Stormwater Planning & Management Policy

University Facilities (UF)
POLICY 17
Effective Date: November 27, 2006
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Approved by: Administrative Council

Abstract: *The responsible use of all forms of energy and the good health of the community are high priorities of Clemson University. This policy makes a clear statement that the University embraces these priorities and will invest in them through environmentally aware stormwater practices. Contained in the policy are procedures, responsibilities, and guidelines that will render the policy useful. This document identifies how stormwater is to be handled in order to create healthy, rich, and stable environments within University lands.*

1.0 Purpose:
This policy is designed to advance the university goal aimed at creating healthy, safe and attractive environments. It is the purpose of this policy to establish a sustainable approach to stormwater issues that will create a more stable and rich environment while reducing toxicity, peak flows, and meet the intent of the Environmental Protection Agency's Municipal Separate Storm Sewer Systems (MS4) requirements.

1.1 Related Policies
University Facilities Policy 14: Campus Tree Protection Policy
University Facilities Policy 16: Sustainable Building Policy

1.2 Policy Statement
Low impact development is adopted as Clemson University's preferred approach for the management of stormwater. Low impact development is to be demonstrated in the planning and construction of new, redeveloped, or existing areas of University lands and facilities.

1.3 Definitions
"Low impact development" is a strategy for stormwater management that mimics the natural hydrological system functions of discharge, frequency, recharge and volume.
"Best management practice" refers to those practices listed by EPA that will be used in conjunction with the principles of this policy and specifications and conditions relating to development and management of Clemson University lands.
"Treatment train" means the application of a series of physical stormwater best management practices to achieve water quality of runoff.
"Multiple use corridor" refers to a linear open space which integrates drainage function as well as conservation and recreation values.
"Riparian Corridor" refers to three dimensional ecological communities that include terrestrial and aquatic ecosystems that extend down into groundwater, up above the

canopy, outward across the floodplain, up the near slopes that drain to the water, laterally into the terrestrial ecosystem, and along the watercourse at a variable width.

1.4 Policy Objectives

This policy is to assist in:

- Protecting and improving water quality and recharging local aquifers.
- Fostering improvements in local habitat;
- The maintenance of ecological processes;
- The promotion of natural landscapes.

The policy seeks to retain or enhance watersheds by adopting the characteristics of natural systems within multiple use open spaces that provide habitat for fish and wildlife and passive recreation opportunities wherever possible.

1.5 Policy Principles

- Water resource issues will be addressed early in the land use planning process.
- Water resource management will be addressed at the development site and sub-watershed level.
- Stormwater will be stored and treated as close to the source as possible and a treatment train approach should be used to match BMP's to treat known contaminants.
- The incorporation of natural features of waterways that improve water quality will be encouraged.
- The use of vegetation will be encouraged (particularly indigenous vegetation) in stormwater management to promote filtering, absorption, and slowing stormwater runoff to maximize the settling and conversion of particulate pollutants and materials.
- Multiple use open space/corridors will be used when appropriate.
- Riparian Corridors will be protected from unnecessary or deleterious development.

The following are examples of structural best management practices that encompass the above principles:

- Onsite detention – detaining water in areas on a site before it is released downstream.
- Stormwater infiltration systems – rain-gardens or other highly pervious areas that will allow stormwater to percolate instead of running off a site.
- Buffer strips – usually turf areas adjacent to riparian corridors that slow down runoff and filter pollutants from stormwater.
- Pollutant traps - filters
- Turf Reinforced Swales
- Intermittent or flush curbing
- Ponds and wetlands
- Permeable paving materials – geoblock, ritterrings, etc.
- Native landscaping to initiate ecological succession

- Selection of best management practices may follow those suggested in the National Pollution Discharge Elimination System. Innovative, Clemson-developed stormwater management practices are encouraged.

1.6 Policy Implementation

This policy will be implemented through the planning, design, and construction of new facilities and through retrofits to existing areas.

1.7 Monitoring and Auditing

Performance indicators for this policy will be assessed on a situational basis at the site planning stage.

1.8 Responsibilities

The responsibility for the application of this Policy ultimately lies with the Clemson University administration and involves University Facilities, Forestry, Environmental Health and Safety and other groups involved in initiating or managing changes to University lands. Organizations affiliated with Clemson University are also encouraged to comply with this policy.

1.9 Guiding Principles for Stormwater Management (expanded)

Incorporate water resource issues early in the land use planning process

The earlier that stormwater management is addressed in the planning process, the more opportunity there is for integrating mechanisms to improve water quality. This should form part of the initial site analysis prior to structure planning. Where the use of ponds or stormwater wetlands is not feasible, the use of swales and inline controls such as rain gardens and pollutant traps may be appropriate.

Storage and stormwater treatment should occur as close to source as possible.

Stormwater treatment such as detention should occur at source or on-site if practical. Structural best management practices are most effective when they can be combined in a treatment train preferably connected by grass swales or multiple use corridors (through open space). Storage areas should be an integral part of the landscape, wherever possible. The use of the treatment train can increase pollutant removal effectiveness, allow for filtration of suspended solids, or overcome site factors that limit the effectiveness of a single measure.

Detention Capacity

The detention capacity of the treatment train should be, wherever possible, capable of retaining the initial pollutant laden “first flush” from constructed areas and should be engineered and built according to the appropriate design criteria that mimicking, or at least approaching, the site hydrology in its’ natural climax successional state.

Stormwater as a resource

Wherever possible, stormwater should be celebrated and reused to reverse the trend of “out of sight, out of mind.” For example, parking lots should direct runoff water into landscaped swales by use of flush or non-contunuous curbing to reduce the

irrigation requirement and filter stormwater pollutants. Permeable paving materials should be encouraged, especially in areas that are infrequently used or carry low traffic volume areas.

Development of Open Space

To maintain as much as possible pre-urban levels of stormwater infiltration impervious areas should not exceed 25% of any total watershed area. Drainage from paved areas should be directed to treatment areas.

Incorporate landscape features to improve water quality

Features that improve water quality that should be incorporated into stormwater drainage systems include:

- Native vegetation, particularly emergent aquatics, should be used to promote filtering of nutrients and sediments;
- Boulders or riffles to improve water aeration and oxygenation
- Ponds, pools or stormwater swales designed as sediment traps
- Drain or watercourse profiles that provide a range of fauna habitats.

Retrofitting existing stormwater systems

Plans will be developed and actions taken to retrofitting existing stormwater systems that are insufficient to meet the goals of creating healthy, safe and attractive environments and to create a more stable and rich environment while reducing toxicity, peak flows, and meet the intent of the Environmental Protection Agency's Municipal Separate Storm Sewer Systems (MS4) requirements.

1.10 Expiration

This policy will expire five years from the Effective Date noted on page 1. In year four, a study is to be engaged to identify and propose modifications to the policy.