – 450	42	54	60	72
451 – 500	42	54	60	72
501 – 550	48	60	60	72
551 – 600	48	60	60	72
601 – 640	48	60	72	72

<sup>a</sup> Assumptions for determining the table: USDA-NRCS Peak Discharge Method CN=65; rainfall depth (average for Georgia) = 3.7" for 2-year frequency.

Source: Manual for Erosion and Sediment Control in Georgia, 2000, Georgia Soil and Water Conservation Commission.

C. Minor streams: <15 feet wide or <2 feet average depth.

1. Timber rip-rap (covered with geotextile fabric and soil) providing vehicle access across stream shall be used.
2. In-stream equipment shall be limited to that needed to construct the crossing.
3. In-stream trenching and backfill work shall be completed within 72 hours whenever feasible.

D. Major streams: >15 feet wide but <100 feet wide

1. Optional methods to be used in providing vehicle access across streams include:
  - a. Equipment and/or timber pads and culvert.
  - b. Clean rockfill shoal crossing.
  - c. Flexi-float or portable bridge.
2. In-stream equipment shall be limited to that needed to construct the crossing.

3. In-stream trenching and backfill work shall be completed within 72 hours whenever feasible.
- E. Rivers: >100 feet wide
1. Size criteria based on:
    - a. Inability to cross using culvert bridge.
    - b. Inability to store trench spoil on riverbank.
  2. Site-specific construction procedures shall be submitted to the City for review and approval prior to initiation of any construction at crossing.
- F. All culvert, bridges, rock, and timber riprap shall be removed from streams and rivers during final clean up and restoration.

### **8.15.3 Trench Dewatering**

- A. Trenches shall be dewatered into upland areas in such a manner that no silt laden water flows directly into any surface waters.
- B. Silt laden water shall be discharged through a functional siltation barrier (hay bales or silt fencing) or a minimum of 100 linear feet of vegetated area before entering streams or other surface waters.

### **8.15.4 Wetland Crossings**

#### **8.15.4.1 Staging Areas**

- A. Staging areas shall be located at least 50 feet from wetland edge, where topographic conditions permit.
- B. The size of staging areas shall be limited to the minimum needed for wetland crossing.
- C. Chemicals, fuel, lubrication oils, or refuel construction equipment shall not be stored within 100 feet of the stream bank. Appropriate spill prevention and control measures shall be implemented.

#### **8.15.4.2 Spoil Pile Placement/Control**

- A. Spoil material shall be placed beyond the edge of a wetland.
- B. Spoil piles shall be protected with silt fences and/or hay bales.

- C. Spoil material shall not be stored near the edge of a wetland where it could be washed away into the wetland.

#### **8.15.4.3 Crossing Procedures**

- A. If a wetland cannot be avoided and must be crossed, the utility shall be routed in a manner that minimizes the length of wetland crossing and disturbances.
- B. Tree stumps, or brush rip-rap shall not be used to stabilize the utility right-of-way.
- C. Clearing of right-of-way shall be limited to 30 feet wherever possible.
- D. Vegetation shall be cut off only at ground level, leaving existing root systems intact. Cut vegetation shall be removed from wetlands for disposal.
- E. Pulling of tree stumps and grading activities shall be limited to directly over trenches; stumps or root systems shall not be removed from non-trenched portions of the right-of-way in wetlands.
- F. Construction equipment operating in wetland shall be limited to that needed to dig trench, install pipe, backfill trench, and restore the right-of-way.
- G. Construction equipment shall be operated off of timber or wooden equipment pads if standing water or saturated soils are present.
- H. All timber or wooden equipment pads shall be removed upon completion of construction.
- I. “Push-pull” or “float” technique shall be used to place pipe in trench whenever water and other site conditions allow.

#### **8.16 TUNNELING**

All sewers or utilities that can be tunneled under the stream or the Greenway System must meet the following requirements:

- A. At stream crossings, the crown of the pipe must be at least 3 feet below the stream or waterbody bed.
- B. For sanitary sewers the pipe material must be ductile iron or reinforced concrete.
- C. For water mains the pipe material must be ductile iron.
- D. Excavation pits shall be located outside the Greenway System.

Each tunnel crossing must be evaluated individually. The designer must take into account stream width, flow conditions, soil conditions, and other factors in designing a proper tunnel. The design plans for tunneling under the Greenway System must be submitted to the City for approval before construction can begin.

## 9.0 SELECTED REFERENCES

- A. Atlanta, Georgia. Stormwater Management Design Manual. Atlanta, 1996.
- B. Atlanta, Georgia. Atlanta Sewer Group (Montgomery Watson). "Collection and Transmissions Systems Maintenance Management Plan (MMP)." Atlanta, 2000.
- C. Georgia Power Company. "Distribution and Network Underground Requirements – Erosion and Sedimentation Control."
- D. Georgia Power Company. "General Operating Procedures of Georgia Power Forestry and R/W Services."
- E. Georgia. Soil and Water Conservation Commission. Manual for Erosion and Sediment Control in Georgia. 5<sup>th</sup> edition. 2000.
- F. Georgia. Soil and Water Conservation Commission. Guidelines for Streambank Restoration. 1994.
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- H. Rosgen, Dave. Applied River Morphology. Pagosa Springs: Wildwood Hydrology, 1996.
- I. Schueler, Tom. Controlling Urban Runoff: A Practical Manual for Planning and Designing Urban BMPs. Washington: Metropolitan Washington Council of Governments, 1987.
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# **APPENDIX N**

## **CITY OF ATLANTA GREENWAY ACQUISITION PROJECT**

### **STANDARD OPERATING PROCEDURES FOR MAINTENANCE OF EXISTING UTILITIES WITHIN THE GREENWAY SYSTEM**

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## 1.0 INTRODUCTION

The following Standard Operating Procedures (SOPs) shall guide entities proposing to perform emergency or scheduled maintenance to existing utilities within the Greenway System. The purpose of these SOPs is to ensure that emergency and scheduled maintenance activities are performed in a manner consistent with the requirements of the Consent Decree and the Greenway Acquisition Plan.

This document presents SOPs for the following activities:

- A. Emergency maintenance to existing utilities within the Greenway System.
- B. Scheduled maintenance to existing utilities within the Greenway System.
- C. Restoration of Greenway Properties disturbed during emergency or scheduled maintenance to existing utilities.
- D. Scheduled maintenance of vegetation growing within existing utility easements within the Greenway System.

These SOPs are designed to minimize erosion and sedimentation within Greenway Properties by:

- A. Minimizing the quantity and duration of soil exposure during emergency or scheduled maintenance of existing utility systems
- B. Requiring the installation of and maintenance of erosion and sediment control measures during emergency or scheduled maintenance construction activities.
- C. Restoring disturbed properties by establishing vegetation immediately following completion of emergency or scheduled maintenance construction activities.

These SOPs do not replace existing utility-specific guidelines for emergency and scheduled maintenance of existing utilities or restoration of utility easements after maintenance activities, but do establish minimum requirements for such activities on Greenway Properties. These SOPs do not limit the City, or other responsible local government or agency, from imposing additional or more stringent requirements to control erosion and/or sediment.

As stated in Section VIII.D.2.m of the Consent Decree, “Any infrastructure for human activity within the Greenway Properties shall be designed and constructed with prevention of non-point source pollution as the primary consideration”. This does not mean that prevention of non-point source pollution is the sole consideration. This means that cost or other factors will not outweigh non-point source pollution prevention as the primary concern. Only safety design consideration shall be as important as non-point source pollution prevention.

## **2.0 EMERGENCY MAINTENANCE TO EXISTING UTILITIES WITHIN THE GREENWAY SYSTEM**

It is anticipated that circumstances may arise when emergency maintenance will need to be performed on an existing utility within the Greenway System. In emergency situations there is little time to plan, permit, or install erosion and sediment control measures before construction activities begin. However, if more than 24-hours are needed to complete the emergency maintenance activities, a permit or variance may be required. It is the responsibility of the entity performing the emergency maintenance to determine when and if a permit and/or variance is required. In the event that more than 24-hours are needed to complete the emergency maintenance activities, erosion and sediment control measures shall be installed as soon as possible, but no later than 24-hours from the beginning of the emergency maintenance activities. Best management practices (BMPs) for erosion and sediment control shall meet the minimum requirements established in Appendix M (Standard Operating Procedures for Construction of New Utilities) and the latest edition of the Manual for Erosion and Sediment Control in Georgia. Emergency maintenance activities are applicable in situations such as when repairs are needed for a sewer or water line break or a downed power line. Ultimately it is the responsibility of the entity performing the maintenance to determine what constitutes an emergency.

## **3.0 SCHEDULED MAINTENANCE TO EXISTING UTILITIES WITHIN THE GREENWAY SYSTEM**

The entity proposing to perform scheduled maintenance to an existing utility within the Greenway System shall be responsible for the preparation of a land disturbance plan which must include, at a minimum, an erosion and sediment control plan. The erosion and sediment control plan shall include specifications describing how erosion and sediment control will be maintained during the scheduled maintenance activities, including the BMPs to be implemented. BMPs for erosion and sediment control shall meet the minimum requirements established in Appendix M (Standard Operating Procedures for Construction of New Utilities) and the latest edition of the Manual for Erosion and Sediment Control in Georgia. A copy of the erosion and sediment control plan shall be kept on site at all times.

The City and other responsible local government or agency shall be notified before scheduled maintenance activities begin inside the Greenway System. The City and other responsible local government or agency may inspect the site to ensure that adequate erosion and sediment control measures are in place prior to construction, that adequate erosion and sediment control measures are maintained until the project is completed, and that the site has been restored to as close to its original condition as feasible once maintenance activities have been completed.

### **3.1 PERMITS, VARIANCES, AND PLANS**

It is the responsibility of the entity performing maintenance within the Greenway System to determine what permits, plans, or variances are required for maintenance activities. For

example, the State of Georgia may have requirements under their General Storm Water Permit Program or Fulton County may require a Stream Buffer Variance and a Land Disturbance Activity Permit. Requirements may vary from one jurisdiction to another. Therefore, it is imperative that the entity performing the maintenance has a clear understanding of local requirements.

### **3.1.1 State of Georgia General Storm Water Permitting**

At the time of the writing of this document, construction projects that are five (5) acres or larger in size require coverage under the State of Georgia NPDES, General Permit GAR100000, for authorization to discharge storm water associated with construction activities. One of the construction activities this permit authorizes is the discharge of storm water associated with construction activities from linear construction that will result in the disturbance of more than five (5) acres. As stated in the permit “‘Linear Construction’ or ‘Linear Construction Project’ means construction activities that are not part of a common development and where the length of the project is at least 25 times longer than the width of the project and the construction activity is being conducted by the Georgia Department of Transportation, by a local government, or by a utility company or utility contractor”. It is the responsibility of the entity performing the maintenance to determine if they need to apply for coverage. Application is made by submittal of a Notice of Intent (NOI) and a permit fee to:

Northwest Georgia Regional Office  
Georgia Environmental Protection Division  
Suite 114  
4220 International Parkway, Suite 101  
Atlanta, GA 30354  
Telephone (404) 675-6240

The NPDES general construction permit requires the use of Best Management Practices (BMPs) to control stormwater runoff for all rainfall events up to and including a 25-year 24-hour rainfall event. BMPs used shall be consistent with, and no less stringent than, those practices contained in the Manual for Erosion and Sediment Control in Georgia published by the State Soil and Water Conservation Commission as of January 1 of the year in which the land-disturbing activity is permitted. For some sites, additional BMPs beyond those identified in the Manual may be necessary for erosion and sediment control for all rainfall events up to, and including, a 25-year 24-hour rainfall events.

To ensure compliance with State water quality standards, the general permit requires inspections of the construction site as well as sampling and analysis of stormwater runoff from the site. The permit also requires daily recording of on-site precipitation. Detailed requirements for inspection and sampling are provided in the general permit. The guidelines set forth in this document and the latest edition of the Manual for Erosion and Sediment Control in Georgia will be used in conjunction with the State general permit to ensure that the best possible procedures are used for erosion and sediment control.

### **3.1.2 Stream Buffer Variance**

The State of Georgia Environmental Protection Division (EPD) enforces minimum stream buffer requirements. At the time of the writing of this document the EPD's requirements prohibit construction activities within a 25-foot buffer along the banks of all state waters or within a 50-foot buffer along the banks of any state waters classified as 'trout streams' (the State of Georgia Department of Natural Resources maintains the most current stream classifications). The Director of the EPD may grant a variance that is at least as protective of natural resources and the environment as provisions described in Title 12-7-6 of the Official Code of Georgia Annotated. The Director of the EPD may also grant a variance where a drainage structure or a roadway drainage structure must be constructed, provided that adequate erosion and sediment control measures are incorporated in the project plans and specifications and are implemented during construction. The buffer distance is measured horizontally from the point where vegetation has been wrested by normal stream flow or wave action. It is the responsibility of the entity performing the maintenance to determine if a variance is required from the State of Georgia, the City, or other responsible local government or agency.

### **3.1.3 Land Disturbance Activity Permits (LDP)**

It is the responsibility of the entity performing the maintenance within the Greenway System to determine if a Land Disturbance Activity Permit is required from any authority having jurisdiction. A Land Disturbance Activity Permit may contain the following information:

- A. Name, address, and contact telephone number.
- B. Narrative description of the maintenance activities to be conducted.
- C. Description of BMPs to be used.
- D. A site map.
- E. An activity schedule.
- F. Supportive data.
- G. Plans and specifications for restoring the site to a natural state with permanent vegetation.

The entity performing the maintenance shall contact the City and other responsible local government or agency for specific Land Disturbance Activity Permit requirements.

## **3.2 SITE CLEARING**

The following SOPs shall be followed during the site clearing phase for scheduled maintenance projects within the Greenway System:

- A. All cut and fill activities occurring within the EPD's mandated 25-foot stream buffer (50-foot buffer for trout streams) shall be stabilized with appropriate erosion control matting and blankets.
- B. The area to be cleared shall be clearly delineated to ensure that no disturbance occurs beyond the area identified. Except for perpendicular utility crossings, any open cut, grading, or clearing shall be set back from the streambanks to the greatest distance feasible. Except for manholes, portals, and the maintenance access to such facilities, the Greenway System must remain in a natural state even where crossings are perpendicular to the stream. Where feasible, scheduled utility maintenance projects are recommended to have no more than a thirty-foot (30') construction width (for projects paralleling the stream).
- C. Vegetation to be preserved shall be identified and clearly marked by flagging before clearing begins. Vegetation to be preserved shall include: vegetation vital to streambank stabilization; vegetation providing food and/or habitat to a federally listed endangered species, threatened species, or species of concern; vegetation that is a federally listed endangered species, threatened species, or species of concern; and vegetation that comprises a wetland ecosystem.
- D. Stemmed vegetation such as brush, shrubs, and trees shall be removed at or near the ground level, leaving the root systems intact.
- E. When pruning is necessary to clear the scheduled maintenance construction area, pruning cuts shall be made in accordance with the International Society of Arboriculture (ISA) Standards.
- F. Trees shall be felled into the cleared construction area or areas to be cleared and not onto vegetation to be preserved.
- G. Trees, which have fallen into water bodies or beyond the construction area, shall be removed immediately.

## **3.3 EROSION AND SEDIMENT CONTROL**

### **3.3.1 Maintenance Project Planning and Preliminary Grading**

Efforts shall be made during initial planning and whenever possible during scheduled maintenance phases, to minimize the amount of area cleared and graded (exposed) as well as the total exposure time. Plans must consider topography and soil type, so as to create the lowest practicable erosion potential. Whenever feasible, preliminary grading

operations shall be used to control the flow direction and velocity of runoff water and thereby dissipate energy. Where feasible, swales and diversion berms shall be used to direct runoff water to locations where treatment by sediment barriers can be performed. Where feasible, transverse diversion berms, installed perpendicular to the flow of water down slopes and in drainage channels, shall be used to reduce runoff water velocity. Cleared slopes shall be harrowed with construction equipment to create small diversion channels along the contours of the slope perpendicular to the direction of runoff flow. This action not only reduces flow velocities of runoff water traveling down the slopes, but also reduces flow quantities by increasing the area of exposed soil and thus enhancing percolation of runoff water. Grading equipment shall cross flowing streams by the means of bridges or culverts, except when such methods are not feasible, provided in any case that such crossings shall be kept to a minimum.

Dust from the disturbed area shall be controlled. Temporary means for controlling dust shall include mulching or vegetative cover with temporary seeding (see the latest edition of the Manual for Erosion and Sediment Control in Georgia). Emergency means for controlling dust shall include tillage or irrigation.

### **3.3.2 Erosion and Sediment Control Practices**

Erosion and sediment control practices must be implemented prior to any land disturbing activities resulting from scheduled maintenance within the Greenway System. Control of factors affecting erosion and sediment can be provided by a number of basic practices. The establishment of a dense stand of vegetation is probably the most effective means of controlling erosion and sediment; however, this control measure is often not practical until the completion of a project. Prior to and during the scheduled maintenance of utilities within the Greenway System, temporary erosion and sediment control measures shall be implemented and maintained until the construction area is restored as described later in this document.

Soft engineering techniques shall be used for erosion and sediment control. Hard engineering techniques shall only be used after soft techniques have failed and the failure is due to the inability of soft techniques to address the erosion problem. Improper choice of soft engineering techniques or improper design, implementation, and/or maintenance shall not be justification to turn to hard engineering techniques.

Appendix M presents summaries of techniques, (including their applications) used to control erosion and sedimentation. Erosion and sediment control measures shall be designed and implemented in accordance with the design standards established in Appendix M and the latest edition of the Manual for Erosion and Sediment Control in Georgia. If a conflict occurs between the design and construction standards presented in this document and those presented in the latest edition of the Manual for Erosion and Sediment Control in Georgia, the more stringent design and construction standards shall prevail. The selection of the most appropriate erosion and sediment control measure will be made by the entity performing scheduled maintenance to a utility on Greenway Property based on site specific conditions.

### 3.4 CONSTRUCTION METHODS

After all appropriate erosion and sediment control measures have been installed, the designated scheduled maintenance project can proceed as approved by the City with recommendations from any other responsible local government or agency. All clearing work and construction operations shall be conducted in such a manner as to effectively control soil erosion and prevent non-point source pollution loads from entering streams, ponds, and/or wetlands. At any time during the scheduled maintenance project, the City, with recommendations from any other responsible local government or agency, has the authority to limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow, and fill operations and to direct the entity performing work on Greenway Properties to provide immediate permanent or temporary erosion and sediment control measures to prevent adverse impacts to wetlands or water courses on the Greenway Property.

Prohibited construction procedures include, but are not limited to, the following:

- A. Dumping of spoil material into any streams, wetlands, surface waters, or unspecified locations.
- B. Indiscriminate, arbitrary, or capricious operation of equipment in wetlands or surface waters.
- C. Pumping of silt-laden water from trenches or excavations into surface waters or wetlands.
- D. Damaging vegetation adjacent to or outside of the construction area limits.
- E. Disposal of trees, brush, debris, plants, chemicals, asphalt products, concrete curing compounds, fuels, lubricants, insecticides, washwater from concrete trucks or hydroseeders, or any other pollutant in wetlands, surface waters, or unspecified locations.
- F. Alteration of the flow line of any stream, unless such work is of a temporary nature, has been specifically authorized by the authority having jurisdiction, and is necessary to divert flow from excavation work so that debris and sediments are not released into streams.
- G. Open burning of debris within Greenway properties.

All conveyance channels, drainage outlets, and erosion and sediment control measures must be constructed to withstand the expected velocity of flow from a 25-year frequency storm without erosion.

#### **4.0 RESTORATION OF THE GREENWAY PROPERTIES AFTER EMERGENCY OR SCHEDULED MAINTENANCE TO EXISTING UTILITIES**

Permanent soil stabilization measures shall be applied to disturbed areas within 30 days after all soil disturbing activities have been completed and the final grade has been reached on any portion of the construction project site. Permanent soil stabilization means that for unpaved areas and areas not covered by permanent structures, at least 70% of the soil surface is uniformly covered in permanent vegetation or equivalent permanent stabilization measures (such as the use of riprap, gabions, permanent mulches, or geotextiles) have been employed. Until these conditions are satisfied and permanent control measures and facilities are operational, interim stabilization measures and temporary erosion and sediment control measures shall not be removed. Efforts shall be made to return the site to its natural condition. Native vegetation shall be used in such efforts. Acceptable plants and grasses are listed in Section 5.0 of this document and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

Temporary soil stabilization measures shall be applied immediately to disturbed areas that are not at final grade but shall remain dormant for longer than 60 days. Areas that have been stabilized by temporary measures must be permanently stabilized once all soil disturbing activities are complete and the area is at final grade. Also, permanent stabilization measures shall be applied immediately to rough graded areas that will require erosion and sediment control for longer than six months.

#### **4.1 PERMANENT VEGETATION**

Permanent vegetation is the planting of perennial vegetation such as trees, shrubs, vines, grasses, or legumes, on exposed areas for permanent soil stabilization. A crop of perennial vegetation appropriate for the region which is capable of providing a 70% coverage within the growing season shall be used to achieve permanent soil stabilization.

The purpose of establishing permanent vegetation in disturbed areas is to protect the soil surface from erosion, reduce damage from sediment, reduce runoff to downstream areas, improve wildlife habitat and visual resources, and improve aesthetics. Permanent soil stabilization applies to each phase of construction. For linear construction projects on land used for agricultural or silvicultural purposes, permanent stabilization may be accomplished by stabilizing the disturbed land for its agricultural or silvicultural use. For design and construction specifications for disturbed area stabilization with permanent vegetation see Appendix M and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

Sod shall be used to establish a permanent vegetative cover on highly erodible or severely eroded lands. Sod establishes immediate ground cover and thereby reduces runoff, erosion, and dust, which results in improved aesthetics; higher land values; stabilized waterways and critical areas; less sediments, nutrients and bugs; less downstream complaints; reduced likelihood of legal action and work stoppage due to legal action; and increased “good neighbor” benefits.

Sod is appropriate for areas that require immediate vegetative covers such as drop inlets, grass swales, and waterways with intermittent flow. Sod can initially be more costly than seed, but the advantages justify the increased initial costs.

The advantages to sod include the following:

- A. Immediate erosion and sediment control, green surface, and quick use.
- B. Reduced failure as compared to seed.
- C. Lack of weeds.
- D. Can be established almost year-round.

Sod is preferable to seed in waterways and swales because of the immediate protection of the channel after application. Sod must be staked in concentrated flow areas. For design and construction specifications for disturbed area stabilization with permanent sod see Appendix M and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

#### **4.2 EROSION CONTROL MATTING AND BLANKETS**

This stabilization technique provides a protective covering (blanket) or a soil stabilization mat to establish permanent vegetation on steep slopes, channels, or shorelines. The purpose of erosion control matting and blankets is to provide a microclimate that protects young vegetation and promotes its establishment and to reinforce the turf against forces of erosion during storm events.

Matting and blankets shall be applied on steep slopes where the hazard of erosion is high and planting is likely to be too slow in providing adequate protective cover. Concentrated flow areas, slopes steeper than 2.5:1 and with a height of ten feet or greater, and cuts and fills within the stream buffer, shall be stabilized with the appropriate erosion control matting or blanket. On streambanks where moving water is present, matting can be used to prevent new plantings from being washed away. For design and construction specifications for erosion control using matting and blankets see Appendix M and the latest edition of the Manual for Erosion and Sediment Control in Georgia.

Benefits of using erosion control blankets include the following:

- A. Protection of seed and soil from raindrop impact and subsequent displacement.
- B. Thermal consistency and moisture retention for seedbed areas.
- C. Stronger and faster germination of grasses and legumes.
- D. Planing off excess stormwater runoff.

- E. Prevention of sloughing of topsoil added to steeper slopes.

Benefits of using erosion control matting include the following:

- A. All benefits gained from using erosion control blankets that are listed above.
- B. Collects soil out of stormwater which becomes the growth medium for the development of roots.
- C. Assists the vegetative root system in forming an erosion-resistant cover resistant to hydraulic lift and shear forces when embedded in the soil of stormwater channels.

## **5.0 SCHEDULED VEGETATIVE MAINTENANCE ON EXISTING UTILITY EASEMENTS WITHIN THE GREENWAY SYSTEM**

It is the responsibility of the entity owning a utility easement on Greenway Property to determine if a permit is required to trim vegetation from the easement. Vegetation shall be trimmed in a manner to insure that at least six (6) inches of top growth shall be maintained under any use and management. The following SOPs shall be followed during scheduled vegetative maintenance of existing utility easements within the Greenway System:

- A. The area to be trimmed shall be clearly delineated to ensure that no disturbance occurs beyond the area identified. Trimming of vegetation along the existing utility easement is suggested to have no more than a twenty-foot (20') width (for utilities paralleling the stream).
- B. Vegetation that does not require trimming shall be identified and clearly marked by flagging before vegetative maintenance begins. Every effort shall be made to preserve the following: vegetation vital to streambank stabilization; vegetation providing food and/or habitat to a federally listed endangered species, threatened species, or species of concern; vegetation that is a federally listed endangered species, threatened species, or species of concern; and vegetation that comprises a wetland ecosystem.
- C. Stemmed vegetation such as brush and shrubs shall be trimmed leaving at least six (6) inches of growth. When removal of a tree cannot be avoided, it shall be removed at ground level, leaving the root system intact.
- D. When pruning is necessary during vegetative maintenance procedures, pruning cuts shall be made in accordance with International Society of Arboriculture (ISA) Standards.
- E. Trees, tree limbs, and other vegetative debris which have fallen into water bodies or beyond the utility easement area, shall be removed immediately.

- F. Mowing shall not take place during quail nesting season, between May and September. Sericea lespedeza shall be mowed only after the seeds have become mature. Mowing shall occur only after frost, between November and March. Bermudagrass, Bahiagrass and Tall Fescue shall be mowed as desired.

## **6.0 TRAINING OF PERSONNEL INVOLVED IN EMERGENCY AND SCHEDULED MAINTENANCE OF EXISTING UTILITIES WITHIN THE GREENWAY SYSTEM**

Key personnel involved in emergency and scheduled maintenance of existing utilities within Greenway Properties shall be trained in the requirements of the Consent Decree, the Greenway Acquisition Plan, and these SOPs. The key personnel shall also be trained on the proper installation, implementation, and inspection of erosion and sediment control measures.

A “pre-construction” meeting may be held between the City, other responsible local government or agency, and key personnel of the utility or construction agency following training in order to ensure that all parties have a common understanding as to how scheduled maintenance will be performed within the Greenway System.

## **7.0 SELECTED REFERENCES**

- A. Atlanta, Georgia. Stormwater Management Design Manual. Atlanta, 1996.
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