



***iSWM* Resource Guide:**

**COMPREHENSIVE COMMUNITY
STORM WATER MANAGEMENT
PROGRAM**

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SECTION 1 – Overview of Local Storm Water Management Programs

1.1 Introduction

To effectively deal with the problems of urban storm water runoff and meet storm water regulatory requirements, as discussed in the iSWM Resource Guide: *Case for Storm Water Management* and in Appendix C, *Federal, State, & Regional Initiatives*, of the iSWM Design Manual for Site Development, North Central Texas communities need to adopt a comprehensive integrated approach to storm water management that ties together storm water quantity control with water quality protection, protection of streambanks and riparian corridors, floodplain management, habitat preservation and restoration, and the use of storm water facilities for multiple purposes.

Given this broad charge, the development of a comprehensive storm water management program often involves a “rethinking” of storm water by local communities. Those responsible for storm water management can no longer limit their mission to drainage and flood control. Rather, local government agencies need to broaden their mission to encompass these broader goals.

Urban storm water runoff needs to be viewed as a valuable water resource that can and should be managed within the context of the community and watershed as a whole. Further, as all of the actions within a watershed ultimately impact Texas’ downstream waters, a holistic approach to storm water management must be developed.

Local governments have a large responsibility for storm water management in Texas since it is at that level where land use, development, and infrastructure decisions are typically made. The overall purposes of a local storm water management program are to:

- Minimize the adverse impacts of storm water runoff on the community;
- Meet the state and federal regulatory requirements for storm water runoff quantity and quality management; and
- Ensure that the community’s priorities, needs, and desires are taken into account in meeting storm water management goals.

In addition, an effective local storm water program requires an institutional structure that includes:

- Adequate legal authority
- Performance standards for development
- Design assistance and guidance
- Program funding and staffing
- Commitment to enforcement
- Public education
- Citizen involvement

The purpose of this resource guide is to provide an overview of the development of a comprehensive local storm water management program. The section below discusses the elements of a comprehensive local program. The remainder of the resource guide looks at the steps in developing an effective local program.

1.2 Elements of a Comprehensive Local Storm Water Management Program

The various program activities that will be included in a local program will vary according to the goals, requirements, and resources of each community. The following is a description of elements that should be considered when developing a comprehensive local program:

- **Watershed Planning** – Storm water master planning and watershed planning help to establish the priorities for storm water management decision-making and should be incorporated early into an effective local program. Watershed planning is a tool that allows a community to assess current and future storm water problems as well as potential solutions within a drainage basin. It can be used to assess the health of existing water resources and make informed land use, transportation, greenspace, and other community-level decisions based upon current and projected land use and development within a watershed and its associated subwatersheds. Watershed plans assist communities in developing and evaluating storm water management scenarios and alternatives.

Watershed and storm water master plans can be used to identify drainage system elements and stream segments in need of improvement or restoration and potential locations for regional storm water control facilities. Watershed planning can also provide a community with the necessary information for conserving natural areas and open space as well as the development of riparian buffers and greenways. In addition, they may also promote a wide range of additional goals including water supply protection, wetland protection and preservation, streambank and stream corridor restoration, habitat protection, protection of historical and cultural resources, enhancement of recreational opportunities, and aesthetic and quality of life issues.

In addition to providing better opportunities for managing storm water problems and watershed resources, the watershed planning approach also involves stakeholders and provides community consensus in the land use and storm water management decision-making process. Further, watershed plans promise a reduction in the overall capital and operation and maintenance costs for storm water management. This accrues from reduced downstream flooding and optimal siting and sizing of storm water control measures. Other benefits include contributions to community land use plans and uniform development standards for developers across an entire watershed.

- **Floodplain Management** – Floodplain management involves the designation of flood-prone areas and the limiting of their uses to those compatible with a given degree of risk. It is also aimed at minimizing modifications to streams, reducing flood hazards, and protecting the water quality of streams. As such, floodplain management can be seen as a subset of the larger consideration of surface water and storm water management within a local community.

Though it is often considered separately in most communities, there are many areas in which floodplain management directly overlaps with other areas of storm water management. The development of riparian buffers and greenway corridors along streams and rivers not only preserve floodplain areas and protect their function in safely conveying floodwaters but they also contribute to water quality maintenance and enhancement. Floodplain regulations and development restrictions, particularly when based upon the full build-out 100-year floodplain, can greatly reduce future flooding impacts and may allow communities, in some areas, to waive the requirements for detention storage for larger storm events.

Ideally, flooding and floodplains should be managed at the watershed level, and floodplain management should be an important goal of comprehensive watershed plans. Consequently, floodplain management activities should be fully integrated into comprehensive storm water management programs and handled in a complementary and coordinated approach. More information on strategies and tools for improved local floodplain management are provided in iSWM Resource Guide: *Floodplain Management*.

- **Information / System Inventory** – Information needs are critical to a successful program. The development of an inventory of the storm water system is one of the first steps in developing a comprehensive storm water management program. Relevant information includes location and classification of storm drains; drainage networks; structural storm water control facilities; streams, ponds, and wetlands; industrial discharges and major outfalls; watershed boundaries; floodplains; existing and proposed land use and zoning; and known water quality problem areas. This information can be collected and stored on paper maps or, if possible, in an integrated municipal GIS system. Storm water system inventories and geographic information tools are covered in more depth in Appendix G, *Storm Water Computer Models and Information Tools*, of the iSWM Design Manual for Site Development.

- **Development Requirements** – Adoption of a comprehensive and integrated set of storm water management requirements for all new development and redevelopment is critical to addressing the problems of post-construction urban storm water runoff and is required for TPDES municipal storm water programs. These requirements are ideally built into a community's development ordinances and supported by a plan review process. This resource guide and the iSWM Design Manual for Site Development detail a recommended approach for new developments and redevelopments to create and implement a site specific *integrated* Storm Water Management Plan (iSWM Site Plan).

Details of the iSWM Site Plan requirements along with an overview of the design tools to be used in developing an iSWM Site Plan are provided in chapter one of the iSWM Design Manual for Site Development. The design tools includes a suite of *integrated* site design practices, reduction credits for *integrated* site design practices, a set of *integrated* storm water design criteria, a provision for downstream assessments, and guidance on the selection of storm water controls. Chapter one of the iSWM Design Manual for Site Development also provides a recommended procedure for the local review of iSWM Site Plans, construction inspections, and ongoing operation and maintenance inspection of facilities.

- **Design Criteria and Guidance** – In support of local development standards and requirements, a community must provide supporting guidance and technical criteria for the design, construction, operation, and maintenance of storm water management facilities. For most communities in North Central Texas, the inclusion of water quality provisions and streambank and habitat protection into storm water management activities represents a departure from the “traditional” drainage approach. Practitioners in the development community (i.e. planners, site designers, and engineers) also must face a host of new concepts and ideas that alter their “traditional” approach of managing storm water on development sites. Many have had little experience in designing or constructing effective structural storm water controls or inspecting and maintaining storm water runoff systems to maximize pollutant prevention and removal. Therefore, it is imperative that adequate design assistance and guidance be provided to those being regulated by the local storm water management program.

A formal set of design criteria and specifications for structural control and drainage system design is critical to ensuring that local requirements and goals are met. The iSWM Design Manual for Site Development is a comprehensive technical document for storm water management that can be adopted by a community as its primary design aid for developers. This manual includes information and criteria on iSWM Site Plan preparation, *integrated* site design, recommended hydrologic methods, structural storm water control selection and design, drainage system design, and inspection and maintenance provisions. A community adopting the iSWM Design Manual for Site Development must develop a Local Criteria section that specifies certain design criteria and tailors the Manual to the specific needs of the community. Additional design aids may be necessary depending on a local community's requirements.

Training on the design, construction, and inspection and maintenance of storm water management facilities and structural control practices is an essential part of providing technical guidance to developers, engineers, contractors, and municipal staff. Regular education programs are important to assure that individuals remain current in the latest requirements and design criteria and to provide opportunities for training new personnel. Education programs help all parties to understand their roles and responsibilities, which is essential to an effective program.

Guidance on best management practices for construction site sediment and erosion control can be found in the iSWM Design Manual for Construction. In addition, a number of the *integrated* site design practices and techniques described in chapter one of the iSWM Design Manual for Site Development can reduce the total amount of area that is cleared and graded. It is essential that erosion and sediment control be considered in storm water concept plans and implemented throughout the construction phase to prevent damage to natural storm water drainage systems and post-construction structural storm water controls and conveyance facilities.

- **Ordinances** – Local ordinances are typically necessary to insure the implementation of activities that will achieve the storm water program objectives. They can include storm water management requirements (both water quantity and quality) for development, protection of natural areas, erosion and sediment control, the

prohibition of non-storm water discharges to municipal storm sewers, and nonpoint source pollution control. Table 1-1 below outlines some types of local ordinances used to support storm water management activities.

Table 1-1 Types of Local Ordinances Used to Support Storm Water Management Activities	
Storm Water Ordinance	Typically contains comprehensive performance criteria for all components of the storm water management system along with procedures for obtaining approval for construction.
Zoning Ordinance	Specifies land uses and site plan minimums which support storm water management through the use of buffers, setbacks, densities, open spaces, dedications, etc. May also contain the FEMA regulations implementing the National Flood Insurance Program.
Subdivision / Development Ordinance	Specifies the proper design, permitting, and inspection procedures for the subdivision of land for the purpose of development. May contain performance standards similar to a Storm Water Ordinance.

In some communities all storm water related requirements are aggregated into one comprehensive storm water ordinance. This has the advantage of insuring a comprehensive and consistent approach to land development and other storm water related activities. It may have a disadvantage in that it may become disconnected from other provisions for land development and from the staff elements that enforce those other provisions. In some communities the storm water requirements are scattered among several documents. In these cases, it is often helpful to pull the pieces together into a special informational publication that can be conveniently used by a developer. This should insure that all storm water requirements are met, regardless of source of the authority.

- **Plan Review** – Having an effective local review process for *integrated* Storm Water Management site plans (including Construction Storm Water Pollution Prevention Plans) for development is a key element in meeting the storm water management objectives. The review should be comprehensive, considering all of the potential impacts of a development and should be conducted at the conceptual, preliminary, and final plan stage as discussed in chapter one of the iSWM Design Manual for Site Development.

The project review and approval process should be explicitly outlined and understandable by the development community. All submittal and permit requirements should be explicitly outlined.

- **Construction Erosion and Sediment Control** – Sediment loadings to receiving waters are highest during the construction phase of development. Consequently, erosion and sediment control on construction sites is an important element of a comprehensive storm water management program for water quality and habitat protection. A combination of clearing restrictions, erosion prevention, and sediment controls, coupled with diligent plan review and strict construction enforcement, is needed to help mitigate these impacts. The iSWM Design Manual for Construction provides the tools to effectively manage construction activities in order to reduce the impact of storm water runoff from construction activities on downstream natural resources and properties.
- **Inspection and Enforcement** – A community needs to provide the means for the enforcement of established ordinances and permit requirements. Trained personnel are required to inspect and ensure compliance for erosion and sediment control, storm water management plans, removal of illicit connections, and private maintenance of structural storm water controls.
- **Storm Water System Improvements** – There are several ways that a local government can make physical improvements to the storm water management system. These can include capital improvements such as the design and construction of conveyance structures or regional controls, streambank stabilization and

improvement programs, and the acquisition of floodplain areas and natural areas such as buffers and wetlands. These improvements would typically be identified as part of a Storm Water Master Plan and included in a Capital Improvement Program. Retrofitting systems may be required to reduce the water quality and quantity impacts in existing developed areas as discussed in the iSWM Resource Guide: *Storm Water Retrofitting*.

- **Operation and Maintenance** – An essential component of a comprehensive storm water management program is the ongoing operation and maintenance of the various components of the storm water drainage, control, and conveyance systems. Failure to provide effective maintenance can reduce the hydraulic capacity and the pollutant removal efficiency of storm water controls and conveyance systems. Operation and maintenance should also include a streambank inspection and restoration program to identify and protect any locations where excessive erosion occurs. The use of bioengineering and other streambank protection and stabilization techniques may be desirable.

Operation and maintenance activities can include cleaning and maintenance of street inlets, drainage swales, open channels, storm drainpipes, storm water ponds, and other structural controls. Street sweeping and other pollution reduction activities also fall under operations and maintenance. Ideally, the best program addresses operation and maintenance concerns proactively instead of reacting to problems that occur such as flooding or water quality degradation.

A clear assignment of storm water operation and maintenance responsibilities, whether they be accomplished by the local government, landowners, private concerns, or a combination of these, is essential to insure that storm water management systems function as they were intended. Maintenance requirements are an important consideration in the selection and design of storm water controls and, therefore, site designers should strive to make their systems as simple and maintenance free as possible.

Storm water system operation and maintenance can also include the retrofitting of existing drainage systems to meet water quality goals. Streambank restoration or stabilization may be a significant maintenance requirement. More guidance on operation and maintenance of storm water controls and systems is found in the iSWM Resource Guide: *Storm Water System Operation & Maintenance*.

- **Monitoring** – Monitoring data can assist in management decisions and/or provide support for enforcement actions. Typical monitoring data include water quality and streamflow measurements, as well as streambank and habitat assessments. The monitoring program should be designed to address specific issues or problems within individual watersheds. Short-term monitoring can be used to evaluate the performance of best management practices (BMP's) and other implemented solutions. Long-term collection of data can be used to identify trends.
- **Pollution Prevention** – Pollution prevention practices are an important way to avoid water quality problems in our water resources. Whether the storm water runoff is from buildings, maintenance facilities, parking lots, open space, or roads, pollution prevention practices are needed to keep potential pollutants from degrading the water quality of streams, rivers, and lakes. Because of the diversity of sources, a comprehensive program is needed to protect water quality that includes a combination of pollution prevention measures and source control practices.

Pollution prevention includes measures such as:

- Materials management (use, exposure, and disposal/recycling controls)
- Spill prevention and cleanup
- Removal of illicit connections
- Prevention of illegal dumping
- Street and storm drain maintenance
- Public information and education

- Storm water quality friendly site design practices
- Site water quality protection structural controls

Specific examples of source control practices include:

- Covering of piles to prevent erosion
- Storing of hazardous waste safely
- Dry weather screening of storm water outfalls to detect illicit connections
- Storm drain stenciling
- Street sweeping
- Fertilizer use restrictions
- Leaf collection programs

In addition, specific efforts can be made to educate and influence citizen's actions (such as proper motor oil disposal and household hazardous waste management) that impact storm water runoff quality.

Many of these practices are easily implemented and are a cost-effective means of reducing storm water contaminants. As such, they should be considered for all residential, commercial, industrial, institutional, and municipal projects and activities. Many are required activities for TPDES municipal (MS4) Storm Water Management Programs. Implementation of Local Good Housekeeping Practices is discussed further in the iSWM Resource Guide: *Good Housekeeping Practices*. These practices can appropriately be applied to both MS4 and non-MS4 communities.

- **Public Education and Involvement** – In order to gain public support for local storm water management programs, citizens and the business community need to be educated and involved in the process. General education efforts can provide information about storm water issues and pollution prevention practices.
 - Educational efforts can include:
 - Meetings and presentations
 - Newsletters, fact sheets, and brochures
 - Homeowner education materials
 - Media campaigns
 - Coordination with activist groups for program support

In addition, Adopt-A-Stream programs can involve local citizens in the cleanup and monitoring of local streams. The public can also be involved in the development of watershed plans and overall storm water management policy. More information on storm water public information and education programs is available through the NCTCOG Regional Storm Water Management Coordinating Council as discussed in Appendix C, *Federal, State, & Regional Initiatives*, of the iSWM Design Manual for Site Development.

- **Funding** – Adequate funding of local storm water management program activities is perhaps one of the most critical, and yet difficult, aspects of establishing a comprehensive program. The best-designed storm water management program will flounder without sufficient community support and a stable and sufficient funding source. An effective and ongoing program that includes planning, engineering, plan review, capital improvements, maintenance, and enforcement activities will require more resources than are typically available from general funds—the traditional way that most local governments in North Central Texas have funded drainage and storm water infrastructure activities.

The next section includes an overview of various approaches that a community can take to establish a dedicated funding source, including the creation of a storm water utility.

SECTION 2 – Developing an Effective Local Storm Water Management Program

2.1 Introduction

Developing a comprehensive local storm water management program requires extensive planning and forethought on a community's needs and resources. Below are four key areas discussed in this section that need to be considered in establishing an effective program:

- Program Goals and Requirements
- Program Components and Priorities
- Organizational Structure and Staffing
- Program Funding

In addition, a community must determine the best approach for implementing and building public support for the program. The goal of this section is to provide an overview of the necessary steps that must be undertaken in putting together an effective local storm water management program.

2.2 Program Goals and Requirements

The first step in building an effective and comprehensive local storm water management program is to evaluate and document the current problems, needs, and regulatory requirements facing the local government. This includes:

- Identifying the location and magnitude of existing and/or potential storm water-related problems including flooding, property damage, water quality impairment, streambank erosion, and habitat degradation; and
- Determining the state and federal regulatory requirements that must be met by the community.

The existence of storm water related problems or mandated requirements leads to formal recognition by the elected officials and in turn establishes the basis for developing the program. This step should ideally be performed with a team from several departments to insure coordination. The team should include the public in the process through the use of a stakeholder or citizens' group.

All storm water program goals should be based on problems which are more clearly recognized by the general public as being important and that can be addressed by the basic powers and responsibilities of the local government. Often a consensus building approach is used to develop general program goals with citizen input. These goals often include the following general foundational responsibilities:

- Protect life and health
- Minimize property damage
- Ensure a functional drainage system
- Protect water quality
- Protect drinking water supplies
- Guide development
- Protect floodplain function
- Encourage economic development
- Protect and enhance the environment
- Improve quality of life

In addition, a community may have a number of local priorities, such as fisheries or wetland protection, for the local storm water program to address.

Objectives are then formed for each key program functional area keeping basic goals in mind. For example, a goal might be to protect streams so they maintain their designated beneficial use standard. Objectives might involve activities such as floodplain acquisition, establishing buffer requirements, implementing a monitoring program, and establishing a greenway master plan. Written policies, regulations, and implementation procedures develop from these objectives.

2.3 Program Components and Priorities

Once storm water needs and requirements have been identified and goals and objectives developed, a community can begin to formulate the activities that need to be undertaken. It is best to do this in two steps:

1. Develop overall storm water program priorities in each of the key functional areas.
2. Then translate these priorities into actual program components with an implementation schedule.

Questions to ask include:

1. What should the major storm water program priorities be in the next three to five years?
 - Priorities are developed to address program requirements and goals/objectives.
 - A special effort is made to identify specific opportunities to move in a more proactive direction rather than simply being reactive.
 - Efforts are made at anticipating future concerns not currently identified and plan for them.
2. How should these program priorities be translated into specific program changes or new program activities in terms of resources, manpower, and policy?
 - Specific program elements and/or changes are proposed.
 - A three to five year cost-of-service estimate is made to assess the ability of the local government to accomplish the program priorities under the program.
 - The needs of each program priority in terms of policy changes and tools required to implement the policy are also defined.

The various elements and activities that will be included in a local storm water management program will vary depending on the needs, priorities, and resources of the community in question. Section 1.2 of this resource guide and Table 2-1 below outline program elements and areas that should be considered in a comprehensive program.

2.4 Organizational Structure and Staffing

The next step is to evaluate the current storm water management activities within the community and determine how the planned program will be handled organizationally. This includes assessing current local programs and activities that may be applicable to the storm water management program and determining which governmental department or agency will be assigned to a program element or task. The functions that need to be addressed for a storm water management program can be divided into the following areas:

- General Administration
- Financial Management
- Planning and Engineering
- Capital Improvements
- Operations and Maintenance
- Regulation and Enforcement

Table 2-1 can be used to help identify the operational or program components needed. This table lists six major functional areas and identifies the elements within each area that may become a program element and require financial and other resources. This table can be used as a guide for a local community's assessment of its storm water program and as a tool to point out ways to improve the program and allocate resources and staff.

1. Administration	
General Administration	Intra-Local Coordination
Program Planning and Development	Public Awareness and Involvement
Personnel	State and Federal Regulation Compliance
2. Billing and Finance	
Financial Management/Budgeting	Customer Service
Capital Outlay	Billing Operations (Storm Water Utility)
3. Storm Water Planning and Engineering	
Storm Water and Watershed Master Planning	Engineering Design
Development Requirements	Hazard Mitigation
Design Criteria & Standards	Retrofitting Program
Development Plan Review / Approval	Zoning Support
Field Data Collection	Multi-Objective Planning Support
Storm Water Modeling	GIS and Database Management
4. Capital Improvements	
Construction	Easements and Rights-of-Way
Land Acquisition	Structural Control Retrofits
5. Operations and Maintenance	
General Routine and Remedial Maintenance	Spill Response and Clean Up
Emergency Response Maintenance	Infrastructure Management
Street Maintenance Program	Public Assistance
6. Regulation and Enforcement	
Code Development & Enforcement	Specialized Inspection Programs
General Permit Administration	Zoning and Land Use Regulation
Drainage System Inspection	Flood Insurance Program
Drainage System Regulation	Floodplain Management
Development Site Inspections	Sediment and Erosion Control Program
Storm Water Monitoring Program	Illicit Connection & Illegal Dumping Program

Traditionally storm water has been the concern of drainage engineers. However, comprehensive storm water management is a multi-disciplinary undertaking that requires the expertise of urban planners, development specialists, transportation planners, civil engineers, water quality specialists, code inspectors, and many others. As such, storm water responsibilities are often dispersed among several departments and/or organizations. These departments often work independently and sometimes at cross-purposes.

Some of the local government departments or agencies that may need to be part of the development and/or implementation of the storm water management program and related policy include:

- Planning and Community Development
- Engineering
- Public Works
- Environmental Management
- Health
- Transportation / Streets
- Building / Code Enforcement
- Facilities and Fleet Management
- Water and Sewer Utilities
- Sanitation
- Police / Fire
- Legal
- Finance and Accounting
- Data Management / GIS

- Parks and Recreation

Table 2-2 shows an example of several storm water program elements and the departments or agencies and staff members that might be responsible for these elements.

Review of iSWM Site Plans	Planning Department (planners) Engineering/Development Department (engineers, planners, technicians) Public Works Department (engineers, technicians)
Storm Water Quality Monitoring	Water & Sewer Department (engineers, technicians, lab analysts) Environmental Management (biologists, environmental scientists) Health Department (scientists, lab analysts) Public Works Department (engineers, technicians)
Site inspections	Planning Department (planners) Engineering/Development Department (inspectors, planners, engineers) Building Department (inspectors, engineers) Transportation Department (inspectors, engineers) Public Works Department (engineers, technicians)
Maintenance of structural controls	Public Works Department (maintenance personnel) Transportation Department (engineers, maintenance personnel) Environmental Management (inspectors, pollution control officer)

A community's options for organizing a storm water management program can fall into one of three basic configurations:

- Organization within an Existing Department – This is a very common organizational structure for a local government. Typically, storm water activities would be organized under an already existing agency or department such as a public works, transportation, or utilities department that has traditionally handled drainage issues.
- Standalone Organization – Some local governments have established a fully functioning storm water management department or agency that operates independently from other departments. Funding may come from an independent source such as a storm water utility. These types of organizations typically have more latitude to issue revenue bonds and respond directly to many storm water-related issues.
- Array or Matrix Organization – Sometimes no formal storm water entity exists within a local government. Instead, storm water responsibilities are shared internally among several departments or agencies. This type of organization is typical of smaller cities and counties. Some communities may also choose to hire outside contractors to perform some services such as storm water planning, plan review, engineering design, or maintenance activities. These types of programs are typically funded by general revenues or impact/permit fees.

Whether a new storm water management department is created or existing departments handle this program, a variety of staff expertise and interdepartmental coordination will be required. Development of a consensus among the various departments that provide storm water management services in a community is an essential consideration. Processes that shift staff, budget, and prestige among managers and departments, especially those that require reorganization, require careful attention. The necessities of reorganization must be explained

at all staffing levels of the departments involved. The manager whose department is diminished must understand why. The manager who is receiving additional staff must be well briefed regarding the storm water program components being assigned. Support from senior management and elected officials within a community are obviously very important to the success of a program.

Since the need to organize storm water programs rarely brings about a total governmental reorganization, communities can remedy the situation of an ineffective storm water organization by the following methods:

- Forming an ad hoc staff committee to seek ways to work jointly and coordinate the various aspects and functions of the storm water program;
- Reorganizing to the extent necessary to align programs which have primary storm water duties;
- Assigning overall storm water coordination duties at a level at which all authority comes together, often in the form of a storm water manager; and
- Developing a storm water policy and procedures manual in which all significant storm water duties and actions are outlined (often with flowcharts) with defined authority, responsibility, and procedures.

2.5 Program Funding

Funding is required for both the formation and ongoing operation of a local storm water program. In terms of the long-term operation of the program, the key funding issues are: (1) how much money is required to fund the program annually, and (2) how to support the program with a consistent and dedicated funding base.

In this area, general revenues from property taxes are typically the main funding source for local storm water management activities. However, there are a number of alternative funding methods for storm water management programs including the sale of bonds, development impact fees, the formation of local improvement districts, and the creation of storm water user fee systems (also known as storm water utilities). Each funding approach has its own advantages and limitations. These methods are discussed below and should be explored and assessed as to potential revenue, suitability, and public acceptance.

General Fund

General appropriations are a traditional way of funding most government programs and services. The strongest advantage of general funding is that it represents a stable funding source from local taxes. The disadvantage is that storm water activities must compete with other local programs and activities for limited funds. A government that elects to use its general fund may subject its storm water operations to budget deliberations each fiscal year.

General Obligation Bonds

Debt financing of capital improvements can be accomplished through issuing general obligation bonds, revenue bonds, or a combination of the two. A bond issue requires voter approval on a referendum ballot and is subject to local administrative policy in the form of debt ceilings. Most storm water project debt has been financed through issuance of bonds. These bonds are repayable from service charge proceeds, general revenues, and other sources (e.g. development fees), depending on the type of debt issued.

Development Impact Fees

This funding source involves the assessment of a development impact fee on developers of new projects. The project's total share-of-costs are determined not by the benefits received but by the impacts it creates by requiring new facilities and/or increased service levels. Development impact fees may be assessed as a permit or plan review fee. These are generally one-time fees, the revenues of which are used specifically to finance new storm water facilities or other system components. While paid by the developer, these types of costs are typically passed to the property owner.

A variation of the development impact or permit fee approach commonly used by small jurisdictions is the use of a private consultant to conduct plan reviews, construction inspections, and maintenance inspections. Using this

scenario, no additional public staff is needed and the consultant is paid either directly or indirectly by the developer for all services rendered. Ongoing maintenance inspections by a private consultant could be billed to the local jurisdiction.

Special Assessments / Tax Districts

A community may create special tax (or local improvement) districts to develop storm water control systems. This approach is good in cases where capital improvements (or land acquisition), special studies, and/or extraordinary maintenance will benefit a specific area or number of properties within a jurisdiction. The result is that only those who receive the benefits from the systems pay for them. Special districts function as quasi-municipal corporations created by law. As such, these districts have several funding options available: special taxes on property within the district, development fees, user fees, and, in some instances, debt financing. Creation of these districts requires voter approval. An alternative to creating these districts is to develop basin-specific user fees through a storm water utility.

User Fees / Storm Water Utilities

A storm water user fee system is a financing option that provides a stable and dedicated revenue source for storm water management. User fees present an alternative to increased taxes or impact fees for the support of local program operations and maintenance as well as the funding of other storm water program activities. In a storm water user fee system, storm water infrastructure and programs are considered a public service or utility similar to wastewater and water programs that are funded on a similar basis.

Users of the storm water system are assessed a fee based on average conditions for groups of customers with similar service requirements. Typically, fees are based on some measure of a property's impervious area. Rates may be assessed in charges per equivalent dwelling unit (e.g. "x" dollars per EDU per month) or unit area (e.g. "x" dollars per 100 square feet per month). Alternative methodologies include the use of a runoff factor or coefficient based on the type or category of land use, a flat fee per customer, or a combination of any of these methods.

A storm water utility operates similarly to water, sewer, or fire districts that are funded through service fees and administered separately from the general tax fund, ensuring stable and adequate funding for these public services. Storm water utilities have been used in Texas since the early 1990's.

Municipal Utility Districts

A Municipal Utility District (MUD) is a political subdivision of the State of Texas authorized by the Texas Commission on Environmental Quality (TCEQ) to provide water, sewage, drainage, and other services within the MUD boundaries. A majority of property owners in the proposed district petitions the Texas Commission of Environmental Quality to create a MUD. After approval, the TCEQ appoints five temporary members to the MUD's Board of Directors, until an election is called to elect permanent Board members, to confirm the MUD's creation, and to authorize bonds and taxing authority for bond repayment.

The publicly elected Board of Directors manages and controls all of the affairs of the MUD subject to the continuing supervision of the Texas Commission on Environmental Quality. The Board establishes policies in the interest of its residents and utility customers. A MUD may adopt and enforce all necessary charges, fees, and taxes in order to provide district facilities and service. MUD tax rates, like all property tax rates, vary according to property values and debt requirements. MUD rates generally decline over time as the MUD is built out and operating and debt service costs are shared by more homeowners.

Table 2-3 provides a summary of the advantages and disadvantages of the various storm water program funding approaches.

<u>Approach</u>	<u>Advantages</u>	<u>Disadvantages</u>
General Fund	Short lead-time; ease of implementation	May have to wait for the next budget cycle.
	Capitalizes on existing resources; may be attached to public works, planning, and other appropriate department. Existing funding base is known.	Initial capital outlays likely to require significant general fund withdrawal or tax increase
	If community-wide benefits realized, is a very equitable approach	If funding levels increased through contributions from other programs/ departments, subject to budget deliberations each year. Year-to-year funding becomes uncertain.
	May have more options available for funding capital projects; therefore, the cost of capital may be lower	If funding levels increased through taxes, subject to political sensitivity of raising taxes of those who may not benefit from improvements. Success dependent on general financial health of local government.
		Inflexible structure for setting funding priorities – funding may not be consistent with actual program needs.
General Obligation Bonds	Covers funding needs for significant time period.	Is a burden on debt services; in some cases may require tax increase on all constituents, some of whom may not benefit from the improvements.
	Results in dedicated, known source of funds, which provides for payment over time by users of the capital improvement.	Interest, dividend, and issuance costs added to total costs for the life of payoff.
	May be linked to other projects (e.g., road improvements) to improve acceptability.	Unlikely to attract investors if not supplemented with other funding.
Development Fees	Up front fees provide immediate source of cash.	May be difficult to implement (general resistance to “impact” fees).
	Fees for new projects tied to need for new facilities to support them.	Careful rate design necessary. If O & M involved, funds should be earmarked for maintenance for facilities on their properties.
	May ultimately be less expensive to developer than installing individual facilities; therefore, may be acceptable.	Only covers improvements necessitated by new development; therefore, may not be appropriate for highly developed areas.
	If coupled with credit for work done by developer, provides incentive to mitigate impacts.	Those paying for improvements may not be within same basin as those benefiting
	Works well for large projects.	Not steady enough to fund O & M indefinitely.

<u>Approach</u>	<u>Advantages</u>	<u>Disadvantages</u>
Special Assessments/Tax Districts	Dedicated funding source. From legal and policy standpoint, may be best method of financing capital if benefits limited area.	Likely to be short term (additional assessments likely to be unpopular).
	Have authority to utilize variety of funding mechanisms: user charges, special property assessments, development fees, etc.	Those paying for improvements may not be within same basin as those benefiting.
		Not easily understood by public.
User Fees/Storm Water Utility	Stable funding source allows accurate forecasting of revenues.	Ease of implementation and administration highly dependent on establishing equitable, cost-based user fees.
	Links costs to damages avoided.	
	Dedicated funding source allows flexibility in setting funding priorities, long-term strategies.	Implementation, start-up time may be significant, depending on structure of public works or other existing department from which fees are administered.
	Allows utility to differentiate based on varying levels of service, drainage basin, and other specific features.	Proven “track record required” to issue revenue bonds – may have to rely on other sources, or “pay-as-you-go” strategy for several years.
	Rates create incentive to protect resource.	Will require significant public education/support building efforts to gain acceptance for level of fees to cover requirements.
	Dedicated funding source enhances ability to secure grant and/or bond monies for projects.	Administrative costs may be significant, but proper administration is critical to insure revenues are appropriately utilized.

2.6 Implementing the Program

Once the framework for the local storm water management program has been established, it is important to develop a plan and schedule for implementing the program. A concerted effort should be made to inform the public of the community's storm water management needs, of the fact that a plan of action for local storm water management has been developed, and that all parties must share responsibility for solving the problems.

In developing storm water policy tools and procedures, a local government should always make sure that any policy under consideration meets the following requirements:

- Has sufficient legal authority
- Be consistent with other guidance
- Be short, clear, and to the point
- Has a sound technical basis
- Be properly staffed and provided financial resources
- Be backed by appropriate administrative procedures and technical support
- Be folded into the community with appropriate training and indoctrination
- Be strongly and fairly enforced

Implementation of a comprehensive storm water management program is not a quick or painless process. It requires the commitment of the community, trained individuals, and effective leadership to ensure that the program meets its long-term goals and objectives. Some of the elements of a “successful” storm water management program include the following:

- Strong institutional motivation to act on the problem
- Political and/or grassroots support for action
- Skilled personnel
- Dedicated funding source
- An environment of institutional cooperation and a long-term commitment to work together
- Targeting strategy / process to maximize use of limited resources

2.7 Conclusion

Effective local storm water management programs are built upon numerous institutional, economic, and technical factors. Setting up a functional program requires outlining problems and goals, determining the required program components and priorities, identifying and obtaining stable funding, and implementing the program. Finally, it should be remembered that storm water management solutions and programs must be tailored to each community’s particular circumstances and needs.

What is iSWM?

integrated Storm Water Management (iSWM) is a new way of managing storm water in North Central Texas by looking to mitigate the negative impacts of development by integrating the management of the quality and quantity of storm water, as well as integrating storm water considerations into the earliest stages of the development and site planning process. iSWM is an avenue to provide comprehensive and practical guidance oriented to implementation in everyday practice.

Why iSWM?

Comprehensive guidance is needed for the region in order to integrate the management of storm water quantity and quality throughout the planning, design, construction, operation, and maintenance of storm water infrastructure that will protect water quality, minimize streambank erosion and provide flood control both onsite and downstream. iSWM guidelines will greatly enhance the storm water management initiatives of North Central Texas area communities by improving and streamlining the development process for communities, developers, and consultants. The short-term and long-term impacts on the storm water quality and quantity improvements brought about by these guidelines will prove invaluable for the region.

What iSWM documents are available?

iSWM Design Manual for Construction – December 2003

Provides guidance on the control of sediment and other pollutants on during construction activities.

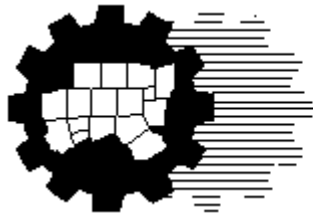
iSWM Design Manual for Site Development – January 2006

A detailed design document to guide developers, consultants, and government agencies on the preparation of an *integrated* Storm Water Management Site Plan to control and manage storm water quality and quantity for new developments and redevelopments.

iSWM Resource Guides – October 2007

Provide guidance for local jurisdictions and developers on various aspects of effective urban storm water management.

These documents can be found at <http://iswm.nctcog.org/>.



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