

**Fort Bend County**

**LID**

**Fort Bend County  
Levee Improvement District No. 7  
Hazard Mitigation Plan**

Pending Adoption in 2018

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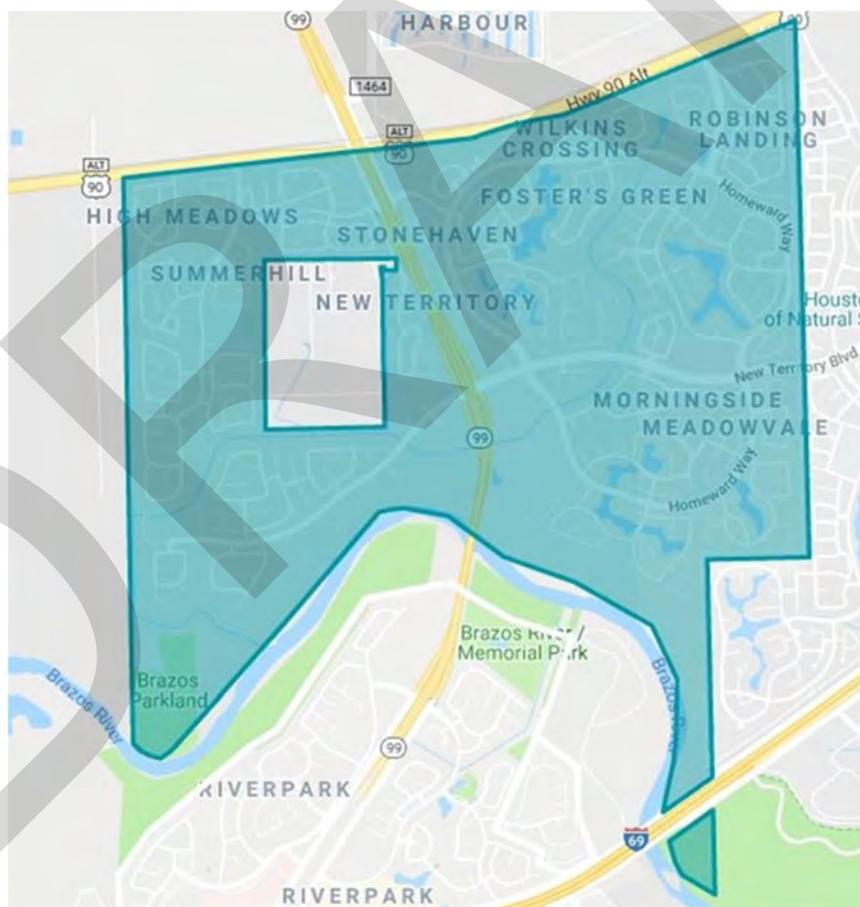
## List of Acronyms

BFE	Base Flood Elevation
CFR	Code of Federal Regulations
FEMA	Federal Emergency Management Agency
DFIRM	Digital Flood Insurance Rate Map
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
HMP	Hazard Mitigation Plan
LID	Levee Improvement District
MPC	Mitigation Planning Committee
mph	Miles per Hour
NCEI	National Centers for Environmental Information
NFIA	National Flood Insurance Act
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NTRCA	New Territory Residential Community Association
NWS	National Weather Service
RL	Repetitive Loss
SFHA	Special Flood Hazard Area
TDEM	Texas Division of Emergency Management
TS	Tropical Storm
TWDB	Texas Water Development Board
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

## Executive Summary

The Fort Bend County Levee Improvement District No. 7 (“the District”) undertook development of this Hazard Mitigation Plan (Plan) because of the increasing awareness that natural hazards, especially flood hazards and the potential for levee failure, may affect people and property in the area. The District was created under the provisions of Article XVI, Section 59 of the Texas Constitution, and operates pursuant to Chapters 49 and 57 of the Texas Water Code, as amended, and Chapter 7808 of the Texas Special District Local Laws Code. The District was created to construct certain levee and drainage improvements to provide protection to the land and improvements of residential and commercial property owners in New Territory from flooding from the Brazos River.

The Hazard Mitigation Plan was written to identify District vulnerabilities to hazards and outline mitigation actions that help to reduce or avoid the impacts of hazards. Approval of the Plan will make the District eligible for federal mitigation grant program funds administered by the State of Texas Division of Emergency Management (TDEM) and the Texas Water Development Board (TWDB). In this Plan, the Mitigation Planning Committee (MPC) looked at what actions need to be taken based on the vulnerabilities of the District and the residents within the boundary of the District. **Figure 1** shows the planning area for this Hazard Mitigation Plan.



**Figure 1 – Hazard Mitigation Study Area, Fort Bend County Levee Improvement District No. 7**

The District is susceptible to a range of hazards inherent to Southeast Texas; however, the hazards considered in this Plan are limited to those impacting the District's ability to fulfil its purpose. According to the petition for its creation, The District was organized for the following purposes:

- 1) To construct and maintain levees and other improvements on, along, and contiguous to rivers, creeks, and streams within and adjacent to the District;
- 2) To reclaim land within the District from overflow from these streams;
- 3) To control and distribute the waters of rivers and streams within and adjacent to the District by straightening and otherwise improving them; and
- 4) To provide for the proper drainage and other improvement of the reclaimed land within the District.

Authority for the preparation of the Hazard Mitigation Plan is derived from Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended; The National Flood Insurance Act of 1968 (NFIA), as amended; and Title 44 Code of Federal Regulations Section 201.6 (44 CFR 201.6).

# 1 The Planning Process

## 1.1 Introduction

The Fort Bend County Levee Improvement District No. 7 (“the District”) undertook development of this Hazard Mitigation Plan because of increasing awareness that natural hazards, especially flood hazards and the potential for a levee failure, may affect people and property in the area. The Hazard Mitigation Plan was written to identify District vulnerabilities to hazards and to outline mitigation actions that help to reduce or avoid the impacts of hazards. Approval of the Plan will make the District eligible for federal mitigation grant program funds administered by the State of Texas Division of Emergency Management (TDEM) and the Texas Water Development Board (TWDB).

In this Plan, the Mitigation Planning Committee looked at what actions should be taken based on the vulnerabilities of the District and the residents within the boundary of the District.

## 1.2 Authority & Current Capabilities

The District is a special purpose district of the State of Texas created under the provisions of Article XVI, Section 59, of the Texas Constitution, and operating pursuant to Chapters 49 and 57 of the Texas Water Code, as amended, and Chapter 7808 of the Texas Special District Local Laws Code.

The District was created to construct certain levee and drainage improvements to provide protection to the land and improvements of residential and commercial property owners in the New Territory subdivision, which is part of the City of Sugar Land, from flooding from the Brazos River. According to the petition for its creation, The District was organized for the following specific purposes:

- 1) To construct and maintain levees and other improvements on, along, and contiguous to rivers, creeks, and streams within and adjacent to the District;
- 2) To reclaim land within the District from overflow from these streams;
- 3) To control and distribute the waters of rivers and streams within and adjacent to the District by straightening and otherwise improving them; and
- 4) To provide for the proper drainage and other improvement of the reclaimed land within the District.

The District is governed by a three-member Board of Directors, appointed by the Fort Bend County Commissioners Court. The Board holds a regular meeting once a month to manage and conduct the business and affairs of the District, and these meetings are open to the public pursuant to the Open Meetings Act, Chapter 551, Texas Government Code.

As is typical for smaller governmental agencies, the District contracts with consultants such as attorneys, engineers, auditors, bookkeepers, tax assessor-collectors, operators, and financial advisors. These consultants provide services, advice, and reports to assist the Board in managing the District.

The District, which encompasses the New Territory subdivision, operates and maintains approximately 3.75 miles of levees and other drainage facilities that include:

- Ellis Creek, an internal drainage channel that collects and conveys storm water runoff;
- Outfall structures where internal storm water drainage is discharged outside of the levee and into the Brazos River via an external drainage channel that is also operated and maintained by the District;
- One pump station (electric facility that pumps stormwater within the levee to the outside of the levee and into the external drainage channel during a combined river/rainfall flood event);
- Flap gates (gates preventing river water from entering New Territory); and

- Nine detention/retention ponds (artificial lakes that include a permanent pool of water and space to detain excess water).

The District also has the power (pursuant to a separate statute) to construct, maintain and operate a reclaimed water system, which is currently under construction, for purposes of providing a non-potable water source to the New Territory Residential Community Association, Inc. (NTRCA) for irrigation of the common areas and make-up water to the lakes within New Territory.

Authority for the preparation of the Hazard Mitigation Plan is derived from Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended; The National Flood Insurance Act of 1968 (NFIA), as amended; and Title 44 *Code of Federal Regulations* Section 201.6 (44 CFR 201.6). These required State and local governments to develop and formally adopt Hazard Mitigation Plans in order to be eligible for certain disaster mitigation grant funding sources.

It should be noted that, due to the District’s limited authority, the District is not a participant in the National Flood Insurance Program (NFIP). The land within the District’s levees is either within Fort Bend County or the City of Sugarland; both entities are participants in the NFIP. The City of Sugar Land is the Floodplain Administrator for the area within the District boundaries.

### 1.3 The Mitigation Planning Committee

The Mitigation Planning Committee (MPC) was established to direct the Hazard Mitigation Plan development. The MPC members are identified in **Table 1**. The MPC oversaw the development of the plan, incorporated public involvement and input, and scheduled all meetings. The MPC determined that in addition to the small committee that would steer the planning process, a larger group of interested and potentially effected individuals called “Stakeholders” would be included in the planning process to discuss the planning process, submit proposed mitigation actions, review drafts and provide comments at critical points in the development of the Plan. Once the Plan was drafted, the MPC reviewed the contents with the District Board of Directors for their comment and approval.

**Table 1 – Mitigation Planning Committee (MPC)**

Team Member	Job Title	Organization
Epifanio E. Salazar Jr.	Chairman	FBCLID7
James R. Grotte	Vice Chairman	FBCLID7
Cindy Picazo	Secretary	FBCLID7
Sarah Lambert	Project Manager	AECOM
Vanessa Hoene	Mitigation Planning Consultant	AECOM
Ross Gordon	Project Principal	AECOM
Jon Vanderwilt	Engineer for the District	Costello, Inc.
Stephen Wilcox	Engineer for the District	Costello, Inc.
Chris Skinner	Attorney for the District	Schwartz, Page & Harding, L.L.P
Matt Reed	Attorney for the District	Schwartz, Page & Harding, L.L.P
Simon Vandyk	Communications	Triton Consulting Group, LLC
Jeff Perry	Operations / Maintenance	Levee Management Services, LLC

A Stakeholder Meeting was held on April 19, 2018 through an online webinar to introduce the District’s planning process and request Stakeholder involvement and input. Stakeholders were invited to the public meeting and were requested to provide feedback through email or by telephoning the District. The Stakeholder group is comprised of the individuals and entities listed in **Table 2**.

**Table 2 – Stakeholders**

Member	Title	Organization
Michael Walker	Executive Director	New Territory Residential Community Association
Jorge Alba	Senior Drainage Engineer	City of Sugar Land
Chris Steubing	Assistant City Manager	City of Sugar Land
Doug Brinkley	Chief of Police	City of Sugar Land Police Department
Patrick Hughes	Assistant Fire Chief; Director of Emergency Management.	City of Sugarland Emergency Management Coordinator
Jeff Braun	Emergency Management Coordinator	Fort Bend County Emergency Operations
Doug Barnes	Senior Planning Coordinator	Fort Bend County Emergency Operations
Richard Stolleis	County Engineer	Fort Bend County
Mark Vogler	Chief Engineer and General Manager	Fort Bend County Drainage District
Mike Stone	General Manager and Chief Operating Officer	Fort Bend County Toll Road Authority
Andre McDonald	President	FBCLID2
David Gornet	Vice-President	FBCLID17
Justin R. Ring	President	FBCLID11
Don Burns	President	FBCLID10
Greg Baird	President	FBCMUD 121
Dave Scott	Presiding Officer	Brazos River Authority
David Collinsworth	General Manager	Brazos River Authority

**1.4 Public Involvement**

Consistent with District’s standard objective to inform and involve citizens, and to fulfill the public involvement requirements of the mitigation planning programs, the District solicited input, notified, and invited residents to participate in the mitigation planning process. Regular and special session board meetings, which are open to and well attended by members of the public, are typically held twice a month. Since Hurricane Harvey in August 2017, the Board has held 8 regular meetings and 9 special meetings, a major focus of which has been discussion of risks and mitigation efforts.

In particular, the development and review of the HMP was on the officially published agenda and was discussed in detail at Board meetings on March 1<sup>st</sup> 2018 and April 5<sup>th</sup> 2018. The Board also held a highly attended community open house on April 24<sup>th</sup> 2018 to discuss in detail proposed mitigation strategies which

are listed in the HMP and which the Board is including in a summer 2018 bond election. See **Appendix B** for details of these meetings.

The public had an opportunity to review the draft Plan when the document was posted on the District's website at <http://www.fbclid7.com/news>. Prior to placing the document online, at the May 3<sup>rd</sup> 2018 Board Meeting the District announced that the draft Plan would be available for review and comments would be taken at the May 15<sup>th</sup> Public Board Meeting, and that this meeting was open to the public and all stakeholders.

Prior to the Public Meeting, a press release was prepared informing the public about the Hazard Mitigation Planning process and urging the public to be involved. It also provided the time, date, and location of the Public Meeting. Notices were published on the District Website and the NTRCA website, in addition to the official published agenda for the Board Meeting.

On May 15<sup>th</sup> 2018 the Public Meeting was held to consider comments on the draft plan and to solicit additional public input. At the meeting, the District provided comment forms for any members of the public to formally submit a comment. The attendee list and sign-in sheet from the Public Meeting are included in **Appendix B** of this Plan.

All input received was reviewed and considered for incorporation into this plan.

## 1.5 Review and Incorporation of Existing Plans, Studies, Reports, and Technical Information

Other planning documents can be used as a valuable resource for integrating information related to hazard mitigation into the District's Plan. As part of the development of the Plan, other plans, studies, and reports that are applicable to the natural hazards discussed in the Plan were reviewed and incorporated where applicable.

The specific Plans, Studies and Reports used for informational purposes along with a discussion on how they were incorporated into the Plan, are listed below.

- **Fort Bend County Levee Improvement District No. 7 Emergency Action Plan (adopted in August 2017).** This plan was used to understand the procedures and field operations that are to be undertaken by the District during events outside of normal operational parameters.
- **Fort Bend County Hazard Mitigation Plan (HMP) Update (2018).** The plan was used as a reference for hazards as they pertain to the District's jurisdictional area. The Mitigation Action worksheet used in the Fort Bend County HMP was used for Mitigation actions in the District's Plan so that all projects have the same format.
- **City of Sugar Land Hazard Mitigation Plan (2014).** The plan was used as a reference for hazards as they pertain to the District's jurisdictional area, and to identify key Stakeholders.
- **Fort Bend County Flood Insurance Rate Map (FIRM).** The Flood Insurance Rate Maps (FIRMs) prepared by FEMA offer the best overview of flood risks. FIRMs are used to regulate new development and to control the substantial improvement and repair of substantially damaged buildings. Fort Bend County FIRMs were reviewed and included in the Plan to develop a floodplain map identifying the 100-year floodplain.
- **Fort Bend County Flood Insurance Study (FIS).** The most recent FIS revised study is dated June 5, 1997. These studies were reviewed as part of the draft Plan. Information describing the flood hazards was added to **Section 2**.

- **State of Texas Mitigation Plan Update (2013).** The State HMP update was reviewed and considered while developing this Plan. The mitigation strategies and mitigation goals are referenced in **Section 3.2** of this Plan.

## 1.6 Plan Adoption and Continued Public Involvement

Upon adoption of this Plan, the public will be notified of any substantial changes to the document between 2018 and the next scheduled Plan update in 2023. Any changes proposed by the MPC considered significant will be distributed to the Stakeholders. The Stakeholders will be encouraged to review the changes and provide comments on any proposed plan revisions.

The District will involve the public in the plan maintenance process and during the next Plan Update in 2023, using the same methods as the plan development. The public will be notified when the revision process is started and will be provided the opportunity to review and comment on changes to the Plan and prioritize action items. It is expected that a combination of informational public meetings, draft documents posted on the website, and public Board of Director meetings will be undertaken.

The District's Hazard Mitigation Plan will be posted on the District's website and notices of its availability will be distributed to the Federal and State agencies, Fort Bend County, all identified stakeholders, as well as a public notice.

## 1.7 Plan Monitoring, Evaluating and Updating

The MPC determined that progress would be best monitored by annual meetings. Upon adoption in 2018, the MPC will meet on an annual basis to discuss the status of the Plan and determine if any significant changes are warranted. As part of the meeting, the Chairman will note progress made on any of the mitigation action items listed in **Table 12**. To this end, the Chairman may convene a meeting of the appropriate District, City of Sugarland, and County departments to discuss and determine progress, and to identify obstacles to progress, if any.

In addition to annual meetings, the Chairman will convene meetings after damage-causing natural hazard events to review the effects of such events. Based on those effects, adjustments to the mitigation priorities listed in **Table 12** may be made or additional event-specific actions identified.

The District will initiate Plan reviews and updates based on the following:

1. The recommendation of the Chairman or on its own initiative, the District Board may initiate a Plan review at any time;
2. At approximately the 1-year anniversary of the Plan's adoption, and every year thereafter;
3. After natural hazard events that appear to significantly change the apparent risk to District assets, operations, and/or citizens;
4. When activities of the District, County, or the State significantly alter the potential effects of natural hazards on District assets, operations and/or citizens. Examples include completed mitigation projects that reduce risk, or actions or circumstances that increase risk; or
5. When new mitigation opportunities or sources of funding are identified.

In addition to the circumstances listed above, revisions that warrant changing the text of this Plan or incorporating new information may be prompted by a number of circumstances, including identification of specific new mitigation projects, completion of several mitigation actions, or requirements for qualifying for specific funding.

Major comprehensive review of and revisions to this Hazard Mitigation Plan will be considered on a 5-year cycle. To be adopted in 2018, the Plan will enter its next review cycle sometime in 2023. The MPC will be convened to conduct the comprehensive evaluation and revision. The MPC will also consider whether it is preferable to include the District as a participant in a regional HMP update (Fort Bend County or City of Sugar Land), instead of as a stand-alone HMP update.

### **1.8 Incorporating Mitigation Plan Requirements into Other Local Planning Mechanisms**

The District intends to integrate this Hazard Mitigation Plan into other local planning efforts through the following process and framework.

For activities associated with District infrastructure, the District will plan for these activities during their standard annual budgeting process and within their existing planning mechanisms, including the District Capital Improvement Plan and Emergency Action Plan. The District will also work with the stakeholders identified in this planning effort to make sure elements of this plan are incorporated in any other plans that are outside the jurisdiction of the district such as Capital Improvement Plans, Master Drainage plans, Emergency Action Plans, etc. The District will designate specific Board meetings to discuss this ongoing effort and invite the Stakeholders to attend and participate in the process of integrating this Plan into the existing planning mechanisms. This includes participation by the District in other regional efforts related to the Brazos River and floodplain mapping and flood mitigation in Fort Bend County.

## 2 Hazard Assessment

### 2.1 Overview of Risks

Natural hazards can cause damage and losses (including physical damage, indirect and economic losses, and injuries and deaths) when the hazard occurs or impacts people and property. Once hazards are identified, the level of risk exposure for people and property can be determined to show how “at risk” a planning area is. When the full range of possible natural hazards is reviewed, it becomes apparent that some events occur frequently and some are extremely rare. Some hazards impact large numbers of people to a limited degree, while others may cause significant damage to a small localized area.

The National Oceanic and Atmospheric Administration’s (NOAA) and the National Centers for Environmental Information, (NCEI), formerly the National Climactic Data Center, collect and maintain certain hazard data in summary format, indicating injuries, deaths, and estimated damages. The data presented in this plan are for Fort Bend County, where the District is located, to demonstrate the potential for natural hazards in the District. According to a query of the NCEI database for “Fort Bend County, Texas”, 304 weather events were reported between January 1950 and November 2017 (the most recent search date available). Fort Bend County has experienced:

- 99 significant severe thunderstorms with high winds (four of which had greater than 60 knot winds),
- One hurricane and three tropical storms,
- 37 floods/flash floods,
- One strong wind event,
- Two heavy rain events,
- Six winter weather/wind chill/ice events,
- 67 hail events,
- 15 lightning events,
- 57 tornadoes and funnel clouds,
- Three severe droughts, and
- Eight extreme heat waves.

The NCEI estimates that the damage from these events totals \$16.4 Billion.

### 2.2 District Hazards

The District is susceptible to a range of hazards inherent to Southeast Texas; however, for the reasons outlined below, the District has determined the most appropriate and useful approach to developing its Hazard Mitigation Plan is to eliminate certain hazards from the detailed risk assessment in the Plan. The three reasons for eliminating certain hazards are:

- 1) The eliminated hazards are not significant enough to warrant detailed vulnerability assessment and loss estimation;
- 2) The District’s mission and jurisdictional authority are explicitly limited to activities related to drainage and levees (although the organization does have the authority to complete actions to protect and mitigate damage to its own facilities); and

3) Assets and populations that are potentially exposed to hazards are part of an existing mitigation plan with actions to address hazards outlined in their HMPs. Fort Bend County and the City of Sugar Land have the authority and the responsibility to sponsor mitigation activities for their constituent populations and communities. The District will continue to coordinate with the County and City to ensure mitigation actions are developed and implemented, aiming to reduce or eliminate any opposition or redundancy between the jurisdictions.

The District's specific assets considered in this Plan include: a reused water system, the levee along the west and south sides of the District, several channels (Ellis Creek, Ditch O), nine of the twelve lakes within the District, the storm water pump station and the external channel (including various flap gates and sluice gates). See **Figure 2** for the location of District assets. However, along with these fixed assets the District also has responsibilities to provide proper drainage within the levee system as well as to maintain the levee's ability to provide flood protection. This plan will consider the impact of hazards on the District's ability to meet those responsibilities.

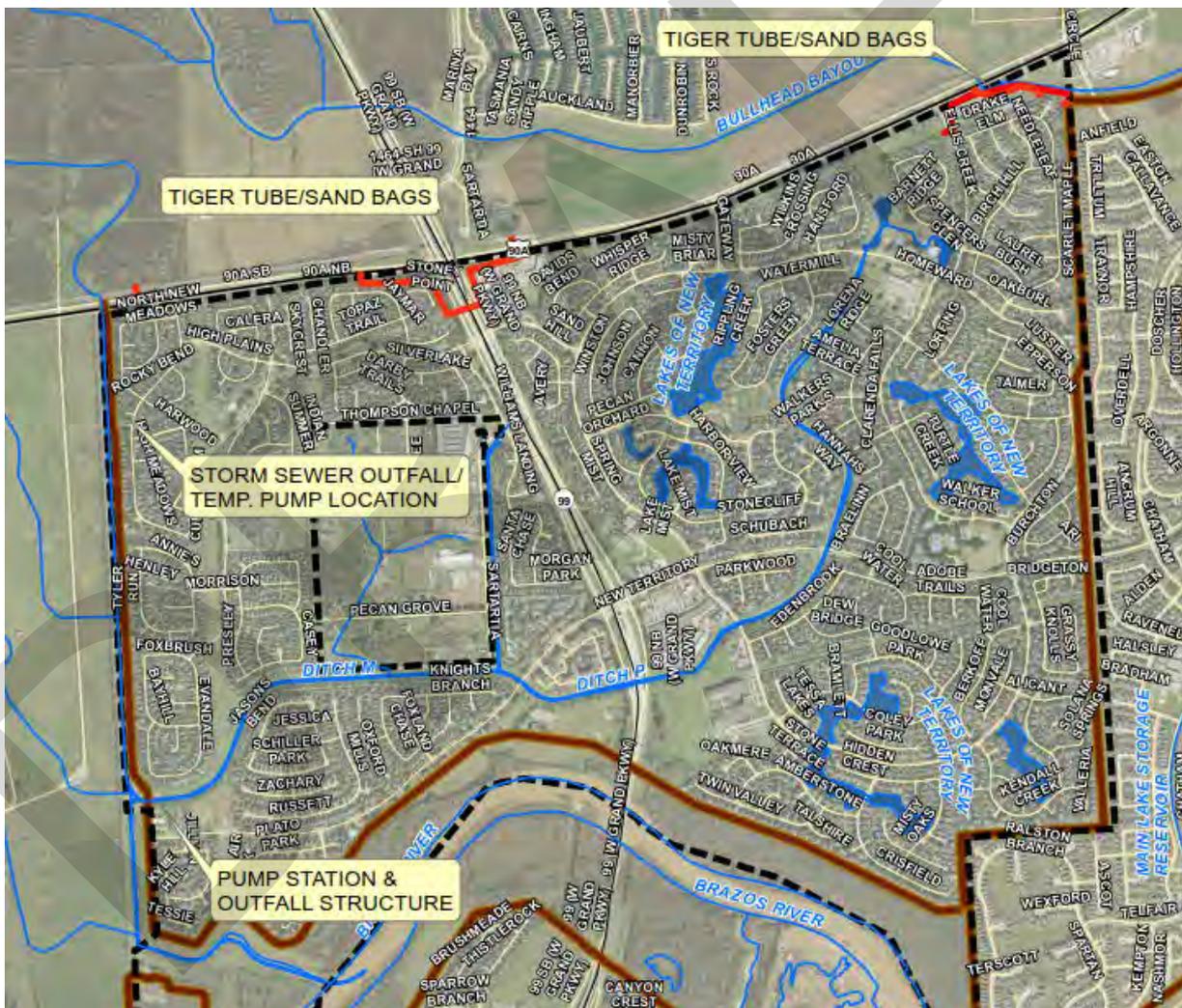


Figure 2 – Location of District Assets

The MPC evaluated the District's risk exposure to natural hazards and the ability of the District to regulate and prepare for such events, as outlined in **Section 1.2**. Based on the District's limited authority when it comes to managing hazards other than flood and the lack of occurrences and/or the limited effect that certain hazards have on the District's assets, the following hazards have been eliminated from consideration and no mitigation action items are associated with them:

- Severe Winter Storms,
- Earthquake,
- Land Subsidence,
- Wildfire,
- Coastal Erosion,
- Hailstorms,
- Extreme Heat,
- Expansive Soils,
- Drought,
- Tornado,
- Thunderstorm Winds,
- Lightning.

The District hazards addressed as part of this plan are:

- Hurricanes and Tropical Storms,
- Flood, and
- Levee Failure

The MPC reviewed each hazard and assigned a probability of occurrence based on the experience of the MPC members and an understanding of the hazards, as outlined in the hazard profiles in **Sections 2.5** through **2.8**. The probability categories are shown in **Table 3**.

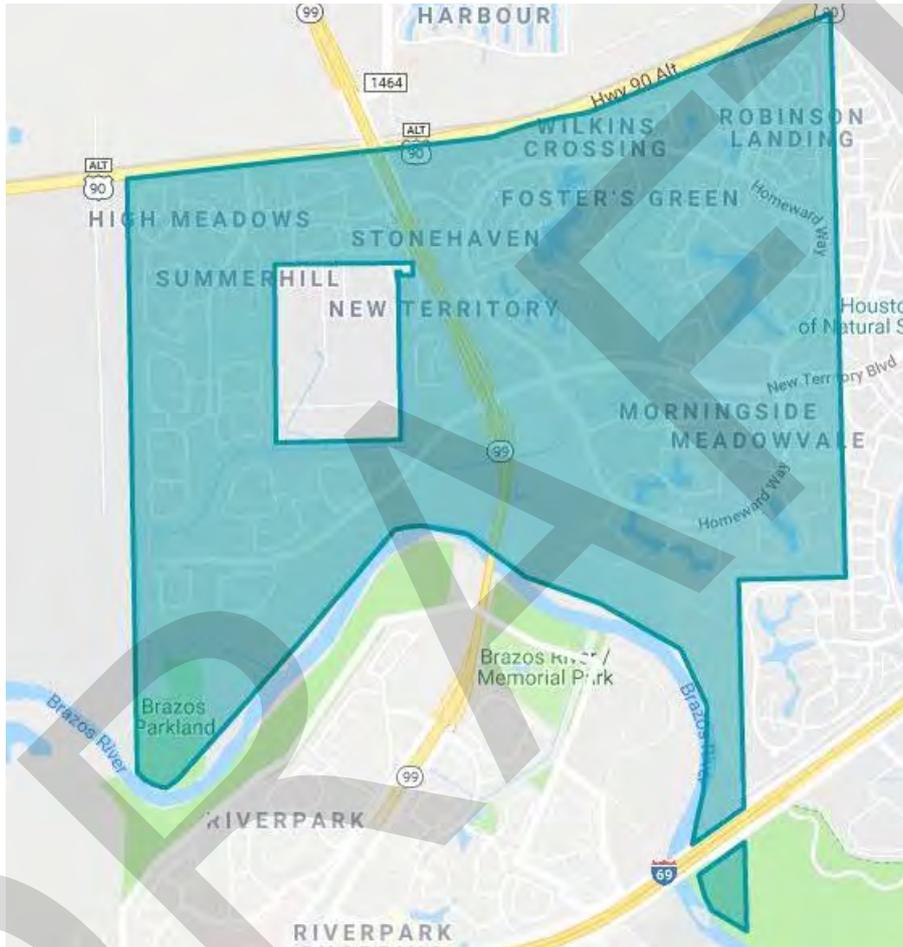
**Table 3 – Hazard Probability**

<p><b>Probability:</b></p> <p><input type="checkbox"/> High: Event probable in next year.</p> <p><input type="checkbox"/> Medium: Event probable in next 5 years</p> <p><input type="checkbox"/> Low: Event possible in next 10 years.</p>
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### 2.3 Geography, Climate, and Population

The District is located in Southeast Texas within the boundaries of New Territory, a master-planned community and a Census Designated Place (CDP). The district consists of approximately 3.8 square miles which lies entirely within Fort Bend County. In November 2016, the Sugar Land city council voted in favor of annexing New Territory. The annexation was effective December 12, 2017. **Figure 3** is a map identifying the

boundary area for the District. The City of Richmond is the Fort Bend County seat. The largest city in the county is the City of Sugar Land. Fort Bend County is located in the Texas Coastal Plain and is relatively flat. Ground surface elevations (not including the levees) across the district have little variance, with the highest elevations reaching 78 feet above sea level. Annual average rainfall in the county is 51 inches. The District is bordered on the North by US 90A, to the south by the Brazos River.



**Figure 3 – Planning Area: Fort Bend County LID 7**

According to the United States Census Bureau, the estimated 2016 population within New Territory CDP was 15,843 residents. This is a 4.3 percent increase from the 2010 census data. **Table 4** summarizes the 2010 census population within the Plan area.

**Table 4 – 2010 Population of Plan Area**

Jurisdiction	2010 Population	Estimated Vulnerable or Sensitive Populations		2010 Population Density per square mile
		Elderly (Over 65)	Below Poverty Level	
New Territory (CDP)	15,186	457	683	3,996

## 2.4 Past Disaster Declarations

FEMA maintains records on Federally Declared Disasters, dating back to 1953. Data on Presidential Disaster Declarations characterize some natural disasters that have affected the area. In 1965, the Federal government began to maintain records of events determined to be significant enough to warrant declaration of a major disaster by the President of the United States. Presidential Disaster Declarations are made at the county level and are not specific to any one city or sub-area. Between 1983 and 2017 there were 17 disasters involving a severe storm, hurricane, or flooding declared in Fort Bend County; those disasters are listed in **Table 5**. The “Disaster Type” in Table 5 is either EM (Emergency) or DR (Major Disaster).

**Table 5 – Declared Emergencies and Major Disasters in Fort Bend County  
(Source: FEMA, Disaster Declaration Summary Database)**

Disaster Number	Declaration Date	Disaster Type	Title	Incident Begin Date	Incident End Date	Declared County/ Area
4332	8/25/2017	DR	HURRICANE HARVEY	8/23/2017	9/15/2017	Fort Bend County
4272	6/11/2016	DR	SEVERE STORMS AND FLOODING	5/22/2016	6/24/2016	Fort Bend County
4269	4/25/2016	DR	SEVERE STORMS AND FLOODING	4/17/2016	4/30/2016	Fort Bend County
4223	5/29/2015	DR	SEVERE STORMS, TORNADOES, STRAIGHT-LINE WINDS AND FLOODING	5/4/2015	6/22/2015	Fort Bend County
1791	9/13/2008	DR	HURRICANE IKE	9/7/2008	10/2/2008	Fort Bend County
3294	9/10/2008	EM	HURRICANE IKE	9/7/2008	9/26/2008	Fort Bend County
3290	8/29/2008	EM	HURRICANE GUSTAV	8/27/2008	9/7/2008	Fort Bend County
3277	8/18/2007	EM	HURRICANE DEAN	8/17/2007	9/5/2007	Fort Bend County
2639	5/26/2006	FM	LAKE OLYMPIA FIRE	5/26/2006		Fort Bend County
1624	1/11/2006	DR	EXTREME WILDFIRE THREAT	11/27/2005	5/14/2006	Fort Bend County

Disaster Number	Declaration Date	Disaster Type	Title	Incident Begin Date	Incident End Date	Declared County/ Area
1606	9/24/2005	DR	HURRICANE RITA	9/23/2005	10/14/2005	Fort Bend County
3261	9/21/2005	EM	HURRICANE RITA	9/20/2005	10/14/2005	Fort Bend County
3216	9/2/2005	EM	HURRICANE KATRINA EVACUATION	8/29/2005	10/1/2005	Fort Bend County
1439	11/5/2002	DR	SEVERE STORMS, TORNADOES AND FLOODING	10/24/2002	11/15/2002	Fort Bend County
1379	6/9/2001	DR	TX-TROPICAL STORM ALLISON-06-06-2001	6/5/2001	6/20/2001	Fort Bend County
3142	9/1/1999	EM	EXTREME FIRE HAZARDS	8/1/1999	12/10/1999	Fort Bend County
1257	10/21/1998	DR	TX-FLOODING 10/18/98	10/17/1998	11/15/1998	Fort Bend County
1239	8/26/1998	DR	TROPICAL STORM CHARLEY	8/22/1998	8/31/1998	Fort Bend County
1041	10/18/1994	DR	SEVERE THUNDERSTORMS AND FLOODING	10/14/1994	11/8/1994	Fort Bend County
930	12/26/1991	DR	SEVERE THUNDERSTORMS	12/20/1991	1/14/1992	Fort Bend County
689	8/19/1983	DR	HURRICANE ALICIA	8/18/1983	8/20/1983	Fort Bend County

## 2.5 Hurricanes and Tropical Storms

There are three types of tropical cyclones defined by the National Oceanic and Atmospheric Administration (NOAA): hurricanes, tropical storms, and tropical depressions. **Table 6** lists the criteria for each classification.

**Table 6 – Classification of Tropical Cyclones**

Stage of Development	Criteria
Tropical Depression (development)	Maximum sustained surface wind speed is < 39 mph
Tropical Storm	Maximum sustained wind speed ranges 39 - <74 mph
Hurricane	Maximum sustained surface wind speed 74 mph+
Tropical Depression (dissipation)	Decaying stages of a cyclone in which maximum sustained surface wind speed has dropped below 39 mph

**2.5.1 Location of Hurricanes and Tropical Storms**

The hazard of hurricanes and tropical storms is expected to affect the District uniformly. The District is on the Texas Gulf Coast; while it does not share a border with the Gulf, the southernmost part of the county is only 48 miles from the coastline. Past occurrences of hurricanes and tropical storms are discussed in **Section 2.5.3. Table 8** lists the previous hurricanes and tropical storms that have impacted the District.

**2.5.2 Extent of Hurricanes and Tropical Storms**

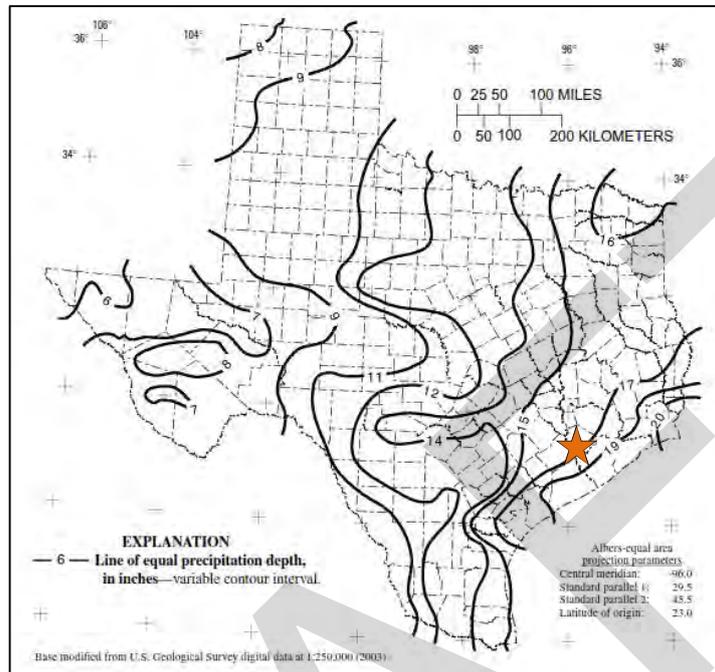
Hurricanes are classified into five categories according to the Saffir-Simpson Hurricane Wind Scale, as shown in **Table 7**.

**Table 7 – Saffir/Simpson Hurricane Wind Scale**

Storm Category	Central Pressure	Sustained Winds	Storm Surge	Potential Damage
1	> 980 mbar	74 - 95 mph	4 – 5 feet	Minimal
2	965 – 979 mbar	96 - 110 mph	6 – 8 feet	Moderate
3	945 – 964 mbar	111 – 130 mph	9 – 12 feet	Extensive
4	920 – 944 mbar	131 – 155 mph	13 – 18 feet	Extreme
5	< 920 mbar	> 155 mph	> 18 feet	Catastrophic

Tropical storms and hurricanes are common in the planning area, and storms of any magnitude are very likely to occur in any given year. The District should anticipate and prepare for Category 5 and Category 4 hurricanes.

Tropical storms tend to have longer durations, producing prolonged wet and saturated conditions, which can lead to flooding, and volumes of rain beyond the design capacity of drainage structures as was witnessed during Hurricane Harvey. **Figure 4** shows the precipitation predicted by the US Geological Survey (USGS) for a 100-year storm (1% Annual Chance) with 7-day duration in Fort Bend County to be approximately 17-inches.



★ Approximate location of the District

**Figure 4 – Depth of Precipitation for 100-Year Storm for 7-Day Duration in Texas (USGS Rainfall Atlas)**

**2.5.3 Historical Hurricanes and Tropical Storms**

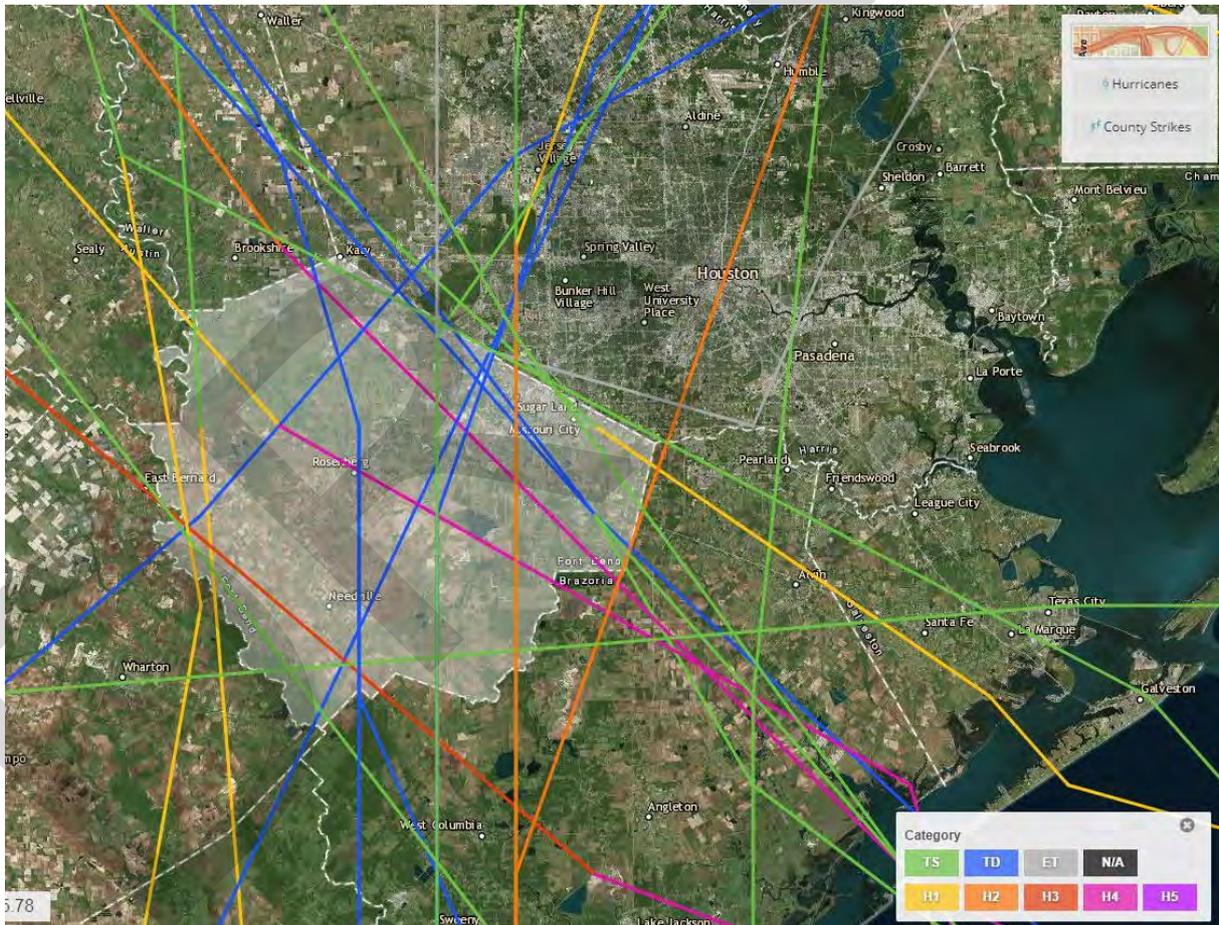
Past hurricane and tropical storm events, available in the NCEI database, that had a direct path through Fort Bend County are summarized in **Table 8**. Significant past events include:

- **Hurricane Harvey, 2017.** This hurricane was a Category 4 with estimated sustained winds of 130-mph at landfall. Fifty inches of rain is the high-end estimated rainfall total from the National Hurricane Center as Harvey passed over Texas. Some parts of Texas received nine days of continuous rainfall. Total damages of this storm in Fort Bend County, as reported by the NCEI database, were \$8 billion.
- **Hurricane Ike, 2008.** This hurricane made landfall on Galveston Island as a Category 2 hurricane with estimated sustained winds of 110 mph. An estimated 10-in to 20-in of rain fell across the southeast Texas region. At the time, Ike was the third-costliest of any Atlantic hurricane and resulted in \$37.5 billion in damages, with only hurricanes Sandy (2012) and Katrina (2005) estimated higher. The resulting damage from Ike in Fort Bend County was estimated at \$400 million.
- **Tropical Storm Allison, 2001.** Allison moved inland less than 12 hours after forming just off the west end of Galveston Island. Allison made its initial landfall on Galveston Island during the evening of June 5, and during the next five days produced record rainfall that led to devastating flooding across portions of Southeast Texas. Heavy rain, 8 to 12 inches, occurred over the Sugarland-Stafford area of Fort Bend on June 7. The resulting damage from Allison in Fort Bend County was estimated at \$7.74 million.

**Table 8 – Historical Hurricane and Tropical Storm Events in Fort Bend County from 1998-2017**

Year	Storm Name	Category	FBC Property Damage
1998	Frances	Tropical Storm	\$100,000
2001	Allison	Tropical Storm	\$7,740,000
2002	Fey	Tropical Storm	\$4,500,000
2008	Ike	Category 2	\$400,000,000
2017	Harvey	Category 4	\$8,000,000,000
<b>Totals</b>			<b>\$8,412,340,000</b>

Figure 5 shows hurricane tracks that have passed over Fort Bend County since 1871, according to the National Oceanic and Atmospheric Administration (NOAA).



**Figure 5 – Historical Hurricanes and Tropical Storms in Fort Bend County**

**2.5.4 Probability of Hurricanes and Tropical Storms**

Based on historical data, the probability of the District being affected by hurricanes and tropical storms is high.

<p><b>Probability:</b></p> <p><input checked="" type="checkbox"/> High: Event probable in next year.</p> <p><input type="checkbox"/> Medium: Event probable in next 5 years</p> <p><input type="checkbox"/> Low: Event possible in next 10 years.</p>
---

**2.5.5 Impact and Vulnerability related to Hurricanes and Tropical Storms**

The District’s mission and jurisdictional authority are explicitly limited to activities related to levee improvement, and protecting the integrity of the levees. Therefore, the District only has the authority to mitigate the effect of hurricanes and tropical storms on District-owned facilities and personnel. Hurricanes can cause a significant threat to buildings and equipment as they could be struck by flying debris, falling trees/branches, utility lines, and poles as well as sustain damage from the wind. However, considering the long warning time associated with Hurricanes and Tropical storms, the District will do their best to warn their personnel, and coordinate protecting their equipment, if possible.

Since the District’s main focus is on activities related to levees, the hazard of hurricanes and tropical storms has an emphasis on the secondary hazard of subsequent flooding that can occur during and after these events and the mitigation actions for flood will serve to mitigate the effects of all the hazards that contribute to flooding. The flood elements, including inundation depths experienced from severe storms, hurricanes, tropical storms, and other large rain events are discussed in the flood portion of this plan, **Section 2.6**.

**2.6 Flood**

A flood is an overflow of a large amount of water, beyond its normal limits, over what is normally dry land.

The District’s levee system protects the New Territory neighborhood from the Brazos River 100-year floodplain, which puts it at risk for a flood event. Flooding is a naturally occurring event, but becomes hazardous when the public, infrastructure, and property are affected. Historically, floods are, and continue to be the most frequent, destructive, and costly natural hazard facing the District.

**2.6.1 Types of Flooding**

Flash Flood Events – According to the National Weather Service (NWS), a flash flood is flooding that begins within 6 hours, and often within 3 hours, of the heavy rainfall (or other cause). Flash Floods can be caused by a number of things, but is most often due to extremely heavy rainfall from thunderstorms. Flash Floods can occur due to Dam or Levee Breaks, and/or Mudslides (Debris Flow).The intensity of the rainfall, the location and distribution of the rainfall, the land use and topography, vegetation types and growth/density, soil type, and soil water-content all determine just how quickly the Flash Flooding may occur, and influence where it may occur. Urban Areas are also prone to flooding in short time-spans and, sometimes, rainfall (from the same storm) over an urban area will cause flooding faster and more-severe than in the suburbs or countryside. The impervious surfaces in the urban areas do not allow water to infiltrate the ground, and the water runs off to the low spots very quickly. Flash Flooding occurs so quickly that people are caught off-guard. Their situation may become dangerous if they encounter high, fast-moving water while traveling. If people are at their homes or businesses, the water may rise quickly and trap them, or cause damage to the property without them having a chance to protect the property.

Riverine Flooding – occurs when water rises out of the banks of the waterway, which is a common cause of flooding in the District. Flooding along waterways is a function of both precipitation levels and water run off volumes that drain from larger watersheds which can often be predicted in advance. In the District's jurisdiction the larger riverine systems will experience a flood crest 24 hours or longer after the storm event begins. Within the District, riverine flooding is caused by either tropical storms or large fronts moving across Texas. These systems can take more than a day to pass, giving ample opportunity for large amounts of rain to fall over large areas. It should be noted, that in instances of high water levels on the Brazos River, the District relies on its storm water pump station to control the level of floodwaters within the leveed areas.

Flooding due to Levee Failure – In the event of a levee breach or levee failure, the subsequent flooding would be disastrous and potentially far worse than any naturally occurring flood. The flooding could occur across the entire LID boundary including over 4,600 residential lots. Aside from the flooding being expansive within the LID study area, due to the topography, the flooding duration would be on the order of days, rather than a typical flash flood or riverine flooding scenario.

### 2.6.2 Location of Flooding

The area within the levees is protected from riverine flooding as long as the water level in the Brazos River is lower than the elevation of the levee where it ties back to natural ground, and as long as the pump station is operational and not surcharged or damaged.

The Special Flood Hazard Area (SFHA) is an area studied and defined by FEMA as an area subject to flooding in the 100-year event. The Digital Flood Insurance Rate Map (DFIRM) data provided by FEMA for the District shows the following flood hazard areas:

- **Zone A:** Areas subject to inundation by the 1-percent-annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no Base Flood Elevations (BFEs) or flood depths are shown. Mandatory flood insurance requirements and floodplain management standards apply.
- **Zone X:** Moderate risk areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1 foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1-percent-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones.

Although the District is surrounded by the Brazos River 100-year flood plain, only the drainage ditches and amenity lakes within the District are designated as "at risk" during the 100-year event (Zone A). All remaining land within the District is designated as "area with reduced flood risk due to levee" by FEMA.

It is important to note that the DFIRM does not include all possible sources of flooding in the District, and therefore the DFIRM only helps understand a portion of the risk exposure for the District. Locations of flood zones in the District based on the Digital Flood Insurance Rate Map (DFIRM) from FEMA are illustrated in **Figure 6** below. This map became effective as of April 2, 2014.

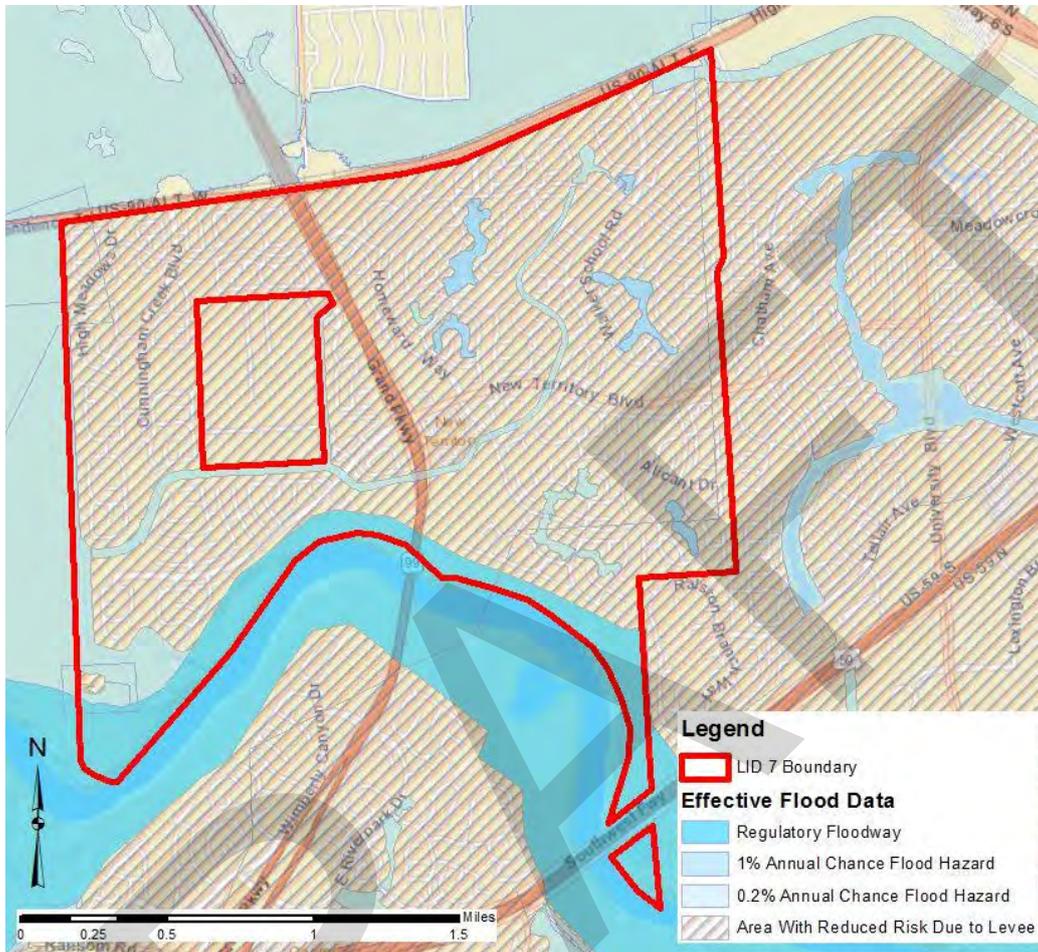


Figure 6 – FEMA Effective Floodplains

2.6.3 Previous Occurrences of Flooding

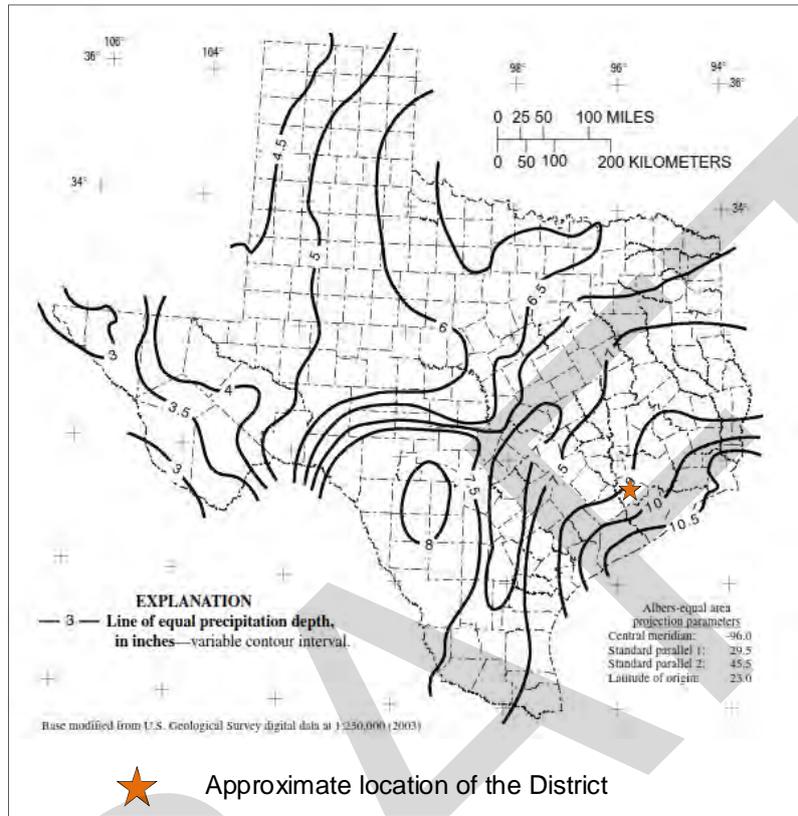
The Effective FEMA Flood Insurance Study (FIS) for Fort Bend County, dated December 21, 2017, notes there have been several significant flood events from 1899 through 1998. Reports on historic flooding show that major storms or floods in the area occurred in 1899, 1900, 1913, 1915, and 1929. The flood of 1899 and the storm of 1900 caused much damage to Fort Bend County. Crops, stock, and lives were lost during these two events. The City of Richmond suffered some of the greater losses. Four to five feet of water was seen for several days, and in some places for a stretch of land seven miles wide. The floods of 1913 and 1929 left water covering large portions of the Cities of Rosenberg and Richmond. It was reported that during the 1913 flood, the waters of the Brazos, San Bernard, and Colorado Rivers met below Rosenberg. Some recent flood events noted in the FIS as well as subsequent events include:

- **August 26, 2017, Hurricane Harvey** - This hurricane was a Category 4 with estimated sustained winds of 130 mph at landfall. The main threat from Hurricane Harvey was flooding due to excessive precipitation. Fifty inches of rain is the top-end forecast rainfall amount mentioned by the National Hurricane Center with Harvey through its odyssey near/over Texas. Some parts of Texas received 9 days of rain. Interstates, critical facilities, infrastructure and hundreds of properties were flooded.

- **May 27 – June 10, 2016, Memorial Day Flooding** – After 20 inches of rain, the water level in the Brazos River reached record heights, and Fort Bend County was added to Presidentially-declared disaster DR-4272. Mostly low to moderate income areas (about 1200 homes total) were impacted by the disaster.
- **April 18 - 22, 2016, Tax Day Floods** – This storm front produced nine to eleven inches of rain in twelve hours. Within Fort Bend County, this incident caused flash and street flooding, Barker Reservoir flooding, and river flooding along the Brazos and San Bernard Rivers.
- **May 29, 2015, Memorial Day Flood** – This storm front produced eight to ten inches of rainfall in the vicinity of Fort Bend County. Depending on the location in the Houston area, it ranged from a 2-year to a 500-year frequency storm. The water level in the Brazos River reached record heights.
- **September 12-13, 2008, Hurricane Ike** - This hurricane made landfall on Galveston Island as a Category 2 hurricane with estimated sustained winds of 110 mph. An estimated 10-in to 20-in of rain fell across the southeast Texas region. At the time, Ike was the third-costliest of any Atlantic hurricane and resulted in \$37.5 billion in damages, with only hurricanes Sandy (2012) and Katrina (2005) estimated higher. The resulting damage from Ike in Fort Bend County was estimated at \$400M. Total damages were estimated to be at least \$1.3 billion across southeast Texas.
- **June 7, 2001, Tropical Storm Allison** - Allison moved inland less than 12 hours after forming just off the west end of Galveston Island. Allison made its initial landfall on Galveston Island during the evening of June 5, and during the next five days produced record rainfall that led to devastating flooding across portions of Southeast Texas. Heavy rain, 8 to 12 inches, occurred over the Sugarland-Stafford area of Fort Bend on June 7. The resulting damage from Allison in Fort Bend County was estimated at \$7.74M.
- **October 1998, Southeast Texas Flood** – This flood event occurred across parts of South Texas and Southeast Texas. The storm that caused it was one of the costliest in the recorded meteorological history of the United States, bringing rainfall of over 20 inches to some parts of Southeast Texas, including the Sugar Land Area, and causing over \$750 million in damages.
- **October 1994, Southeast Texas Flood** – This flood was the deadliest Southeast Texas weather event since 1983's Hurricane Alicia. Heavy rains began falling late afternoon of October 16th across Burleson, Brazos, Grimes and Washington counties. On the night of the 17th and on the 18th rains continued to slide further south and began affection people in Jackson, Wharton, Matagorda, Brazoria, and portions of Fort Bend counties. Total rainfall from the entire storm generally ranged from 10 to 20 inches with Liberty recording 30.50 inches during the storm. Over 13,000 people had to be evacuated during the floods and over 22,000 homes received flood damage. Total damage to homes and businesses was approximately \$800 million while another \$100 million was done to roads and bridges throughout Southeast Texas.

#### 2.6.4 Extent of Flooding

Flooding in Fort Bend County can result from the various types of flooding described in **Section 2.6.1**. Because of the flatness of the terrain, many inland areas are characterized by FEMA as shallow flooding during heavy rainfall. Flooding is most common after a short duration of heavy precipitation, with the typical rain total of 9 inches for a 1% Annual Chance 6-hour rainfall, as shown in **Figure 7**.



**Figure 7 – Depth of Precipitation for 100-Year, 6-Hour Duration: Approximately 9 Inches (Source: USGS Rainfall Atlas)**

**2.6.5 Probability of Flooding**

- |                                     |  |
|-------------------------------------|--|
| <b>Probability:</b>                 |  |
| <input type="checkbox"/>            | High: Event probable in next year.     |
| <input type="checkbox"/>            | Medium: Event probable in next 5 years |
| <input checked="" type="checkbox"/> | Low: Event possible in next 10 years.  |

Based on past events and the predicted precipitation, the probability of large rainfall events within the District’s boundary is designated as highly likely. Fort Bend County has experienced 36 floods over a 10-year period, giving a frequency of three to four flood events per year. However the protection provided by the levees and the pump stations make the probability of structural flooding within the District boundary relatively low.

**2.6.6 Impact and Vulnerability Related to Flooding**

The impact of floods on the Plan area is not typical of the area, because of the protection provided by the levees. Typically the District’s flat topography and proximity to the Brazos River would make it prone to flooding. However, with the protection provided by the levees and internal pump station, the study area is likely only vulnerable if one of the following events were to occur:

- levee failure due to breach,
- levee failure due to river levels exceeding the elevation of the ends of the levee, or
- failure or surcharge of the pump station.

The potential impacts of flooding include direct damages to structures and their contents, displacement of residents and businesses, and disruption of government services (including roads and infrastructure).

The District's vulnerability to floods is considered relatively high if one of the situations listed above occurs. If a flood event occurs, the entire study area would be inundated. The District would be unable meet its responsibility to provide for the present and long term drainage needs in the planning area. **Table 9** shows the Critical Facilities protected by the District's levees. Note that within the area protected by the District's levees, only one structure has ever been flooded; that incident occurred during Hurricane Harvey in 2017.

**Table 9 – Critical Facilities Protected by the Levee in LID7**

Critical Facilities	Number
Schools	3
Banks	3
Grocery Stores	2
Gas Stations	2
Water and Wastewater Facilities	4

**2.6.7 NFIP Repetitive Loss structures**

As of July 31, 2017, no repetitive loss (RL) structures were located within the boundary of the District.

**2.7 Levee Failure**

A levee a man-made structure; usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water to provide protection from temporary flooding.

Levee failure is a collapse or breach in the earthen structure resulting in the uncontrolled release of water, often resulting in floods that can exceed the 100-year floodplain boundaries. The breach may occur gradually or suddenly. The most dangerous breaches happen quickly, usually during high water. The District is bounded by a "u-levee" rather than a "ring levee". In this situation the levee could fail if water levels in the adjacent Brazos River or Bullhead Bayou are high enough to flow around the end of the levee.

Many factors could lead to the earthen levees being damaged, and therefore compromised. One example is erosion from strong river currents, debris carried by floodwaters, and even large objects such as boats or barges can collide with and gouge the levee. Some animals are known to burrow, creating holes that enable water to pass through, weakening the structure. Any of these weaknesses can lead to a levee breach.

**2.7.1 Levee Failure Location**

The District is responsible for operation and maintenance of the levees protecting the District. The potential levee failure locations can be assumed to be anywhere along the levees shown in **Figure 8**. The levee within the study area is approximately 3.75 miles long and approximately nine feet high. Particular consideration

should be given to the ends of the levees, where water from the adjacent river has the potential to flow around the levee and into the protected neighborhoods.

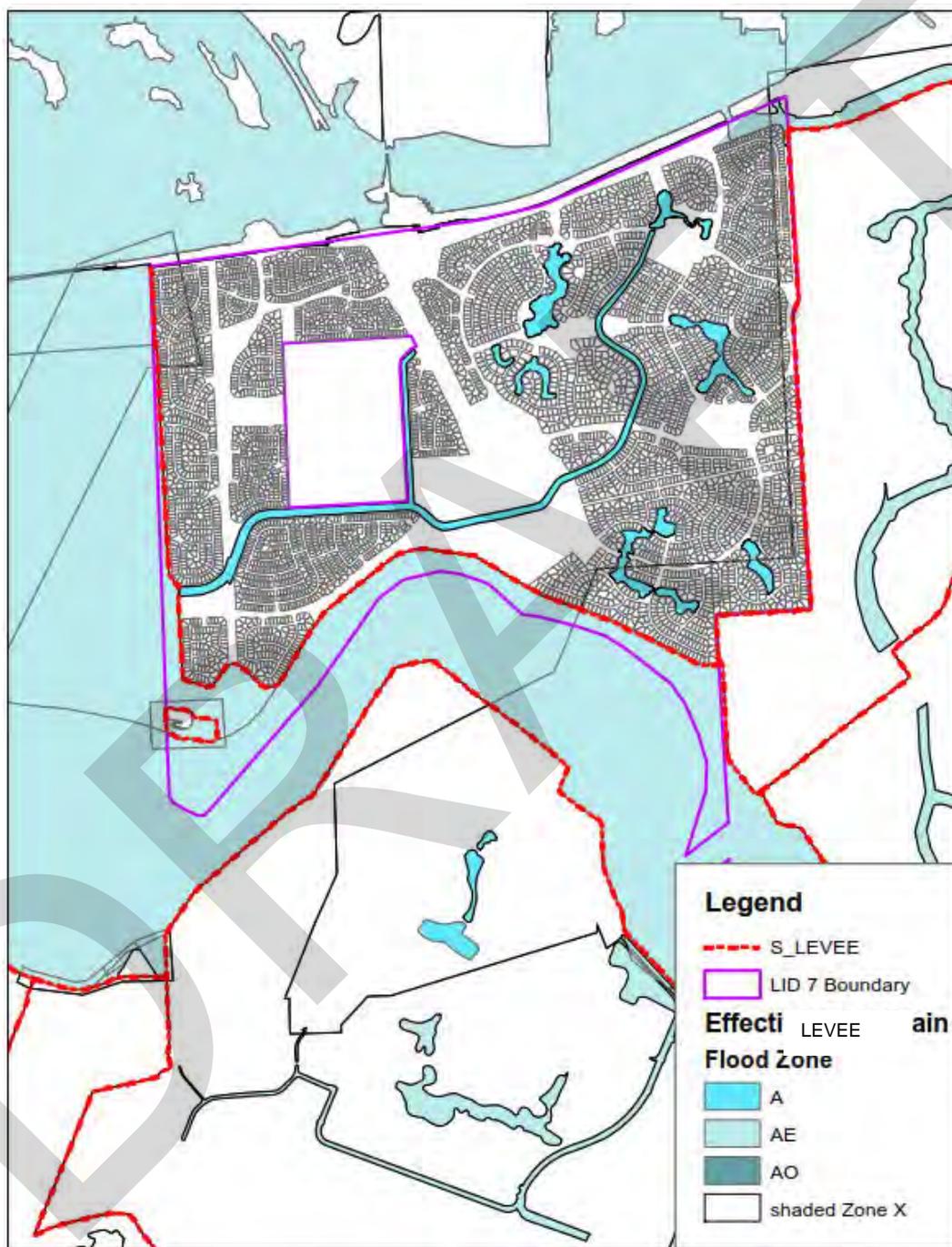


Figure 8 – Location of Levees in the Vicinity of FBCLID 7.

NOTE no levee on North Side

**2.7.2 Extent of Levee Failure**

The extent of levee failure can be determined by assessing the amount of area being protected by the levee, i.e. a greater amount of area being protected offers greater possibility for damage in the event of a failure. In the study area, there are more than 4,600 residences that could potentially be flooded if the levees failed, making the extent of flooding approximately 3.4 square miles.

**2.7.3 Probability and Historical Levee Failure**

<p><b>Probability:</b></p> <p><input type="checkbox"/> High: Event probable in next year.</p> <p><input type="checkbox"/> Medium: Event probable in next 5 years</p> <p><input checked="" type="checkbox"/> Low: Event possible in next 10 years.</p>
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There are no historical levee breaches on record associated with the District’s levee system but this hazard is still considered a possibility, in particular because recent large storm events have caused significant erosion of the banks of the Brazos River, causing it to migrate closer to the levee. There is also concern about the lack of protection on the north side of the District. The u-shape of the existing levee causes vulnerability, since the area protected by the District levees would be inundated if the water level in the Brazos River or Bullhead Bayou were to rise far enough to flow into the neighborhood from the north side. Seasonal flooding as well as cyclical droughts can degrade the levee condition, and the ability to function as the primary flood protection measure.

**2.7.4 Impact and Vulnerability Related to Levee Failure**

Levee failure is the most significant hazard for the District to assess and be prepared for, as it has the potential to make the highest impact on the District’s jurisdiction, and study area. As the District’s responsibility is flood protection, levee failure presents a very substantial secondary hazard of flooding in the event of a levee failure. More details on subsequent flooding found in **Section 2.6.1**.

The Levees must maintain accreditation with FEMA in order for the area to be shown on the map as a Shaded Zone X, a non-special flood hazard area. The loss of accreditation would change the Zone X to a Zone A which would return the entire area to a FEMA “Floodplain”. Within the study area there are more than 4,600 resident parcels currently protected by the levee shown in **Figure 8** above.

## 3 Mitigation Strategy

### 3.1 Mitigation Goals

State and federal guidance and regulations pertaining to mitigation planning require the development of a mitigation goal statement that is consistent with other goals, mission statements, and vision statements. To do so, the District reviewed FEMA's national mitigation goals, several examples of goal statements from other states and communities, and the State of Texas' Mitigation Goal.

#### 3.1.1 Mitigation Goal Statement

The mitigation goals of the District are:

1. To protect public health, safety, and welfare;
2. To reduce losses due to hazards by identifying hazards, minimizing exposure of citizens and property to hazards, and increasing public awareness and involvement;
3. To seek solutions to potential levee safety risks and existing flooding problems;
4. To have shovel ready projects prepared for implementation if/when funding is available through the HMGP.

### 3.2 State of Texas Mitigation Goals

The Texas Division of Emergency Management (TDEM) is designated by the Governor as the state's coordinating agency for disaster preparedness, emergency response, and disaster recovery assistance. TDEM also is tasked to coordinate the State's natural disaster mitigation initiatives and administer grant funding provided by FEMA. A key element in that task is the preparation of the State of Texas Hazard Mitigation Plan. The State's 2007 plan includes a series of mitigation goals, which were augmented as part of the State of Texas' 2013 HMP update (Goal 5 and Goal 6 were added to their Plan Update).

1. Goal 1 - Reduce or eliminate hazardous conditions that may cause loss of life;
2. Goal 2 - Reduce or eliminate hazardous conditions that may inflict injuries;
3. Goal 3 - Reduce or eliminate hazardous conditions that can cause property damages;
4. Goal 4 - Reduce or eliminate hazardous conditions that degrade important natural resources;
5. Goal 5 - Reduce or eliminate repetitive losses due to frequent probability of occurrence; and
6. Goal 6 - Lessen economic impact within communities when hazards occur.

### 3.3 FEMA's Mitigation Goal

FEMA's mitigation strategy is set forth in a document originally prepared in the late 1990s. This strategy is the basis on which FEMA implements mitigation programs authorized and funded by the U.S. Congress. The national mitigation goal Statement is as follows:

- To engender fundamental changes in perception so that the public demands safer environments in which to live and work; and
- To reduce, by at least half, the loss of life, injuries, economic costs, and destruction of natural and cultural resources that result from natural disasters.

### 3.4 Previous Mitigation Actions

This is the first iteration of the Hazard Mitigation Plan for the District. There are no previous mitigation actions to discuss.

### 3.5 Identifying Priority Actions

Each action item identifies an appropriate lead agency for each action, cost effectiveness, a schedule for completion and suggested funding sources. For this Plan, the MPC considered the (STAPLEE) methodology to prioritize mitigation actions. STAPLEE assesses actions based on six general criteria: Social, Technical, Administrative, Political, Legal, Economic, and Environmental. The criteria for prioritization are listed on each individual Mitigation Action Worksheet, in **Appendix F. Table 10** describes the STAPLEE methodology.

**Table 10 – STAPLEE Methodology**

STAPLEE	Criteria Explanation
S – Social	Mitigation actions are acceptable to the community if they do not adversely affect a particular segment of the population, do not cause relocation of lower income people, and if they are compatible with the community's social and cultural values.
T – Technical	Mitigation actions are technically most effective if they provide long-term reduction of losses and have minimal secondary adverse impacts.
A – Administrative	Mitigation actions are easier to implement if the jurisdiction has the necessary staffing and funding.
P – Political	Mitigation actions can truly be successful if all stakeholders have been offered an opportunity to participate in the planning process and if there is public support for the action.
L – Legal	It is critical that the jurisdiction or implementing agency have the legal authority to implement and enforce a mitigation action.
E – Economic	Budget constraints can significantly deter the implementation of mitigation actions. Hence, it is important to evaluate whether an action is cost-effective, as determined by a cost benefit review, and possible to fund.
E - Environmental	Sustainable mitigation actions that do not have an adverse effect on the environment, that comply with Federal, State, and local environmental regulations, and that are consistent with the community's environmental goals, have mitigation benefits while being environmentally sound.

### 3.6 District's Mitigation Actions

All District Mitigation Actions were reported on Mitigation Action Worksheets consistent with associated worksheets to provide further detail seen in **Appendix F**. A summary table of all mitigation actions proposed is shown in **Table 11**. For more detailed descriptions and evaluation of each Mitigation Action, see worksheets in **Appendix F**. Providing that funding is available, the Attorney and the Engineer, as authorized by the Board of Directors, are responsible for administering and implementing the various proposed mitigation actions.

**Table 11 – Proposed District Mitigation Actions**

Number	Mitigation Action	Hazard	Estimated Cost	Time (years)
1	Pump Station Electrical Improvements	Flood, Hurricane & Tropical Storms	\$100,000 - \$500,000	1 - 2 years
2	Northeast / Northwest Levee Improvements	Flood, Hurricane & Tropical Storms, Levee Failure	\$3,000,000	1 - 3 years
3	Outfall Channel Erosion Control Project	Flood, Hurricane & Tropical Storms, Levee Failure	\$3,000,000	1 - 2 years
4	Procure Additional Temporary Pumping Capacity	Flood, Hurricane & Tropical Storms	<\$500,000	1 - 2 years
5	Maintain Ownership of Tiger Dams	Flood, Hurricane & Tropical Storms, Levee Failure	<\$500,000	1 - 2 years
6	Integrate Emergency Notification System through City of Sugar Land	Flood, Hurricane & Tropical Storms, Levee Failure	<\$100,000	1 - 2 years
7	Maintain Website to Disseminate Public Information	Flood, Hurricane & Tropical Storms, Levee Failure	<\$100,000	1 - 2 years
8	North Levee Closure Project	Flood, Hurricane & Tropical Storms, Levee Failure	\$15,000,000	1 – 5 years
9	Pump Station Capacity Enhancement Project	Flood, Hurricane & Tropical Storms	\$7,000,000	1 – 5 years
10	Internal Detention Basin Project	Flood, Hurricane & Tropical Storms	\$7,000,000	1 – 5 years
11	Brazos River Erosion Control Project	Flood, Hurricane & Tropical Storms, Levee Failure	\$55,000,000	1 – 5 years
12	Raise the Existing Levee	Flood, Hurricane & Tropical Storms, Levee Failure	\$25,000,000	5 – 10 years
13	Drainage System Capacity Restoration	Flood, Hurricane & Tropical Storms	\$3,000,000	5 – 10 years

**APPENDIX A: PLANNING TEAM  
MEETINGS**

## FBCLID7 Hazard Mitigation Planning Kick-off meeting

Date: March 1, 2018

### Attendees:

FBCLID7: Jim Grotte, Epi Salazar, Cindy Picazo, Chris Skinner, Matt Reed, Jeff Perry, Stephen Wilcox, Jon Vanderwilt, Michael Walker

AECOM: Ross Gordon

Note that other stakeholders and numerous community residents were also in attendance and participated in the dialogue.

### Agenda:

- I. Introductions
- II. Overview of Hazard Mitigation Planning Process
- III. Mitigation Planning Committee Composition
- IV. Stakeholder Committee Composition
- V. Review of greatest hazard concerns
- VI. Discussion of priority mitigation actions
- VII. Request for supporting data: enabling documents, Emergency Action Plan, list of assets, etc.

## FBCLID7 Hazard Mitigation Planning Workshop

Date: April 5, 2018

### Attendees:

FBCLID7: Jim Grotte, Epi Salazar, Cindy Picazo, Chris Skinner, Matt Reed, Jeff Perry, Stephen Wilcox, Jon Vanderwilt, Michael Walker

AECOM: Ross Gordon

Note that other stakeholders and numerous community residents were also in attendance and participated in the dialogue.

### Agenda:

- I. Overview of hazard mitigation planning process and goals and objectives
- II. Detailed review of draft hazard mitigation plan (page by page)
- III. Finalization of stakeholders to include in outreach, including discussion of previous coordination with Fort Bend County
- IV. Discussion and development of mitigation actions to include in the plan.
- V. Discussion regarding schedule for the review process, public involvement process, and submittals to TDEM and FEMA.

**APPENDIX B: PUBLIC  
INVOLVEMENT**

## FORT BEND COUNTY LEVEE IMPROVEMENT DISTRICT NO. 7

### NOTICE OF PUBLIC MEETING

Notice is hereby given to all interested members of the public that the Board of Directors (the "Board") of the above captioned District will hold a public meeting at The Club of New Territory, 1200 Walker School Road, Sugar Land, Fort Bend County, Texas 77479, said address being a meeting place of the District.

The meeting will be held on *Thursday, March 1, 2018, at 5:00 P.M.*

The Board shall consider and discuss the following matters and take any action necessary or appropriate with respect to such matters:

1. Review and approve the minutes of the January 24, 2018, February 1, 2018, and February 12, 2018, Board meetings;
2. Matters related to Directors Election to be held on May 5, 2018;
3. Matters related to Bond Authorization Election to be held on May 5, 2018, including:
  - a. Community outreach preparations and planning, including review of proposal from Community Awareness Services, Inc.;
4. Engineer's report:
  - a. (i) Authorization of the design, advertisement for bids and/or award of construction contracts or concurrence in the award of a contract for the construction of facilities within the District and acceptance of TEC Form 1295, including status of repairs;
  - (ii) Status of construction contract approval of any change orders and/or acceptance of facilities for operation and maintenance purposes District and acceptance of TEC Form 1295; and
  - (iii) Acceptance of site and/or easement conveyances for facilities constructed or to be constructed for the District;
  - b. Status of Bond Application Report in connection with the District's proposed Bond Issue No. 13; authorize any action necessary in connection therewith;
  - c. Stormwater Drainage Improvements Projects, including:
    - (i) Status of hydraulic and hydrologic modeling of the District;
    - (ii) Status of peer review of hydraulic and hydrologic modeling of the District by AECOM, Inc. ("AECOM");

- (iii) Status of proposed detention facilities project;
    - (iv) Status of planned pumping station improvements and/or proposed new pumping station; and
    - (v) Acquisition of real property rights for construction of improvements;
  - d. North Levee Improvements Projects, including:
    - (i) Status of revised Preliminary Engineering Report;
    - (ii) Acquisition of real property rights for construction of improvements; and
    - (iii) Status of investigation regarding viability of regional levee project;
  - e. Brazos River Bank Erosion Control Project, including:
    - (i) Status of Preliminary Engineering Report; and
    - (ii) Status of construction of joint Erosion Control Wall with the Fort Bend Grand Parkway Toll Road Authority;
  - f. Discuss External Drainage Channel Erosion Control Project, including:
    - (i) Project design, permitting matters and project financing; and
    - (ii) Acquisition of real property rights for the natural channel design improvements;
  - g. Drainage Improvements to relieve flooding at 318 High Meadows Drive and in the High Meadows Subdivision in Fort Bend County Municipal Utility District No. 68 ("No. 68") during heavy rain events, including:
    - (i) Status of Design and Advertisement for Bids of Drainage Improvements; and
    - (ii) Acquisition of real property rights for construction of improvements;
  - h. Status of communications with City of Sugar Land, Texas (the "City") and Fort Bend County, Texas, regarding the City's assumption of Floodplain Administrator Role for New Territory; and
  - i. Interlocal Agreement between the City and the District related to access to storm water drainage outfalls by the City;
- 5. Status of Emergency Application to TCEQ for Approval of Change in Use of Expenditure of Bond Proceeds and Construction Funds to reimburse the General Operating Fund for the purchase of Tiger Dams;

6. Status of financing, design, construction and operation of planned New Territory reclaimed water system, including legal matters related to obtaining the necessary permits and/or authorizations from the TCEQ in connection with said system and other related project matters and acceptance of TEC Form 1295:
  - a. First Amendment to the Reclaimed Water Supply Agreement between the District and the NTRCA to amend the definition of "User Expenses";
  - b. Status of acquisition of real property interests in connection with the planned New Territory reclaimed water system and other related transactional matters; authorize any action necessary in connection therewith;
    - (i) Reclaimed Water Line Easements from NTRCA; and
  - c. Discussion regarding landscaping of Reclaimed Water Plant Site;
7. Operations and maintenance report:
  - a. Status of operation and maintenance of levees and pump station; authorize any action necessary in connection therewith;
  - b. Status of storm drain inspections; authorize any action necessary in connection therewith; and
  - c. Status of installation of lights under Highway 99 overpass along the Ellis Creek drainage ditch;
    - (i) Review and approval of Permit For Attachment of Lighting Fixtures to Right-of-Way by and between the District and Fort Bend County Grand Parkway Toll Road Authority ("FBGPTRA");
8. Status of requests for financial public assistance from governmental agencies, including:
  - a. FEMA for expenses incurred in connection with high-river events in 2016 and Hurricane Harvey in 2017 and potentially the Brazos River Bank Erosion Control Project;
  - b. Status of preparation of Hazard Mitigation Plan;
  - c. USDA Natural Resources Conservation Service in connection with the Brazos River Bank Erosion Control Project and the External Drainage Channel Erosion Control Project; and
  - d. Rebuild Texas for the Brazos River Bank Erosion Control Project;

9. Bookkeeper's report, including financial and investment reports and authorizing the payment of invoices presented; status of establishment of reserve account for capital improvements;
10. Adoption of amended operating budget for the District's fiscal year ending August 31, 2018;
11. Authorize consultants to research unclaimed property and consider authorizing bookkeeper to prepare Unclaimed Property Report as of March 1, 2018;
12. Tax Assessor-Collector report, including status of delinquent tax accounts, authorizing the payment of invoices presented, approving tax refunds and approving the moving of accounts to the uncollectible roll;
13. Report and legal action taken by the District's delinquent tax collection attorneys, including authorizing foreclosure proceedings, installment agreements, and the filing of proofs of claim;
14. Status of compliance with the EPA Phase II Small MS4 General Permit; any training that is necessary under the Storm Water Management Plan; and the taking of any action required in connection therewith;
15. Report regarding activities of the Fort Bend Flood Management Association;
16. Status of website for District and other community communications matters;
17. Public Comments;
18. Attorney's Report;
19. Closed Session pursuant to Open Meetings Act, Texas Government Code, Sections 551.071 to consult with the District's attorney regarding matters protected by attorney-client privilege, and/or Section 551.072 to discuss acquisition of real property interests, if necessary;
20. Reconvene in Open Session and authorize any action resulting from matters discussed in Closed Session; and
21. Matters for possible placement on future agendas.



(SEAL)

SCHWARTZ, PAGE & HARDING, L.L.P.

By:   
Christopher P. Skinner  
Attorney for the District

*Persons with disabilities who plan to attend this meeting and would like to request auxiliary aids or services are requested to contact the District's attorney at (713) 623-4531 at least three business days prior to the meeting so that appropriate arrangements can be made.*

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DRAFT

## FORT BEND COUNTY LEVEE IMPROVEMENT DISTRICT NO. 7

### NOTICE OF PUBLIC MEETING

Notice is hereby given to all interested members of the public that the Board of Directors (the "Board") of the above captioned District will hold a public meeting at the City Hall of The City of Sugar Land, Texas, 2700 Town Center Boulevard, Sugar Land, Fort Bend County, Texas, 77479, said address being a meeting place of the District.

The meeting will be held on *Thursday, April 5, 2018, at 5:00 P.M.*

The Board shall consider and discuss the following matters and take any action necessary or appropriate with respect to such matters:

1. Review and approve the minutes of the March 1, 2018, Board meeting;
2. Matters related to Directors Election to be held on May 5, 2018;
3. Matters related to Bond Authorization Election to be held on May 5, 2018, including preparations and planning for Community outreach event to be held on April 24, 2018, at the Club at New Territory;
4. Engineer's report:
  - a.
    - (i) Authorization of the design, advertisement for bids and/or award of construction contracts or concurrence in the award of a contract for the construction of facilities within the District and acceptance of TEC Form 1295, including status of repairs;
    - (ii) Status of construction contract approval of any change orders and/or acceptance of facilities for operation and maintenance purposes District and acceptance of TEC Form 1295; and
    - (iii) Acceptance of site and/or easement conveyances for facilities constructed or to be constructed for the District;
  - b. Status of Bond Application Report in connection with the District's proposed Bond Issue No. 13; authorize any action necessary in connection therewith;
  - c. Stormwater Drainage Improvements Projects, including:
    - (i) Status of hydraulic and hydrologic modeling of the District;
    - (ii) Status of peer review of hydraulic and hydrologic modeling of the District by AECOM, Inc. ("AECOM");
    - (iii) Status of proposed detention facilities project;
    - (iv) Status of planned pumping station improvements and/or proposed new pumping station; and

- (v) Acquisition of real property rights for construction of improvements;
  - d. North Levee Improvements Projects, including:
    - (i) Status of revised Preliminary Engineering Report;
    - (ii) Acquisition of real property rights for construction of improvements; and
    - (iii) Status of investigation regarding viability of regional levee project;
  - e. Brazos River Bank Erosion Control Project, including:
    - (i) Status of Preliminary Engineering Report; and
    - (ii) Status of construction of joint Erosion Control Wall with the Fort Bend Grand Parkway Toll Road Authority;
  - f. Discuss External Drainage Channel Erosion Control Project, including:
    - (i) Project design, permitting matters and project financing; and
    - (ii) Acquisition of real property rights for the natural channel design improvements;
  - g. Drainage Improvements to relieve flooding at 318 High Meadows Drive and in the High Meadows Subdivision during heavy rain events, including:
    - (i) Status of Design and Advertisement for Bids of Drainage Improvements; and
    - (ii) Acquisition of real property rights for construction of improvements;
  - h. Status of communications with City of Sugar Land, Texas (the "City") and Fort Bend County, Texas, regarding the City's assumption of Floodplain Administrator Role for New Territory;
  - i. Interlocal Agreement between the City and the District related to access to storm water drainage outfalls by the City; and
  - j. Discussion regarding financing of projects through the Texas Water Development Board's Clean Water State Revolving Fund program;
5. Status of Emergency Application to TCEQ for Approval of Change in Use of Expenditure of Bond Proceeds and Construction Funds to reimburse the General Operating Fund for the purchase of Tiger Dams;

6. Status of financing, design, construction and operation of planned New Territory reclaimed water system, including legal matters related to obtaining the necessary permits and/or authorizations from the TCEQ in connection with said system and other related project matters and acceptance of TEC Form 1295:
  - a. Status of acquisition of real property interests in connection with the planned New Territory reclaimed water system and other related transactional matters; authorize any action necessary in connection therewith;
    - (i) Reclaimed Water Line Easements from NTRCA; and
  - b. Discussion regarding landscaping of Reclaimed Water Plant Site;
7. Operations and maintenance report:
  - a. Status of operation and maintenance of levees and pump station; authorize any action necessary in connection therewith;
  - b. Status of storm drain inspections; authorize any action necessary in connection therewith; and
  - c. Status of installation of lights under Highway 99 overpass along the Ellis Creek drainage ditch;
    - (i) Review and approval of Permit For Attachment of Lighting Fixtures to Right-of-Way by and between the District and Fort Bend County Grand Parkway Toll Road Authority ("FBGPTRA");
8. Status of requests for financial public assistance from governmental agencies, including:
  - a. FEMA for expenses incurred in connection with high-river events in 2016 and Hurricane Harvey in 2017 and potentially the Brazos River Bank Erosion Control Project;
  - b. **Status of preparation of Hazard Mitigation Plan;**
  - c. USDA Natural Resources Conservation Service in connection with the Brazos River Bank Erosion Control Project and the External Drainage Channel Erosion Control Project; and
  - d. Rebuild Texas for the Brazos River Bank Erosion Control Project;
9. Bookkeeper's report, including financial and investment reports and authorizing the payment of invoices presented; status of establishment of reserve account for capital improvements;

10. Tax Assessor-Collector report, including status of delinquent tax accounts, authorizing the payment of invoices presented, approving tax refunds and approving the moving of accounts to the uncollectible roll;
11. Report and legal action taken by the District's delinquent tax collection attorneys, including authorizing foreclosure proceedings, installment agreements, and the filing of proofs of claim;
12. Adoption of Resolution Authorizing an Additional Penalty on Delinquent Real Property Taxes and authorize the delinquent tax attorney to pursue the collection of delinquent real property taxes beginning July 1, 2018, including the filing of lawsuits, as necessary;
13. Status of compliance with the EPA Phase II Small MS4 General Permit; any training that is necessary under the Storm Water Management Plan; and the taking of any action required in connection therewith;
14. Report regarding activities of the Fort Bend Flood Management Association;
15. Status of website for District and other community communications matters;
16. Public Comments;
17. Attorney's Report;
18. Closed Session pursuant to Open Meetings Act, Texas Government Code, Sections 551.071 to consult with the District's attorney regarding matters protected by attorney-client privilege, and/or Section 551.072 to discuss acquisition of real property interests, if necessary;
19. Reconvene in Open Session and authorize any action resulting from matters discussed in Closed Session; and
20. Matters for possible placement on future agendas.

SCHWARTZ, PAGE & HARDING, L.L.P.



By: Christopher T. Skinner  
 Christopher T. Skinner  
 Attorney for the District

***Persons with disabilities who plan to attend this meeting and would like to request auxiliary aids or services are requested to contact the District's attorney at (713) 623-4531 at least three business days prior to the meeting so that appropriate arrangements can be made.***

## Lambert, Sarah

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Subject: REMINDER: FBCLID7 HMP Stakeholder WebEx  
Location: Online WebEx

Start: Thu 4/19/2018 9:00 AM  
End: Thu 4/19/2018 10:00 AM

Recurrence: (none)

Meeting Status: Meeting organizer

Organizer: Lambert, Sarah  
Required Attendees: Lambert, Sarah; executivedirector@newterritory.org; Gordon, Ross; jalba@sugarlandtx.gov; csteubing@sugarlandtx.gov; dbrinkley@sugarlandtx.gov; phughes@sugarlandtx.gov; jeff.braun@fortbendcountytexas.gov; doug.barnes@fortbendcountytexas.gov; richard.stolleis@fortbendcountytexas.gov; mark.vogler@fortbendcountytexas.gov; mikestone@mikestoneassociates.com; fbclid17@gmail.com; jring@odysseyeg.com; information@brazos.org; davidc@brazos.org; MUD121@riverparkwestonline.org; cskinner@sphllp.com; j.perry@leveemanagementservices.com; mreed@sphllp.com; swilcox@costelloinc.com; jvanderwilt@costelloinc.com; simon@tritoncg.com; ops\_man2005@hotmail.com; Michael Willett  
Optional Attendees: Jason Kelly; Ashley Ramos; Greg Baird

All,

Fort Bend County Levee Improvement District No. 7 ("The District") is in the process of creating a Hazard Mitigation Plan. The Plan will assist the District in its preparedness for natural hazards, and in mitigating damages that can result therefrom. Additionally, the Plan will allow the District to become eligible for federal and state funding in the event of natural disasters, in particular related to Hurricane Harvey.

Our Mitigation Planning Committee would like to invite you to attend a Hazard Mitigation Plan Stakeholder Meeting scheduled for Thursday April 19, 2018 at 9:00 a.m. The meeting will be held online, using WebEx. Information for logging into the meeting can be found below.

The goal of the planning meeting, which is not expected to last more than one hour, is to update you on the District's hazard mitigation planning efforts, including specific projects the District is considering, and to explore opportunities for coordination between entities. This input will be incorporated into the District's official planning document.

Please let me know by replying to this invite if you are able to participate in the District's Hazard Mitigation Plan online stakeholder meeting. We greatly appreciate your consideration of this request and involvement in this process. Thank you!

Sincerely,

**Sarah Lambert, PE, CFM**  
Project Manager, Water  
D +1-281-675-1789  
M +1-832-891-7693  
[sarah.lambert@aecom.com](mailto:sarah.lambert@aecom.com)

**AECOM**  
19219 Katy Freeway  
Suite 100  
Houston, Texas 77094, USA  
T +1-281-646-2400  
[aecom.com](http://aecom.com)

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### [Join WebEx meeting](#)

Meeting number (access code): 591 224 731  
Host key: 221866  
Meeting password: NxvHSQM2

Join from a video system or application

Dial [591224731@aecom.webex.com](tel:591224731@aecom.webex.com)

Join by phone

+1 602 585 0123 US Toll

1 844 712 3247 US Toll Free

[Global call-in numbers](#) | [Toll-free calling restrictions](#)

Can't join the meeting? [Contact support.](#)



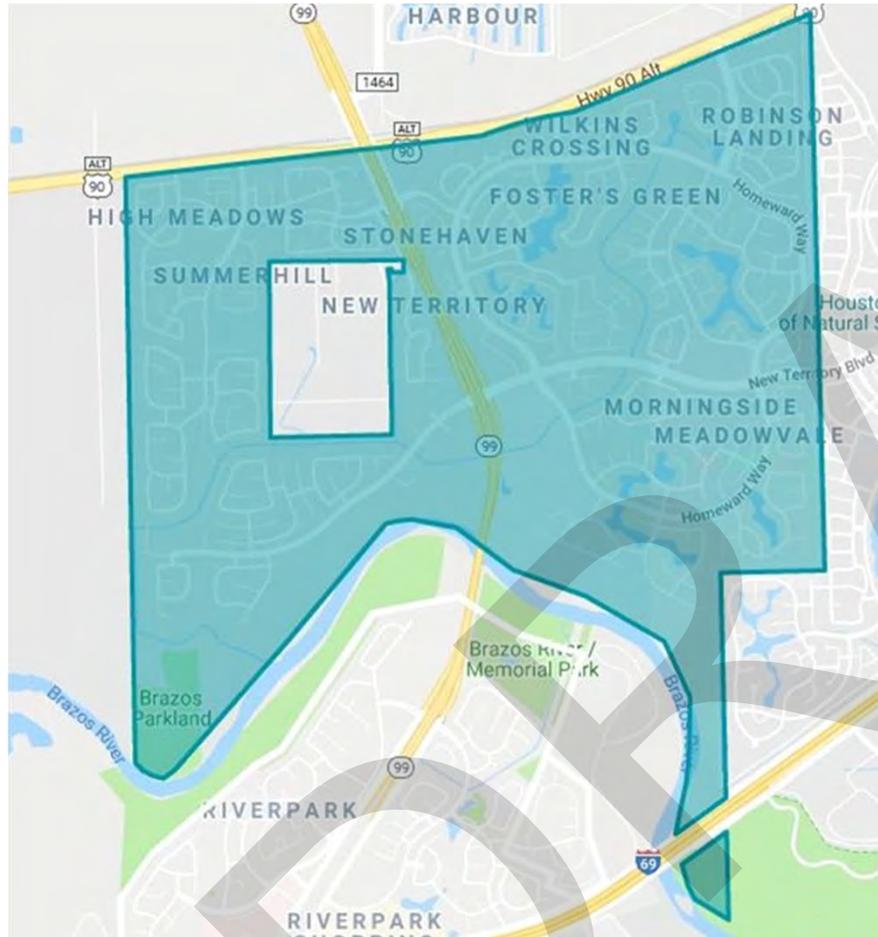
**AECOM**

Fort Bend County  
Levee Improvement District No. 7  
Hazard Mitigation Plan

Stakeholder Meeting

April 19, 2018

# INTRODUCTIONS



- Fort Bend County Levee Improvement District No. 7 (LID 7)
- Participating Stakeholders

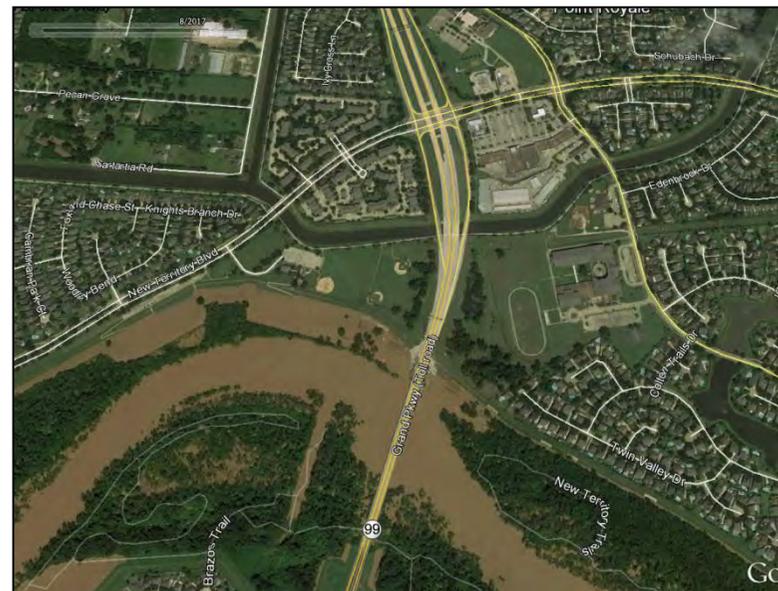
# GOALS FOR MEETING

- Notify stakeholders of LID 7's hazard mitigation planning efforts
- Update stakeholders on projects under consideration by LID 7
- Discuss opportunities for coordination or collaboration
- Review schedule for remaining hazard mitigation planning steps

LID 7

# RECENT DISASTERS

- Hurricane Harvey (2017)
- Tax Day Flood (2016)
- Memorial Day Floods (2015 and 2016)



# HAZARD MITIGATION PLAN (HMP) CREATION

- HMP Needed To Establish Eligibility For FEMA Funding
- Plan to include the following hazards:
  - Flooding
  - Hurricane/Tropical Storm
  - Levee Failure
- Identifies potential mitigation activities to be considered
- Must be integrated into broader regional hazard mitigation efforts



## Local Mitigation Planning Handbook

March 2013



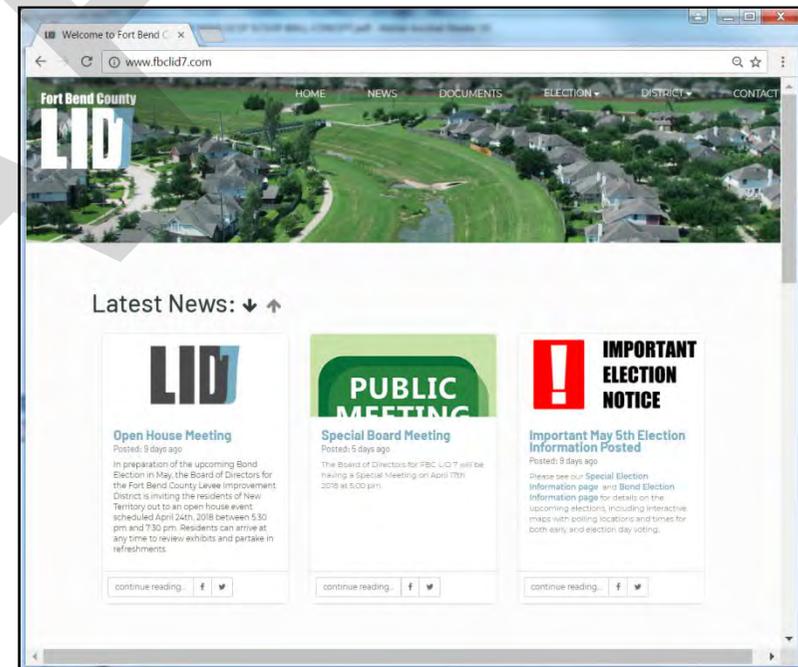
# POTENTIAL MITIGATION ACTIVITIES

## Capital Projects

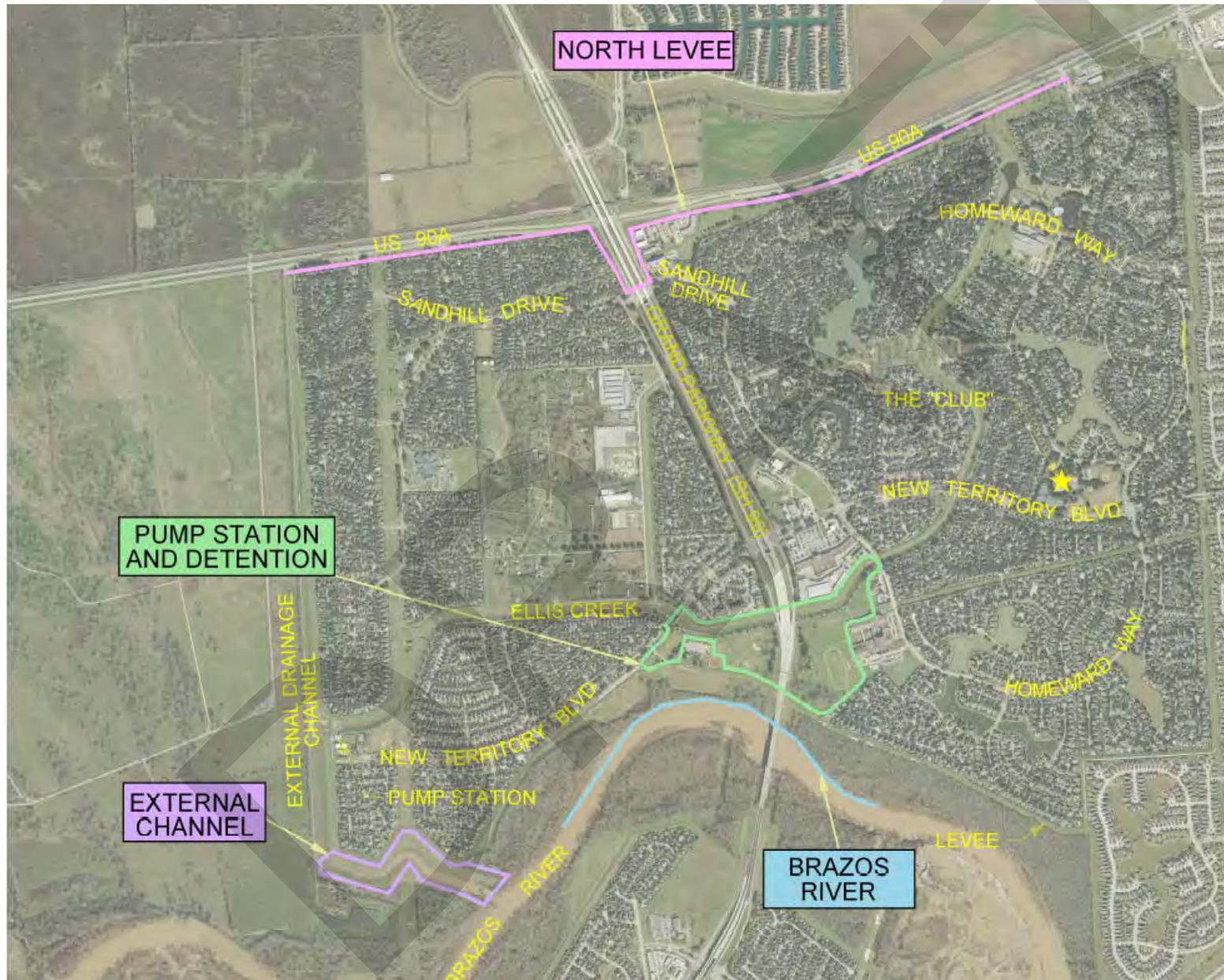
- Brazos River Bank Stabilization
- North Levee Closure
- Pump Station / Detention Improvements
- External Channel Erosion Repair

## Other Activities

- Communication Improvements
- Temporary Protection Measures



# POTENTIAL MITIGATION ACTIVITIES



# SCHEDULE

- Finalize HMP Draft – April / May
- First Public Meeting – May 15<sup>th</sup>, 2018 5 pm (tentative)
- Second Public Meeting – June 12<sup>th</sup>, 2018 5 pm (tentative)
- Finalize HMP and Submit to TDEM – June / July



# OPPORTUNITIES FOR INPUT

- Discussion today
- Separate discussion with AECOM or LID 7 Directors
- Review and comment on Draft HMP (to be posted on the LID 7 website)
- Discussion at Public Meeting #1
- Discussion at Public Meeting #2



# DISCUSSION / QUESTIONS

sarah.lambert@aeacom.com  
ross.gordon@aeacom.com

<http://www.fbclid7.com/>

# **Fort Bend County Levee Improvement District No. 7 Notice of Public Hearing on Hazard Mitigation Plan Creation**

The purpose of Fort Bend County Levee Improvement District No. 7 (“LID 7”) is to construct and maintain certain levee and drainage improvements to provide protection to the land and improvements of residential and commercial property owners in New Territory from flooding from the Brazos River. LID 7 is in the process of creating the District’s Hazard Mitigation Plan. The plan will identify local policies and actions for reducing risk and future losses from natural hazards. To remain eligible for certain federal funding associated with natural hazards, the plan must be created, approved, and updated every five years.

Numerous other local governmental stakeholders are assisting LID 7 in the Hazard Mitigation Plan. However, it is also vital and very helpful that LID 7 have public input regarding the creation of the Hazard Mitigation Plan in all respects, including the identification of natural hazards, mitigation goals, strategies and possible mitigation actions.

LID 7 is inviting the public to participate and provide input into the creation of the Hazard Mitigation Plan in one or both of the following ways:

1. By reviewing the Hazard Mitigation Plan Update that can be found on the LID 7 website: <http://www.fbclid7.com/>
2. By attending a Public Hearing that is scheduled for Tuesday, May 15, 2018 at 5:00 p.m. at the Sugar Land City Hall, 2700 Town Center Blvd N, Sugar Land, TX 77479. At the Public Hearing there will be an opportunity for any member of the public to review the draft Hazard Mitigation Plan, and to discuss mitigation strategies.

LID 7 appreciates and thanks all persons and other local governmental entities who are assisting and providing input in regard to the creation of the LID’s Hazard Mitigation Plan.

**APPENDIX C: ADOPTION  
RESOLUTION FOR THE  
DISTRICT**

**TO BE ADDED AFTER  
ADOPTION OF THE  
PLAN BY THE BOARD**

**APPENDIX D: FEMA  
APPROVAL LETTER**

TO BE ADDED AFTER  
APPROVAL OF THE  
PLAN BY FEMA

## APPENDIX E: SOURCES

## Sources<sup>1</sup>

Table 4 – 2010 Population of Plan Area: US Census Bureau

Table 5 – Declared Emergencies and Major Disasters in Fort Bend County: FEMA, Disaster Declaration Summary Database

Table 6 – Classification of Tropical Cyclones: NCEI Storm Events Database

Table 7 – Saffir/Simpson Hurricane Scale: NCEI Storm Events Database

Table 8 – Historical Hurricane and Tropical Storm Events in Fort Bend County from 1998-2017: NCEI Storm Events Database

Figure 4 – Depth of Precipitation for 100-Year Storm for 7-Day Duration in Texas: USGS Rainfall Atlas

Figure 5 – Historical Hurricanes and Tropical Storms in Fort Bend County: NOAA

Figure 6 – Effective Floodplains: FEMA

Figure 7 – Depth of Precipitation for 100-Year, 6-Hour Duration: USGS Rainfall Atlas

Note <sup>1</sup> - If a source is not listed in this appendix, it is assumed that the Table or Figure was created based on District data and created specifically for this plan.

**APPENDIX F: MITIGATION  
ACTION WORKSHEETS**

### Mitigation Action #1

<b>Proposed Action:</b>	<b>Existing Pump Station Electrical Improvements</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure Projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	High
<b>Estimated Cost:</b>	\$100,000 - \$500,000
<b>Potential Funding Sources:</b>	Bond Funds / Operating Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 2 years

<b>COMMENTS</b>
<p>The purpose of this mitigation action is to improve the existing pump station that is situated behind the levee and ensures that the internal drainage system in the community functions effectively. The action would make electrical upgrades which, among other things, would allow the on-site generator to power all four pumps, instead of three, in the event of a power outage. This will increase the resiliency of the pump station during adverse conditions.</p>
<p><b>Additional Considerations:</b>          The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>
<p>Socially Acceptable = 5; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 5; Economically Sound = 4; and Environmentally Sound = 5</p>

### Mitigation Action #2

<b>Proposed Action:</b>	<b>Northeast / Northwest Levee Improvements</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure Projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms, Levee Failure
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	High
<b>Estimated Cost:</b>	\$3,000,000
<b>Potential Funding Sources:</b>	Bond Funds / Operating Funds / Grant Funding
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 3 years

<b>COMMENTS</b>
<p>The purpose of this mitigation action is to reduce the risk of flood waters entering the community at the northeast and northwest corners of the district during a severe flood event. The proposed action would construct levees or floodwalls at the northeast and northwest corners of the district, tying into the existing levees which currently terminate at US-90A.</p>
<p><b>Additional Considerations:</b>            The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>
<p>Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4</p>

### Mitigation Action #3

<b>Proposed Action:</b>	<b>Outfall Channel Erosion Control Project</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure Projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms, Levee Failure
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	High
<b>Estimated Cost:</b>	\$3,000,000
<b>Potential Funding Sources:</b>	Grant Funding / Bond Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 2 years

<b>COMMENTS</b>	
<p>High flows in the outfall channel during recent storm events, including Hurricane Harvey in 2017, have caused significant erosion in the downstream section of the outfall channel, prior to its discharge into the Brazos River. Continued erosion of the channel could cause damage to the adjacent levee. This action will serve to repair the damage from Harvey and protect the channel from erosion during future high-flow events using natural channel design principles.</p>	
<b>Additional Considerations:</b>	
<p>The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p> <p>Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 4; and Environmentally Sound = 4</p>	

### Mitigation Action #4

<b>Proposed Action:</b>	<b>Procure Additional Temporary Pumping Capacity</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure Projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	High
<b>Estimated Cost:</b>	< \$500,000
<b>Potential Funding Sources:</b>	Operating Funds / Grant Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 2 years

<b>COMMENTS</b>	
<p>The district currently has two temporary pumps on call which can be deployed in the event of an emergency. Temporary pumping capacity has proven to be a valuable and cost effective approach to managing risk during severe events. The proposed action would procure an additional four temporary pumps which can be deployed if needed during a severe flood event. These pumps would be placed within areas of the community known to flood most frequently.</p>	
<b>Additional Considerations:</b>	
<p>The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>	
<p>Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5</p>	

### Mitigation Action #5

<b>Proposed Action:</b>	<b>Maintain Ownership of Tiger Dams</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure Projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms, Levee Failure
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	High
<b>Estimated Cost:</b>	< \$500,000
<b>Potential Funding Sources:</b>	Grant Funding / Operating Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 2 years

<b>COMMENTS</b>	
<p>During Hurricane Harvey, the District procured Tiger Dams to provide an additional layer of protection along the north side of the community. Tiger Dams are portable temporary flood barriers (water filled bladders), which can be connected together to seal off areas which may be at risk for flooding. The proposed action would maintain ownership of these Tiger Dams, storing them in a nearby storage facility, for continued use in future flood events as needed.</p>	
<b>Additional Considerations:</b>	
<p>The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>	
<p>Socially Acceptable = 3; Technically Feasible = 4; Administratively Possible = 5; Politically Acceptable = 5; Legal = 5; Economically Sound = 5; and Environmentally Sound = 5</p>	

**Mitigation Action #6**

<b>Proposed Action:</b>	<b>Integrate Emergency Notification System through City of Sugar Land</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Education and Awareness

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms, Levee Failure
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	Moderate
<b>Estimated Cost:</b>	< \$100,000
<b>Potential Funding Sources:</b>	Grant Funding / Operating Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 2 years

<b>COMMENTS</b>
<p>The purpose of this action is to allow emergency notifications relevant to FBCLID7 to be deployed or published through the existing City of Sugar Land emergency notification system. This will ensure wide distribution of the notifications as most residents already subscribe to the City of Sugar Land alerts. It is more cost effective than developing a second emergency alert system for the District alone. This will build upon existing distribution systems currently utilized through the New Territory Residential Community Association.</p>
<p><b>Additional Considerations:</b>          The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>
<p>Socially Acceptable = 5; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 5</p>

### Mitigation Action #7

<b>Proposed Action:</b>	<b>Maintain Website to Disseminate Public Information</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Education and Awareness

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms, Levee Failure
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	Moderate
<b>Estimated Cost:</b>	< \$100,000
<b>Potential Funding Sources:</b>	Grant Funding / Operating Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 2 years

<b>COMMENTS</b>
<p>It is of key importance to the District to maintain clear and open communication with its constituents and to engage them in the mitigation planning and preparation process. The creation of a website to be used to provide and receive information to and from community residents is a vital part of that effort. This proposed action would support creation of the website and continued maintenance and operation of the website.</p>
<p><b>Additional Considerations:</b>            The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>
<p>Socially Acceptable = 5; Technically Feasible = 5; Administratively Possible = 4; Politically Acceptable = 5; Legal = 4; Economically Sound = 5; and Environmentally Sound = 5</p>

### Mitigation Action #8

<b>Proposed Action:</b>	<b>North Levee Closure Project</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms, Levee Failure
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	High
<b>Estimated Cost:</b>	\$15,000,000
<b>Potential Funding Sources:</b>	Grant Funding / Bond Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 5 years

<b>COMMENTS</b>
<p>The existing levee system surrounds the community on three sides, but the fourth (north) side does not have levee protection as it ties into higher ground. In an extreme event it is possible that the water level in the Brazos River or Bullhead Bayou could rise enough that water could begin to spill around the ends of the existing levee, resulting in potential flooding in the community. This proposed action would construct levees or flood walls along the entire north side of the community to close the levee system and protect the community on all sides. Alternatives approaches to preventing water from entering the community on the north side would also be considered</p>
<p><b>Additional Considerations:</b>            The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>
<p>Socially Acceptable = 4; Technically Feasible = 3; Administratively Possible = 3; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4</p>

### Mitigation Action #9

<b>Proposed Action:</b>	<b>Pump Station Capacity Enhancement Project</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	High
<b>Estimated Cost:</b>	\$7,000,000
<b>Potential Funding Sources:</b>	Grant Funding / Bond Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 5 years

<b>COMMENTS</b>
<p>The District proposes to construct a second pump station to improve performance of the internal drainage system in events where gravity discharge is restricted, and the community relies on pumping capacity to keep internal water levels at an acceptable level. This would reduce street ponding and the potential for structural flooding during extreme events</p>
<p><b>Additional Considerations:</b>                  The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>
<p>Socially Acceptable = 5; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 3; and Environmentally Sound = 4</p>

**Mitigation Action #10**

<b>Proposed Action:</b>	<b>Internal Detention Basin Project</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	Moderate
<b>Estimated Cost:</b>	\$7,000,000
<b>Potential Funding Sources:</b>	Grant Funding / Bond Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 5 years

<b>COMMENTS</b>
<p>The District proposes to construct new detention capacity within the community. This could be in the form of a new detention basin, or by increasing storage capacity within existing channels or lakes. This would reduce street ponding and potential for structure flooding during extreme events.</p>
<p><b>Additional Considerations:</b>          The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>
<p>Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4</p>

### Mitigation Action #11

<b>Proposed Action:</b>	<b>Brazos River Erosion Control Project</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms, Levee Failure
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	High
<b>Estimated Cost:</b>	\$55,000,000
<b>Potential Funding Sources:</b>	Grant Funding / Bond Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	1 - 5 years

<b>COMMENTS</b>	
<p>Significant erosion of the Brazos River bank has occurred near the Grand Parkway bridge during recent storm events. The current minimum distance from the bank to the levee is approximately 200 feet, and over 180 feet of bank has been lost in the past 3 years. This mitigation action would prevent future erosion and loss of river bank that could lead to levee failure and the potential for flooding throughout New Territory during a future extreme flood event on the Brazos River. The action will utilize river training structures, engineered scour protection, and armored slopes to divert energy away from the outer bank, reduce scour potential, and prevent continued bank erosion.</p>	
<p><b>Additional Considerations:</b>                  The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>	
<p>Socially Acceptable = 5; Technically Feasible = 4; Administratively Possible = 3; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4</p>	

### Mitigation Action #12

<b>Proposed Action:</b>	<b>Raise the Existing Levee</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms, Levee Failure
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	Moderate
<b>Estimated Cost:</b>	\$25,000,000
<b>Potential Funding Sources:</b>	Grant Funding / Bond Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	5 - 10 years

<b>COMMENTS</b>
At some point in the future, it may be necessary to consider raising the elevation of the existing levee system. This could be driven by future revisions to FEMA floodplain maps and hydraulic models, which may necessitate a higher levee elevation to meet recommended freeboard requirements.
<b>Additional Considerations:</b> The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)
Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 3; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 4

### Mitigation Action #13

<b>Proposed Action:</b>	<b>Drainage System Capacity Restoration</b>
<b>BACKGROUND INFORMATION</b>	
<b>Jurisdiction/Location:</b>	FBCLID7
<b>Risk Reduction Benefit:</b>	Flood risk reduction for benefitted properties
<b>Type of Action</b> ( <i>Local Plans and Regulations, Structure and Infrastructure projects, Natural System Protection, or Education and Awareness</i> )	Structure and Infrastructure projects

<b>MITIGATION ACTION DETAILS</b>	
<b>Hazard(s) Addressed:</b>	Flood, Hurricane & Tropical Storms, Levee Failure
<b>Effect on New/Existing Buildings:</b>	Reduce risk to existing and future structures
<b>Priority (High, Moderate, Low):</b>	Moderate
<b>Estimated Cost:</b>	\$3,000,000
<b>Potential Funding Sources:</b>	Grant Funding / Bond Funds
<b>Lead Agency/Department Responsible:</b>	FBCLID7
<b>Implementation Schedule:</b>	5 - 10 years

<b>COMMENTS</b>	
<p>At some point in the future, it may be necessary to remove sediments deposited within the existing conveyance system. This deposition occurs naturally over time, but can lead to reduced conveyance capacity which can impact performance of the drainage system. Removal of these sediments would improve performance of the drainage system.</p>	
<p><b>Additional Considerations:</b>                  The following STAPLEE criteria were evaluated on a scale of 1 to 5 indicating the extent to which this action satisfies each consideration. (1= Does Not Satisfy 3 = Moderately Satisfies 5 = Strongly Satisfies)</p>	
<p>Socially Acceptable = 4; Technically Feasible = 4; Administratively Possible = 4; Politically Acceptable = 4; Legal = 4; Economically Sound = 4; and Environmentally Sound = 3</p>	