



STORMWATER

MANAGEMENT PROGRAM MASTER PLAN



MAY 2018



ACKNOWLEDGMENTS

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THE STORMWATER MANAGEMENT PROGRAM

- City of Fort Worth Vision
- City of Fort Worth Mission
- City Council Strategic Goals
- City Values
- Stormwater Management Program
- Stormwater Management Vision

- Stormwater Management Mission
- Stormwater Management Initial Strategic Goals
- SWMP Elements
- How does the Stormwater Management Program Operate?
- What About Water Quality?

THE STORMWATER MANAGEMENT PROGRAM

The Stormwater Management Program (SWMP) vision, mission, and strategic direction are direct outgrowths and program specific applications of the City's comprehensive vision, mission, strategic goals, and City Values. The Comprehensive City Vision is memorialized and refreshed annually in the Fort Worth Comprehensive Plan. The City Council strategic goals summarize the primary focus areas City leadership has established to accomplish the vision.



CITY OF FORT WORTH VISION

Fort Worth will be the most livable and best managed City in the country



CITY OF FORT WORTH MISSION

Working together to build a strong community



CITY COUNCIL STRATEGIC GOALS

- Make Fort Worth the nation's safest major City
- Improve mobility and air quality
- Create and maintain a clean and attractive City
- Strengthen the economic base, develop the future workforce and create quality job opportunities
- Promote orderly and sustainable development



CITY VALUES

- Exceptional Customer Experience
- Accountability
- Ethical Behavior
- Diversity
- Mutual Respect
- Continuous Improvement

STORMWATER MANAGEMENT PROGRAM

The Stormwater Management Program vision, mission, and goals directly contribute to the City's progress toward its comprehensive vision. Stormwater program priorities and strategies are always directed toward that end.



STORMWATER MANAGEMENT VISION

To be commonly recognized as an exceptionally effective and progressive municipal stormwater management program



STORMWATER MANAGEMENT MISSION

Protect people and property from harmful stormwater runoff



STORMWATER MANAGEMENT INITIAL STRATEGIC GOALS

When the SWMP was developed, a very simple, two pronged framework for program goals was established.

Make things better

- Get the drainage system performing as designed (Maintenance and Repair)
- Identify and correct deficiencies in the drainage system (Flood and Erosion Mitigation Capital Improvement Program)
- Warn of stormwater related hazards

Keep things from getting worse

- Keep the drainage system performing as designed (Maintenance and Repair)
- Review Development to ensure no adverse impact (Development Services)

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SWMP ELEMENTS

The Transportation and Public Works Department (TPW) Stormwater Management Division consists of four primary elements:

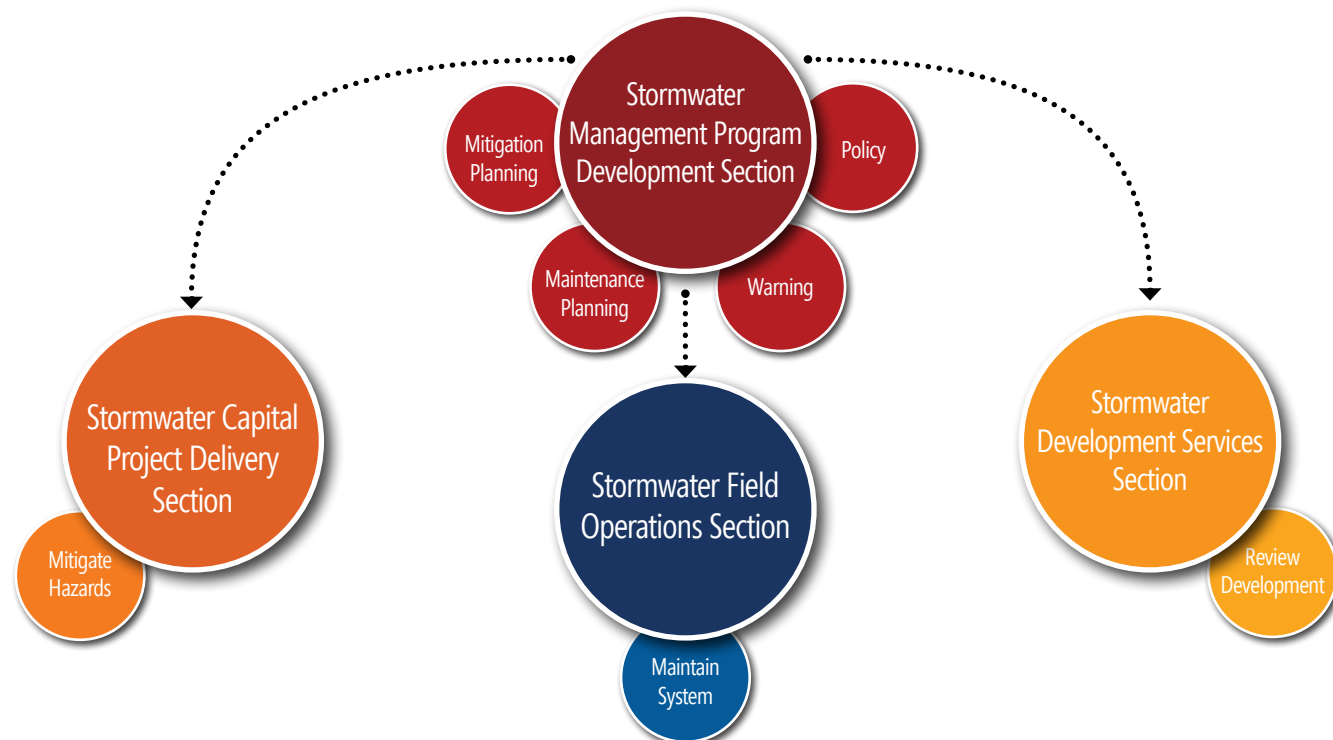
- 1 MAINTAIN**
the City's existing stormwater infrastructure
- 2 MITIGATE**
hazards through capital projects
- 3 WARN**
community of hazards
- 4 REVIEW DEVELOPMENT**
for compliance with City standards

HOW DOES THE STORMWATER MANAGEMENT PROGRAM OPERATE?

In order to address the above four elements, the Stormwater Management Program is divided into the following sections: Program Development, Capital Project Delivery, Field Operations, and Development Services. As shown in the graphic below, Program Development is responsible for establishing the strategic direction of the program.



WHAT ABOUT WATER QUALITY?



As recognized in 2006 when the SWMP was established, stormwater management plays a key role in protecting and enhancing the water quality in the community. As such, protected/enhanced water quality is a program goal and, therefore, a significant consideration in the execution of the four program elements. The main role of the SWMP is in serving as a major service provider to the Code Compliance Department, Environmental Quality Division (EQD) who is responsible for the City's Municipal Separate Storm Sewer System (MS4) Permit administered by the Texas Commission on Environmental Quality (TCEQ) for the Environmental Protection Agency (EPA). The City has developed an MS4 Stormwater Management Plan as required by the permit. The SWMP leads the permit compliance efforts associated with the following measures in the Stormwater Management Plan:

- Maintenance Activities – minimizing erosion, maintaining vegetation, removing sedimentation, etc.
- Post-construction Stormwater Measures – identifying and implementing water quality practices on flood control projects as much as practicable.
- Public Education, Outreach, Involvement, and Participation – informing residents about watersheds, drainage systems, and ways to prevent water pollution.

In addition, the SWMP provides review and technical support to EQD for the permit compliance efforts associated with the following measures in the Stormwater Management Plan:

- Construction Site Stormwater Runoff – permitting construction activity that provides water quality protection measures during construction activities
- Monitoring, Evaluation, and Reporting – keeping records of our work efforts and reporting them annually to TCEQ

Water quality is not a discrete element and it reaches across all program elements. More information on how the City of Fort Worth addresses water quality can be found in the City's Environmental Master Plan.



THE UPDATE PROCESS

What was the process for updating the SWMP Master Plan?

What does this plan provide?

THE UPDATE PROCESS

The SWMP was 10 years old when this update process was initiated. Many of the initial program goals had been achieved and a tremendous amount of progress made in understanding the drainage needs and challenges of the City during the first 10 years of the program. This update to the SWMP Master Plan was initiated to take the progress made, lessons learned, and information gathered since the program was initiated in 2006 and establish the strategic direction of the program to optimize effectiveness over the next ten years.

The Master Plan defines the priorities, policies, and strategies that will direct the use of program resources to best meet the stormwater related needs of the City of Fort Worth.

This update to the SWMP Master Plan is meant to be a comprehensive and living document that helps ensure alignment of policies and strategies with the current and future City of Fort Worth directives established by City leadership and documented in the City's Comprehensive Plan. The update process was conducted with the goal of producing a strategic framework to guide the program for the next 10 years by:

- Consolidating and pivoting off of lessons learned to date
- Optimizing the use of existing resources to meet community needs
- Developing and refining policies to address recurring issues
- Clearly defining challenges and prioritizing initiatives

The SWMP will review and update this Master Plan as new initiatives, major events, and budget revisions are encountered. These ongoing revisions will keep it pertinent and up-to-date with the inevitable changes that will occur over the next ten years.



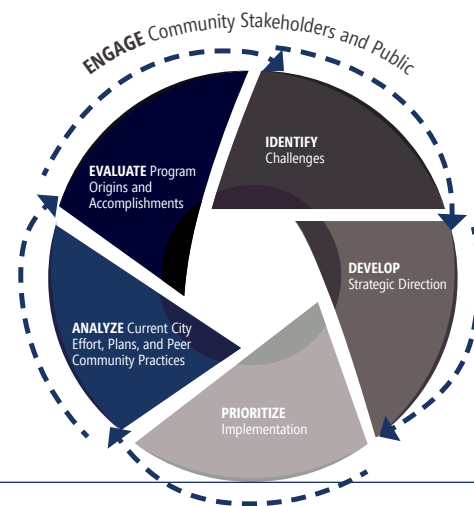
STAKEHOLDER COMMENT: Meeting was very well planned and well conducted. Stakeholder's input is obviously valued. GOOD JOB!



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WHAT WAS THE PROCESS FOR UPDATING THE SWMP MASTER PLAN?

This update to the SWMP Master Plan is the result of an in-depth engagement process that walked community stakeholders, public, and city staff through five main steps: analyzing current City efforts and related strategic City plans and reviewing practices from peer communities to confirm the internal program assessment (Chapter 2); evaluating the origins of the SWMP and the history of stormwater management within the City (Chapter 3); identifying the challenges faced by the SWMP (Chapter 4); developing strategic directions to overcome the identified challenges (Chapter 5); and prioritizing initiatives for implementation (Chapter 6).



Community Stakeholder and Public Engagement

The Stakeholder group was comprised of representatives from each council district and ad hoc representatives from various stormwater rate-payer categories. The group was created to help guide the planning process and provide feedback on major policy considerations. The Stakeholder group of seventeen participants was engaged at a series of open-to-the-public meetings during 2017. The stakeholder group showed great commitment to the process and their valuable feedback will help guide the strategic direction and policy development over the course of the next 10 years. The stakeholder group discussions provided input on the challenges, strategic direction, and relative priority of each of the four program elements. Additionally the group was engaged in discussions on each of the four major policy challenges facing stormwater management. For both the strategic direction of the program elements and the four major policy challenges, the group agreed on the general direction that should be reflected in the Master Plan's update. This direction is presented as part of the Strategic Direction found in Chapter 5. Details of the stakeholder group's meetings, discussions and feedback are found in the Appendix (not included with draft report).

The public was invited to attend the series of 2017 stakeholder meetings and feedback was requested through written comments and open comment periods during the meetings. The following opportunities to inform the stakeholders/public, solicit feedback, and engage in discussion were utilized throughout this planning process:

- 4 Stakeholder Meetings open to the Public
- Website including status updates after each stakeholder meeting and public comment form
- Neighborhood Meetings (limited engagement in conjunction with other City initiatives)
- Infrastructure and Transportation Committee presentation
- Email updates to residents that have expressed interest in the SWMP
- Council District News
- Nextdoor Webapp Postings
- Flood Warning Public Meetings
- Plan Commission presentation



A complete summary of Stakeholder Feedback Documents are located in the appendix.



City Staff Engagement

City Stormwater Management staff were engaged throughout the planning process to identify needs and priorities of those with the most knowledge of the day-to-day program and tasks. The internal engagement also included interdepartmental coordination to identify opportunities to collaborate across City divisions and departments that have overlapping interests and goals. The following City staff were engaged as part of this process:

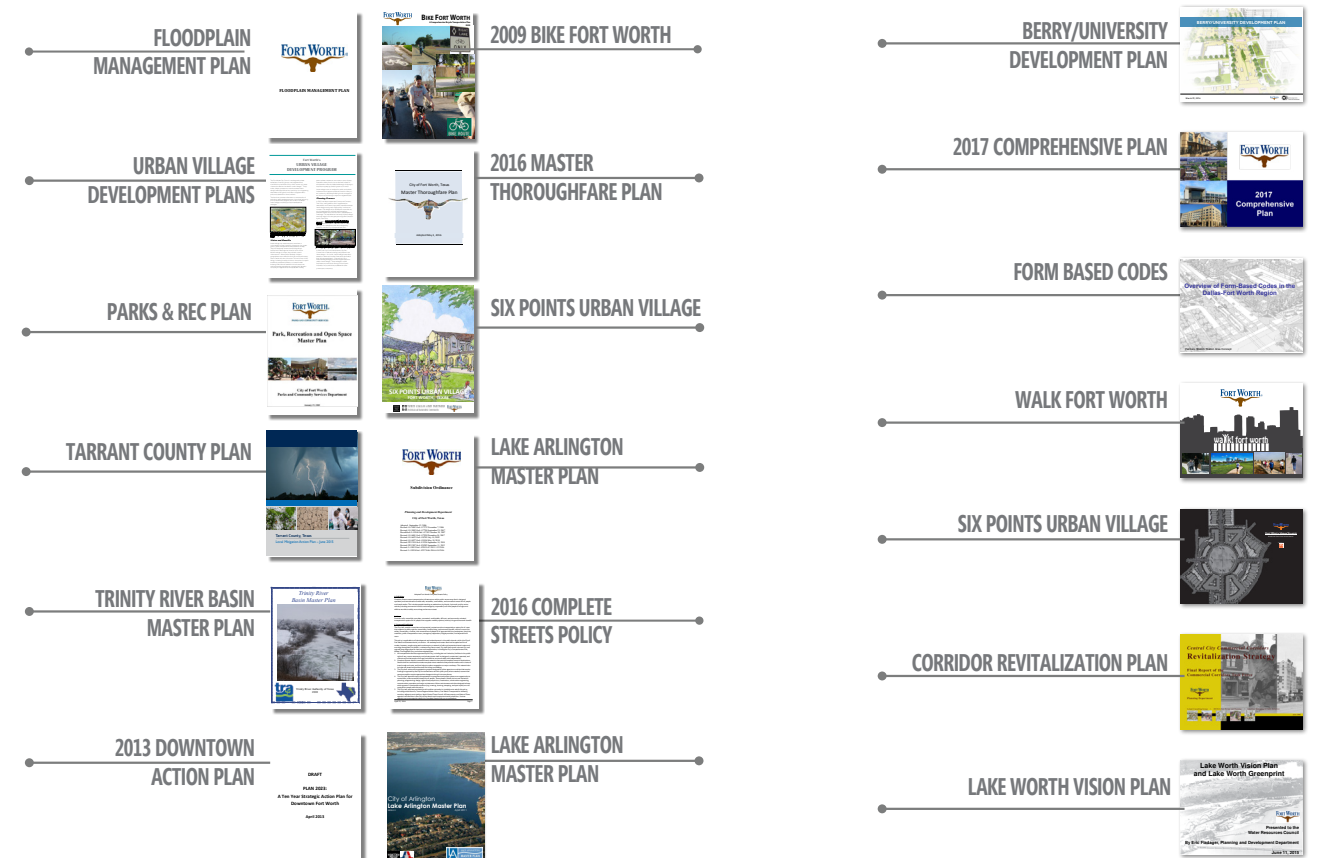
- SWMP staff in the following work functions
 - Field Operations
 - Program Development
 - Business Support
 - GIS
 - Floodplain Management
 - Development Services
 - Capital Delivery
- Other City staff/departments
 - Planning and Development
 - Water
 - Emergency Management
 - Parks
 - Transportation and Public Works Department Streets Division
 - Code Compliance Department Environmental Quality Division



A complete summary of Staff Engagement Documents are located in the appendix.

Review of Relevant City Plans and Initiatives

Numerous documents and plans from other City departments and programs were reviewed to identify initiatives that could influence the strategic direction of the SWMP. This review helped ensure that the SWMP Master Plan is consistent with the current City direction and avoid conflicts with the planning objectives of other City programs. This review also helped identify potential opportunities where the SWMP may be able to partner with other City efforts to implement future policies and strategies such as multi-use open spaces. The following documents were reviewed



Peer Community Review

The identification of current best practices and potential improvement opportunities for the SWMP was sought through comparisons with peer communities. The following peer communities were contacted and interviewed as part of this process:

1. Arlington, TX (ARL)
2. Austin, TX (AUS)
3. Dallas, TX (DAL)
4. Oklahoma City, OK (OKC)
5. Raleigh, NC (RAL)
6. San Antonio, TX (SAN)
7. Charlotte, NC (CHA)

 A complete summary of Peer Review Documents are located in the appendix.



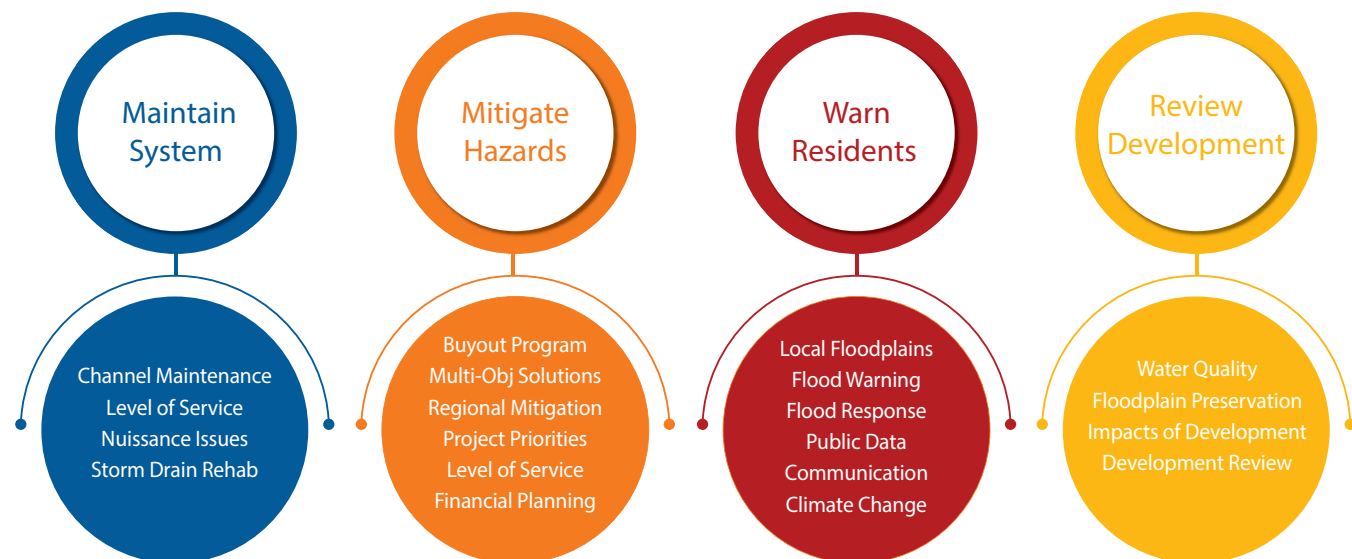
These communities were selected based on one or more of the following criteria: similar stormwater infrastructure responsibilities, similar funding model, similar community size, regional proximity, and/or nationally recognized stormwater programs.

This Peer Community Review was an extensive survey that provided ideas and helped inform the evaluation of current and future City policies and strategies. The topics shown in the graphic below were reviewed as part of this effort.

WHAT DOES THIS PLAN PROVIDE?

The SWMP Master Plan is intended to help ensure that ongoing program decisions and short/medium term initiatives are directed by a well-developed, community-informed strategic framework. This report is intended to support the following:

- Basic Program Definition - A comprehensive overview of the SWMP to provide transparency for City leaders, elected officials and stakeholders. Reference to this document will make clear to the reader what the SWMP's responsibilities and priorities are and how they are developed.
- Strategic Program Direction - A summary of the strategic direction established by the SWMP and vetted by the stakeholders based on the comprehensive master planning effort and current funding structure. This strategic direction will inform future policy creation and/or refinements and resource allocations.
- Plan Implementation - Actions to be implemented by Stormwater staff in support of the established strategic direction. Specific actions are included in the implementation planning section and appendices.





BACKGROUND

Historical Context
Initial Stormwater Management Program Objectives and Funding
SWMP Activities/Accomplishments Since 2006

HISTORICAL CONTEXT

Established in 1849 as a U.S. Army fort on bluffs overlooking the confluence of the West Fork and Clear Fork of the Trinity River, Fort Worth's history has always been shaped by water. The Fort Worth Stockyards were established on the banks of Marine Creek less than a mile from the West Fork Trinity River in order to ensure a constant supply of water for the livestock and cattlemen. Partly in response to a devastating fire which wiped out 26 blocks of Fort Worth's South Side in 1909, the City built Lake Worth on the West Fork several miles upstream of town in order to guarantee an adequate water supply for the growing city.

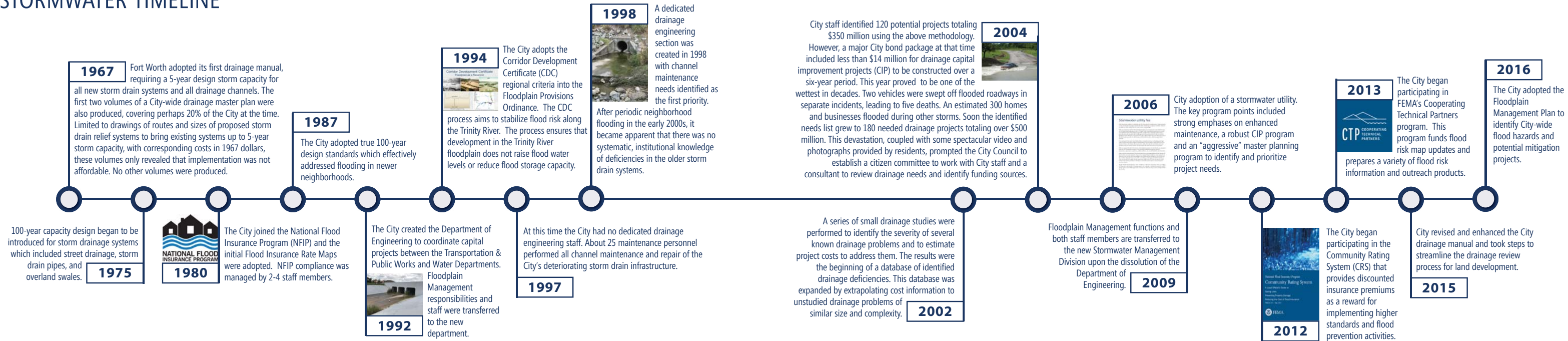
Historically, development was tied to a street grid system and little regard was given to topography and the small intermittent streams traversing through many neighborhoods. Many drainage draws and creek beds were filled in, with small storm drains traversing across lots and under houses as the only evidence remaining of their previous alignments. In many instances, creeks draining several hundred acres were enclosed in storm drains in order to create more developable property on the surface. Historically, the City has experienced costly and deadly flooding from the small streams and watersheds, as well as the West Fork and Clear Fork of the Trinity River and their major tributaries.

The timeline below provides a brief summary of the progression of stormwater efforts in the City of Fort Worth over the past 50 years.



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STORMWATER TIMELINE



INITIAL STORMWATER MANAGEMENT PROGRAM OBJECTIVES AND FUNDING

The Stormwater Program was established in conjunction with a Stormwater Utility in 2006. Table 3-2 summarizes the original SWMP fee plan and actual monthly fee schedule by fiscal year. Table 3-1 summarizes stormwater management activities prior to 2006 and the desired outcomes of the established Stormwater Management Program.

 [Link to Comprehensive Stormwater Management Program AMEC SWU Reports](#)

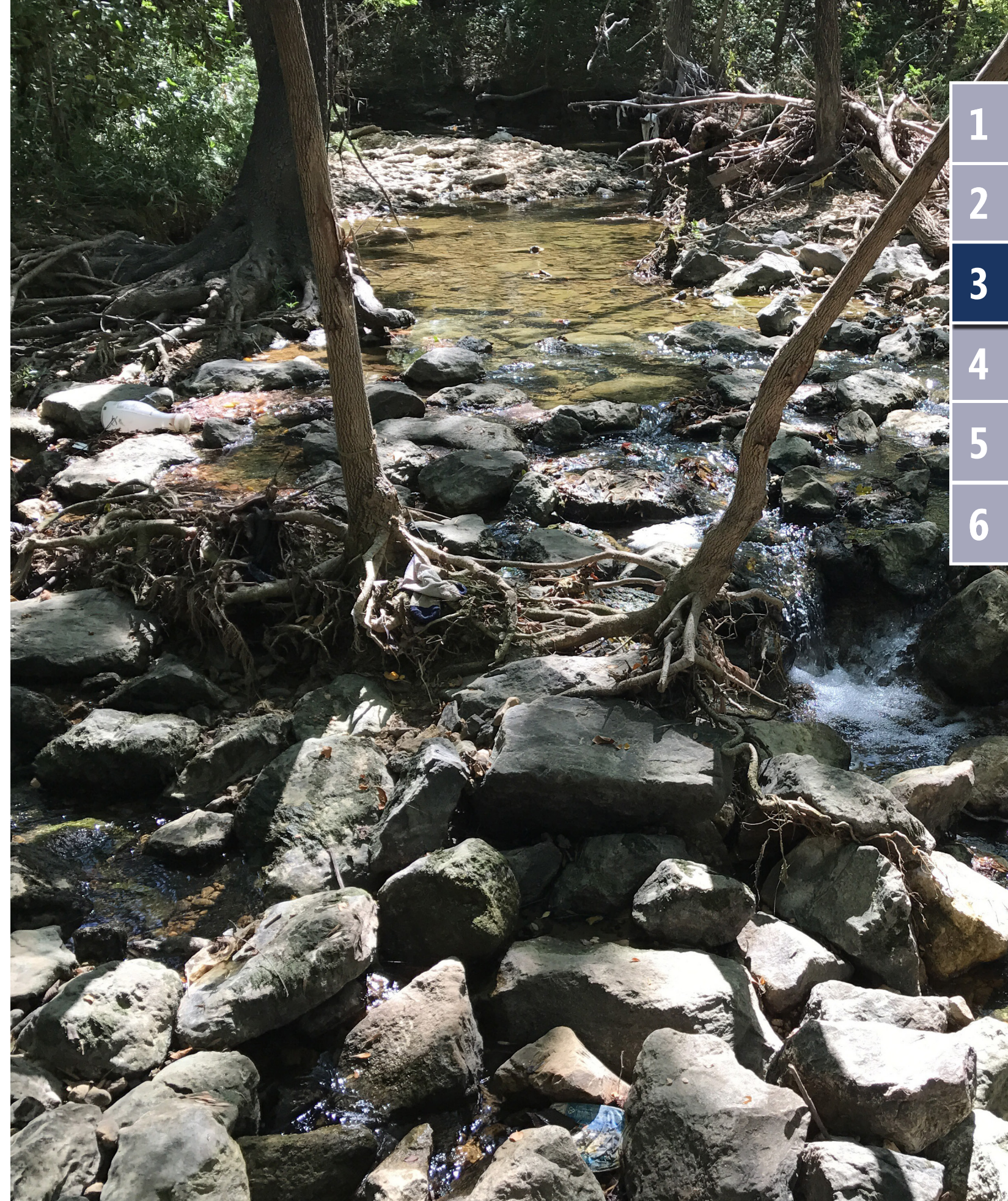
INITIAL SWMP OBJECTIVES

PRE-2006	DESIRED
Flood reduction capital projects – over \$500 million backlog	Funded capital program (stable funding source) that reduces backlog in a reasonable timeframe
Reactive maintenance	Proactive, prioritized, scheduled, effective, maintenance program
Incomplete inventory	Complete inventory and condition assessment of facilities
Planning – Limited studies (5% of City) focused only on water quantity issues	Comprehensive master planning – Setting priorities with cost-effective solutions (including water quality issues)
Development Services/Design Standards – 1967 era with limited enforcement	Up-to-date standards that protect from flooding & erosion without slowing growth
Outdated equipment/technology	Up-to-date hardware, software, and field equipment
Public Education primarily limited to water quality issues	Effective education/outreach on all aspects of stormwater issues

SWMP FEE PLAN

	FY07	FY08	FY09	FY10	FY11	FY12-18
Original projected monthly fee per billing unit	\$2.90	\$3.25	\$3.75	\$4.25	\$4.50	Original projection did not go beyond Year 5
Actual monthly fee/annual budget	\$2.90 / \$10.2M	\$3.20 / \$15.1M	\$3.75 / 19.3M	\$4.75 / \$25.7M	\$4.75 / \$28.1M	\$5.40 / \$39M in FY18

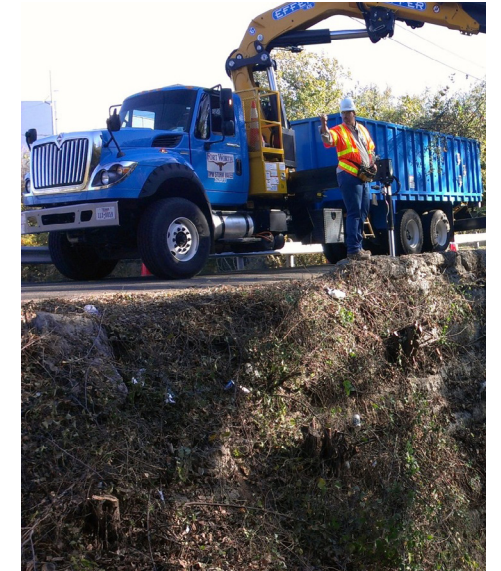
* Billing units are calculated by measuring the hard surface area on a property and dividing by the Equivalent Residential Unit (ERU) of 2,600 square feet to determine the number of billing units on the property.



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SWMP ACTIVITIES/ACCOMPLISHMENTS SINCE 2006

Focusing on the initially established program objectives summarized on page 19, key activities and accomplishments of the SWMP since 2006 include:



FLOOD REDUCTION CAPITAL PROJECTS

- \$150 million in revenue bonds issued since 2008
- Over 130 projects completed (75 major projects and 55 minor projects)
 - Over 600 properties with reduced flood risk
 - Over 190 flood-prone parcels acquired
 - Roads with 255,000 average daily trips are no longer subject to overtopping
- Most “low hanging fruit” stormwater mitigation projects completed
- Successful partnerships with Fort Worth ISD, Tarrant County, Fort Worth T, and other City departments

MAINTENANCE

- | | |
|---|--|
| <ul style="list-style-type: none"> ➤ A specific Field Operations Section was established to implement a prioritized, scheduled and proactive maintenance program ➤ Channel Maintenance <ul style="list-style-type: none"> • Development of a channel maintenance prioritization system • 170 + miles of channel maintained • ~ 25% actively maintained and functioning as designed • 400 + culverts maintained and cleaned as appropriate ➤ Vegetation Maintenance <ul style="list-style-type: none"> • Currently 50+ miles of channel/ditches maintained • 3 times per year | <ul style="list-style-type: none"> ➤ Inlet Cleaning Program <ul style="list-style-type: none"> • 30,000 + inlets in our system • Clean/inspect 9,000 +/year ➤ Water quality devices <ul style="list-style-type: none"> • 17 devices in the system • Maintained every 6 months • Inspected quarterly ➤ Storm Drain Rehabilitation <ul style="list-style-type: none"> • Pipe rehabilitation technologies being tested with pilot projects ➤ Dam inspections ➤ North Service Center Construction to be completed in early 2018 • 50% of resources transitioning to new location for increased efficiencies |
|---|--|

INVENTORY AND CONDITION ASSESSMENT

- Complete
 - Storm Drain Inventory
 - Business Risk Exposure / Criticality Assessment (high level planning) for pipes, inlets, infalls, and outfalls
- In Progress
 - Storm Drain Condition Assessment using video to further define need and priority
 - Channel Inventory to identify and catalog assets

PLANNING

- [Completed the following Citywide Assessments](#)
 - Capital Project Prioritization
 - Citywide Areas of Potential High Water
 - Drainage Area Prioritization
 - Citywide Erosion Hazard Potential
 - Maintenance Project Prioritization
 - Criticality of Stormwater Infrastructure
 - Stream Crossing Inventory
 - Citywide Pipe Capacity
 - Documented Flooding Incidents Data Set
- Completed over 40 watershed assessments
- Flood warning system – installation of 53 gauges/flashers since 2006

EQUIPMENT AND TECHNOLOGY

- Acquisition and implementation of Accla Workorder Management Software
- Majority of drainage system mapped in Geographic Information System (GIS) Software
- Acquisition and incorporation of Field Tablets in the Field Operations section to provide access to key system data in the field and real time recording of maintenance activities and field conditions
- Acquisition and use of Automatic Vehicle Locators to enhance operational efficiency and emergency response
- Dramatic upgrade in the quality and effectiveness of Maintenance Equipment



DEVELOPMENT SERVICES

- Updated standards and criteria manual
- Over 1500 reviews completed in 2016
- Average turnaround time per review = 8.7 business days
- Process/service improvements recognized by the Greater Fort Worth Builder's Association via their 2017 Community Spotlight Award
- Floodplain Management
 - Reviews all building and development permits for compliance with NFIP regulations and the Floodplain Provisions Ordinance standards.
 - Flood insurance claims reduced by over 88% since joining the NFIP in 1980.
- Increased dedicated Floodplain Management staff from 2 to 4 positions.
- Managed the Cooperating Technical Partners Program to update FEMA flood zone maps citywide, receiving over \$2.1M in grant funds to date.
- Administer Community Rating System which is currently at a level 8 which provides a 10% discount on insurance premiums for higher standards and activities that reduce flood risk.
- Prepared the Floodplain Management Plan to identify citywide flood hazards and mitigation opportunities in mapped floodplain areas.
- Repetitive Loss Area Analysis

PUBLIC COMMUNICATIONS

- Newsletters
 - Runoff Rundown Newsletter (annual citywide mailout focused on flood risk awareness and insurance availability)
 - Direct Mail Newsletters (project specific as needed)
- Online
 - City Stormwater Website
 - Project/Planning specific webpages
 - Online Questionnaires
 - Neighborhood Email Blasts
- Public Meetings
- Social Media Campaigns (NextDoor, Twitter, etc.)



4

CHALLENGES

- Program Wide Challenges
- Program Element Challenges
- Policy Challenges

PROGRAM WIDE CHALLENGES

The SWMP accomplishments are significant, but the remaining needs are numerous. Many areas of chronic flooding concerns remain. A complete inventory and condition assessment of SWMP assets is not yet complete. Enhanced hazard warning is needed due to residual risks. Finally, the City is in the midst of rapid growth, and residents have expressed frustration over impacts of increased land use density in areas with known flooding problems. The SWMP mission and remaining work is enormous.

The SWMP faces significant challenges in the pursuit of its vision and mission. These challenges can affect every program element. Understanding and effectively dealing with them was key to the development of the program's strategic direction for the next 10 years. The challenges are identified in the following sections and the resulting strategic direction is presented in Chapter 5. The overall program challenges are classified as financial, prioritization, communication and resource programming challenges.

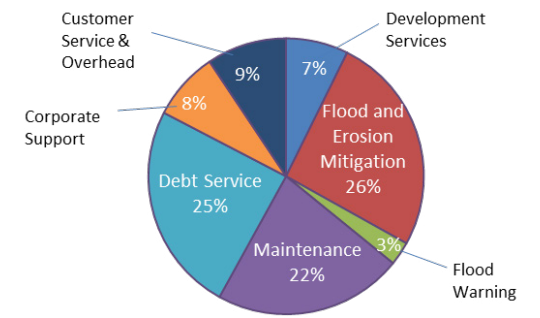


STAKEHOLDER COMMENT: The single biggest issue is lack of required funds to make a truly impactful statement on the problems stormwater faces.



FINANCIAL

The SWMP is funded through stormwater utility fee revenues. In Fiscal Year (FY) 17 the total revenue generated was approximately \$38 million. When debt service and other overhead costs are subtracted from the revenue, the program had approximately \$22M in discretionary budget in FY17. Those were the revenues utilized to fund the four program elements: system maintenance, flood/erosion mitigation, flood/erosion warning, and development review. The overall budget is expected to grow approximately 2% each year as revenues increase with development across the City. FY 18 revenues are expected to be approximately \$39 million. The chart depicts the proportion of the FY 17 budget allocated to the major expense categories.



As discussed in the Program Element Challenges section below, every aspect of the SWMP has significant and high priority needs that cannot be met with the current funding levels.

PRIORITIZATION

Given the service level gaps that exist in every element of the SWMP, significant effort and emphasis has gone, and must continue to go, to optimizing the use of resources to accomplish the mission and vision of the program as efficiently and effectively as possible. The prioritization of resources requires the consideration of both objective and subjective criteria. Understanding and assigning appropriate weights to these criteria that

are consistent with community priorities is complex. Another significant facet of the prioritization challenge is comparing the relative priorities of various needs. For example: deciding if resources would be more effectively used on flood warning or private development review.

Objective criteria are derived from an inventory of needs and an assessment of data. During the last ten years, the SWMP has developed several very

useful tools to compile and present prioritization data to help inform the objective criteria but there are still significant gaps. Subjective criteria such as public opinion, economic development impacts, aesthetics, and neighborhood impact require considerable judgment and interpretation and can often be difficult to apply consistently.

COMMUNICATION

The SWMP has acquired a significant amount of data that could be useful for decision making by City leadership, City staff, and residents/businesses. This data includes the location and nature of stormwater related hazards, real time information on the intensity and duration of rain events and

potential public safety risks created by the events, assessments of critical infrastructure and capital needs, and strategies that could help minimize future capital costs. Seeking to educate decision-makers about the existence of the information and developing means of making it reasonably accessible

is a challenge. There are also some potentially sensitive policy issues that need to be sorted through regarding the manner and scope of the promulgation of some of the information. The SWMP needs an effective strategy to effectively get the right information to stakeholders and the community.

RESOURCE PROGRAMMING

Given the funding limitations and the growing framework for comparing relative priorities of various program needs, decisions on the optimal allocation of program resources to best meet customer needs have become a foundational challenge.

Questions that have to be asked to make final decisions include:

- How should the prioritization data from varied program needs (warning, capital projects, rehab, mitigation and development

review) be compared to make resource allocation decisions?

- What is the proper balance between large and small projects?
- What is the appropriate level of budget that should be set-aside for reactive needs (e.g. system emergencies, voluntary buyouts,

partnership opportunities, etc.)?

- How can overall community priorities be understood and tracked over time to determine how the SWMP can best help accomplish them?
- When will a lower level of service be considered?



STAKEHOLDER COMMENT: Until the assessment of the condition of infrastructure is completed, I don't know how you can know what the investment in storm drain rehabilitation should be.

PROGRAM ELEMENT CHALLENGES

The following outline some of the major challenges facing each program element of the SWMP.

1 MAINTAIN SYSTEM

Funding Gap

Currently \$8.4 M is allocated in the annual budget to maintain the existing stormwater infrastructure. The funding for the maintenance program is divided between four main services: vegetation maintenance, concrete maintenance, channel maintenance, and inlet cleaning. As discussed in the paragraphs below, there is a significant backlog of work in the maintenance program.

Information Gap

The current maintenance program has an information gap that exists due to a lack of data regarding the current condition of storm drain pipes and channels. This gap affects the ability of the program to ensure that resources are being used on the highest priority needs and makes future planning less efficient and accurate.

Pipe Rehabilitation Need

Over 60 miles of pipe in the City are over 70 years old and much of it will need to be rehabilitated over the coming years in order to avoid large scale system failures that could create damaging sinkholes and flooding during heavy rains. Additional pipe assessment is needed to better understand the funding needs of the pipe rehabilitation program and effectively use resources to address the most urgent needs. It is expected, though, that the funding needs in this area could easily be \$50 - \$100 million.

Channel Rehabilitation Need

The current channel rehabilitation program includes a 12 month backlog of high priority locations and backlog of work orders to February of 2025. A comprehensive channel inventory will help to better understand the maintenance needs across the City and to be proactive in addressing these needs. Maintenance of high priority areas could help prevent failures and expensive rehabilitation costs.

Concrete Maintenance Need

Full strength concrete repair has a backlog of work orders to October of 2022.

Vegetation Maintenance Need

Tree cutting and clearing has a backlog of work orders to 2021.



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MITIGATE HAZARDS

Funding Gap

The mitigation of flood and erosion hazards is currently funded based on the remaining revenue bond funds from previous debt sales plus about \$11 million/year of pay-as-you go funding from stormwater utility fee revenues. This level of funding only enables reduction of flooding through smaller, incremental projects. There are significantly more flooding problems than can be addressed at that funding level. SWMP staff estimate that it would cost roughly \$300 - \$400 million to substantively address the flood risks in the City that are considered to represent critical public safety/property risks. It would take decades to address all of these situations based on a gradual growth in the pay-as-you-go funding based on growth in the revenue base. If additional funding is realigned to pipe rehabilitation, the funding gap will be even greater. Beyond the critical needs are nuisance drainage issues (some chronic and severe) that would require another several hundred million dollars to address.

Assessing Relative Priorities

Understanding and effectively comparing the various categories of flood and erosion mitigation needs to establish overall priorities is complex and includes significant subjective judgment and development of overarching philosophies. For example, comparing the relative benefits of a project to protect structures from flooding to the benefits of a hazardous road overtopping project is not completely objective.

Balancing Short Term and Long Term Focus

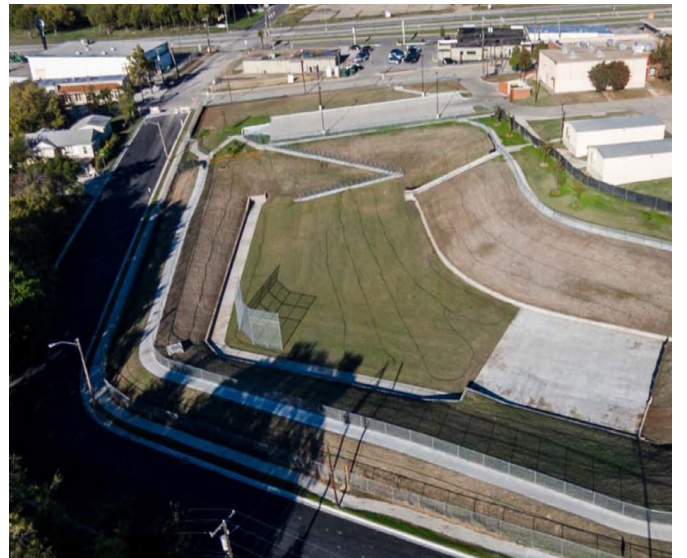
There are various project sizes associated with the serious flood/erosion risks around the City. Some problems can be mitigated with one or two small to medium projects and fit well within the overall scale of the SWMP capital program. Some of the most chronic needs, though, can only be corrected with a series of very large projects phased in over a long period of time. Pursuing mitigation for those projects would entail significant investments in the short-term but would yield little to no short-term benefits.

Budgeting for Reactive Needs

Each year, significant needs arise that were unanticipated. These can result from system failures, emergent partnership opportunities that afford the ability to significantly leverage resources to contribute the mitigation of chronic problems, and other factors. Whatever funds are programmed for these opportunities are effectively taken out of the pool for pursuing the mitigation of known needs but if funding is not set aside for reactive needs then highly beneficial opportunities can be lost.



STAKEHOLDER COMMENT: \$8-10 million isn't nearly enough to fix all of Fort Worth stormwater problems, even with the voluntary buyout program these problems keep getting worse and more expensive to fix.



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3 WARN RESIDENTS

Assessing Relative Priorities

Determining whether plans should be made to mitigate specific risks vs. having an exclusive warning strategy for some risks will require conscious decision-making involving subjective factors.

Data Reliability Gap

The SWMP warning program is challenged by the reliability of data to accurately inform stakeholders of emergent flood risks. The information received during and after rain events via rain and stream gauges can be subject to glitches and there are varied levels of precision with data used to assess and depict the level of flood risk throughout the City.

Limited Advanced Warning Capability

The current flood warning system is not able to provide residents with advanced warning due to the short, flashy storm events typical of many watersheds in the City.

Communication Gap

Real-time event data is not currently being effectively communicated through the flood warning program. Flood and erosion hazard risk maps are available but communication of these risks can be challenging. Records of historical and current flooding data can be one of the best communication tools; however, this data is not readily accessible in all areas of the City.

Collaboration Gap

Requires intensive coordination before, during and after an event with City departments such as TPW Streets, Emergency Management, and outside entities such as the National Weather Service.



4 REVIEW DEVELOPMENT

Determining the Overall Appropriate Level of Care

The City has provided design standards but is not ultimately responsible for the design and construction of private development. How much review can/should realistically be applied with regard to standards, review process, and enforcement to ensure new/re-development doesn't create or aggravate drainage issues? The answer to this question is not an objective matter and is resource constrained.

Balancing Flexibility, Responsiveness, and Predictability

The efficiency of private development is enhanced by City permitting that is highly flexible, quick to respond to customer challenges and queries, and is highly predictable. These things all work against each other and, given resource constraints, it is an ongoing challenge to balance these factors. Additionally, certain federal regulations adopted by the City offer fewer opportunities for flexibility and are dependent upon experienced applicants and knowledgeable permit review staff members.

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POLICY CHALLENGES

Four policy need areas were identified as having potential for significant impact on the community as well as SWMP resources. Consequently, the SWMP Master Plan Update process was used to gain input on these areas from City staff, peer communities, and stakeholders. The input received confirmed that some sort of policy in each of these areas should be developed. Policy developments or refinements will need to be thoroughly vetted to ultimately determine the preferred direction for the City. Policy development and refinement for each of the following topics will provide the City and stakeholders with clear direction to streamline and standardize future decision-making in these areas. The four policy topic areas are:



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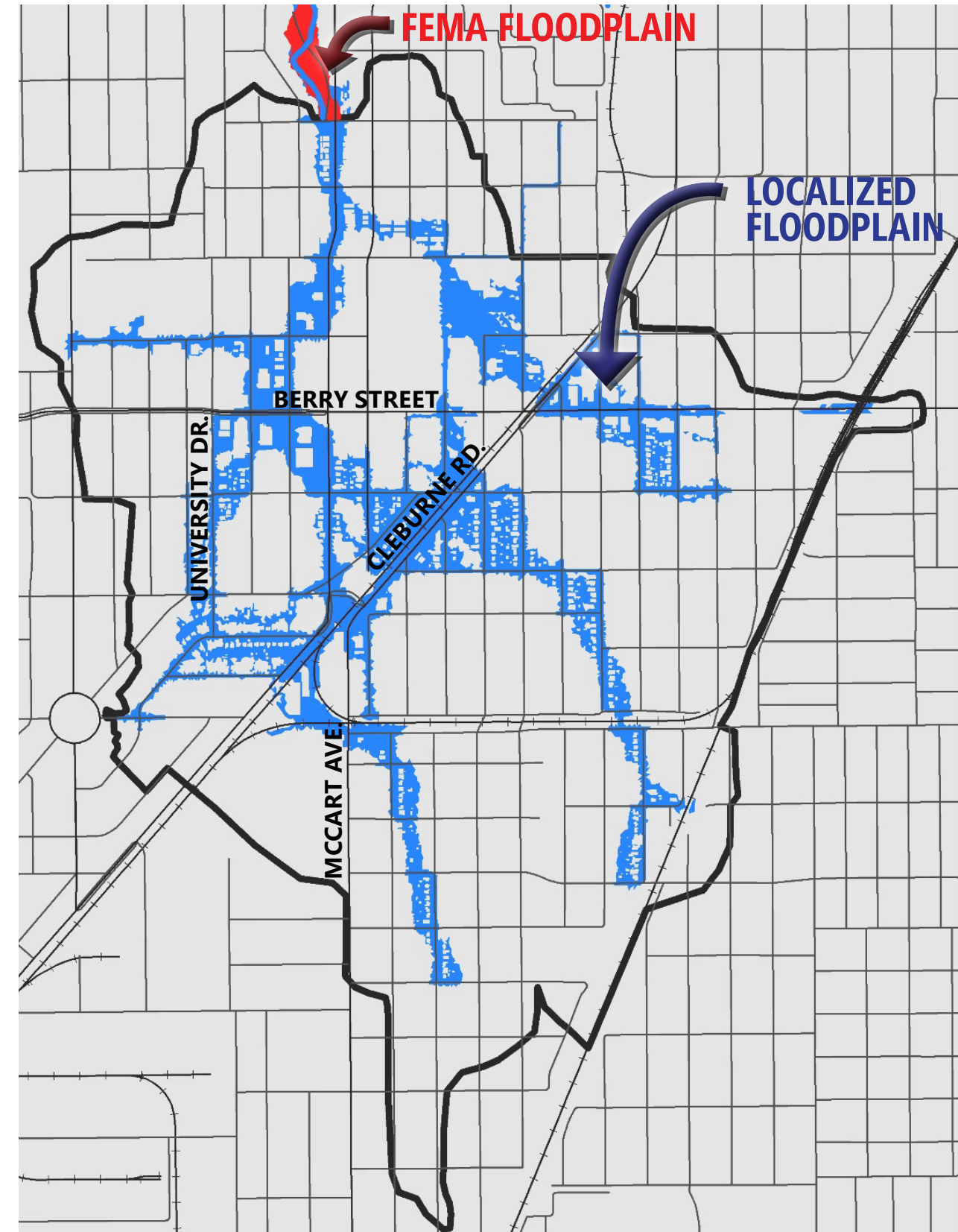
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Local
Floodplains

LOCAL FLOODPLAINS

Local floodplains are areas of flood risk not shown on FEMA maps, and are one of the primary hazards the SWMP was created to address. These flood risks are often known to City staff and local residents but are often unidentified on maps and therefore may not be considered in planning by residents. The City's Repetitive Loss Area Analysis confirmed that 80% of the repetitive flood insurance claim locations are in local floodplains. The challenges associated with local floodplains include:

- Public perception that developed areas have adequate and functional storm drain systems
- Inadequate awareness of risk of flooding to people and property
- Effectively/appropriately mapping and communicating flood risk
- Expensive and constrained mitigation options
- Regulating could help protect the public but also could have implications on property values and flood insurance requirements and rates
- Development review impacts on developers and City staff if new regulations are established

The City needs a defined policy to objectively clarify how local floodplain risks will be communicated and managed.



LOCALIZED FLOODPLAIN EXAMPLE IN ZOO CREEK STORM DRAIN WATERSHED

STAKEHOLDER GROUP POLLING RESPONSE

Fort Worth should address issues of flooding risk in local floodplains



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2
Private Property
Erosion

PRIVATE PROPERTY EROSION

Private property erosion is that which occurs along creeks/channels where the property lines extend to the centerline of the creek/channel and the City has no ownership or maintenance responsibility. The City has historically allowed the development of property alongside such drainage features with the condition that the private property owners accept responsibility for the risk and future maintenance costs that result. The challenges associated with private property erosion include:

- Threat to structures and infrastructure
- Maintenance and mitigation costs can exceed the resources of the property owners but may not be an appropriate use of City funds
- Buffer zones or erosion setbacks could help protect properties but would also reduce the amount of developable land
- Potential for unmitigated water quality issues, sedimentation, and blockages
- Potential for increased City maintenance responsibility if City capital projects are executed to mitigate erosion problems
- The scale of a true solution could be significantly larger than fixing erosion in a limited area

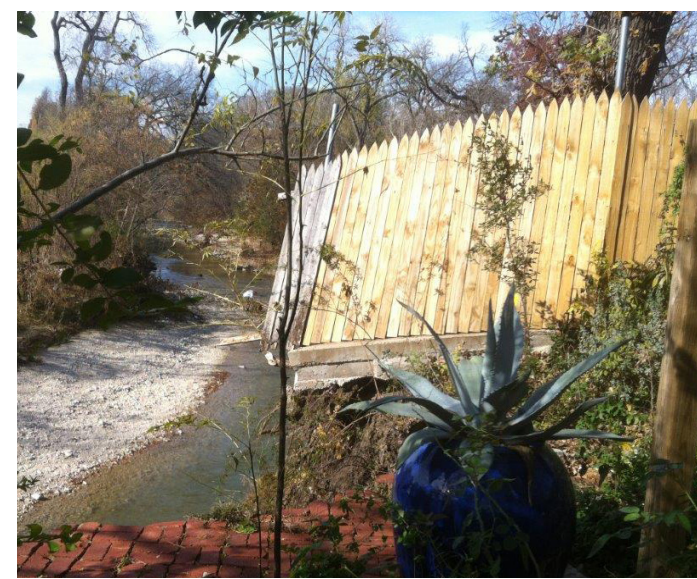
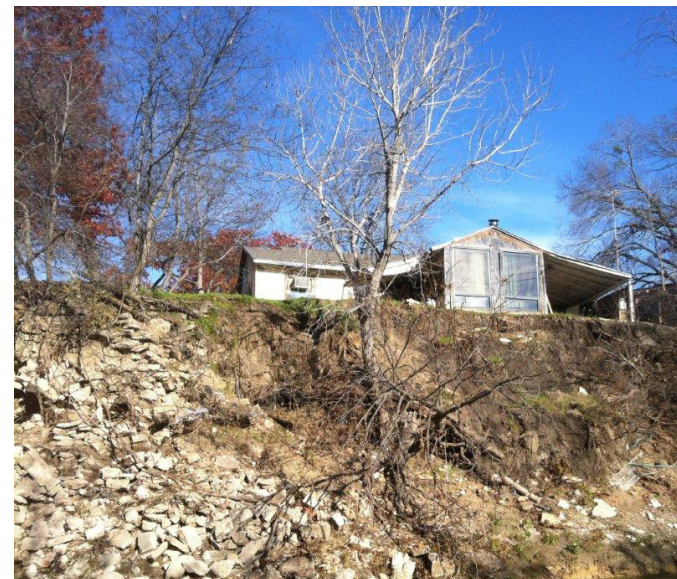
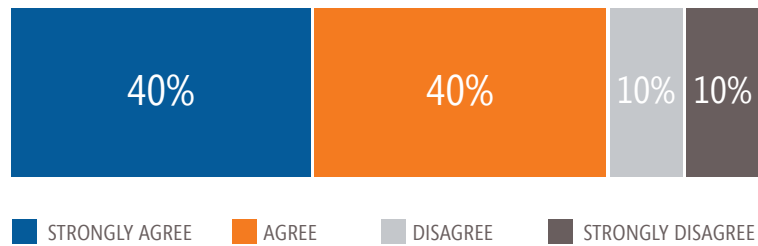
There are private properties in the City that are currently threatened by severe erosion where property owners have requested City assistance. The City needs a defined policy to objectively clarify the circumstances under which it should participate in addressing erosion issues on private property.



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STAKEHOLDER GROUP POLLING RESPONSE

Fort Worth should have a standard policy for addressing channel erosion impacts to private property.



3
Voluntary Buyout

VOLUNTARY BUYOUT

Voluntary buyout of flood-prone properties is a potential flood/erosion mitigation tool. The feasibility of such purchases would only be evaluated in cases where property owners desire to be bought out. Such buyouts would eliminate the risk of private property damage for the properties purchased. In many cases, the purchase of the property would be more cost effective than the construction of a capital project to mitigate the flood/erosion risk. The challenges associated with a voluntary buyout program include:

- Maintaining neighborhood integrity and attractiveness
- Capital costs
- Tax revenue losses
- Maintenance costs and future use of acquired property

The City has been approached by property owners in some flood-prone areas requesting a voluntary purchase. The City needs a defined policy to determine the conditions under which voluntary buyouts should be a flood/erosion mitigation tool.



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STAKEHOLDER GROUP POLLING RESPONSE

Fort Worth should have a voluntary buyout program for flood prone or erosion threatened properties



■ STRONGLY AGREE
 ■ AGREE
 ■ DISAGREE
 ■ STRONGLY DISAGREE

4
Review
for Private
Development

LEVEL OF REVIEW FOR PRIVATE DEVELOPMENT

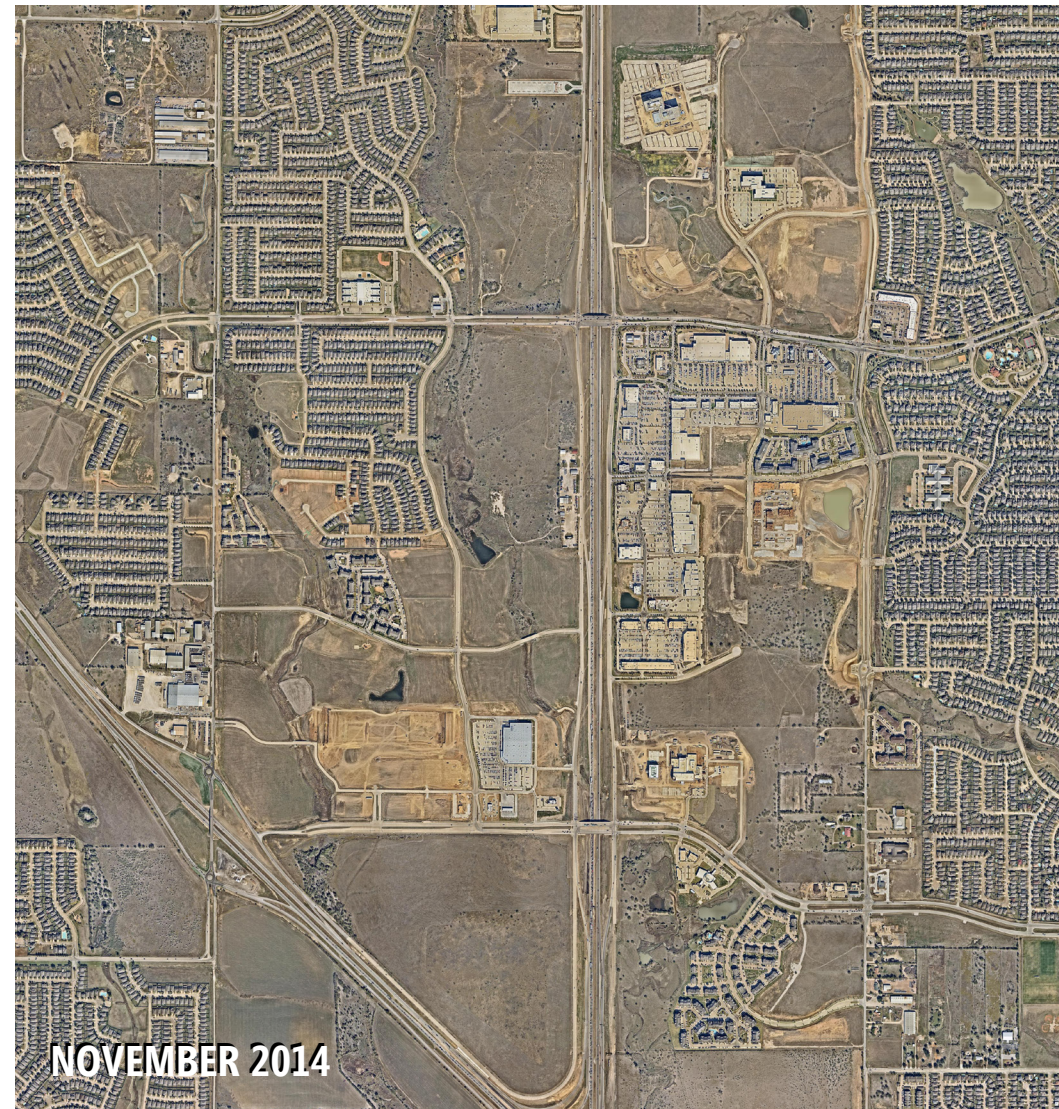
Stormwater development review minimizes the risk of adverse drainage impacts onsite and offsite of new/re-development by ensuring that new development complies with drainage standards. The City currently applies a significant level of detail in the review process but the review is still an audit with the ultimate responsibility for the adequacy of the drainage design resting with the design engineer. While this level of review on new development is believed to be sufficient for most areas of the City, areas of known flood hazards present the following challenges:

The cumulative impacts of development could aggravate drainage problems even though individual projects by themselves don't cause a significant impact

The general level of regulation/review may not be sufficient to provide protection in known flooding areas

Determining the appropriate land development size threshold to trigger a Stormwater Review

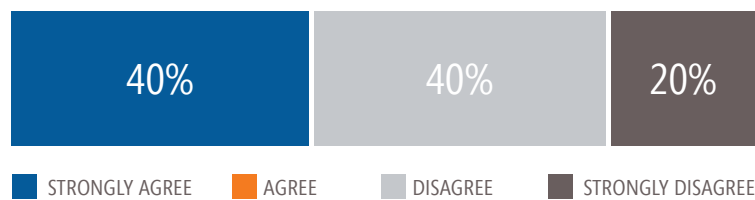
There have been increasing complaints/concerns from property owners in known flood hazard areas about new/re-development proposed or occurring in those areas and the cumulative impact this can have on flooding. In addition, there is concern from developers that changes could significantly impact desired development. A defined policy (or policies) is needed to establish the City's position in each of these areas.



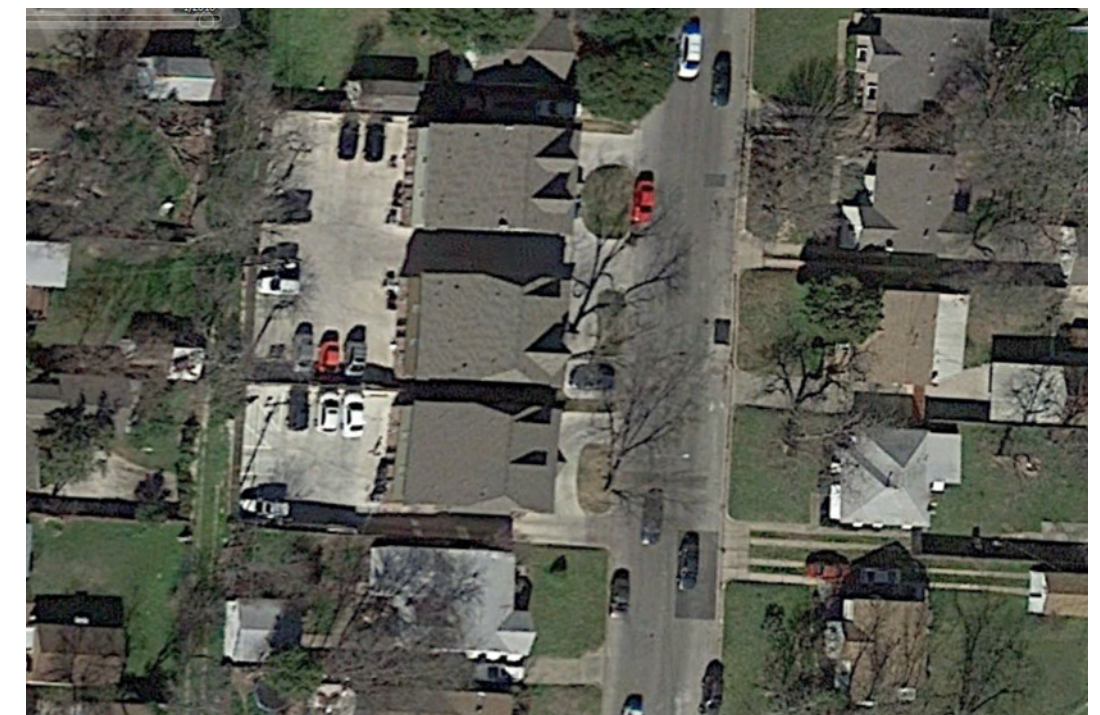
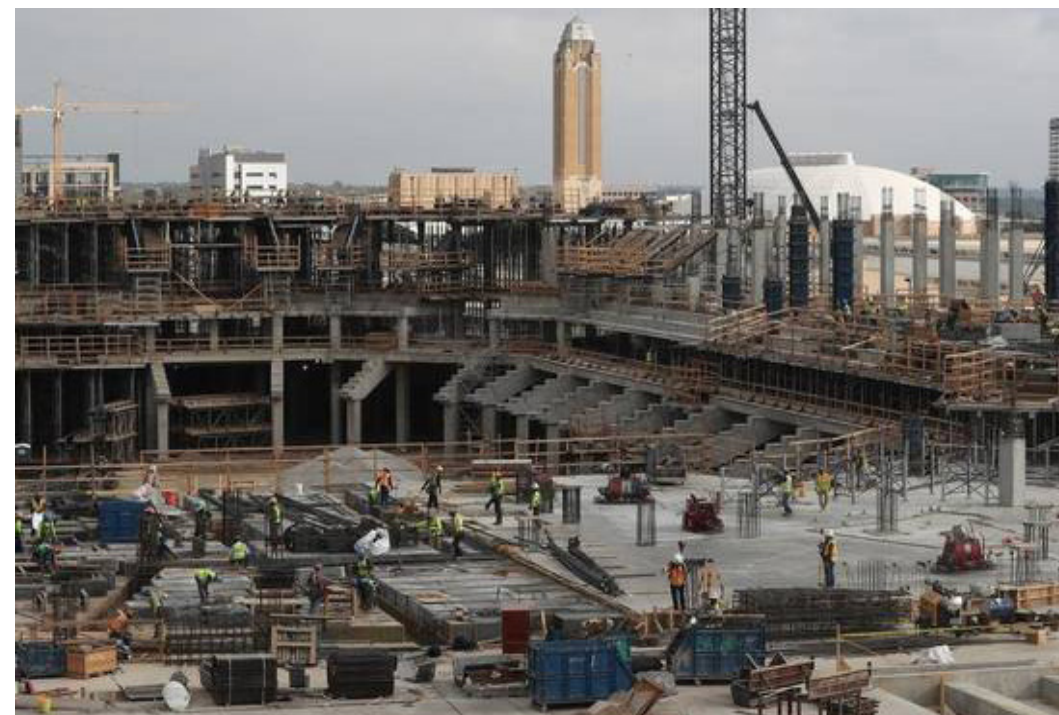
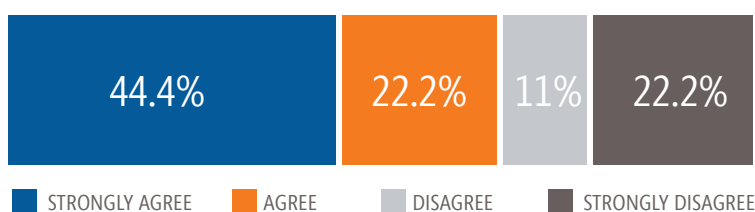
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STAKEHOLDER GROUP POLLING RESPONSE

Fort Worth's stormwater management review during the development process should provide a more thorough evaluation of stormwater impact than currently done.



The cumulative stormwater impacts of future development in a watershed should be considered when reviewing development proposals.





5

STRATEGIC DIRECTION

Program Wide Strategies
Program Element Strategies
Policy Refinement Strategies

PROGRAM WIDE STRATEGIES

The following strategic direction is established in response to the identified community needs/priorities and the challenges faced by the overall program, the specific program elements, and the key policy areas.



\$

STRATEGIC DIRECTION

Leverage available resources and opportunities to expand the capacity of the SWMP to meet the established vision and mission

Grant Opportunities

To provide potential financial resources for the SWMP, the City will look for, and take advantage of when appropriate, state and federal grant funding for hazard mitigation. This implementation strategy is consistent with the June 2016 Floodplain Management Plan, which includes the mitigation action to “Pursue grants to complete property acquisition projects”. In addition, other mitigation measures, such as drainage improvements, can be partially funded with grants. By pursuing state and federal grants, the City will create opportunities to leverage local funding to plan, develop, and construct projects to mitigate flood and erosion impacts.

The following potential grant sources will continue to be considered by the SWMP:



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Federal Emergency Management Agency (FEMA)

Provide substantial federal funding for the purchase of flood-prone homes through FEMA's Flood Mitigation Assistance program (FMA) and the Pre-Disaster Mitigation program (PDM). The Voluntary Buyout policy, once developed, will provide guidance on the circumstances under which these grant funds would be pursued. FEMA currently provides grant funds through the Cooperating Technical Partner program to update regulatory flood maps across the City, as well as producing a variety of flood risk awareness and outreach products.



U.S. Army Corps of Engineers (USACE)

The USACE can provide funding for studies and implementation projects that include planning, analysis, and development of structural (channelization and other drainage features) and non-structural alternatives (such as flood-prone property acquisition) under Section 205 of the 1948 Flood Control Act, and Section 22 of the Water Resources Development Act of 1974, as amended.



Housing and Urban Development (HUD)

The Department of Housing and Urban Development (HUD) administers the federal Community Development Block Grant (CDBG) program that can assist with housing, economic development, and measures to reduce damage in future storms. In Texas, the General Land Office (GLO) administers this part of the CDBG program.



Texas Water Development Board

Flood Protection Planning Grants provide funds to political subdivisions of the State of Texas for evaluation of structural and nonstructural solutions to flooding problems.

The Flood Mitigation Assistance grant program assists states and communities by providing federal funds for cost-effective measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program (NFIP).

The Severe Repetitive Loss grant program, under the FEMA's Hazard Mitigation Assistance Grant Program, provides federal funding to assist states and communities in implementing mitigation measures to reduce or eliminate the long-term risk of flood damage to severe repetitive loss residential structures insured under the NFIP.

The Clean Water State Revolving Fund (Low Interest Loans) provides financial assistance for stormwater projects at below-market interest rates.



Texas Department of Emergency Management

The Hazard Mitigation Grant Program (HMGP) provides post disaster statewide FEMA funding for eligible mitigation projects.

Partnership Opportunities

The SWMP has successfully partnered with a number of private and public entities to fund multi-use projects that provide mutual benefits. The following is a summary of partnership opportunities that will be considered going forward.

Private-Public Partnerships

The SWMP will continue to pursue private partnership opportunities to fund stormwater improvements. These opportunities can include both joint-funding of drainage projects in association with private development and incentives provided to private development in exchange for above-standard drainage treatments. The City has successfully completed the Berry University Development Plan and Form Based Code that included development incentives such as additional floor height allowance for stormwater improvements beyond the minimum requirements. Additionally, joint projects with private developers have been identified to help address regional drainage issues in conjunction with private development projects.

Public-Public Partnerships

The SWMP Master Plan update engaged City departments such as Parks, Planning, TPW Streets, Environmental Quality, and Emergency Management that have overlapping missions and goals. Shared initiatives and coordination opportunities were identified for future collaboration on project development and construction. Other potential public partners that have been engaged in the past for joint projects and could be again in the future are: Tarrant County, the Fort Worth Independent School District, the Tarrant Regional Water District, and the Fort Worth Transportation Authority.

Rate Structure Refinement

The SWMP funding structure was established at the implementation of the Stormwater Utility in 2006. The SWMP will evaluate the level of additional stormwater fee revenue that would be needed to close program gaps for consideration in future City budget decisions.

Bonds

The size and timing of future bond sales will be determined by City leadership based on overall City priorities and within established financial and programmatic guidelines (e.g. debt to revenue ratios, reserve requirements, pay-go to debt proportions).

Stormwater Revenue Bonds

The SWMP has a debt cap of 30% and is currently near this cap. As the existing stormwater debt begins to be paid off, starting in 2033, capacity for new debt will be freed up and can be considered along with other program priorities that exist at that time. Debt service is currently the single largest budget item



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for the SWMP. The issuance of new debt would require the reallocation of current resources to service additional debt or increased revenue via utility fee increases.

General Obligation Bonds

Many of the peer communities utilize general obligation bonds to fund large stormwater capital projects when specific drainage needs are considered to be a high enough priority by the community. While the SWMP was created to provide a dedicated funding source for the program, general obligation bonds may be an option for funding future stormwater projects. If so, the relative level of priority of the stormwater projects would have to be determined in comparison with other projects such as transportation, police and fire, libraries, and parks.



PUBLIC COMMENT:
Funding for some of this needs to be included in the upcoming 2018 bond package.

Special Tax/Drainage Districts

Special tax/drainage districts are independent, special-purpose units established to generate revenue to fund drainage improvements, maintenance, and/or rehabilitation for a specific area of the City. Although not widely utilized by peer communities, special tax/drainage districts create an opportunity for independent revenues to fund stormwater activities in specific areas if the benefit of mitigating the drainage need is considered to be sufficient to warrant such action.

Mitigation Banking

Over the last 5 years, the City has spent roughly \$1.5 million to mitigate the environmental impacts of City construction projects to meet requirements imposed by the U.S. Army Corps of Engineers. The SWMP could consider the establishment of a wetland/stream mitigation bank that could be used for the environmental mitigation of City projects. This could provide the SWMP with more affordable mitigation costs. Additionally, the SWMP could sell credits to other City departments and/or entities to fund the operation and maintenance of the mitigation bank and potentially provide an additional revenue source for the program.

STRATEGIC DIRECTION

PRIORITIZATION Continue to expand the acquisition and effective use of data to inform programming decisions

The SWMP funding structure is expected to be consistent and reliable for the foreseeable future but inadequate to address many high priority needs. The strategic direction for the SWMP established through the master plan update process was formulated to most efficiently and effectively accomplish the mission and vision of the SWMP based on the available resources.

As noted in the Accomplishments Section of Chapter 3, several tools have been developed to date in the life of the program to guide the prioritization of stormwater resources. These prioritization tools will be leveraged to inform future resources allocations and heavy emphasis will continue to be made on refining and appropriately applying these tools. The primary prioritization tools developed to date are:

1. Capital Project Prioritization
2. Citywide Areas of Potential High Water
3. Repetitive Loss Area Analysis
4. Drainage Area Prioritization
5. Citywide Erosion Hazard Potential
6. Maintenance Project Prioritization
7. Criticality of Stormwater Infrastructure
8. Stream Crossing Inventory
9. Citywide Pipe Capacity
10. Documented Flooding Incidents Data

STAKEHOLDER COMMENT: I think you have to prioritize and achieve results over time without increasing budget/expenditures.

STAKEHOLDER COMMENT: We need to be responsive to what people know is a priority but also be responsible in addressing some of the problems that people are unaware of.

Each of these tools is currently being utilized, as applicable, to prioritize resource utilization for each of the SWMP program elements: Maintain, Mitigate, Warn, and Review Development.

These Prioritization Tools are described further in the appendix.



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COMMUNICATION

STRATEGIC DIRECTION

Communicate effectively to public and City staff so they can make informed and educated decisions

Program Wide Communications Plan

This initiative will seek to find more effective ways for stakeholders to access stormwater data, particularly data that depicts chronic flooding and potential erosion risk. Website refinements and updates will be considered as part of this initiative as well as availability of digital data.

The success of future SWMP Master Plan initiatives will be contingent on the outreach, engagement, and education of stakeholders. An overall outreach strategy and framework will be evaluated in coordination with the overall City outreach and engagement process.

STAKEHOLDER COMMENT: We need to get the local floodplain maps out to the people as they are purchasing property. It's more difficult for residential properties that do not always thoroughly research the flood risks.

RESOURCE PROGRAMMING

STRATEGIC DIRECTION

Apply asset management principles and develop data in conjunction with other strategic factors in order to optimize programming decisions

A framework needs to be developed to:

- Create a normalized score for the various categories of need being assessed and ranked so that the urgency of the different needs and the relative benefits of addressing the needs can be compared.
- Determine the proper balance between large and small projects
- Determine the appropriate level of budget to be set-aside for reactive needs (e.g. system emergencies, voluntary buyouts, partnership opportunities, etc.)
- Create and sustain effective community engagement to ensure that SWMP priorities are set with a solid understanding of overall community priorities and adapted as appropriate over time.

PUBLIC COMMENTS: We need to understand priority. Discuss benefit cost ratio. Biggest bang for the buck.

We would like to see more focus on public safety. Not just property but loss of life and potential threats to people.



Stormwater Management Program Master Plan Update

Purpose and Objectives

This update to the Stormwater Management Program Master Plan will assess the progress and lessons learned from the first 10 years of the program.

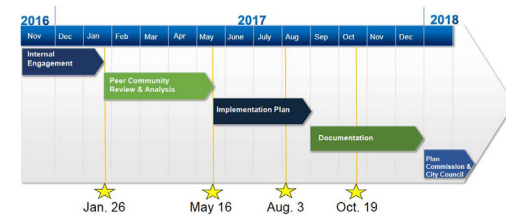
Opportunities for efficiencies and improvements will be objectively evaluated to ensure the City of Fort Worth is in line with representative communities. Strategies, priorities, and policies will be refined to optimize the use of resources to best meet the stormwater related needs of the City of Fort Worth community over the next 10 years. This initiative will include significant stakeholder engagement and input with the updated Master Plan ultimately being submitted for adoption by City Council.

This video is a modified version of the May 16, 2017, stakeholder meeting presentation, which provides an overview of the peer review communities and a focused discussion on four specific that we wanted feedback on: non-FEMA local floodplains, private property channel erosion, voluntary buyout, and development oversight.

Adoption Schedule Overview



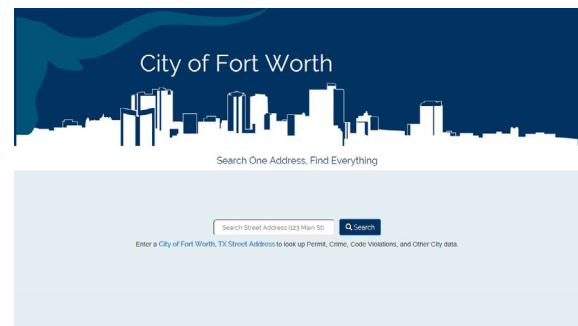
Planning Schedule Overview



Background

The City of Fort Worth implemented a Stormwater Utility in 2006 to address a backlog of data and technology needs, fulfill maintenance obligations, and construct capital projects to protect people and property from harmful stormwater runoff. The first 10 years of the Stormwater Management Program have focused on assessing citywide flood risk and drainage system capacity, addressing many of the most hazardous flooding problems in the city, implementing a high water warning system, developing a work order system and maintenance program, and developing a basic inventory of the major components of the drainage system.

FTW ONE ADDRESS



Fort Worth Stormwater Management

inside:

- Flood Insurance
- Property Protection
- Improvement Requirements

runoff Rundown

FORT WORTH

FORT WORTH STORMWATER MANAGEMENT DIVISION

The mission of the City of Fort Worth's Stormwater Management Division is to protect people and property from harmful stormwater runoff. Education and prevention are valuable and proven tools that help communities become resistant to these natural disasters.

The City of Fort Worth recognizes that its entire community can be susceptible to flooding, not just those structures located within Special Flood Hazard Areas (SFHA's). The following information is being provided to all property owners within the City of Fort Worth, not just those located within the SFHA.

Stormwater Management is updating its Master Plan to better meet community needs for the next ten years and beyond. The update will identify policies to address recurring issues and prioritize service gaps. Stakeholder and public feedback are helping to shape the direction of the update. The next stakeholder meeting, which is open to the public, is 6:00 p.m., October 19, 2017 at Hazel Harvey Peace Center for Neighborhoods, 818 Missouri Ave. For more information visit <http://fortworthtexas.gov/stormwatermasterplanupdate/>

A publication of the City of Fort Worth Transportation and Public Works Department Stormwater Management Division

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PROGRAM ELEMENT STRATEGIES

The following program element strategies were developed in response to the identified challenges.



OTHER KEY INITIATIVES

- **Mitigation Banking Strategies** – The SWMP could create an environmental mitigation bank to mitigate the environmental impacts of stormwater projects based on regulatory requirements. Stormwater mitigation projects could bank credits and make them available for other City projects at a reduced cost compared to the private mitigation banks.
- **Opportunistic construction of small CIPs** – Consider the use of City staff and equipment to complete the construction of small capital projects. The goal of this initiative would be to find cost benefits utilizing City resources instead of outside contracts.

Maintain System

STRATEGIC DIRECTION

Increase emphasis on pipe rehabilitation

At this time, service levels for maintenance and rehabilitation for inlets, infalls, outfalls, channels, and culverts are assessed to be adequate in consideration of overall program needs, priorities, and resources. Based on information gained through limited closed-circuit television (CCTV) inspection of parts of the storm drain pipe system, though, Stormwater staff has concluded that a significant increase in pipe rehabilitation is needed to ensure critical storm drains continue to function as designed. Given this critical need, the stormwater program plans to continue expansion of the CCTV inspection of storm drain pipes and, based on the results, continue to refine the pipe rehabilitation program and reallocate resources from flood and erosion mitigation projects, as indicated, to the assessment and rehabilitation of critical storm drain pipes throughout the City. Also, service levels for other aspects of the maintenance program will be reviewed to determine if reallocation of resources from other maintenance services such as concrete, channel, vegetation, and inlet cleaning to the pipe rehabilitation need is warranted.



STAKEHOLDER COMMENT: Don't want to pass up opportunity to fix an issue now when it is less expensive than it will be in the future.

OTHER KEY INITIATIVES

- **Public Channel Maintenance** – Complete an inventory and criticality assessment of public channel infrastructure rehabilitation needs. Based on the results, evaluate needed adjustments to the program to rehabilitate critical channel infrastructure needs.
- **Prioritization of Critical Maintenance Tasks** - Evaluate current levels of service for maintenance programs to prioritize resource allocations to areas of greatest benefit in serving the community needs.

POTENTIAL IMPLICATIONS OF NEW POLICIES

- **Private Property Channel Erosion Policy** – Private property erosion policy development will consider City involvement in private property erosion mitigation. Erosion mitigation could add maintenance responsibilities.
- **Voluntary Buyout Policy** – Voluntary buyouts will result in additional maintenance responsibilities for the purchased properties. Maintenance will typically focus on mowing

Mitigate Hazards

STRATEGIC DIRECTION

Emphasize smaller project execution with operating budget and seek partnerships for larger projects

The stormwater revenue bond capacity is currently capped at 30% and the SWMP is operating on a pay-go flood and erosion mitigation capital project budget expected to be \$10 - \$11 million annually for at least the next 5 years. The flood and erosion mitigation capital budget is expected to be reduced to reallocate funding to critical rehabilitation of existing stormwater infrastructure.

Given that this budget is for addressing needs citywide, it is expected that the maximum size of an individual project would typically be in the \$1-\$3 million range. Capital resources will be focused on smaller mitigation projects with the highest overall benefit cost ratio.

Generally speaking, in order for medium to large size projects to move forward, there will need to be a significant funding partner to make the SWMP contribution to the project proportionate to the scale of the pay-go program. Toward that end, the SWMP will be proactive in looking for partnership opportunities and quick to assess and respond to any opportunities presented. Consideration will also need to be given, though, to phased implementation of some very large, high priority projects over time, even if the initial phases have little immediate benefit.

POTENTIAL IMPLICATIONS OF NEW POLICIES

- **Private Property Channel Erosion Policy** – The policy development for private channel erosion could create another demand on City resources.
- **Voluntary Buyout Policy** – Impacts of the voluntary buyout policy could impact the options available to mitigate flooding and erosion projects. If the ultimate policy endorses the use of voluntary buyouts as a flood/erosion mitigation tool in certain circumstances, some mitigation needs that would not be affordable with conventional solutions may become affordable and have a high enough benefit/cost ratio to become a high priority mitigation project.

- **Natural Area Preservation, Conservation and Restoration** – The benefits resulting from this initiative could include a reduction of flood and erosion risks as well as lower costs for future capital projects by allowing the drainage ways to function more naturally. The use of native vegetation also allows for reduced maintenance of engineered channels. Channel maintenance needs are growing at a rate of 1.5 miles per year and this program could help reduce this need. Outreach and education are important to inform stakeholders of the ecological benefits of the program and the reason for/benefit of less frequent mowing in targeted areas.



Warn Residents **STRATEGIC DIRECTION**
 Increase communication of real-time and historical flooding, and erosion risk through mapping and other tools in areas where risk mitigation is not affordable

Resource allocation to this program area is not expected to change significantly in the short-term. However, as the SWMP gains a greater understanding of the cost and benefits of enhanced real-time warning are realized, it is possible that a more aggressive warning program will be deemed beneficial enough to expand current capabilities.

KEY INITIATIVES

- **Flood Preparedness** – A standard operating procedure (SOP) for flood preparation, response, and recovery will be prepared to inform responsibilities and roles of stormwater staff before, during, and after a storm event. An evaluation will be conducted to determine the feasibility of expanding the real-time flood warning program strategically to include more enhanced and predictive flood warning components.

POTENTIAL IMPLICATIONS OF NEW POLICIES

- **Local Floodplain Policy** – The local floodplain policy development is expected to include better communication and warning of local flood risks.
- **Private Property Channel Erosion Policy** – The developed policy could include a focus on prevention and result in the establishment of Channel Buffer Zones and/or the preservation of natural areas. These buffer zones and/or preservation areas could be a tool to warn residents and developers of potential hazards.

Review Development **STRATEGIC DIRECTION**
 Maintain the current level of review while evaluating potential regulation revisions for flood prone areas

The resources allocated to development review are not anticipated to change in the short-term. As the City grows and development continues, the percentage of resource allocation will be held at the same level. Efforts will be made to gain efficiencies in this program element to provide additional budget for other high priority needs.

KEY INITIATIVES

- **Specific initiatives for private development level of review are included with the policy refinement strategies.**

POTENTIAL IMPLICATIONS OF NEW POLICIES

- **Local Floodplains** – The policy development could result in changes to development standards and the level of review and management of local floodplains.
- **Private Property Channel Erosion Policy** - If a buffer zone is established, development review staff would have another factor to consider in their review of development projects.



- 1
- 2
- 3
- 4
- 5
- 6

POLICY REFINEMENT STRATEGIES

The following summarizes the strategic direction set through the Master Plan Update process for the four policy challenges discussed in Chapter 4.

1
STRATEGIC DIRECTION

1 Local Floodplains

Develop a policy to improve identification, communication, and planning for flood hazards that exist beyond the limits of FEMA floodplains. Determine if they should be regulated differently and if so, how.

Initiatives:

- Develop a written City policy, vetted by public, City staff and Council
- Communicate existing local floodplain information externally and internally
- Undergo a separate evaluation to determine how local floodplain information should be used based on current development regulations

Policy Development Considerations:

- Communication Plan – Determine how to effectively inform internal and external stakeholders of changes and resources available to help inform them
- Development Regulation Decisions – Determine if there should be additional requirements for development in local floodplains
- Mapping – Determine what level of information is needed to delineate local floodplain boundaries and how this mapping should be made publicly available
- Data Maintenance – Develop the process for updates and revisions to local floodplain mapping
- City Resources – Assess the overall impact to staff resources to map local floodplains, Review Development within local floodplains and maintain up-to-date data regarding local floodplains



STAKEHOLDER COMMENTS: Need education to understand how local floodplains impact me.

The written policy would also establish what information is communicated externally and internally.

2
STRATEGIC DIRECTION

2 Private Property Erosion

Develop a policy regarding private property erosion resulting from streams and channels that are not located within a public drainage easement.

Initiatives:

- Prevention of future private property erosion issues
 - Communicate internally and externally about high erosion risk areas.
 - Investigate the potential for a written buffer zone policy vetted by public and City staff to protect future development particularly within greenfield developments.
- Mitigation of existing private property erosion issues
 - Develop a written City policy, vetted by public, City staff and Council

Policy Development Considerations:

- Communication Plan – Determine how to effectively inform stakeholders of changes and resources available to help inform them
- Prevention Options – Determine the appropriate level of prevention from informational (e.g. mapping) to regulatory (e.g. buffer zone or natural area preservation requirements)
- Evaluate City conditions for participation – Establish objective conditions for determining if City participation is appropriate and consider actions by the City for private properties with an imminent threat
- Public Benefit Requirements – Establish the type of public benefits required for City participation. Channel conveyance, public utilities and infrastructure protection, public use, economic performance, and water quality are potential public benefits to be considered
- Prioritization Criteria – Develop criteria to be used to evaluate benefits of erosion mitigation for comparison to other citywide resource needs
- Buyout Options – Define conditions under which a buyout would be considered in lieu of a structural mitigation project
- Maintenance – Develop criteria to determine maintenance responsibility
- City Resources – Assess the overall impact to staff and SWMP resources resulting from the policy

STAKEHOLDER COMMENTS: Caution should be exercised in drawing up erosion policy so as to not rescue private property.



No hard and fast policy/must have flexibility always.

It appears we are going straight towards a buffer zone policy and I'm concerned about the number of streams in the city and the impacts this could have on development.

3
STRATEGIC DIRECTION

3 Voluntary Buyout

Develop a policy regarding participation in the voluntary buyout of properties at risk of flooding or erosion.

Initiatives:

- Develop a written City policy, vetted by public, City staff and Council

Policy Development Considerations:

- Goals/Objectives – Consider the scale of and funding levels for the program
- Criteria for City Participation – Establish objective conditions to indicate when City participation is appropriate
- Future Property Uses – Establish acceptable uses for property following acquisition
- Prioritization Criteria – Develop criteria to evaluate benefits of buyout for comparison to other citywide resource needs. Initial focus on benefit-to-cost & historical flooding
- Grant and Partnership Opportunities – Identify grants that could be pursued to leverage available resources
- Communication Plan – Decide how to effectively inform stakeholders of the resulting voluntary buyout program and resources available to help inform them
- Maintenance Plan/Resource Requirement – Evaluate potential impacts to maintenance resources.
- Effect on community aesthetics/integrity – Evaluate impacts to the community
- City Resources – Assess the overall impact to staff and SWMP resources resulting from the policy



STAKEHOLDER COMMENT: Availability of grant funding was relatively unimportant in the polling but it is something that we need to keep looking at it.

4
STRATEGIC DIRECTION

4 Review for Private Development

Investigate policy refinements that, if implemented, would:

- Further reduce the risk of adverse flooding impacts as a result of development in floodprone areas
- Properly account for the cumulative impacts of development
- Incentivize development to help reduce flood risk

Initiatives:

- Work with the public and development community to evaluate if more protective standards should be used in areas with known flooding problems
- Consider reducing the 1 acre review threshold in areas of known flood risk
- Work with the Planning Department and stakeholders to identify potential development incentives
- Evaluate options to help minimize cumulative impacts of development

Policy Development Considerations:

- Balance – Evaluate risk reduction with the cost and schedule impact of additional City review on new development
- City Resources – Assess the overall impact to staff and SWMP resources resulting from the policy.



STAKEHOLDER COMMENTS: Any incentives should be vetted with public before they are provided. The preferred incentives need to be acceptable to the public.

Cumulative impact – infill development – extremely important.

Changing the development review threshold to look at lots less than 1 acre would not be very effective. If you start reviewing lots that are too small it could negatively impact ability to redevelop.



IMPLEMENTATION STRATEGY

Ongoing Stakeholder Engagement
SWMP Annual Business Plan
Managing Change

IMPLEMENTATION STRATEGY

Successful implementation of the strategic direction of this Master Plan will entail:

- Translating high level vision and broad priorities into actionable and measurable steps
- Developing and executing a plan to take those steps
- Monitoring and reporting progress
- Adjusting the course over time as needed to ensure the program direction remains consistent with the overall strategy while being responsive to evolving community needs and other dynamic factors that can impact program direction and priorities

The activities listed above are vital for keeping the strategic direction fresh and ensuring that the tactical work plan remains driven by the strategy. This chapter discusses three key facets of a sustainable framework for effective implementation of the strategic direction: ongoing stakeholder engagement, the development and use of an annual business plan, and change management.

ONGOING STAKEHOLDER ENGAGEMENT

Development of the updated master plan memorialized in this document involved a robust dialogue with internal and external program stakeholders. Ensuring that the program remains true to the strategy developed and adequately informed by/responsive to stakeholder perspectives will necessitate structured and intentional means for the following categories of ongoing stakeholder engagement

Intradepartmental Coordination

The SWMP Program Development Section will lead the ongoing stakeholder engagement process and will be responsible for implementation of and adjustments to the strategic direction of the program. All SWMP sections will be fully involved in the process to ensure that both the strategic direction and annual work plans are appropriately informed by the experience and perspective of frontline service delivery staff.



Interdepartmental Coordination

Interdepartmental coordination will continue to be leveraged by the SWMP to create opportunities for shared objectives and mutual benefits. The City departments that have been identified for focused coordination include:

- Planning and Development
- Water
- Emergency Management
- Parks
- Transportation and Public Works Department Streets Division
- Code Compliance Department Environmental Quality Division

In addition, the SWMP staff will continue to coordinate with City leadership through the Plan Commission, council briefings, and informal reports.

SWMP Stakeholder Group

This group is intended to include representatives from various customer groups that are subject to the Stormwater Utility fee, understand the SWMP, and can provide feedback on key initiatives as well as the future strategic direction of the SWMP. The group will be responsible for speaking objectively on key topics and representing their own perspectives as individuals while seeking the greater good of the City. The Stakeholder Group will help the SWMP stay in touch with changing community needs and values. Feedback from this group will help guide the overall strategic direction and resource allocations of the program. The SWMP Stakeholder Group will also be responsible for vetting the feedback of the specific Working Subgroups.

Structure

A targeted group size of roughly 15-20 participants will be selected by City staff. The group is intended to include a Lead Stakeholder Representative that will assist in the facilitation of meetings and serve as a spokesperson for the group as needed.

Logistics

The group is expected to begin meeting in early 2018. Approximately four meetings per year are planned with two occurring early on in the budget planning process and two spaced throughout the rest of the year. . Some stakeholder turnover is to be expected, but the SWMP will ask group members to commit to regular attendance and active participation in order to provide consistency for the group. The group is not expected to always reach a consensus on specific topics or initiatives during these relatively informal meetings. The feedback, though, will always be valuable and influential in providing both pros and cons from the customer perspective for consideration by the City staff who will be responsible for final decisions.

Working Subgroups

Several Working Subgroups will be formed to be responsible for more detailed vetting on the implementation of specific, key initiatives. This group is intended to include participants with special interests, practical experience, and some technical expertise regarding the key initiative. Feedback and recommendations of the Working Subgroups will be provided to the larger SWMP Stakeholder Group.

Structure

A targeted group size of roughly 6-8 participants will be selected by City staff. The group is intended to include at least one participant from the SWMP Stakeholder Group who will assist in facilitation of meetings and provide specific input from the Subgroup to the overall Stakeholder Group when needed. The Working Subgroups may include members that are not a part of the larger SWMP Stakeholder Group.

Logistics

Group meetings will be held at key junctures in the process of developing a specific policy or strategic initiative. The group will meet more frequently than the SWMP Stakeholder Group and discontinue meetings as the initiative is completed or the strategic direction is established. The SWMP will seek commitments from group members to regularly attend and actively participate in meetings. Expectations for meeting frequency and duration will be determined based on the specific policy or strategic initiative the group is formed to vet. These groups are not expected to always reach a consensus on specific topics or initiatives in this relatively informal meeting format. The feedback, though, will always be valuable and influential in providing both pros and cons from the customer perspective for consideration by the larger Stakeholder Group and the City staff who will be responsible for final decisions.

SWMP ANNUAL BUSINESS PLAN

The SWMP will develop an annual Business Plan that will be the primary working document to show how ongoing SWMP services, activities, and initiatives support the strategic direction, relate to program resources, and are measured to ensure the desired progress toward goal accomplishment is being made. The Business Plan will drive the annual work plan of the SWMP staff and will:

- Document the connection between annual SWMP resource allocations overarching City goals, the long-term strategies of the SWMP and the key initiatives identified in the Master Plan update
- Depict the role of each SWMP section within the greater context of the SWMP
- Establish Key Performance Indicators and performance measures to assess the progress and monitor the service levels of the SWMP
- Create a detailed road map for how SWMP goals and commitments are met
- Connect SWMP key initiatives with tactical staff level objectives
- Document resource allocation decisions that drive the SWMP annual budget submission
- Facilitate a process and establish a framework for strategic input of key SWMP staff
- Identify ongoing or developing factors that could have a significant impact on SWMP strategies and priorities



Priorities of SWMP Key Initiatives

The Strategic Direction Chapter of this Master Plan contains information on the key strategic initiatives that were developed in the course of the SWMP Master Plan update process. The implementation priorities indicated in the table below were established for these initiatives in coordination with City staff and stakeholders.

The priorities of the initiatives are considered relative to each other based on the magnitude of their potential impact on the community. Level 1 initiatives are the highest priority with Level 3 being the lowest. The actual schedule for initiating and completing work on each initiative will be driven by staff capacity. The future SWMP Business Plan will refine the implementation objectives, schedule, and performance measures in more detail for each for each initiative.



STAKEHOLDER COMMENTS: I'm satisfied with the process city staff conducted. I thought stakeholder's participation level was great. I'm confident the final product (master plan) will be a very comprehensive and very well thought out document.



Key Initiatives

LEVEL 1 PRIORITY	LEVEL 2 PRIORITY	LEVEL 3 PRIORITY
Page 57 Local Floodplain Policy	Page 53 Resource Programming Normalization Framework	Page 55 Public Channel Maintenance
Page 55 Storm Drain Rehabilitation Program	Page 55 Voluntary Buyout Policy	Page 56 Mitigation Banking
Page 57 Private Property Channel Erosion Policy	Page 56 Opportunistic Construction of Small CIPs	Page 56 Natural Area Preservation, Conservation, and Restoration
Page 55 Prioritization of Critical Maintenance Functions	Page 53 Program Wide Communication Plan	
Page 57 Flood Preparedness (warn, respond, recover)		
Page 57 Level of Development Review Policy		

More information regarding these initiatives can be found in the [Strategic Direction Chapter](#).



These Key Initiatives are described further in the appendix.

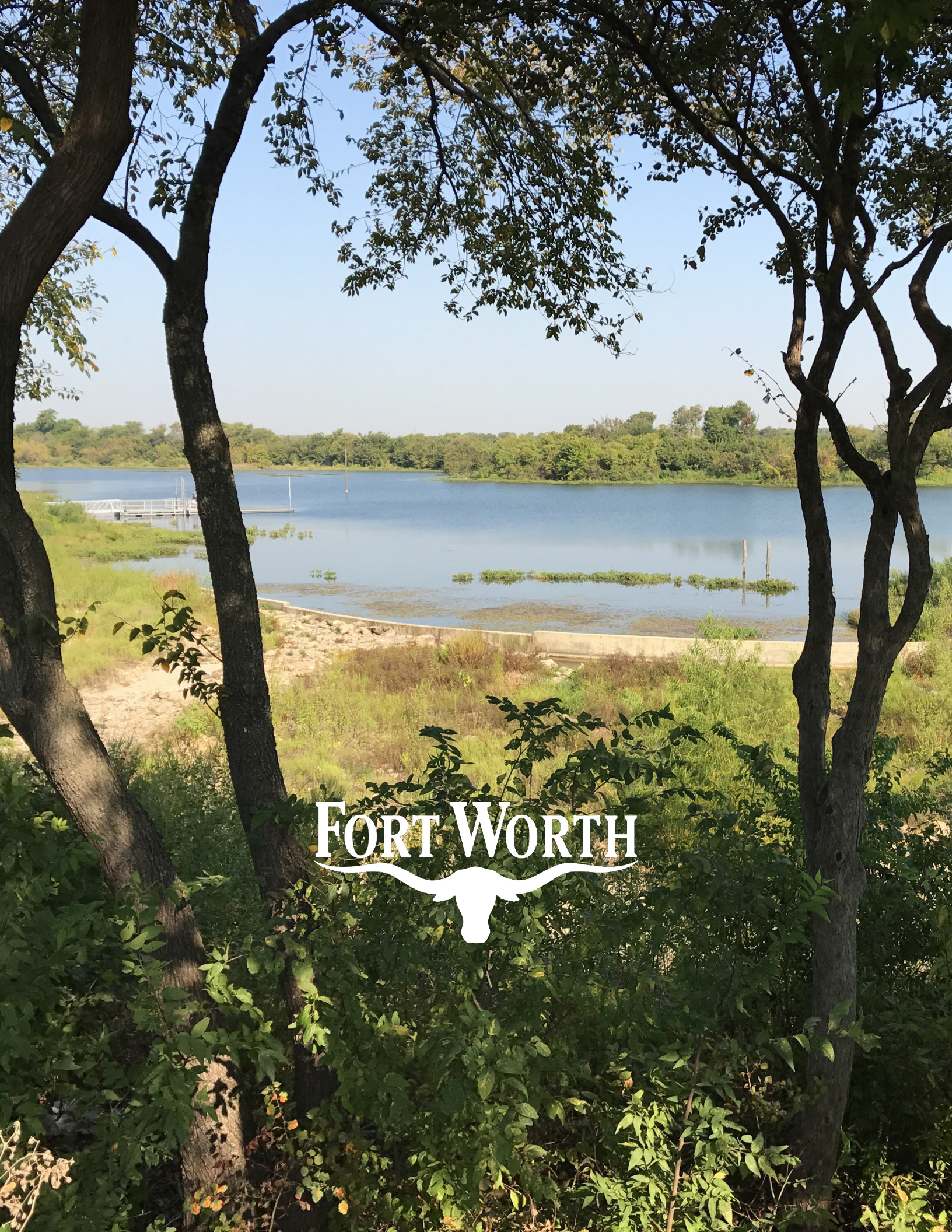
MANAGING CHANGE

It is a given that new challenges will evolve that impact the strategic direction and key initiatives of the SWMP. Seeking to anticipate potential changes will allow the SWMP to respond effectively when these occur.

Each of the following items have the potential to significantly impact the direction, structure, priorities and service expectations/demands of the SWMP.

- Federal and State Regulations
- Major Flooding Events
- Rehabilitation Costs/Needs Exceed Expectations
- Critical Infrastructure Failures
- Partnership Opportunities
- Community Initiatives

As a part of the ongoing maintenance and implementation of the SWMP Master Plan and Annual Business Plan, SWMP staff will work to stay abreast of emergent issues in the above categories, and others, to posture the program to respond as efficiently and effectively as possible to changing requirements and expectations.



FORT WORTH

