SECTION 6 – POST-CONSTRUCTION STORMWATER MANAGEMENT

40 CFR 122.34 (b)(5) – Develop, implement and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects that are less than one acre that are part of a larger common plan of development or sale, that discharge into your small MS4. Develop and implement strategies which include a combination of structural and/or non-structural BMPs appropriate for your community. Use an ordinance or other regulatory mechanism to address post-construction runoff. Ensure adequate long-term operation and maintenance of BMPs.

6.0 OVERVIEW

Post-construction stormwater management in new development and redevelopment focuses on implementation of controls to maintain good water quality conditions after an area has been developed. New development can also have a significant effect on water quality because during the course of development, natural landscapes are often replaced by impermeable roads, parking lots, sidewalks and other paved surfaces that lead to increases in both the volume of stormwater runoff and the accompanying pollutants that reach local water bodies.

The MS4s are required to develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale that discharge to the small MS4. The program must ensure that controls are in place that would prevent or minimize water quality impacts.

Studies have shown that it is much easier and more cost-effective to control pollution at its source rather than after it enters into an MS4. It is important to consider BMPs that may be needed for post-construction pollution control prior to the construction. Strategies should include a combination of structural and non-structural BMPs appropriate for the community.

Structural controls include use of storage, infiltration, and vegetative practices. Local governments can use preventative practices such as buffer zones, zoning, or requirements that new development implement specific structural BMPs. Buffer zones are areas along water bodies where development is restricted or prohibited. They separate water bodies from development, making it more difficult for polluted stormwater to reach the body of water. The natural terrain of the buffer zone can also absorb excess runoff and cleanse pollutants as runoff moves through it. Local ordinances can require developers to use porous pavement or swales and can grant local governments the authority to inspect development and sites and enforce ordinances.

Non-structural controls include planning and procedures and site-based local controls. Zoning ordinances can prevent development in sensitive areas, and promote development in areas that can better accommodate development. Minimization of impervious areas,

wetland protection, and vegetated drainage ways are some of the non-structural controls that may be considered for use during the design of a new development or redevelopment project.

The chosen BMPs should be appropriate for the community served, minimize water quality impacts, and try to maintain pre-development runoff conditions. Regulations and ordinances will be created to establish requirements for post-construction runoff from new development and redevelopment projects. The MS4 needs to develop a mechanism to ensure that there is long-term operation and maintenance of the BMPs.

Table 6.1 BMP and measurable goal summary for Post-Construction Stormwater Management.

BMP	MEASURABLE GOAL	PERMIT YEAR				
		1	2	3	4	5
Ordinance	Evaluate existing ordinances and develop draft ordinance; conduct public review			X		
	Present to Council for adoption, implement ordinance				X	
Revise Development Review Procedures	Evaluate existing procedures, make revisions, and implement new procedures			X		
Encourage low impact designs	Research; evaluate; modify design standards				X	
Inspection of completed projects	Check all completed projects for implementation of structural controls; begin annual inspections				X	
Long-term inspection and maintenance plan requirements	Implement procedures/checklist to review development plans for provision of long-term inspection and maintenance				X	
Evaluate regional ponds	Add stormwater quality to design consideration		X			
	Evaluate need to program to monitor detention ponds; evaluate need for ordinance requiring detention pond maintenance			X		
	Adopt ordinance and implement program, if necessary				X	

6.1 POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT ORDINANCE

Description

Sugar Land will develop an ordinance or modify existing ordinances to require management of post-construction stormwater in new development and redevelopment. The ordinance will allow the City to develop, implement, and enforce a program to address stormwater runoff from new development and redevelopment projects that

disturb one acre or more. Also included are projects less than one acre that are part of a larger common plan of development or sale that will result in the disturbance of one or more acres that discharge into the small MS4.

In developing this ordinance, Sugar Land must decide at what level stormwater management standards of redevelopment projects will be held. Providing cost effective stormwater treatment at redevelopment sites is often difficult, and these projects may be given reduced criteria to meet or non-structural requirements to allow for site constraints. Sugar Land may also consider use of its regional drainage system for permanent structural controls of stormwater quality where available. Such an ordinance might consider the following areas:

- Site development project proposal
- Conceptual stormwater management plan
- Agency review
- Final stormwater management plan design/construction drawings
- Easements/covenants for operation and maintenance secured
- Performance bond/security
- Construction inspection
- Maintenance and repair requirements
- Enforcement measures
- City installation of stormwater runoff control measures

Measurable Goals

- Evaluate existing ordinances that may require modification.
- Develop draft ordinance and/or modification.
- Conduct public review and collect comments on draft ordinance.
- Present ordinance to City Council. Adoption of ordinance by Council.
- Implement ordinance.

Costs

- Labor
  - Consultant assistance in Permit Year 3
  - 1/4 FTE in Permit Year 4
- Equipment/Supplies
  - 1/4 of equipment for FTE

Implementation Schedule

Evaluate existing ordinances and develop a draft ordinance and/or modification in Permit Year 3. Conduct public review and collect comments on draft ordinance in Permit Year

3. Present ordinance to Council for adoption in Permit Year 4. Implement ordinance in Permit Year 4.

6.2 REVISE DEVELOPMENT REVIEW PROCEDURES

Description
Sugar Land will integrate post-construction stormwater quality requirements into inspection programs. Sugar Land will revise development review procedures to address ordinance changes requiring post-construction controls for new development and redevelopment in areas where regional ponds are not suitable for retrofit. The Development Review Committee (DRC) will incorporate the review of stormwater quality features into the plan review process to ensure that stormwater quality objectives are addressed at an early stage of the development. City staff will evaluate the review process to address ordinance changes. Forms and checklists for development review will be revised accordingly.

Measurable Goals

- Review existing procedures.
- Update existing procedures.
- Implement updated procedures.

Costs

- Labor – Consultant assistance in Permit Year 3
- Equipment/Supplies – N/A

Implementation Schedule
Review and update existing procedures in Permit Year 3. Implement updated procedures in Permit Year 3.

6.3 ENCOURAGE LOW IMPACT STORMWATER DESIGNS

Description
Sugar Land may modify development design criteria to allow low impact stormwater designs where these alternatives do not conflict with other code requirements. Sugar Land will actively support use of development practices commonly referred to as low-impact design, conservation development, or open space development. Such design alternatives include:

- Low impact development
- Narrower residential streets
- Eliminating curb and gutters
- Green parking
- Alternative turnarounds

- Alternative pavers
- Buffer zones
- Open space design
- Conservation easements

These design alternatives strive to maintain pre-development stormwater quality conditions, so that downstream structural controls are not necessary. Some of these alternatives may be compatible with master-planned communities and floodplain management. Some developers are considering these options to minimize loss of buildable land to stormwater quality impoundments. City staff will incorporate allowance for low stormwater impact designs into the plan review process and into guidance manuals.

Measurable Goals

- Modify design standards to allow alternative designs.

Costs

- Labor – Consultant assistance in Permit Year 4
- Equipment/Supplies – N/A

Implementation Schedule
Research and evaluate in Permit Year 4. Modify design standards to allow alternative low stormwater quality impact design in Permit Year 4.

6.4 INSPECTION OF COMPLETED PROJECTS

Description
Inspectors will check completed projects for proper construction of permanent structural controls in compliance with approved plans. Checking for proper installation before signing off on a project is necessary to correct potential defects. The proper construction of permanent controls is necessary for the success of the inspection and maintenance requirements. Inspectors will need to have training on stormwater quality design criteria. Inspection forms and checklists for inspection of permanent stormwater quality structural controls will be developed.

Measurable Goals

- Check all completed projects for implementation of structural controls.
- Inspect all structural controls annually to ensure that maintenance is performed.

Costs

- Labor – 1/4 FTE in Permit Year 4
- Equipment/Supplies – 1/4 of equipment for FTE

Implementation Schedule
Begin checking all completed projects in Permit Year 4.

6.5 LONG-TERM INSPECTION AND MAINTENANCE PLAN REQUIREMENTS FOR STORMWATER STRUCTURAL CONTROLS

Description
Sugar Land will integrate post-construction stormwater quality requirements into the plan review program. The City then will revise the plan review process to require developers of commercial and residential property to submit plans and provisions for long-term inspection and maintenance of any structural controls implemented to maintain stormwater quality. Depending on the ordinance development process, an annual permitting system may be needed to assure proper inspection and maintenance of these structural controls. Alternatively, the City may take over responsibility for maintenance of these structures. Routine inspection and maintenance help to identify and repair problems before they become serious. Maintaining proper functioning of structural controls reduces the chance of polluting stormwater runoff with subsequent rain events.

Measurable Goals

- Implement procedure/checklist to review development plans for provision of long-term inspection and maintenance.

Costs

- Labor – 1/4 FTE in Permit Year 4
- Equipment/Supplies – 1/4 of equipment for FTE

Implementation Schedule

- Implement procedure/checklist to review development plans for provision of long-term inspection and maintenance in Permit Year 4.

6.6 EVALUATE REGIONAL PONDS FOR STORMWATER QUALITY

Description
Sugar Land will evaluate existing and planned regional detention ponds for potential modification to incorporate stormwater quality features. Existing ponds will be evaluated for feasibility of retrofit to incorporate stormwater quality features that may improve the quality of the stormwater discharged. The ability to use regional drainage features for stormwater quality treatment could reduce direct impact of the stormwater quality program on new development and redevelopment projects in some watersheds.

Measurable Goals

- Evaluate need for ordinance requiring maintenance of detention ponds.

- Adopt ordinance, if deemed necessary.
- Add stormwater quality to design considerations for regional detention ponds.
- Evaluate the need for a program to monitor detention ponds.
- Implement detention pond monitoring program.

Costs

- Labor
  - Consultant assistance in Permit Years 2 and 3
  - 1/4 FTE in Permit Year 4
- Equipment/Supplies – 1/4 of equipment for FTE

Implementation Schedule

Add stormwater quality to design considerations for regional detention ponds in Permit Year 2. Evaluate the need for a program to monitor detention ponds in Permit Year 3. Evaluate the need for ordinance requiring maintenance of detention ponds in Permit Year 3. Adopt ordinance in Permit Year 4, if deemed necessary. Implement detention pond monitoring program in Permit Year 4, if deemed necessary.