Spring 2018

Fort Bend County Levee Improvement District No. 2

Hurricane Harvery Response & Recovery

Hurricane Harvey produced more than 31 inches of rain in the areas of Sugar Land, Texas protected by Fort Bend County Levee Improvement District No. 2 (FBCLID 2), flooding over 200 homes and coming within inches of flooding hundreds more. Harvey also produced a modern flood record on the Brazos River, and thousands of homes were protected from even deeper flood waters by FBCLID 2. Harvey produced two different floods for the residents of FBCLID 2, and any attempt to prevent future home flooding starts with a close look at what happened during the last week of August 2017.

Friday, August 25 /Saturday, August 26

Harvey made landfall in Rockport, TX on Friday evening and produced a little more than 2 inches of rainfall inside FBCLID 2 throughout the day. At the same time the Brazos River was also flowing at a typical level, far below flood stage. Under these normal conditions rainfall runoff within FBCLID 2 flows through City streets and storm sewers, into FBCLID 2 ditches, and out of the District through large flood gates in the levee en route to the Brazos River. This normal gravity drainage continued throughout Saturday as another 8 inches of rain fell on Sugar Land and Harvey slowly moved inland 100 miles to the south.

Sunday, August 27

On Sunday 12 more inches of persistent rainfall caused the Brazos River to begin rising towards flood levels. As the river rises the flood gates in the FBCLID 2 levee begin to close, and eventually the flood gates are sealed shut by water pressure when the Brazos River water level outside the levee is higher than the ditch water level inside the levee. The flood gates are not operated by a person or computer, but instead rely on gravity and water pressure to keep out the rising river. However, after the flood gates close the protection provided by the levee can also be compared to a bathtub with the drain plugged that will be filled up by any water that falls inside. This restriction on water easily flowing out of the District started to occur during the day Sunday, and the flood gates closed for the duration of Harvey just after midnight early Monday morning. When gravity can no longer move rainfall outside the levee and FBCLID 2 becomes a plugged bathtub, then every drop of rain that falls inside the levee must be pumped out. At 1:25 am early Monday morning FBCLID 2 turned on the 250,000 gallon per minute Bill Little Pump Station and started removing water from behind the levee.

Monday, August 28/Tuesday, August 29

As Monday started, Harvey had already produced 22 inches of rain in Sugar Land over just three days. While some of this rainfall flowed out of the levee under gravity flow, the remaining runoff filled almost 70% of drainage storage inside the levee when the pump station was turned on. Nine more inches of rain would fall on Monday and early Tuesday after the flood gates closed, requiring more than a billion gallons of water to ultimately be pumped out of the levee. The continued, persistent rainfall and full drainage system far exceeded the capacity of the pump station and late on Monday night water began entering homes. Flood waters remained inside homes for 12-18 hours, at an average depth of 1-2 inches, until Tuesday afternoon. During this

Public Meeting Notice

Hurricane Harvey Recovery

Fort Bend County Levee Improvement District No. 2

City of Sugar Land
Wednesday, April 4, 2018 – 6:00 p.m.
Sugar Land City Hall
City Council Chamber
2700 Town Center Blvd. North
Sugar Land, TX 77479

same period, hundreds of more homes were also within inches of flooding and most city streets were impassible. The rain finally slowed to a stop on Tuesday allowing the pump station to catch up and water to recede out of homes by Tuesday afternoon.

Wednesday, August 30/Thursday, August 31

On Wednesday, while Hurricane Harvey has made its second landfall in Cameron, LA, the FBCLID 2 pump station removed enough water to make most local streets passible again. By Thursday, the FBCLID 2 drainage system was emptied and the pump station turned off. At the same time the Brazos River crested, setting a modern flood record at the Richmond, TX river gage of 55.19 feet. The previous record occurred only a year prior during the 2016 Memorial Day flood (54.74 feet - June 2, 2016). Following Harvey, Brazos River flood waters reached an elevation of 72.3 feet above sea level on the FBCLID 2 levees. The lowest segment of the levee is 80 feet above sea level, leaving almost 8 feet of freeboard for additional flood protection when the Brazos crested. For a few days during Harvey the Brazos River was forecasted to reach an even higher crest of 59 feet at the Richmond river gage, which still would leave 3-4 feet of freeboard as flood protection for FBCLID 2. Although over 200 homes experienced flooding from Harvey's persistent rainfall inside the levee, thousands of structures were still protected from the flood waters of the Brazos River. For comparison the highest Brazos River elevation outside the levee (72.3 feet), was almost 6 feet higher than that worst water elevations inside the District (66.4 feet).

Hurricane Harvey Response

Immediately following Harvey, FBCLID 2 partnered with the City of Sugar Land and engaged a third-party engineering firm, Freese & Nichols, to analyze drainage system performance during the flood. The study included both City streets and storm sewers and FBCLID 2 ditches and pump stations. The study focused on the neighborhoods where homes flooded to determine the cause and identify possible solutions to eliminate future flooding. The report states that, "[t]he only scenario that would result in a reduction of the peak water surface elevation involves additional pump capacity." For FBCLID 2 to keep water out of homes during the next storm like Harvey, a new pump station will need to be constructed. The District is already working with an engineering firm to produce a preliminary engineering report regarding the construction of a new pump station. Based on an initial evaluation, the capacity of the new pump station could be up to 3 times greater than the existing facility in order to handle future flood levels and meet modern design requirements. A new pump station design will be complete and ready for bidding by the start of 2019. At the same time, the District will also engage another engineering firm to evaluate any other drainage system improvements, besides additional pump capacity, that can reasonably reduce future flood risks. This study will examine the feasibility of adding storage capacity to hold more runoff by making ditches larger or by lowering parks, golf courses, and other green space.

Freese & Nichols also evaluated the District's pump operations during Harvey. Although the pumps were turned on early Monday morning, by Sunday enough water had collected in FBCLID 2 ditches to potentially operate the pumps, even though the flood gates were still open with water flowing out of the levee. The two small pumps could have started 10.5 hours earlier and the large pumps 5.5 hours earlier due to a higher water elevation requirement. However, water flows out of the levee eight to ten times faster through the flood gates than the pump station. While the flood gates are still open the pump station is far less efficient at removing water and is not essential for continued drainage. However, once the gates close, the pump station is the only way water can leave FBCLID 2. Because the pump station is less efficient at removing water with the gates open, but completely essential for removing water when the gates close, the pumps are only turned on after the flood gates are completely sealed.

The third-party study confirmed that pump operations during Harvey reduced flood levels inside FBCLID 2 as much as possible. While pumping 10.5 and 5.5 hours earlier produced a temporary decrease in ditch levels Sunday afternoon, any additional storage capacity created by the early pumping would have been filled by a band of intense rainfall Sunday night from 6pm to 9pm. In both scenarios, with or without early pumping, the District is still filled with the same amount of water, over 900 million gallons, at 1:25 am on Monday when the pumps turned on. Even with earlier pumping flood water would still have reached the same elevation of

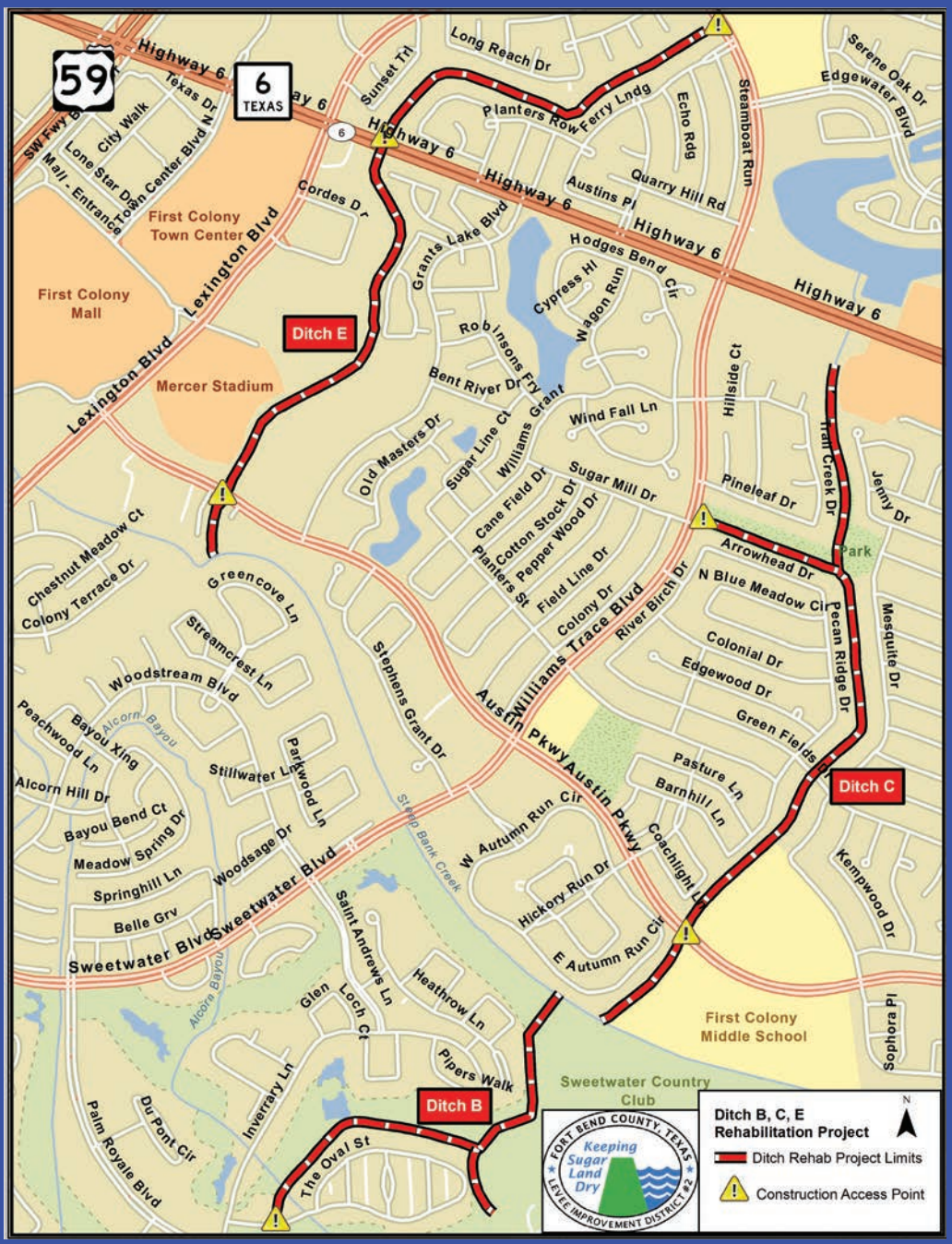
Background photo Thursday, August 31, 2017

Hurricane Harvery Response & Recovery

66.4 feet on Tuesday. As stated by Freese & Nichols, "The earlier pump operations resulted in reductions in water surface elevations of up to 0.5 feet on Monday but did not reduce the peak water surface elevation at midnight on Tuesday."

The District will continue to engage the public throughout the Hurricane Harvey recovery process. The impact of even an inch of water in any home is devastating, and FBCLID 2 is evaluating all options to keep that from occurring again. A follow-up public meeting will occur in April 2018 to update residents on the status of the District's response. For additional information or to provide comments, please contact the FBCLID 2 General Manager (*gm1@fbclid2.com*) and Board of Directors (*board@fbclid2.com*) or visit the District's website at *www.fbclid2.com*.

Beginning Summer 2018: Construction Project to Rehabilitate Ditches B, C, and E



Beginning in the summer of 2018, Fort Bend County Levee Improvement District No. 2 (FBCLID2) will begin a large capital improvement project within the community. The project will impact Ditches "B", "C", and "E" which drain storm water runoff for a large portion of First Colony. The goal of the project is to rehabilitate the ditch bottoms to prevent further erosion and to improve slope stability within these channels. When complete, the project will help remove rainfall runoff from inside the levee as efficiently as possible.

The project is expected to take more than a year to complete, contingent on inclement weather, and should be finished in 2019. The selected contractor will enter the construction sites from the locations noted on the map, including Austin Parkway, Highway 6, and Williams Trace. Please be aware of construction traffic when traveling through these impacted areas. For questions or comments about the project email the FBCLID2 General Manger at *gm1@fbclid2.com* .

Fort Bend County Levee Improvement District No. 2
3200 Southwest Freeway, Suite 2600
Houston, TX 77027

Sign up for FBCLID 2 news and updates:

Email: GM1@fbclid2.com
Address: Fort Bend County Levee Improvement District No. 2
3200 Southwest Freeway, Suite 2600
Houston, TX 77027

Please provide your preferred contact information:

Name: _____

Address: _____

City, State, Zip: _____

Phone: _____

Email: _____

Preferred method of communication? _____

FloodSmart.gov
The official site of the NFIP

For information about FBCLID 2, email *board@fbclid2.com* or go online to *www.fbclid2.com*.