

**HARRIS COUNTY**  
**PUBLIC INFRASTRUCTURE DEPARTMENT**

1001 Preston, 5<sup>th</sup> Floor  
Houston, Texas 77002  
(713) 755-4400

August 15, 2007

Commissioners Court  
Administration Building  
Houston, TX 77002

Vote of the Court:	Yes	No	Abstain
Judge Emmett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comm. Lee	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comm. Garcia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comm. Radack	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Comm. Eversole	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

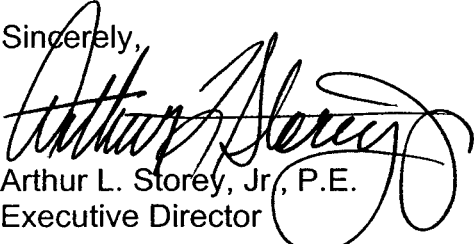
**SUBJECT: Recommendation that Commissioners Court adopt the "Guidelines for using Alternative Storm Water Quality Features on County Linear Projects" and the associated "Program Overview for Alternative Post-Construction Storm Water Quality Control Measures for Harris County Agency sponsored Linear Projects," to facilitate compliance with NPDES EPA Permit No. TXS001201 effective August 21, 2007.**

Dear Court Members:

It is recommended that Commissioners Court adopt the "Guidelines for using Alternative Storm Water Quality Features on County Linear Projects" and the associated "Program Overview for Alternative Post-Construction Storm Water Quality Control Measures for Harris County Agency sponsored Linear Projects," to facilitate compliance with NPDES EPA Permit No. TXS001201 effective August 21, 2007. This is the program that has been informally described as the "storm water quality banking" program.

Pursuant to federal requirements, Harris County is required to provide permanent storm water quality features for new development and significant redevelopment. The reference manuals will allow greater flexibility to Harris County and Harris County Flood Control District to meet these permit requirements. This program has received the approval of the EPA with respect to our NPDES permit.

Sincerely,

  
Arthur L. Storey, Jr., P.E.  
Executive Director

ALS:ASM:ccj  
Attachments

cc: John Blount  
Deborah Vaughn  
Jackson Lamb

Presented to Commissioner's Court

AUG 21 2007

APPROVE E/G

Recorded Vol \_\_\_\_\_ Page \_\_\_\_\_

Mike Talbott  
Alisa Max  
Catherine Jackson

07 AUG 15 AM 10:15  
HARRIS COUNTY  
MANAGEMENT SERVICES

Gary Stobb  
Nick Russo

PID copy

**HARRIS COUNTY  
PUBLIC INFRASTRUCTURE  
DEPARTMENT**



**GUIDELINES FOR USING ALTERNATIVE  
STORM WATER QUALITY FEATURES  
ON COUNTY LINEAR PROJECTS**

**PLANNING & OPERATIONS DIVISION  
John Blount, P.E.**

**WATERSHED PROTECTION GROUP  
Alisa Max, P.E.**

Vote of the Court:

Judge Emmett  
Comm. Lee  
Comm. Garcia  
Comm. Radack  
Comm. Eversole

Yes

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

No

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

Abstain

<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>
<input type="checkbox"/>

**August 21, 2007**

Presented to Commissioner's Court

**AUG 21 2007**

APPROVE E / G

Recorded Vol. \_\_\_\_\_ Page \_\_\_\_\_

# **GUIDELINES FOR USING ALTERNATIVE STORM WATER QUALITY FEATURES ON COUNTY LINEAR PROJECTS**

## **INTRODUCTION:**

Linear projects present a unique challenge when installing permanent storm water features. These guidelines outline allowable measures to comply with “The Regulations of Harris County for Storm Water Quality” by using a “banking” system.

## **AVAILABLE METHODS:**

The following methods can be used in lieu of traditional storm water quality features:

- Land Protection
- Land Restoration
- Enhanced Erosion Control projects
- Urban Forestry

## **PARTICIPATION:**

Any county agency can participate by making “deposits” into the system and making “withdrawals” at plan approval from their account.

## **GENERAL REQUIREMENTS:**

The general requirements are outlined in Table I of this document. “Deposit” and “Withdrawal” forms are located in Appendix A. Alternate formats may be used to make deposits and withdrawals with prior approval by the Watershed Protection Group manager or their designee.

## **Database:**

A system for tracking deposits and withdrawals has been developed and will be administered by the Watershed Protection Group.

**TABLE I**

<b>METHOD</b>	<b>ALLOWABLE CREDIT</b>	<b>GENERAL REQUIREMENTS</b>
Protection of flood plain property	1 acre of protected property = 1 acre of new development	<ul style="list-style-type: none"> <li>• Land must have been acquired after November 1, 1998.</li> <li>• Protected land can only have 10% development in the form of trails or recreation access.</li> <li>• Use of this method must be in general conformance with the Program Overview.</li> <li>• “Deposit” and “Withdrawal” forms or approved alternatives must be complete for each project.</li> </ul>
Protection of non-flood plain property	1 acre of protected property = ½ acre of new development	<ul style="list-style-type: none"> <li>• Land must have been acquired after November 1, 1998.</li> <li>• Protected land can only have 10% development in the form of trails or recreation access.</li> <li>• Use of this method must be in general conformance with the Program Overview.</li> <li>• “Deposit” and “Withdrawal” forms or approved alternatives must be complete for each project.</li> </ul>
Protection of riparian corridor property	1 acre of protected property = 2 acres of new development Note: For the purpose of this program, a property will be accepted as riparian corridor if it is located within 100 feet of the channel top-of-bank and is contiguous, undeveloped land. Exceptions may be made with prior approval by the Watershed Protection Group Manager or their designee.	<ul style="list-style-type: none"> <li>• Land must have been acquired after November 1, 1998.</li> <li>• Protected land can only have 10% development in the form of trails or recreation access.</li> <li>• Use of this method must be in general conformance with the Program Overview.</li> <li>• “Deposit” and “Withdrawal” forms or approved alternatives must be complete for each project.</li> </ul>
Land restoration, e.g. buyout property	1 acre property restored = 1 acre of new development	<ul style="list-style-type: none"> <li>• Land must have been acquired after November 1, 1998.</li> <li>• Protected land can only have 10% development in the form of trails or recreation access.</li> <li>• Use of this method must be in general conformance with the Program Overview.</li> <li>• “Deposit” and “Withdrawal” forms or approved alternatives must be complete for each project.</li> <li>• Existing structures must be demolished and area re-vegetated.</li> </ul>
Enhanced Erosion Control projects	1 acre of enhanced erosion control measures = 2 acres of new development  1 acre of stream restoration = 3 acres of new development.	<ul style="list-style-type: none"> <li>• Erosion Control project must have been completed after November 1, 1998.</li> <li>• Use of this method must be in general conformance with the Program Overview.</li> <li>• “Deposit” and “Withdrawal” forms or approved alternatives must be complete for each project.</li> <li>• Restoration plan must be approved by the Watershed Protection Group and stream owner.</li> </ul>
Urban Forestry	1 acre of planted trees = 1 acre of new development or use urban forestry worksheet and calculate by caliper inch requirements.	<ul style="list-style-type: none"> <li>• Planting or tree preservation must have occurred after November 1, 1998.</li> <li>• Use of this method must be in general conformance with the Program Overview.</li> <li>• “Deposit” and “Withdrawal” forms or approved alternatives must be complete for each project.</li> <li>• Project must ensure a reasonable survival rate.</li> </ul>

\*In all instances, the location of the credit must be within the watershed of the new project being developed or within the boundary of 2 adjacent watersheds on either side, based upon Harris County Flood Control District’s 22 primary watersheds.

**WATERSHED PROTECTION GROUP  
STORM WATER QUALITY DEPOSIT FORM**

County Agency: _____
Contact Name: _____ Phone No.: _____

<b>TYPE OF DEPOSIT (CHECK APPLICABLE BOX)</b>	
<input type="checkbox"/> Property Protection Flood Plain	<input type="checkbox"/> Property Protection Non-Flood Plain
<input type="checkbox"/> Protection Riparian Corridor Property	<input type="checkbox"/> Land Restoration aka Buyout
<input type="checkbox"/> Enhanced Erosion Control Projects	<input type="checkbox"/> Urban Forestry

<b>LOCATION OF DEPOSIT</b>	
General description of location ( <i>attach sketch, survey etc</i> )	
Key Map Page: _____	Description: _____
_____	_____
_____	_____
_____	_____

<b>DESCRIPTION OF DEPOSIT</b>	
General description of deposit ( <i>Example: planted 2 acres of pine seedlings</i> )	
_____	
_____	
_____	
_____	

<b>***** OFFICE USE ONLY *****</b>	
Project No: _____	Entered By: _____
Entry Date: _____	Verified By: _____
_____	_____
<i>Signature</i>	<i>Date</i>

**WATERSHED PROTECTION GROUP  
STORM WATER QUALITY WITHDRAWAL FORM**

County Agency: _____	
Contact Name: _____	Phone No.: _____

<b>PROJECT DESCRIPTION</b>
Type of Project: _____
Description: _____
_____
_____
Amount of new developed area: _____
_____
Is there a preference on what type of credit you wish to use: <input type="checkbox"/> No <input type="checkbox"/> Yes (If yes please indicate type)
Type: _____

<b>***** OFFICE USE ONLY *****</b>	
Project No: _____	Entered By: _____
Entry Date: _____	Plan-set Name: _____
_____	_____
<i>Signature</i>	<i>Date</i>

# **Harris County Storm Water Quality Program**

**Program Overview**

**for**

**Alternative Post-Construction Storm Water  
Quality Control Measures**

**for**

**Harris County Agency Sponsored Linear Projects**

**March, 2007**

Harris County Storm Water Quality Program  
Alternative Post-Construction Storm Water Quality Control Measures

## **I. Background**

Under the provisions of NPDES MS4 Permit No. TXS001201, co-permittees for Harris County, including the Harris County Toll Road Authority, and the Harris County Flood Control District (collectively known as the Harris County Agencies), are charged with implementing a program to reduce storm water pollutants entering the municipal separate storm sewer system. While both Harris County and the Harris County Flood Control District operate under the guidance of the same permit, each has its own Storm Water Management Program based on its specific operations.

When these co-permittees and their associated agencies undertake projects that meet the definition of “new development” or “significant redevelopment” as defined by the Regulations of Harris County for Storm Water Quality Management (the “regulations”), the agencies are subject to local rules that require the incorporation of permanent storm water quality treatment measures into projects. These regulations are in accordance with the co-permittees NDPEs permit. These Alternative Post-Construction Storm Water Quality Control Measures are designed to meet water quality requirements on Harris County Agencies’ linear projects and addresses the permanent storm water quality features that would be required by the regulations.

This document is intended only as it relates to permanent storm water quality measures (“New Development and Redevelopment”); the requirements for Storm Water Pollution Prevention Plans (SWPPP) and inspections during construction of these linear projects will remain in effect and are not considered in this document.

The installation of post-construction treatment control measures for Harris County Agencies’ linear projects, specifically linear road and drainage projects, may not be the most effective methods to preserve storm water quality. The Harris County agencies believes that an approach which examines the watershed protection programs more holistically will yield better results than a piece by piece approach that has been incorporated on previous projects. The methodology presented in this document considers alternative water quality enhancement opportunities that are equivalent to the on-site alternatives currently being used on projects in our area. Alternative measures should help protect the long term health of the watershed and will potentially offset water quality impacts of linear projects. This approach would allow the County to direct resources toward larger scale water quality initiatives.

Harris County agencies will still consider on-site alternatives in all of their project development plans. Where there are clearly benefits to include the storm water quality features on-site, that option will take precedent over the alternative off-site improvements. Storm water quality options will be evaluated by an engineer registered to practice in the State of Texas. The Harris County Watershed Protection Group Manager or their designee will review each project covered by this program to assure the goals and objectives of the storm water quality program and its associated permits and regulations are met.

This program will be based on watersheds as defined by the Harris County’s 22 primary watersheds, as defined by Harris County Flood Control District (see Exhibit 1). The Harris County agency’s objective is to use this program of alternative measures within the watershed where the new project is to be developed or within the boundary of two adjacent watersheds on either side if the opportunity to improve water quality and meet objectives of the overall program is apparent. By using a watershed approach to storm water quality, the Harris County agencies



may find opportunities to selectively install water quality features where they will maximize the benefit to the watershed and best meet the County Agencies' operational needs.

A database and reporting system will be used to track alternative measure compliance and maintenance under this program.

## **II. Alternative Measures**

### **A. On-Site Pollutant Control Measures**

#### **Approved Technologies**

- 1.) Street Sweeping
- 2.) Floatables Collection
- 3.) Grassed Swales
- 4.) Dry Basins
- 5.) Wet Ponds
- 6.) Constructed Wetlands
- 7.) Urban Forestry Techniques

#### **Alternative Technologies**

- 1.) Low Velocity Open Ditch
- 2.) Other On-Site Pollutant Control Measures

#### **Approved Technologies**

The Harris County agencies have adopted other manuals that address various on-site technologies that may be used to meet the requirements for the new development and significant redevelopment portions of the MS4 permit. These technologies currently include: street sweeping, floatables collection, grassed swales, dry basins- including trash racks, wet ponds, constructed wetlands, and urban forestry techniques. The technologies referenced in other manuals continue to be available for Harris County agency linear projects, and will be used when determined by the Harris County agency project manager to be the best fit for their project.

#### **Alternative Technologies**

##### **1. Low Velocity Open Ditch**

The Low Velocity Open Ditch can be used for conveyance of storm water and as a storm water quality control measure on linear projects. Low Velocity Open Ditches provide water quality benefits by reducing velocity and associated erosion either in the channel or in downstream drainage structures. To qualify as low velocity, side slopes and channels must be stabilized by at least 70% vegetated cover after construction with side slopes not exceeding 5 to 1 and channel grade set or weir structures installed to limit velocities at the

roadside ditch design flow to not more than 1.5 feet per second. At the time of this manual's writing, the roadside ditch design flow is the flow occurring at the 3-year (33% probability) rainfall intensity, but the flow determination would change if County design standards change. Channels and side slopes must be mowed or maintained according to the water quality plan of the design of the channel. The exact procedures may vary according to the species of grasses which are specified.

- To utilize the Low Velocity Open Ditch, the agency must follow Harris County details for a Low Velocity Open Ditch. The detail of this alternative technology is contained in the Guidance Manual to this Program Overview.

## **2. Other On-Site Pollutant Control Measures**

Because storm water quality management is an evolving practice, this document and policy does not seek to preclude other alternative practices that seek to accomplish the same goals. On-site practices not described in this document may be used on a case-by-case basis after submission and approval of the concept by the Harris County Watershed Protection Group Manager or their designee.

### **III. Off-Site Water Quality Benefits (WQBs):**

The following Water Quality Benefits (WQBs) may be used in lieu of on-site treatment control measures for linear projects:

#### **1. Land Protection**

- a. Non-Floodplain Property
- b. 100-year Floodplain Protection
- c. Riparian Corridor Protection

#### **2. Restoration**

- a. Land Restoration
- b. Enhanced Erosion Protection
- c. Stream Restoration

#### **3. Urban Forestry Techniques**

#### **4. Other Storm Water Quality Enhancements**

WQBs can be used as mitigation in one of two ways:

- A QWB can be undertaken specifically to mitigate for a linear project; or
- The constructing agency can access credits that have been established for prior or current WQBs.

In both cases, if multiple attributes are superimposed on the same property boundary, then the WQB credits for each of the improvements is intended to be additive. The ability to be additive will be determined by the Harris County Watershed Protection Group Manager or their designee.

**1) Land Protection**

Preserving open space protects land from large scale development, thereby limiting impervious surfaces and the other deleterious impacts of residential, commercial, and industrial development is a WQB. Where a County agency is engaged in land acquisition for open space and/or park purposes, a credit will be established based on taking the land out of development potential.

**a) Non-Floodplain Property Protection**

Credit for protection of property located outside of the 100-year floodplain, as mapped at the time in which the credit is entered into the system, will be applied in accordance with Table 1 provided:

- a) the land must be protected from future development ,
- b) the land acquired must be free from development with the exception of 10 percent utilization for recreational access,
- c) the land must have been acquired or conserved after November 1,1998,
- d) the land cannot be mitigation for another water quality purpose or permit, and
- e) the WQB must be in general conformance with the Guidance Manual for this Program.

At the discretion of the Watershed Protection Group Manager or their designee, land protection WQBs may also be eligible for urban forestry credits, equal to up to those that it would have been eligible for had the tree population saved been planted by the owner.

**b) 100-year Floodplain Property Protection**

Credit for protection of property located within the 100-year floodplain, as mapped at the time in which the credit is entered into the system, will be applied in accordance with Table 1 provided:

- a) the land must be protected from future development ,
- b) the land acquired must be free from development with the exception of 10 percent utilization for recreational access,
- c) the land must have been acquired or conserved after November 1,1998,
- d) the land cannot be mitigation for another water quality purpose or permit, and
- e) the WQB must be in general conformance with the Guidance Manual for this Program.

**c) Riparian Corridor Protection**

Protection of riparian corridors can either be through the acquisition of land or the installation of on-site measures such as fencing and signage. Credit for protection of riparian corridors will be applied in accordance with Table 1 provided:

- a) the land must be protected from future development ,
- b) the land acquired must be free from development with the exception of 10 percent utilization for recreational access,
- c) the land must have been acquired or conserved after November 1,1998,
- d) the land cannot be mitigation for another water quality purpose or permit, and
- e) the WQB must be in general conformance with the Guidance Manual for this Program.

## **2) Restoration**

### **a) Land Restoration**

Restoring land to a natural state by removing improvements and/or planting native or other non-invasive trees and other native or non-invasive vegetation can have a positive impact on water quality. Where a County agency is engaged in land restoration either by purchasing and removing homes and buildings located in flood prone areas or restoring native trees and grasses to natural areas, credit will be applied in accordance with Table 1 provided the following general guidelines are met:

- a) the restoration project must have a plan that is approved by the Harris County Watershed Protection Group Manager or their designee,
- b) if applicable, existing structures must be demolished and the land stabilized/re-vegetated,
- c) the land must be protected from future development,
- d) the land acquired must be free from development with the exception of 10 percent utilization for passive recreational access,
- e) the land cannot be mitigation for another water quality purpose or permit, and
- f) the WQB must be in general conformance with the Guidance Manual for this Program.

### **b) Enhanced Erosion Control**

Enhanced Erosion Control Projects are those that go above and beyond simple maintenance of drainage channels and basins and are designed to provide long term erosion protection. Credit for enhanced erosion control WQB's will be applied in accordance with Table 1 provided:

- a) the enhanced erosion control project must have a plan that is approved by the Harris County Watershed Protection Group Manager or their designee.

### **c) Stream Restoration**

Stream restoration has multiple water quality benefits, including returning streams to a more natural and self-sustaining configuration. Credit for stream restoration WQB's will be applied in accordance with Table 1 provided:

- a) the restoration project must have a plan that is approved by the Harris County Watershed Protection Group Manager or their designee,
- b) the restoration must include slope geometry that will support native vegetation or other non-invasive species vegetation without erosion,
- c) the planting plan must include a variety of grasses, shrubs and trees that are native to the area or otherwise non-invasive, and are drought tolerant.
- d) the WQB must be in general conformance with the Guidance Manual for this Program.

## **3. Urban Forestry Techniques**

Trees serve to retain soil, increase infiltration rates, and reduce splatter erosion during rain events which has a positive impact on water quality. Credit for the planting of trees or preservation of trees as a WQB will be applied in accordance with Table 1 provided:

Harris County Storm Water Quality Program  
Alternative Post-Construction Storm Water Quality Control Measures

- a) the planting or tree preservation must have been performed after November 1, 1998,
- b) the project must ensure a reasonable survival rate, and
- c) the WQB must be in general conformance with the Guidance Manual for this Program.

**4. Other Water Quality Benefit Projects**

The Watershed Protection Group Manager or their designee may approve other water quality enhancement projects on a case by case basis and will assign credits based on the relative improvement to water quality. The assignment of credits will be determined at the time of request.

**TABLE 1**

WQB	Allowable Credit
1a) Non-Floodplain Property Protection	1 acre of non-floodplain property protected = ½ acre of added project impervious cover
1b) 100-year Floodplain Property Protection	1 acre of floodplain property protected = 1 acre of added project impervious cover
1c) Riparian Property Protection	1 acre of riparian property protected = 2 acres of added project impervious cover
2a) Land Restoration	1 acre of land restored = 1 acre of added impervious cover
2b) Enhanced Erosion Control	1 acre of enhanced erosion control measure applied = 2 acres of added impervious cover
2c) Stream Restoration	1 acre of stream restored = 3 acres of added project impervious cover (Partial credits may be applicable at the discretion of the Watershed Protection Group Manager or their designee for partial restoration projects)
3) Urban Forestry Techniques	Credits may be applied in one of two ways (at the discretion of the Harris County agency project manager): 1) The credit may be calculated in a manner as if the trees were planted on-site (in accordance with other Harris County agency manuals), or 2) 1 acre of applied urban forestry techniques = 1 acre of added impervious cover