

Appendix A: Previous Studies and Data Capture



LOWER BRAZOS FLOOD PROTECTION PLANNING STUDY APPENDICES

March 2019

Appendix A – Previous Studies and Data Collection

Table of Contents

A.1.0 Summary of Previous Studies.....	A-1
A.2.0 Gauge Data.....	A-3
A.3.0 Vertical Datum Adjustments	A-5
A.4.0 Current Effective FEMA Studies	A-5
A.5.0 Historical Storm Events.....	A-8
A.6.0 Lower Brazos River Reservoirs	A-18
A.7.0 TxDOT As-Built Bridge Plans	A-19
A.8.0 Flood Data.....	A-21
A.9.0. High-Water Marks.....	A-22
A.10.0 Public Meetings	A-22

Tables

Table A-1: 2009 LJA Flood Frequency Analysis Results at Richmond, Tx Gauge	A-2
Table A-2: 2009 Distributed 1% ACE Discharges in Fort Bend County	A-2
Table A-3: 2009 Fort Bend County Water Surface Elevations	A-3
Table A-4: Lower Brazos River USGS Gauges	A-4
Table A-5: Vertical Datum Adjustments by County.....	A-5
Table A-6: 1999 Brazoria County FIS Summary of Discharges	A-5
Table A-7: 2017 Fort Bend County FIS Summary of Discharges	A-6
Table A-8: 2017 Fort Bend County FIS Summary of Water Surface Elevations.....	A-6
Table A-9: 2010 Austin County FIS Summary of Discharges	A-7
Table A-10: 2010 Austin County FIS Summary of Water Surface Elevations	A-7
Table A-11: 2009 Waller County FIS Summary of Discharges	A-8
Table A-12: 2009 Waller County FIS Summary of Water Surface Elevations	A-8
Table A-13: Hempstead Gauge Peaks (USGS ID 08111500 / 1938-2017).....	A-8
Table A-14: Richmond Gauge Peaks (USGS ID 08114000 / 1903-2017)	A-9
Table A-15: Rosharon Gauge Peaks (USGS ID 08116650 / 1967-2017)	A-9
Table A-16: December 1913 Flood Estimated Rainfall Totals.....	A-10
Table A-17: May 1957 Flood Observed Peak Discharges.....	A-12
Table A-18: 1991 Flood Observed Peak Discharges.....	A-13

Table A-19: 1991 Flood Reservoir Storage	A-13
Table A-20: 1998 Flood Observed Peak Discharges	A-13
Table A-21: November 2002 Observed Peak Discharges	A-14
Table A-22: 2004 Observed Peak Discharges	A-14
Table A-23: 2007 Observed Peak Discharges	A-14
Table A-24: 2010 Observed Peak Discharges	A-15
Table A-25: October 2013 Flood Observed Peak Discharges	A-15
Table A-26: May 2015 Flood Observed Peak Discharges	A-16
Table A-27: May 2016 Flood Observed Peak Discharges	A-17
Table A-28: T.S. Harvey 2017 Flood Observed Peak Discharges	A-18
Table A-29: Lower Brazos River Reservoirs	A-18
Table A-30: TxDOT As-Built Bridge Plans	A-19
Table A-31: Progress and Public Meetings Locations	A-23

Figures

Figure A-1: Rainfall Totals for Storm of December 1-5, 1913 End of Fifth Day	A-11
Figure A-2: Brazos River Flood at Southern Pacific Railroad, Hempstead, Texas May 1, 1957	A-12
Figure A-3: NASA Photo Flooding on the Brazos River on May 28, 2016	A-22

Exhibits

Exhibit A-1: USGS Gage Locations
Exhibit A-2: TxDOT Bridge Plans
Exhibit A-3: Highwater Marks

Supporting Information

Public Meeting Sign-In Sheets
TxDOT Plans
Highwater Mark Shapefile

Appendix A – Previous Studies and Data Collection

A.1.0 Summary of Previous Studies

Numerous studies, reports, and surveys have been completed throughout the years related to the Lower Brazos River. Documents were obtained from the Brazos River Authority (BRA), the Fort Worth District Corps of Engineers (USACE), the Texas Water Development Board, Federal Emergency Management Agency (FEMA), Texas Department of Transportation (TxDOT) and other agencies. These documents were reviewed for this study.

1. [USACE Fort Bend County Study \(1977\)](#) - In February 1977, a report titled "Reassessment of 100-Year Peak Flow, Brazos River at Richmond, Texas by Espey Huston and Associates, Inc. (1984)" prepared by the USACE for the Fort Bend County Commissioners Court established the 1% ACE peak flow for the Brazos River at Richmond to be 210,000 cfs.
2. [Initial Countywide FEMA Flood Insurance Study \(1984\)](#) - The initial countywide hydrologic and hydraulic analyses for Fort Bend County were completed by Espey Huston and Associates for FEMA in May 1984. Espey Huston and Associates developed a methodology to re-analyze gauge data at the Brazos River at Richmond, Texas gauge (USGS ID 08114000). The methodology was developed to address the progressive development of major flood control structures within the Brazos River basin over the years resulting in a non-homogeneous streamflow data set. Recorded flows were adjusted to "unregulated flow conditions by adding the net change in reservoir storage". The HEC-1 hydrologic computer program was utilized to produce "unregulated" flood flows to be used in the flood frequency Pearson Type III analysis. Once a satisfactory calibration had been obtained without the reservoirs, the effect of the reservoirs was incorporated and a value for each flood flow was determined. Based on this study, the 1% ACE peak flow for the Brazos River at Richmond was reduced to 181,000 cfs and applied throughout the 90 river miles in Fort Bend County.
3. [Flood Protection Planning Study for the Brazos Valley Subdivision Area City of Simonton, Texas \(1996\)](#) - In 1996, Claunch and Miller completed a flood protection planning study for the City of Simonton, Texas, focused on the Brazos Valley Subdivision. The study determined that the 1% ACE flood elevations near the Brazos Valley Subdivision range from 109 to 113 feet. Protection of Section I of the subdivision was determined to not be technically or economically feasible. A proposed levee system, including detention storage, diversion channel, main channel, and collector channel, was recommended for protection of Sections II and III of the subdivision. The estimated cost for the levee system (not including land acquisition) was \$1.8 million in 1996. In addition to structural alternatives, it was recommended that the City's floodplain management ordinances be revised to require new construction to be a minimum of one foot above the 1% ACE floodplain.
4. [DFIRM Update for Fort Bend County, Texas \(2009\)](#) - In 2009, the Comprehensive Flood Risk Resources and Response Joint Venture (CF3R) completed a hydrologic and hydraulic update of the Brazos River in Fort Bend County. CF3R contracted LJA Engineering and Surveying, Inc. to perform the flood frequency analysis of the USGS Richmond gauge. Analysis of the flow attenuation along the Brazos River was performed by CF3R. The 2009 LJA flood frequency analysis for the Brazos River at Richmond gauge is shown in Table A-1.

Table A-1: 2009 LJA Flood Frequency Analysis Results at Richmond, Tx Gauge

Probability	Unregulated Discharge (cfs)	Regulated Discharge (cfs)
10% ACE	134,000	103,000
2% ACE	192,000	147,000
1% ACE	215,000	164,000
0.2% ACE	246,000	202,000

To attenuate and distribute the flows across Fort Bend County, CF3R performed an analysis of the flow attenuation for the Brazos River between the Hempstead, Richmond, and Rosharon USGS gauges. The analysis determined that peak flows are reduced approximately 10-20% from Hempstead to Richmond and approximately 10% from Richmond to Rosharon. The unsteady flow option of HEC-RAS was used to calculate the flow distributions of different flow events from the Waller/Fort Bend County Line to the Brazoria/Fort Bend County Line. The analysis showed that most of the attenuation from the Hempstead gauge to the Richmond gauge occurs in Waller County.

In 1986, the USACE study for the Brazoria County FIS determined that due to a lower topography to the east, high flows from the Brazos River along the Fort Bend/Brazoria County line overflowed in an easterly direction. Due to the overflow, the 1% ACE flow in the Brazos River is reduced from 181,000 cfs at the Brazoria/Fort Bend County line to 103,189 cfs at the confluence of the Brazos River with Cow Creek (Brazoria County current effective FIS). Based on the flow distribution in the current effective Brazos River HEC-2 model in Brazoria County, the 1% ACE flow distribution for the Brazos River was adjusted to reflect the gradual drop from 162,000 cfs at the Brazoria/Fort Bend County line to 103,189 cfs at the confluence of Cow Creek and the Brazos River. Table A-2 shows the distributed 1% ACE flow along the Brazos River across Fort Bend County.

Table A-2: 2009 Distributed 1% ACE Discharges in Fort Bend County

Location	1% ACE Discharge (cfs)
Waller/Fort Bend County Line	171,700
FM 1093	168,000
FM 723	165,700
Richmond USGS Gauge	164,000
Brazoria/Fort Bend County Line	162,000
Cow Creek and Brazos River	103,289

In addition to the hydrologic analysis update, a steady state HEC-RAS hydraulic model was developed for the Brazos River in Fort Bend County. 115 cross-sections were included along the Brazos River, with 78 of those generated from field survey. In addition, ten bridges and 14 levees were included in the model. Resulting water surface elevations at key locations are shown in Table A-3.

Table A-3: 2009 Fort Bend County Water Surface Elevations

Location	Water Surface Elevation (NAVD 88 Feet)			
	10% ACE	2% ACE	1% ACE	0.2% ACE
Waller/Fort Bend County Line	112.42	115.56	116.53	118.04
Upstream of FM 1093	107.03	111.35	112.83	115.78
Upstream of FM 1489	100.50	106.49	108.28	111.61
Upstream of FM 723	85.34	91.51	93.19	95.84
Richmond Gauge (US 90A)	76.73	81.44	82.92	85.36
Upstream of Grand Parkway	72.07	76.04	77.33	80.04
Upstream of U.S. Hwy. 59	71.00	74.52	75.64	77.91
MUD 46	64.77	67.26	68.06	69.31
Brazoria/Fort Bend County	56.98	58.09	58.50	58.99
Upstream of FM 1462	52.05	52.53	52.59	52.91

5. **Review of Prior Studies of Brazos River and Oyster Creek Flows (2015)** - In 2015, Risk Assessment, Mapping and Planning Partners (RAMPP) prepared a study under contract with FEMA Region VI in order to determine whether the Brazos River 1% ACE event discharge and Base Flood Elevations (BFEs) in the draft Brazoria County workmap were suitable for the Levee Analysis and Mapping Procedures (LAMP) analysis of the Angleton and Velasco Drainage District Levees. The study did not establish new preliminary flows or BFEs.

The study concluded that prior studies on the Brazos River have significantly over-estimated the various return frequency flows. The frequency curves generate in the prior studies place the largest flow ever recorded (1929) in 92 years at less than a 10-year event. Two key inaccuracies in the prior reports are the inclusion of pre-1915 floods in the statistical analysis and the selection of an inappropriate channel routing method in the hydrologic models.

A.2.0 Gauge Data

There are several mainstem USGS flow gauges throughout the Lower Brazos Basin. In addition to these mainstem gauges, there are numerous USGS gauges on tributaries and reservoirs throughout the basin. In total, over 42 USGS streamflow gauges have been or are currently in service within the Lower Brazos River Basin. Table A-4 provides a summary of the USGS flow gauges utilized for this study. These gauges were selected due to their period-of-record and locations. In addition to the streamflow gauges, USGS stage gauges at Sterling C. Robertson Dam and Bistone Dam (headwater) are utilized. The table include the gauge datum elevation in feet above the NAVD88 vertical datum as a reference to the gauges elevation. The USGS gauge locations are shown on Exhibit A-1 at the end of this Appendix.

Table A-4: Lower Brazos River USGS Gauges

Streamflow Gauge	USGS ID	Drainage Area Below USACE Reservoirs (sq. mi.)	Period-of-Record	Peak Flow (cfs)	Gauge Datum Feet above NAVD88 (ft)
Brazos River near Aquilla	8093100	56	1938-Present	58,200 (May 1957)	404.29
Brazos River at Waco	8096500	456	1898-Present	101,000 (April 1957)	349.34
Brazos River near Highbank	8098290	1,650	1965-Present	78,700 (Feb. 1986)	279.29
Little River near Little River	8104500	384	1962-Present	79,600 (May 1965)	400.11
Little River at Cameron	8106500	1,491	1916-Present	116,000 (Dec. 1991)	281.89
Big Elm Creek near Cameron	8108250	314	2008-Present	28,300 (Apr. 2016)	320.00
Brazos River near Bryan	8108700	4,341	1993-Present	85,900 (Jul. 2007)	189.30
Davidson Creek near Lyons	8110100	195	1962-Present	26,400 (Oct. 1994)	220.26
Navasota River near Easterly	8110500	938	1924-Present	60,400 (Apr. 2009)	271.46
Navasota River above Groesbeck	8110325	240	1979-Present	27,200 (May 1979)	396.65
Big Creek near Freestone	8110430	97	1979-Present	23,200 (Oct. 2013)	362.94
Navasota River at OSR	8110800	1,317	1997-Present	54,300 (Apr. 2009)	245.00
Brazos River near Hempstead	8111500	8,156	1938-Present	153,000 (May 2016)	107.90
Mill Creek near Bellville	8111700	362	1963-1993; 2000-Present	91,100 (May 2016)	122.82
Brazos River near San Felipe	8111850	8,873	2013-Present	146,000 (Aug. 2017)	0.00
Brazos River near Richmond	8114000	9,213	1903-Present	122,000 (Sep 2017)	27.94
Brazos River near Rosharon	8116650	9,532	1967-Present	133,000 (Aug. 2017)	0.00

A.3.0 Vertical Datum Adjustments

The vertical datum utilized for this study is the North American Vertical Datum of 1988 (NAVD). Several previous studies were completed using the National Geodetic Vertical Datum of 1929 (NGVD). Conversion factors between NGVD to NAVD are included in Table A-5 below.

Table A-5: Vertical Datum Adjustments by County

County	Conversion Factor from NAVD29 to NGVD88
Austin	0.07 feet
Brazoria	0.1 feet
Fort Bend	-0.014 feet
Waller	0.045 feet
Washington	0.11 feet

A.4.0 Current Effective FEMA Studies

The Brazos River reach from the Austin/Waller county boundary to the Gulf of Mexico includes portions of four separate FEMA Flood Insurance Studies (FIS) including Brazoria County, Fort Bend County, Austin County, and Waller County.

1. **Brazoria County FIS** - The Brazoria County FIS was last updated in September 22, 1999. The hydrology and hydraulics for the Brazos River is based on the 1985 Espey Huston and Associates study. The Brazoria County flood maps are in the process of being updated as part of FEMA's MAPMOD program but are awaiting levee analyses before preliminary maps are released. The 1% ACE discharge published in the 1999 FIS near the mouth of the Brazos River (River Mile 5) is 60,700 cfs. The published discharge at the Brazoria/Fort Bend County Line (River Mile 64) is 175,000 cfs. Table A-6 provides a summary of the 1999 FIS published discharges along the Brazos River in Brazoria County. The current effective FIRMs for Brazoria County are dated 1999. The Brazos River is mapped as a Zone AE with Floodway. The 1% ACE water surface elevation in the 1999 FIS is 24.5 feet (NGVD 1989-Releveling) at FM 521, 28.5 feet (NGVD 1989-Releveling) at SH 35, and 59.0 feet (NGVD 1989-Releveling) at the Fort Bend County Line.

Table A-6: 1999 Brazoria County FIS Summary of Discharges

Location	Discharge (cfs)			
	10% ACE	2% ACE	1% ACE	0.2% ACE
river mile 5	59,900	60,100	60,700	60,900
river mile 16	75,600	76,600	77,000	78,900
river mile 21	76,200	88,300	95,700	103,000

river mile 32	84,800	93,600	94,600	101,000
river mile 38	90,500	91,800	92,000	92,500
river mile 50	96,100	101,000	101,000	102,000
river mile 60	96,100	105,000	108,000	116,000
river mile 64	97,800	151,000	175,000	234,000

2. **Fort Bend County FIS** - The Fort Bend County FIS was revised December 21, 2017. The original countywide Fort Bend FIS was printed in 1992. The FIS was revised in 1997, 2000, and 2001, but the Brazos River hydrology was not updated from the original 1984 Espey Huston and Associates analysis. The 2017 FIS update is based on new frequency discharges along the Brazos River from the 2009 CF3R/LJA study (See Section A.1.0 Item 4 for report summary). This new study revised the previous 1% ACE discharge at Richmond from 181,000 cfs (1984 Espey, Huston & Associates Study) to 164,000 cfs. In addition to development of new frequency discharges, a new steady-state HEC-RAS hydraulic model was developed for the Brazos River through Fort Bend County to determine frequency water surface elevations. Table A-7 provides a summary of the 2017 FIS published discharges along the Brazos River. Table A-8 provides a summary of the 2017 FIS published 1% ACE water surface elevations along the Brazos River through Fort Bend County.

Table A-7: 2017 Fort Bend County FIS Summary of Discharges

Study	Discharge (cfs)			
	10% ACE	2% ACE	1% ACE	0.2% ACE
At the Brazoria/Fort Bend County Line	103,000	145,000	162,000	200,000
At US 90A (Richmond Gauge)	103,000	147,000	164,000	202,000
Just upstream of FM 723	103,400	148,500	165,700	201,100
Just upstream of FM 1093	103,900	150,600	168,000	206,900
At the Waller/Fort Bend County Line	105,400	153,900	171,700	211,500

Table A-8: 2017 Fort Bend County FIS Summary of Water Surface Elevations

Location	1% ACE Water Surface Elevation (feet NAVD 88)
Fort Bend/Brazoria Co. Line	51.0
FM 1462	52.0
US Hwy. 59	76.0
Grand Parkway	77.0
US 90A (Richmond Gauge)	83.0
FM 723	93.0
FM 1489	108.0
FM 1093	112.0
Waller/Fort Bend Co. Line	116.5

3. **Austin County FIS** - The Austin County FIS was last updated in September 2010. The hydrology and hydraulics for the Brazos River is based on the 1985 Espey Huston and Associates study. Table A-9 provides a summary of the 2010 FIS published 1% ACE discharges along the Brazos River in Austin County. The Brazos River is mapped as a Zone AE with Floodway between State Highway 59 and the Washington County line. The Brazos River is mapped as a Zone A floodplain between FM 1458 and State Highway 59. Below FM 1458, the Brazos River is mapped as a Zone AE with Floodway. Table A-10 provides a summary of the 2010 FIS published 1% ACE water surface elevations along the Brazos River through Austin County.

Table A-9: 2010 Austin County FIS Summary of Discharges

Location	Drainage Area (sq. mi.)	1% ACE Discharge (cfs)
Hwy. 159	42,640	206,962
6.4 miles Downstream of IH-10	34,384	181,000
5.6 miles upstream of ATSR	21,380	181,000

Table A-10: 2010 Austin County FIS Summary of Water Surface Elevations

Location	1% ACE WSEL (NAVD 88)
Fort Bend/Austin Co. Line	106.0
FM 1093	108.0
IH-10 and U.S. Hwy. 190	121.0
FM 1458	127.0
SH 159	162.5
Austin/Washington Co. Line	165.0

4. **Waller County FIS** - The Waller County FIS was last updated in February 2009. The hydrology and hydraulics for the Brazos River are based on the 1985 Espey Huston and Associates study. Table A-11. provides a summary of the 2009 FIS published discharges along the Brazos River in Waller County. Above U.S. Hwy. 290, the Brazos River is mapped as Zone A with no base flood elevations (BFE). The Brazos River is also mapped as a Zone A floodplain between State Highway 59 and FM 1458. Below FM 1458, the Brazos River is mapped as a Zone AE with Floodway. The Brazos River is also mapped as a Zone AE with Floodway between U.S. Hwy. 290 and State Highway 59. Table A-12 provides a summary of the 2009 FIS published 1% ACE water surface elevations along the Brazos River through Waller County.

Table A-11: 2009 Waller County FIS Summary of Discharges

Location	Discharge (cfs)			
	10% ACE	2% ACE	1% ACE	0.2% ACE
Hwy. 159	110,000	182,473	206,962	260,000
6.4 miles downstream of IH-10	101,000	157,000	181,000	242,000

Table A-12: 2009 Waller County FIS Summary of Water Surface Elevations

Location	1% ACE WSEL (feet NAVD 88)
Fort Bend/Waller County Line	117.0
IH-10	121.0
SH 159	162.5
U.S. Hwy. 290	169.0

A.5.0 Historical Storm Events

Numerous historical storm events were researched for comparison and calibration purposes as part of the Lower Brazos Floodplain Protection Planning Study. A complete list of peak flows at the Hempstead, Richmond, and Rosharon gauges as recorded by the USGS are shown in Table A-13, Table A-14, and Table A-15, respectively. A summary of major flood events in the Lower Brazos River is provided following the USGS peak recorded flows.

Table A-13: Hempstead Gauge Peaks (USGS ID 08111500 / 1938-2017)

Date	Peak Recorded Flow (cfs)
Nov. 1940	116,000
April 1942	90,500
May 1944	108,000
April 1945	106,000
May 1946	85,300
May 1957	143,000
Feb. 1958	91,800
May 1965	106,000
April 1977	84,700
June 1979	83,800
Dec. 1991	116,000
Oct. 1994	109,000
Nov. 2004	84,100
July 2007	80,100
May 2015	91,500
May 2016	153,000
August 2017	101,000

Table A-14: Richmond Gauge Peaks (USGS ID 08114000 / 1903-2017)

Date	Peak Recorded Flow (cfs)
April 1926	86,900
June 1929	123,000
February 1932	80,500
May 1935	90,900
July 1940	82,100
Nov. 1940	117,000
May 1944	93,800
April 1945	85,000
May 1946	82,500
May 1953	83,100
May 1957	119,000
Oct. 1957	87,600
May 1965	98,800
May 1968	89,600
June 1979	88,100
Jan. 1992	94,000
Oct. 1994	88,100
Oct. 1998	80,300
Nov. 2002	74,800
Nov. 2004	76,700
July 2007	72,100
June 2015	72,900
June 2016	102,000
September 2017	122,000

Table A-15: Rosharon Gauge Peaks (USGS ID 08116650 / 1967-2017)

Date	Peak Recorded Flow (cfs)
May 1968	79,900
June 1973	79,300
Apr. 1977	73,000
June 1979	76,500
Jan. 1992	82,700
Oct. 1994	84,400
Nov. 1998	76,400
Nov. 2002	63,700
Nov. 2004	71,100
July 2007	67,800
June 2015	67,600

Date	Peak Recorded Flow (cfs)
June 2016	112,000
August 2017	133,000

1. **December 1913 Flood** - (Source: Flash Floods in Texas by Jonathan Burnett and Excessive Rainfall in Texas) In the fall of 1913, a period of wet weather saturated the central and lower Brazos River Basin and by the end of November, the Brazos River was at its highest level in ten years. In early December, a low-pressure system stalled over West Texas. For several days (December 1-4), the system triggered continuous rain showers and storms over areas saturated from the fall rains. Table A-16 shows the 1913 event estimated rainfall totals.

Table A-16: December 1913 Flood Estimated Rainfall Totals

Location	Rainfall Total (inch)							Storm Total
	Nov. 20-30	Dec. 1	Dec. 2	Dec. 3	Dec. 4	Dec. 5	Dec. 1-5 Total	
Lampasas	3.09	0.00	6.05	1.57	1.67	1.03	10.32	13.41
Waco	3.52	0.00	1.42	2.0	5.4	1.0	9.82	13.34
Temple	2.63	0.00	1.0	4.43	2.93	1.4	9.76	12.39
Cameron	2.67	0.62	4.09	4.29	0.97	0.0	9.97	12.64
Taylor	2.28	0.05	2.25	5.6	1.83	0.3	10.03	12.31
Georgetown	3.24	0.00	4.0	4.51	5.05	0.02	13.58	16.82
Hewitt	2.72	Trace	2.22	7.86	0.8	0.96	11.84	14.56
Salado	2.3	0.00	2.67	5.9	1.5	1.15	11.22	13.52
Brenham	8.4	0.00	0.16	0.42	3.73	0.5	4.81	13.21
Somerville	11.0	0.00	0.3	5.0	7.75	0.5	13.55	24.55

At 7:00 a.m. on December 1, the Brazos River at Waco was at 13 feet. The River peaked at 39.7 feet on December 3. The Brazos River flooded the town of Marlin which sits five miles away from the river. Flooding continued downstream at Valley Junction below the confluence of the Little River and overtopped the new levee system in the Bryan-area. At Hempstead, the Brazos River reached 52.8 feet, and floodwaters spread six to eight miles wide. Flooding continued downstream through Austin, Waller, Fort Bend, and Brazoria Counties. Figure A-1 shows the rain totals for the Storm of December 1-5, 1913 at the end of the fifth day (source: Excessive Rainfall in Texas). The Colorado and Brazos Rivers merged together in the lower reaches creating a floodplain over thirty miles wide. This event occurred prior to construction of any flood control reservoirs in the Brazos and Colorado River basins.

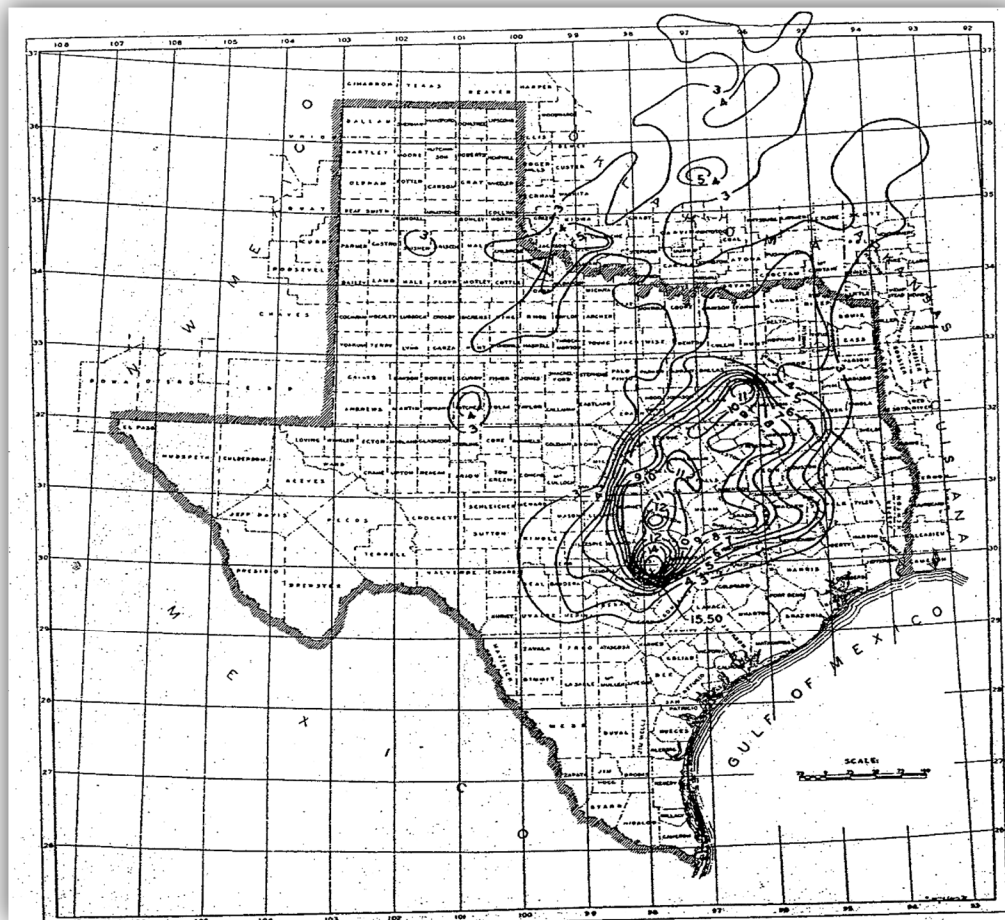


Figure A-1: Rainfall Totals for Storm of December 1-5, 1913 End of Fifth Day

2. **May 1957 Flood** - (Source: Floods of April-June 1957 in Texas and Adjacent States by USGS Water-Supply Paper 1652-B) The April-June 1957 flood came at the end of a severe drought across Texas and the Brazos River Basin in the 1950s. The flood generated a high volume of runoff across a large geographic area over the Brazos River Basin, including over 8 million acre-feet and 9.3 million acre-feet of runoff volume passing the Bryan and Richmond gauges, respectively, along the Brazos River between April and June of 1957. Lake Whitney rose from 512.38 feet on April 1, 1957 to 570.21 feet on May 28 (1.7 million acre-feet change). Belton Reservoir rose from 558.18 feet on April 1 to 620.44 feet on June 5 resulting in a 729,300 acre-feet volume change. These were the only two USACE flood mitigation reservoirs in the Brazos River basin in 1957. Fifteen to twenty-five inches of rainfall occurred over the Brazos River basin during the three-month period of 1957. Table A-17 shows the recorded peak discharges at streamflow gauges across the Brazos River Basin. Figure A-2 the Brazos River flood at the Southern Pacific Railroad near Hempstead, Texas on May 1, 1957. The discharge at the time of the photo was estimated to be about 140,000 cfs. The photo was taken by the USACE.

Table A-17: May 1957 Flood Observed Peak Discharges

Gauge	Peak Flow (cfs)	Date of Peak
Brazos River at Whitney	58,200	May 28, 1957
Aquilla Creek near Aquilla	8,550	April 23, 1957
Brazos River at Waco	101,000	April 20, 1957
Leon River near Belton	8,490	June 19, 1957
San Gabriel at Georgetown	155,000	April 24, 1957
Little River at Cameron	116,000	April 20, 1957
Brazos River at Bryan	137,000	April 26, 1957
Yegua Creek at Somerville	17,300	April 27, 1957
Navasota River near Bryan	35,800	April 26, 1957
Brazos River at Richmond	119,000	May 5, 1957
Brazos River at Brazoria	88,100	May 10, 1957



Figure A-2: Brazos River Flood at Southern Pacific Railroad, Hempstead, Texas May 1, 1957

3. **Dec. 1991 – Spring 1992 Flood** - Rainfall totals of six to ten inches across the Brazos River Basin in late December 1991 resulted in widespread flooding. Record flooding moved down the San Gabriel and Little Rivers into the Brazos River. The Brazos River was five miles wide west of Bryan and College Station. Downstream, the Brazos River and Oyster Creek merged. Residential flooding was widespread above Simonton to the Gulf of Mexico with over 500 homes being impacted. Emergency spillways on every flood-control reservoir on the Brazos River were spilling by mid-March 1992. A series of smaller flood events occurred into late May or early June of 1992. Table A-18 shows the recorded peak discharges at

streamflow gauges across the Brazos River Basin. Table A-19 shows the change in reservoir level storage between mid-December 1991 and mid-March 1992.

Table A-18: 1991 Flood Observed Peak Discharges

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Brazos River near Aquilla	8093100	23,800	Dec. 28, 1991
Brazos River at Waco	8096500	50,000	Dec. 21, 1991
Brazos River near Highbank	8098290	72,200	Dec. 22, 1991
Little River at Cameron	8106500	116,000	Dec. 21, 1991
Navasota River near Easterly	8110500	61,800	Dec. 22, 1991
Brazos River at Richmond	8114000	94,000	Jan. 1, 1992
Brazos River near Rosharon	8116650	82,700	Jan. 3, 1992

Table A-19: 1991 Flood Reservoir Storage

Reservoir	Dec. 15, 1991 Storage (ac-ft)	Max Storage (ac-ft)	Date
Whitney	650,500	1,559,000	Dec. 28, 1991
Aquilla	56,720	118,900	Dec. 23, 1991
Waco	150,600	520,900	Dec. 23, 1991
Belton	445,200	1,168,000	Mar. 5, 1992
Stillhouse Hollow	236,800	654,000	Mar. 4, 1992
Granger	66,170	266,600	Mar. 4, 1992
Somerville	151,500	547,600	Mar. 6, 1992

4. **Oct. 1998 Flood** - (Source: NOAA Service Assessment South Texas Floods Oct. 17-22, 1998) The Guadalupe-Blanco and Colorado River Basins received more rainfall than the Brazos River basin in October 1998. Rainfall on the Brazos River averaged between five and ten inches of rainfall across the central and lower regions from October 17-21, 1998. Table A-20 shows the recorded peak discharges at streamflow gauges across the Brazos River Basin.

Table A-20: 1998 Flood Observed Peak Discharges

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Brazos River near Highbank	8098290	21,200	Oct. 18, 1998
Little River at Little River	8104500	19,100	Oct. 18, 1998
Little River near Cameron	8106500	47,000	Oct. 19, 1998
Brazos River at Richmond	8114000	80,300	Oct. 22, 1998
Brazos River near Rosharon	8116650	76,400	Nov. 17, 1998

5. **November 3-13, 2002 Flood** – (Source: NWS October/November 2002 Heavy Rainfall and Flooding Report) – During the last 10 days of October, an upper level trough stalled over the region with numerous disturbances moving across the area. This provided several days of widespread rainfall. The precipitation was further enhanced by a stationary front located across southeast Texas into southwest and central Louisiana, as well as by the remnants of Hurricane Kenna moving northeast across the area from Mexico. As a result,

very heavy rainfall occurred in many areas. Table A-21 shows the November 2002 observed peak discharges in the Lower Brazos Basin.

Table A-21: November 2002 Observed Peak Discharges

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Brazos River near Hempstead	8111500	66,854	Nov. 7, 2002
Davidson Creek near Lyons	8110100	11,900	Nov. 5, 2002
Brazos River at Richmond	8114000	74,700	Nov. 7, 2002

6. **November 20-21, 2004 Flood** – (Source: Flash Flooding Across Goliad and Victoria Counties November 20th – 21st, 2004 https://www.weather.gov/crp/20041121_Flood) A significant heavy rainfall event occurred on November 20-21, 2004. Up to 15 inches of rainfall was observed over northern Goliad County which resulted in flash flooding along Perdido, Coleta, and Spring Creeks. Several high-water rescues were performed as motorists attempted to cross flooded roadways. Table A-22 shows the recorded peak discharges at streamflow gauges across the Brazos River Basin.

Table A-22: 2004 Observed Peak Discharges

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Brazos River near Aquilla	8093100	16,300	Nov. 30, 2004
Brazos River at Waco	8096500	28,400	Dec. 01, 2004
Brazos River near Highbank	8098290	41,200	Nov. 24, 2004
Brazos River near Bryan	8108700	69,800	Nov. 24, 2004
Brazos River at Richmond	8114000	76,700	Nov. 29, 2004
Brazos River near Rosharon	8116650	71,100	Nov. 29, 2004
Little River near Little River	8104500	13,900	Nov. 17, 2004
Little River near Cameron	8106500	32,600	Nov. 24, 2004
Navasota River near Easterly	8110500	15,600	Nov. 24, 2004
Navasota River at OSR	8110800	16,900	Nov. 25, 2004
Mill Creek near Bellville	8111700	19,300	Nov. 23, 2004

7. **June-July 2007 Flood** - A wet spring pattern was followed by a wet early summer. The most significant rainfall occurred in the Brazos River upstream of Lake Whitney. Runoff from this rainfall event moved downstream and generated peak discharges along the central and lower Brazos River. Table A-23 shows the recorded peak discharges at streamflow gauges across the Brazos River Basin.

Table A-23: 2007 Observed Peak Discharges

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Brazos River near Aquilla	8093100	29,000	Mar. 29, 2007
Brazos River at Waco	8096500	39,600	Mar. 30, 2007
Brazos River near Highbank	8098290	43,100	May 28, 2007
Brazos River near Bryan	8108700	85,900	July 16, 2007
Brazos River at Richmond	8114000	72,100	July 20, 2007
Brazos River near Rosharon	8116650	67,800	July 6, 2007
Little River near Little River	8104500	26,700	June 27, 2007
Little River near Cameron	8106500	42,600	July 15, 2007

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Navasota River near Easterly	8110500	28,400	July 15, 2007
Navasota River at OSR	8110800	30,900	May 05, 2007

8. **September 2010 Flood** - The remnants of Tropical Storm Hermine dropped significant rainfall in the Little River Basin and along the IH-35 corridor. At Lake Georgetown, 16.37 inches of rainfall were recorded from September 7-9, 2010. Over 14.5 inches occurred within a 24-hour period. The system did not result in major flows along the mainstem of the Brazos River, but the event was utilized to calibrate the Little River Basin for this study. Table A-24 shows the recorded peak discharges at streamflow gauges in the Little River Basin below Lake Belton and Stillhouse Hollow Lake.

Table A-24: 2010 Observed Peak Discharges

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Little River at Little River	8104500	50,700	Sept. 08, 2010
Little River near Cameron	8106500	21,800	Sept. 10, 2010

9. **October 13-14, 2013 Flood** – (NWS October 30-31, 2013 Halloween Flash Flood Event Report) An upper level trough that moved from northern New Mexico across the Texas Panhandle and into Kansas and Oklahoma. A weak surface trough also stalled along Interstate 35, providing a concentrating focus for moist Gulf air. The rainfall was a typical, early fall, flood event occurring from the evening of October 30 through late afternoon on October 31, 2013. There was widespread rainfall of 2-4 inches across central Texas with substantial rainfall of 6-10 inches in the hill country. A bull's-eye of 12-14 inches in fell from Wimberly to Driftwood. The rainfall resulted in major flash flooding along the I-25 corridor and minor flooding within the Lower Brazos Basin. Table A-24 show the peak discharges observed during the October 2013 flood event.

Table A-25: October 2013 Flood Observed Peak Discharges

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Brazos River near Bryan	8108700	55,300	Nov. 1, 2013
Little River at Cameron	8106500	22,200	Nov. 1, 2013
Navasota River near Easterly	8110500	34,600	Nov. 1, 2013
Brazos River near Hempstead	8111500	48,400	Nov. 3, 2013
Brazos River near Highbank	8098290	28,900	Oct 31, 2013
Navasota River at OSR	8110800	26,000	Nov. 2, 2013
Brazos River near Richmond	8114000	44,400	Nov. 5, 2013
Brazos River near Rosharon	8116650	39,300	Nov. 5, 2013

10. **May 1 – June 20, 2015** – (Source: National Centers for Environmental Information) Across already very saturated grounds, a slow-moving line of thunderstorms moved into Harris County from central Texas during the evening hours of the 25th. Very heavy rainfall began in the mid evening hours across the northern portions of the county, while additional thunderstorms developed over central Fort Bend County and moved into Harris County from the southwest. A period increasing storm activity occurred from around 10 PM to 1 AM from Fort Bend County into north-central Harris County where the cells merged with the line of storms moving southward from northern Harris County. Thunderstorm continued to merge together over central and southwest Harris County for several hours resulting in

widespread significant flooding. The Houston/Galveston National Weather Service Office issued their first ever Flash Flood Emergency for this event. The area's worst flooding was focused across the western portion of Harris County from the northwest side of the City of Houston to Richmond in central Fort Bend County. Hundreds of water rescues (mainly motorists stranded on area freeways and roadways) were performed by various agencies during the height of the rainfall. After daylight on the 26th, the Houston Fire Department responded to many requests for assistance of residents in flooded homes.

Seven fatalities were directly related, and one additional fatality was indirectly related to the flooding. Three fatalities resulted from the capsizing of a Houston Fire Department rescue boat in Brays Bayou and the other four were all flooded vehicle related. Rainfall totals averaged three to four inches across much of Harris County. Four to six inches were fell in the area from Humble to Jersey Village to Katy, and then eastward to Galveston Bay. Rainfall totals of eight to ten inches were recorded on the northwest side of the City of Houston southwest to Sugar Land. A maximum rainfall accumulation of eleven inches was recorded at Brays Bayou and Beltway 8. A Community Collaborative Rain, Hail, and Snow Network (CoCoRaHS) observer, 6.2 miles west of Downtown Houston, recorded 10.03 inches of rainfall. Another observer, 3.4 miles northeast of Richmond in Fort Bend County, recorded 11.88 inches of rainfall. Maximum rainfall rates included 4.8 inches in one hour, 8.3 inches in three hours, and 10.1 inches in six hours. The combination of the heavy rainfall and associated overflow of area creeks, rivers and bayous caused flood damage to thousands of homes and close to 100 commercial buildings. Table A-26 shows the recorded peak discharges at streamflow gauges across the Brazos River Basin.

Table A-26: May 2015 Flood Observed Peak Discharges

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Brazos River at SH21 near Bryan	-	78,000	May 28, 2015
Brazos River at Hempstead	8111500	92,000	May 31, 2015
Brazos River at San Felipe	8111850	89,800	May 31, 2015
Brazos River at Richmond	8114000	74,000	June 3, 2015
Brazos River near Rosharon	8116650	67,000	June 4, 2015

11. March 2016 – June 2016 Flood - (Source: National Centers for Environmental Information)

A slow moving upper low over the southwestern U.S. combined with near record-level moisture aided in producing extremely heavy rainfall and devastating flooding over portions of Harris, Waller, and Fort Bend Counties. Northeast to southwest orientated bands of precipitation commenced during the early evening hours of April 17th across extreme southwestern and western Harris County as well as north and west into Grimes, Waller, Fort Bend, Austin, and Colorado Counties. Between 8:00 pm and 9:00 pm thunderstorms began to greatly intensify and slow their northward movement over Waller County. By late evening the thunderstorms had stalled and began shifting eastward into Harris County. Excessive rainfall spread across northwestern Harris County during the late evening hours of April 17th and into the early morning hours of April 18th. Slow thunderstorm movement and rain rates of over four inches per hour resulted in a large portion of northwest Harris and Waller Counties receiving between ten and 20 inches of rainfall over a 12-hour period. A few CoCoRaHS gauges in Waller County measured over 20 inches of rainfall. The flooding resulted in eight direct fatalities over the region, all drownings in vehicles. Six of these were in Harris County with one in Waller County and one in Austin County. An estimated 40,000 cars and trucks were flooded. Several bayous and creeks were flooded.

The Addicks Barker Reservoir was severely impacted. At least ten thousand homes were flooded. Damage was estimated from Damage Survey Reports to be near \$60 million. Table A-27 shows the recorded peak discharges at streamflow gauges across the Brazos River Basin.

Table A-27: May 2016 Flood Observed Peak Discharges

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Brazos River at SH21 near Bryan	08108700	89,000	May 27, 2016
Brazos River near Hempstead	8111500	156,000	May 27, 2016
Mill Creek near Bellville	08111700	89,000	May 27, 2016
Brazos River at San Felipe	8111850	143,000	May 28, 2016
Brazos River at Richmond	8114000	102,000	June 1, 2016
Brazos River near Rosharon	8116650	112,000	June 4, 2016

12. [Hurricane Harvey August 23 - September 8, 2017](#) – (Source: National Centers for Environmental Information) Harvey made landfall as a category 4 hurricane near Rockport, Texas during the evening of August 25th. The storm then weakened to a tropical storm and slowed, looping back and tracking over southeast Texas then back over the Gulf of Mexico making a second landfall along the Louisiana coast during the early morning hours of August 30th. Over that five-day period, tropical storm Harvey produced catastrophic flooding across southeastern Texas with thirty to sixty inches of rain, twenty-three tornadoes, tropical storm force winds and a moderate storm surge near Matagorda Bay. In some of the heavier bands, rain fell at a rate of over five inches per hour. This copious record amount of rain led to catastrophic flooding. Thousands of homes, businesses, and roads were flooded due to flash flooding and sheet flow from long duration intense rain. Main stem rivers and adjoining tributaries, creeks and bayous reached full capacity and came out of their banks and this also contributed to the massive flooding across southeastern Texas.

Sections of FM 762 were flooded near SH 69 south of Richmond. Major record level flooding of both the Brazos and San Bernard Rivers caused significant home flooding from Richmond to Rosharon. Massive flooding occurred in Tierra Grande subdivision along the San Bernard River in southwestern Fort Bend County. Home flooding occurred at Valley Lodge in Simonton, along Edgewood and Baudet Roads in Richmond, along Bar, Barker, Cumings, Sixth Street, Avenue B and Rio Brazos Roads in Rosenberg. Sections of FM 2759 as well as the Grand River, Rivers Edge and Pecan Estates in Thompsons flooded. Many countywide roads became inundated in flood waters including, but not limited to, Highway 90A, Pitts Road, FM 1489, FM 723, FM 1093, FM 359, SH 6 feeder roads, Sienna Parkway, Carrol Road, McKeever Road, Knights Court, Miller Road, River Oaks Road, Thompsons Ferry Road, Strange Drive, Greenwood Drive, Second Street and low-lying roads in Quail Valley in Missouri City. Record pool levels were recorded at Addicks and Barker Reservoirs. Big Creek flooding in Needville caused the flooding of homes on Ansel Road. Table A-28 shows the recorded peak discharges at streamflow gauges across the Brazos River Basin.

Table A-28: T.S. Harvey 2017 Flood Observed Peak Discharges

Gauge	USGS ID	Peak Flow (cfs)	Date of Peak
Brazos River near Hempstead	08111500	101,000	Aug. 28, 2017
Brazos River at San Felipe	8111850	146,000	Aug. 28, 2017
Brazos River at Richmond	8114000	126,000	Sept. 1, 2017
Brazos River near Rosharon	8116650	133,000	Aug. 29, 2017

A.6.0 Lower Brazos River Reservoirs

Several BRA and USACE reservoirs are located upstream of the detailed study area. These major reservoirs include: Lake Aquilla (USACE), Lake Whitney (USACE), Lake Waco (USACE), Lake Limestone (BRA), Lake Belton (USACE), Stillhouse Hollow Lake (USACE), Lake Granger (USACE), and Lake Somerville (USACE). The lakes are shown in Table A-29.

Table A-29: Lower Brazos River Reservoirs

Reservoir	USGS Gauge	DA (sq. mi.)	Conservation Pool Storage (ac-ft)	Flood Pool Storage (ac-ft)	Date Built	Owner
Aquilla	08093350	252	52,400	86,700	1983	USACE
Whitney	08092500	17,656	554,203	1,445,297	1951	USACE
Waco	08095550	1,670	152,500	553,300	1965	USACE
Limestone	08110470	675	203,780	N/A	1978	BRA
Belton	08102000	3,570	435,225	640,000	1954	USACE
Stillhouse Hollow	08104050	1,318	227,825	390,600	1968	USACE
Granger	08105600	709	51,822	192,378	1980	USACE
Somerville	08109900	1,006	160,100	337,700	1967	USACE

The USACE water supply reservoirs have designated flood control storage pools that regulate flows through the detailed study area. As summarized in Table A-28, the USACE Brazos River Basin reservoirs provide a total flood storage capacity of approximately 3,600,000 acre-feet (plus an additional 415,000-acre feet in Lake Proctor and Lake Georgetown). Releases from the USACE flood control pools follow an adopted regulation plan which is based on downstream flows at designated control points.

In the study area, the USACE control points are at the Hempstead and Richmond gauge stations. The controlling flow at these two control points is 60,000 cfs. The USACE will adjust operations at USACE projects to maintain flows at or below this 60,000 cfs threshold. If existing flows exceed or are anticipated to exceed 60,000 cfs at these two control points due to inflow from the uncontrolled drainage area below the USACE projects, the USACE will hold water within the flood control pools (if allowable under the regulation plan for the project based on pool elevation at the dam). Once the flow at Hempstead and Richmond has receded to less than 60,000 cfs, the USACE will begin to evacuate flood control storage. This regulation of flood flows impacts the

hydrology, hydraulics, and floodplains for the study area and must be considered in any comprehensive hydrologic analysis of the Lower Brazos River Basin.

Prior to 1951 and the construction of Lake Whitney by the USACE, there were no reservoirs with dedicated flood control storage in the Brazos River Basin. Possum Kingdom Lake, owned and operated by BRA and located above Lake Whitney, was constructed in 1941 but does not provide any dedicated flood control storage. Between 1951 and 1983, the USACE built the 9 multi-purpose (including designated flood control storage) projects throughout the Brazos River Basin providing regulation and mitigation of flood flows from runoff occurring above these projects. Lake Proctor and Lake Georgetown are not included in Table A-28 as these projects are located upstream of Lake Belton and Lake Granger, respectively.

Prior to 1951, many of the large floods in the Lower Brazos Basin resulted from runoff in the upper reaches of the basin above the future USACE projects. That said, several of these historic storm events had significant runoff from the uncontrolled drainage areas below the now present USACE projects and would have still resulted in large flows through the Lower Brazos Basin even if the USACE projects had been in place. After construction of Lake Aquilla in 1983, most of the significant flow events in the Lower Brazos River Basin have resulted from runoff in the 9,766 square mile uncontrolled area below the USACE projects.

Lake Limestone does not have a designated flood control storage space, and this project tends to have little impact on flood flows as it is designed to pass inflows up to outlet capacity for any stage above the top of conservation pool. Lake Limestone typically only impacts downstream flood flows if it is below designated top of conservation pool levels at the onset of an event and can store the initial inflows to fill the conservation storage.

There are numerous other smaller reservoirs owned by cities, power generation companies, mining companies, Texas Parks and Wildlife Department, and private landowners within the Lower Brazos River Basin. These smaller reservoirs do not offer any designated flood control storage capacity because they are small relative to the Brazos River Basin. The smaller reservoirs were not included in the hydrologic analysis as they would have negligible impacts on mainstem Brazos River flood flows.

A.7.0 TxDOT As-Built Bridge Plans

Texas Department of Transportation bridge as-built plans were collected for 59 bridge crossings throughout the Lower Brazos River Basin. The project area is within four TxDOT District Offices including the Bryan, Houston, Waco, and Yoakum Districts. Exhibit A-2 at the end of this Appendix shows the locations of the TxDOT Bridge crossings in the Lower Brazos Basin.

Table A-30 presents the TxDOT Bridge As-Built plans collected for the study. These bridge data were used in the development of the hydrologic and hydraulic models for this study.

Table A-30: TxDOT As-Built Bridge Plans

TxDOT District	Name	County	River
Bryan	FM 50	Washington	Yegua Creek
Bryan	SH 21	Brazos	Little Brazos River
Bryan	SH 21	Burleson/Brazos	Brazos River

TxDOT District	Name	County	River
Bryan	SH 105	Brazos/Washington	Brazos River
Bryan	FM 1687	Brazos	Little Brazos River
Bryan	FM 60	Burleson/Brazos	Brazos River
Bryan	SH 36	Burleson/Washington	Yegua Creek
Bryan	SH 105	Grimes	Navasota River
Bryan	US 77	Milam	Little River
Bryan	US 79	Milam	Brushy Creek
Bryan	FM 486	Milam	Little River
Bryan	FM 486	Milam	Brushy Creek
Bryan	FM 486	Milam	San Gabriel River
Bryan	FM 437	Milam	Little River
Bryan	FM 487	Milam	San Gabriel River
Bryan	FM 1600	Milam	Little River
Bryan	FM 908	Milam	Brushy Creek
Bryan	FM 1915	Milam	Little River
Bryan	US 79 (US 190)	Milam/Robertson	Brazos River
Bryan	US 79 (US 190)	Robertson	Little Brazos River
Bryan	FM 970	Milam/Robertson	Brazos River
Bryan	FM 970	Robertson	Little Brazos River
Houston	US 90A	Fort Bend	Brazos River
Houston	US 59	Fort Bend	Brazos River
Houston	US 290	Washington	Brazos River
Houston	SH 35	Brazoria	Brazos River
Houston	FM 723	Fort Bend	Brazos River
Houston	IH 10	Waller	Brazos River
Houston	SH 159	Waller	Brazos River
Houston	FM 1489	Fort Bend	Brazos River
Houston	FM 2004	Brazoria	Brazos River
Houston	FM 529	Waller	Brazos River
Houston	SH99	Fort Bend	Brazos River
Waco	FM 1123	Bell	Lampassas
Waco	FM 1304	Hill	Aquilla Creek
Waco	FM 1637	McLennan	Brazos River
Waco	FM 1858	McLennan	Aquilla Creek
Waco	FM 2114	McLennan	Aquilla Creek
Waco	FM 2843	Bell	Salado Creek
Waco	FM 3051	McLennan	Brazos River
Waco	FM 413	Falls	Brazos River
Waco	FM 712	Falls	Brazos River
Waco	FM 93	Bell	Nolan River

TxDOT District	Name	County	River
Waco	FM 93	Bell	Leon River
Waco	FM 933	McLennan	Aquilla Creek
Waco	IH 35	Bell	Leon River
Waco	IH 35	Bell	Nolan River
Waco	IH 35	Bell	Lampassas
Waco	IH 35	Bell	Salado Creek
Waco	IH 35	McLennan	Brazos River
Waco	SH 317	Bell	Nolan River
Waco	SH 317	Bell	Leon River
Waco	SH 6	McLennan	Brazos River
Waco	SH 7	Falls	Brazos River
Waco	US 84	McLennan	Brazos River
Waco	SH 95	Bell	Little River
Waco	SL 121	Bell	Nolan Creek
Yoakum	FM 1093	Fort Bend	Brazos River
Yoakum	FM 1458	Waller	Brazos River

A.8.0 Flood Data

Flood data were collected for the recent flood events along the Brazos River for the 2015, 2016, and 2017 storm events. Flood data collected included georeferenced flood photos, Facebook and Twitter posts by Fort Bend County Sherriff's Office, Fort Bend County Emergency Management, Velasco Drainage District, City of Sugar Land, and Halff Associates field visits. Figure A-3 shows a photo posted on Twitter on May 28, 2016 by the NASA Space Station. The flood data collected were used for calibration of the hydraulic models. The flood data used for this study is included in the digital submittal.



Figure A-3: NASA Photo Flooding on the Brazos River on May 28, 2016

A.9.0. High-Water Marks

Approximately 100 historical high-water marks were collected from several different sources for the detailed study area of the Lower Brazos Floodplain Protection Planning Study. Sources for the high-water marks included the Fort Bend Technical Support Notebook (September 2009), Fort Bend County Sheriff's Office 2016 flood photos, NASA satellite imagery, TxDOT flood photos, USACE floodplain information for Fort Bend County, USACE Hurricane Beulah Report, USACE War Department Map, and USGS Floods in Central Texas in September 1921.

High-water marks were also collected for the May and June 2016 storm events by the Halff Associates field survey department. Halff Associates made several field visits to document locations with high-water marks. Eight-hundred and fifty (850) georeferenced flood photos with a time stamp including the date and time were taken during the 2016 flood event. Eighteen (18) high-water mark surveys were also obtained during the 2016 flood event. The georeferenced flood photos and survey data were used to verify the calibration of the hydraulic modeling. Exhibit A-3, after this Appendix, shows the high-water marks collected by Halff Associates, Inc.

A.10.0 Public Meetings

Public meetings, stakeholder meetings, and coordination meetings were held throughout the Lower Brazos Floodplain Protection Planning Study. Meetings were held throughout the basin including Richmond, Rosharon, Hempstead, Rosenberg, Angleton, and Prairie View. Sign-in sheets are provided at the back of Appendix A.

Table A-31 shows the meetings, dates, and locations for the meetings held throughout the project. Sign-in sheets are provided at the back of Appendix A.

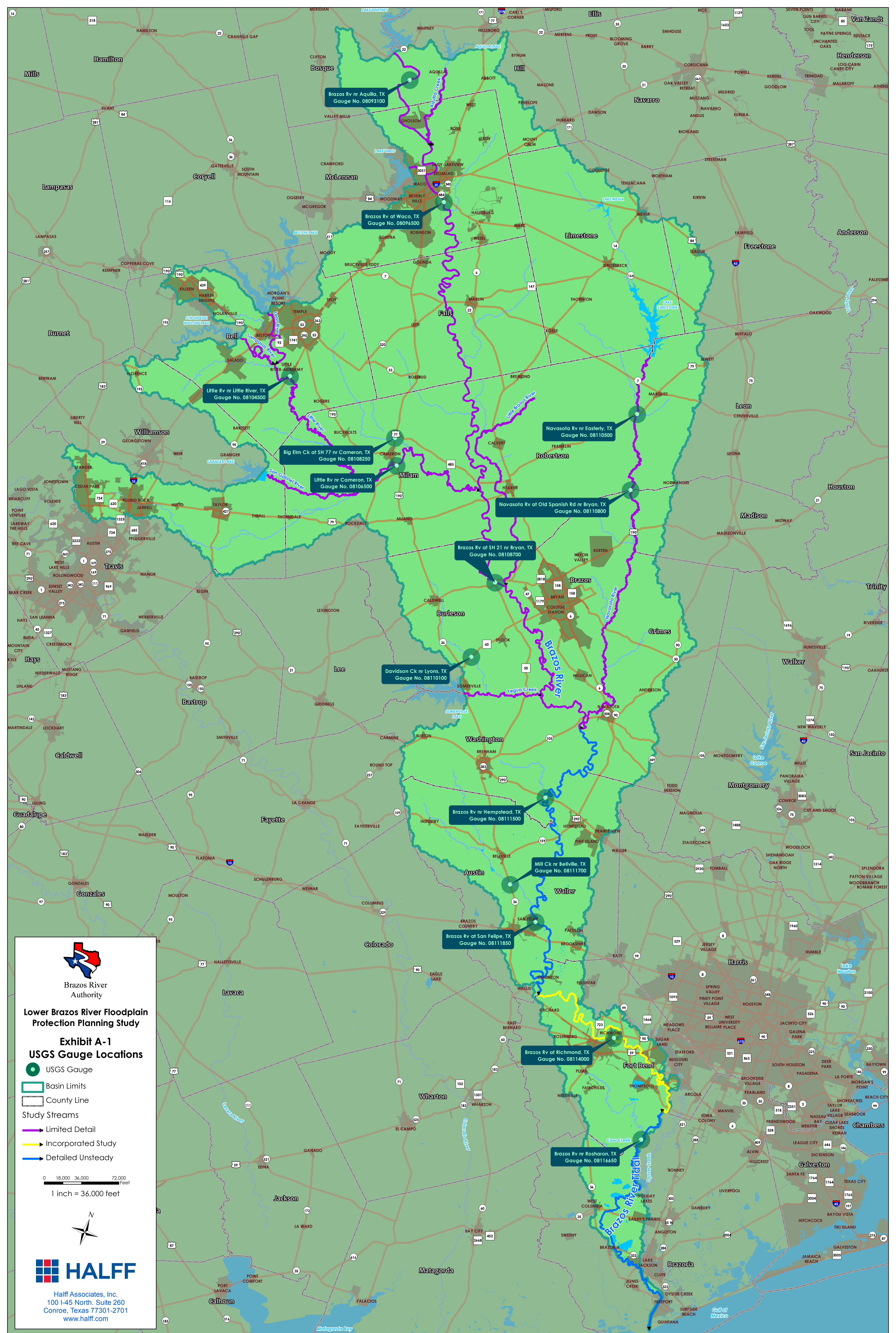
Table A-31: Progress and Public Meetings Locations

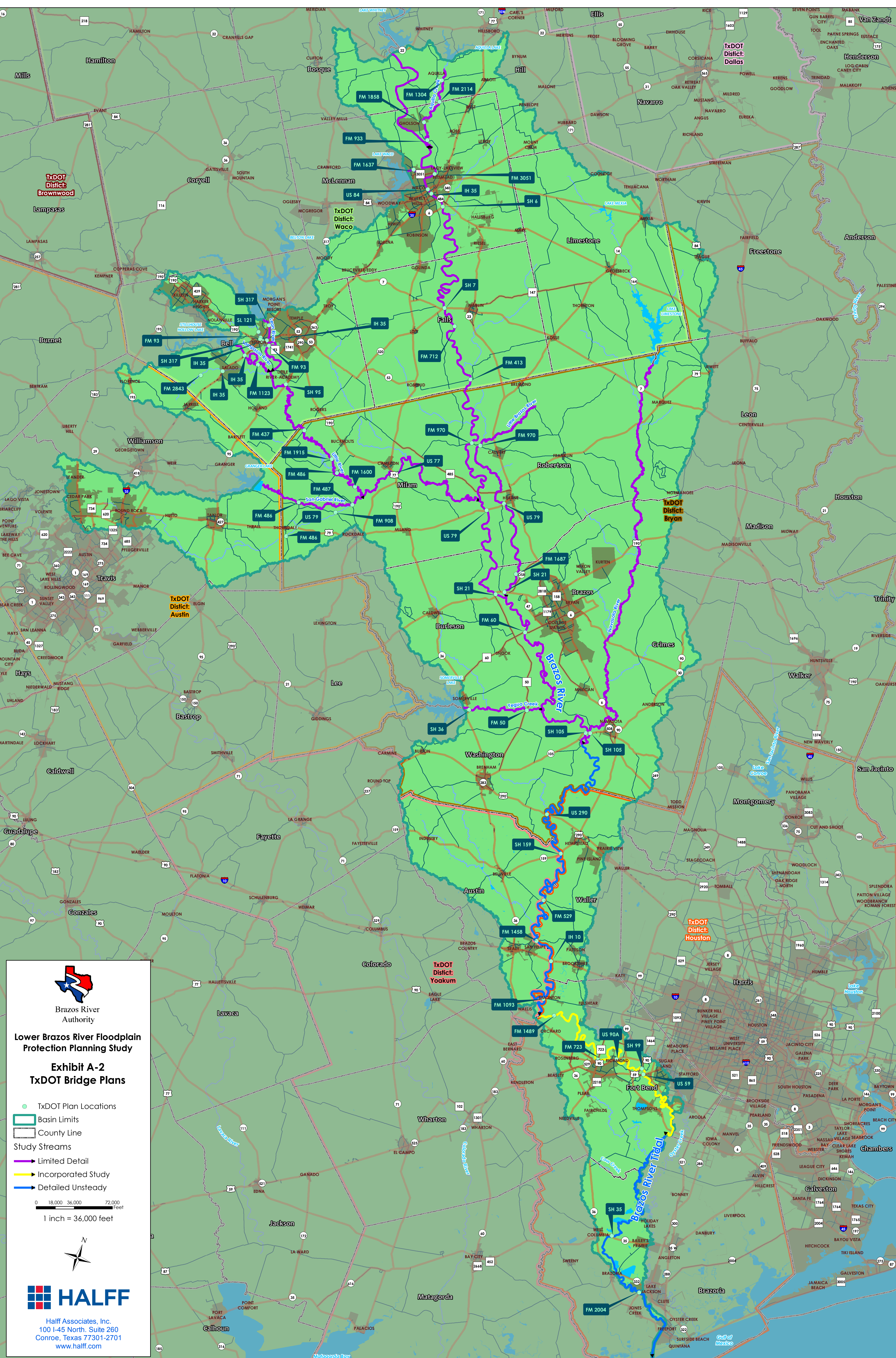
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1	Public Meeting	April 29, 2015	Richmond, TX
2	Public Meeting	November 19, 2015	Rosenberg, TX
3	Public Meeting	March 15, 2016	Hempstead, TX
4	Public Meeting	November 4, 2016	Richmond, TX
5	Coordination with National Weather Service and USACE	August 25, 2016	Fort Worth, TX
6	Public Meeting	April 13, 2017	Rosenberg, TX
7	Coordination with Fort Bend Levee Improvement District	August 22, 2017	Rosenberg, TX
8	Stakeholder Meeting	November 30, 2017	Richmond, TX
9	Public Meeting	February 16, 2018	Angleton, TX
10	Coordination with Fort Bend Levee Improvement District	July 25, 2018	Richmond, TX
11	Public Meeting	July 26, 2018	Prairie View, TX

Appendix A: Previous Studies and Data Collection

Appendix A: Previous Studies and Data Collection

Exhibits





Brazos River
Authority

**Lower Brazos River Floodplain
Protection Planning Study**

**Exhibit A-2
TxDOT Bridge Plans**

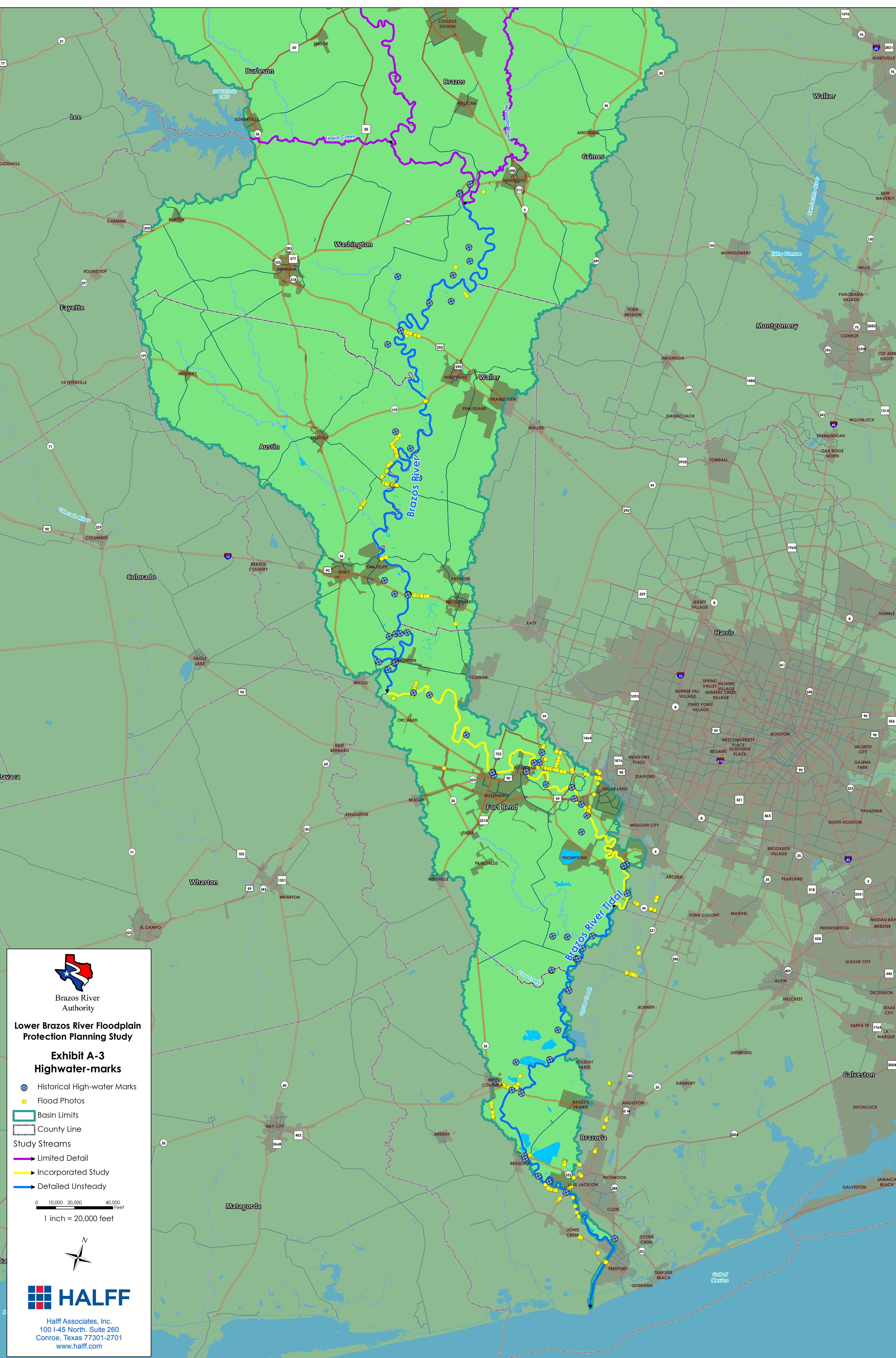
- TxDOT Plan Locations
- ▭ Basin Limits
- ▭ County Line
- Study Streams
 - ▬ Limited Detail
 - ▬ Incorporated Study
 - ▬ Detailed Unsteady

0 18,000 36,000 72,000
Feet

1 inch = 36,000 feet



Half Associates, Inc.
100 I-45 North, Suite 260
Conroe, Texas 77301-2701
www.halff.com



Brazos River
Authority

**Lower Brazos River Floodplain
Protection Planning Study**

**Exhibit A-3
Highwater-marks**

- Historical High-water Marks
- Flood Photos
- Basin Limits
- County Line
- Study Streams**
 - Limited Detail
 - Incorporated Study
 - Detailed Unsteady

0 10,000 20,000 40,000
Feet

1 inch = 20,000 feet



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Appendix A: Previous Studies and Data Collection

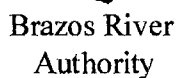
Public Meeting Sign-In Sheets



Brazos River
Authority

Lower Brazos Basin Floodplain
Stakeholder Meeting, Richmond, TX
April 29, 2015

Name	Phone	E-Mail Address
Dave Schwertz	281-337-5074 ext 228	dave.schwertze@nasa.gov
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Joe Ruppel	979-864-1272	joe.r@brazoria-county.com
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Wes Hinchell	512 913 2906	whinchell@halff.com
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Dwain Woods	979-826-7670	d.woods@wallercounty.us
Mario Beddingfield	409-766-3179	Mario.L.Beddingfield@osaes.com
Craig OTTMAN	817-847-1422	COTTMAN@HALFF.COM

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Stakeholder Meeting
Lower Brazos River Floodplain Protection Planning Study
Lower Brazos River Watershed

Thursday, November 19, 2015
11:00am – 12:30pm

	Name	Organization	E-mail	Phone Number
1	Andrew Ickert	Half Associates	aickert@half.com	817-847-1422
2	Sam Hinojosa	Half	shinojosa@half.com	713 588-2471
3	Angela Davidson	Half	adavidson@half.com	817-847-1422
4	CRAIG OTTMAN	HALFF	COTTMAN@HALFF.COM	817-847-1422
5	YANCY SCOTT	WALLER COUNTY	y.scott@wallercounty.us	
6	ORVAL RHODES	WALLER COUNTY	o.rhodes@wallercounty.us	832-444-5903
7	Ivan Ortiz	TW DB	iortiz@twdb.texas.gov	512-468-2181
8	BOB BARDIN	LJA Engineering	bbardin@ljaengineering.com	713 953 5294
9	John Grounds	LJA	jgrounds@ljaengineering.com	713 953 5221
10	BUNNY KLUPPEL	POCAHONTAS MIND	BUNNY_KLUPPEL@MSW.COM	281 342-7913
11	Stephen Wilcox	Costello	swilcox@costelloinc.com	713-783-7788
12	Greg Frank	Costello	gfrank@costelloinc.com	713-783-7788
13	Dave Schwertz	NWS	dave.schwertz@noaa.gov	281-337-3374
14	JOE RIPPLE	BRAZORIA COUNTY	joe.r@brazoria-county.com	979-450-8641
15	Shelley Elliott	City of Simonton	shelley citysecretary@simonton.texas.gov	281-533-9809
16	Douglas King	AUSTIN COUNTY	dking@austincounty.com	979-348-1143
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Please Write Legibly

Stakeholder Meeting
Lower Brazos River Floodplain Protection Planning Study
Lower Brazos River Watershed

Thursday, November 19, 2015
11:00am – 12:30pm

	Name	Organization	E-mail	Phone Number
20	DANIEL M. JUNKIN	CITY OF SIMONTON	MAYOR@SIMONTONTEX.GOV	832-377-7203
21	CURT MOWERY	CITY OF SANDY POINT	C.M.FARM@ATT.NET	713-882-0036
22	Craig Kalkomey	Jones / Carbel	ckalkomey@jonescarbel.com	281-342-2033
23	MARK VOGLER	FBCDD		281-342-2863
24	Mario Beddingfield	USA CE	Mario.L.Beddingfield@usace.army.mil	409-766-3179
25	David Harkin	Carrello		
26	Shashi Kumar	City of Sugar Land	Skumare@sugarlandtx.gov	(281) 275-2275
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Stakeholder Meeting
Lower Brazos River Floodplain Protection Planning Study
Lower Brazos River Watershed

Thursday, November 19, 2015
11:00am – 12:30pm

	Name	Organization	E-mail	Phone Number
39	Charles A Kellomay	Jones/Center Rosenberg	ckellomay@jonescenter.com	281-342-2033
40	Cathy Dominguez	BRA		
41	John Marsh	Ctr of Rosenberg	johnm@ci.rosenberg.tx.us	832-595-3310
42	Joe Klinkousky	TOCJ		979-319-0187
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Stakeholder Meeting
Lower Brazos River Floodplain Protection Planning Study
Lower Brazos River Watershed

Thursday, November 19, 2015
11:00am – 12:30pm

	Name	Organization	E-mail	Phone Number
58	Omar Gadalla	Carollo Engineers	ogadalla@carollo.com	646-637-4096
59	Wes Bull	Wulf	wbul@wulf.com	512 777 4545
60	GL KIDWELL	XDD	glkidwell@sbcglobal.net	979- 239 239-8518
61	Chris Gallion	YDD	chrisgallion@velascodrainage.org	979-265-4251
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Lower Brazos Basin Floodplain Meeting Hempstead, Texas - March 15, 2016

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Sign-In Sheet for:

Stakeholder Meeting – Lower Brazos Floodplain Protection Planning Study - 11/4/2016 11:00 AM

Facilitator: Halff Associates, Inc.

	Name	Agency	Email	Phone Number
1.	CURT MOWERY	CITY OF SADDY POINT		713-882-0036
2.	Chris Gallin	VDD		979-265-4251
3.	Geary Caldwell	VDD		979-265-4251
4.	C-E. BRUGIER	Personal land owner	bbrugier@netscape.com	979 2151639
5.	Sandra Vrablic	Austin County	planning1@AustinCounty.com	979-865-5211
6.	RAY CHISLETT	AUSTIN COUNTY	EMGT@AUSTINCOUNTY.COM	979 270 1449
7.	ANGELA DAVIDSON	HALFF	ang adavidson@halff.com	817-847-1422
8.	Pamela Hannemann	BRA	pamela.hannemann@bragos.org	254-761-3135
9.	Wes Birdwell	Halff	wbirdwell@halff.com	512 477 4545
10.	John Grounds	LJA	jggrounds@ljaengineering.com	713 953-5221
11.	STEVEN SCHUSTER	SNCA	SSCHUSTER@SNCA.COM	512 483 6151
12.	Jason Pollender	USGS	jpollender@usgs.gov	713 997 0899
13.	David Brown	USGS	dsbrown@usgs.gov	832-289-2422
14.	Shashi Kumar	City of Sugar Land	skumare@sugarlandtx.gov	281 275-2275
15.	Chris Steubing	1)	csteubing@sugarlandtx.gov	281 275-2780

Sign-In Sheet for:

Stakeholder Meeting – Lower Brazos Floodplain Protection Planning Study - 11/4/2016 11:00 AM

Facilitator: Halff Associates, Inc.

	Name	Agency	Email	Phone Number
1.	Pwllhmy	Halff	phmy@halff.com	
2.	JEFF JANECEK	FBCDD	jeffrey.janecek@fortbendcountytx.gov	281 342 2863
3.	Lorenzo Wingate	COMC	lorenzto.wingate@missouricitytx.gov	281-403-8685
4.	Mario Beddingfield	USACE	Mario.L.Beddingfield@usace.army.mil	409-766-3179
5.	Ivan Ortiz	TWDB	Ivan.Ortiz@twdb.texas.gov	512-463-8184
6.	Craig Kalkomey	Jones Co. LA	ckalkomey@jonescalbert.com	281.342.2033
7.	G. A. Kluppel	PB MUD	BIGBY-KLUPPEL@PB.MUD.COM	281-342-7773
8.	Eric Wilson	City of Pearland	ewilson@pearlandtx.gov	281-562-1904
9.	Tina Finley	Dow Chemical	TFinley@Dow.com	979-238-5884
10.	MARK VOGLER	FBCDD		281-342-2863
11.	Doug King	Austin County	dking@austincounty.com	979-398-1143
12.	TREY Duhon	Waller County	tduhon@wallercounty.us	979-826-7700
13.	Joe Rippe	Brazoria County	joer@brazoria-county.com	979-864-1272
14.	Yancy Scott	WALLER COUNTY		
15.	Cathy Dominguez	B.R.A.		

Sign-In Sheet for:

Stakeholder Meeting – Lower Brazos Floodplain Protection Planning Study - 11/4/2016 11:00 AM

Facilitator: Halff Associates, Inc.

	Name	Agency	Email	Phone Number
1.	DeWayne Davis	Waller Co	d.davis d.davis@wallercounty.us	
2.	ATHEL STANLEY	LAKE SACKSON	ASAMCHE2@ LAKE SACKSONTX.COM	878-415- 2417
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Sign-In Sheet

Lower Brazos River Floodplain Protection Planning Study – 4/13/2017

Rosenberg, Texas

	Name	Email	Organization	Phone Number
1	Ivan Ortiz	Twdbo.texas.gov ivan.ortiz@twdbo.org	TWDB	512-463-8184
2	CHONY ESSEK	CHONYEA@GMAIL		2813895701
3	BRIAN FANGUY	BRIANFANGUY@GMAIL.COM	VALLEY LODGE Simonton	713-444-6386
4	MAUREEN FANGUY	"	"	"
5	CHRISTINA MASSENGALE	"	"	"
6	JAKE TAYLOR	"	"	"
7	ANDRE' McDONALD	PPAC SUGARLAND @ GMAIL.COM		281-265-6687
8	Chris Gallion	chrisgallion@evlasco drainage.org	FDD	979-236-8791
9	JEFF ANDERSON	jeff_anderson@understream.net	FBC LID 14	281 814 4900
10	RON FRERICH	RJFRERICH@EARTHLINK.NET	FCLID 2	281-728-7360
11	DeWayne Davis	d.davis@wallercounty.us	Waller County	979 826 7670
12	JEFF JANECEK	jeffrey.janecek@fortbendcountytx.gov	FBCDD	281-342-2863
13	Jim Ettema		mad Citizen	281-346 1091
14	JOHN LEBOURNUS	JOHN@JOHNLEBOURNUS.COM		281-346-8677
15	ATHIEL TAN, SANCHEZ	ASANCHEZ@LAKESACKTOWNSHIP.TX	City of Lake Jackson	979-45-2417
16	Richard Perrell	resherrell@AOL.COM	FCLID	832-260 2462
17	Enca Molina	cityhall@Simonton.texas.gov	City of Simonton	281 533 9809
18	Shelley Elliott	cityadministrator@Simonton.texas.gov	City of Simonton	281 533 9809

19	Juling Bao	juling.bao@northenday	FB CPD	281-342-2863
20	Sandra Vrablec	planning1@.gov Austin City	Austin City	779-865-594
21	Shannon Hensley	cjudge2@justicounty.com	Austin City	979-865-5911
22	Charles A Kellomey	ckellomey@jonasnet.com	Roanoke Sumner	281-342-2033
23	Craig Kalkomey	ckalkomey@jonasnet.com	Texas Carter	281-342-2033
24	J.D. McAnani	JDMCCANN52@YAHOO	LANDOWNERS	713-294-3153
25	ROBERT FROST	ROBERTSFROST	Simonton	713-357-496
26	MARK VOGLER	FB CPD	FB CPD	281-342-2863
27	Rana Rehman	rrehman@down.com	Down	979-238-0557
28	Donna Whitman	dngrayer@baker	ADD	979-308-5980
29	Joe Rippe	Joe.r@brazoria-county.com	Brazoria County	979-864-4272
30	Paul Wong	rewong@half.	HALFF	75882440
31	Stephen Wilcox	swilcox@costelloinc.com	Costello	713-783-7788
32	JASON KELLY	jkelly@lja.com	LJA	713-953-5064
33	ALVIN SORRELS	alvin.sorrels@gmail.com	Landowner	832-423-7293
34	Zach Weimer	zach.weimer@gmail.com	FCLID2	832-655-9001
35	Carlos E. Qunbar	cquintero@fugio.com	Fugio USA Land	713-369-5485
36	Chris Stading	cstading@synerlastry	COSL	281-275-2788
37	Burton L Johnson	BLJohnson@lan-inc.com	LAN, Inc	713-821-0251
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per email
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Public Meeting for the Lower Brazos Floodplain Management Study
Friday, February 16, 2018
Angleton, Texas

Name	Address	Phone	E-mail
CHARLIE SCHOLZE	417 Creekside Dr	713-702-6725	CHARLES.SCHOLZE @ HOLLIBRINTON.COM
CURT MOWERY	297 CR 42 SANDY POINT	713-882-0036	C.M. FARM @ ATT.NET
Marcell Kohlen	2259 FM 3318 Pattison, TX 77423	979 885-7355	Kohlenmar@hushes.net
Charles Kohlen	2259 FM 3318 Pattison, TX 77423	↓ ↓	—
Randall Weeks	261 Crestview 77486	406-210-2621	RandallWeeks@outlook.com
BRYAN B. STEVES	720 N. ANDERSON ST.	979-848-6473	bbsguns@yahoo.com
John Phillips	Box 724 W. Columbia, Tex 77486	713-828-8399	LARKPhillips@Hotmail.com
Mike Nobser	16519 Deerhaven Run Rosharon, TX	713-825-1823	mikewobser@gmail.com
Stephen Branch	17219 Lucky Horse Dr Rosharon	979 264-5149	swbranch1@gmail.com
Fred Rubalcaba	217 Fawn Trail	979.480.5136	Fred@Fawn
TED FELDER	1237 ARABIAN CT. ANGLETON, TX	979-482-1043	TedFelder@centurylink.net
ROBERT SPARK	150 Lakeside Dr. ANGLETON	832-773-7180	robertspark@gmail.com

Name	Address	Phone	E-mail
Paul Gianny			phanny@halff.com
ALLAN SASSIN	14200 Green Ln West Columbia 77486	979-345-2805	ALLANSAS@AOL.com
Angela Davidson	4000 FOSSIL CR FW TX 76244	817 847 1422	adavidson@halff.com
Brian Downing	"	817 847 1458	bdowning@halff.com
JOE STEPHENSON	1020 CR 49	979-549 5733	JOEWFRA@AOL.COM
Charles Kalkomey	6415 Reed Rd Rosenberg	281-342-2033	ckalkomey@jonaworki.com
Gregory Waller	3401 Northern Cross Ft Worth TX	817 831 3284	greg.waller@noaa.gov
DEREK GIARDINO	3401 Northern Cross	817 831-3284	derek.giardino@noaa.gov
Katie Landry-Guyton	1353 FM 1416 Suite 202 Dickinson TX	281-337-5074	katie.landry@noaa.gov
Yancy Scott	Waller Co.		
Lanasa Moyer	12201 FM 2759	713 818 3915	lmoyer@fortbendservices.com
JASON HOLL	1100 CHERRY ST		
Chris Steubing	2700 Zinn Center Blvd	281- 225 2276	CSTEUBING@SERCOSLANDING.COM
HOWARD CHRISTIAN	600 Morton	281 342 0559	hchristian@richmondtx.gov
Ernie Kistner	270 MORTON DR	817 248 6902	

Name	Address	Phone	E-mail
JOE STRPELINSKY	1020 CR 49	979 549 5733	JOE W F R E AOL COM
Disa Schulze	Holiday Lakes 417 Creekside Dr	979-248-9529	dise.schulze@yahoo.com
Sharon Valiente	30603 FM 1043	281 346 1796	svaliente@ulshear-lyons.com
David Barton	3414 Crossbranch	713 412 8311	david.barton @rpsgroup.com
David Spoor	712 Cottonwood Angleton	979 849 4214	dad6spoor@sbcglobal.net
Brenda K. Tortorice	18227 ^{ROSEHARCOON 77583} WOODS END	281-369-0123	BKTORTORICE@gmail.com
Chris Hosen	708 Cottonwood Angleton	979-481-1285	hosen@pittreport.com
MARC YOUNG	PO BOX 1693	979-877-0660	Marc.Young.pe@gmail.com
DAVID W. RAMSEY	272 ^{L.J.} FAWN TRAIL	979-235-9635	FIRSTBACKPACKER@YAHOO.COM
SUSAN M. RAMSEY	11	11	11
Glenn Lord	118 Damberry Lake Jackson TX 77566	979-292-0554	MGLord@Bov.com
Brent Harley	173 Brazos Dr	979-481-9626	Harleyb1862@yahoo.com
Juling Bao	Fort Bend County	281-342-2863	julingbao@fortbendcountTXis
Beverly Stricker	954 Mill Rd BAY X	832 4070 161	bj_stricker@yahoo.com
Dr. Charles	1514 CR 34 Angleton, TX	281-367-0362	

Name	Address	Phone	E-mail
Duke Suttheland	City of West Columbia 5401 Brazos Ave	979-345-3622	citymanager@westcolumbiatx.org
Laurie Kincannon	" " "	" " "	mayor@westcolumbiatx.org
John & Carol Treble	1014 CHEYENNE RIDGE DR ROSHARON	832-493-3916	JOHNH.TREBLE@ICLOUD.COM
Ray Sauer	2133 Riverside	978-289-4088	Greg.Sauer@Yahoo.com
Ernest Schreiber	2301 Brazosport Blvd Freeport Tx	979-238-7482	ecschreiber@Daw.com
Clay Stevens	5146 Blue Lake Rd 77515	832-244-9907	claystred@aol.com
GL Kidwell	101 DASHY TX	979-239-8518	glkidwell@shglobal.net
Tom Wallen	1737 CR30H	979-848-8707	CCARROW13@aol.com
SANDY WEEMS	Box 733 77486 WEST COLUMBIA TX	979 313 8611	SWEEMS@QUICK.COM
Bob Antoine	7 DEER C LAKE JACKSON	713 875-3252	BobAntoine@gmail.com
Hank Coleman	133 DONE TR. RICHWOOD	281-910-5974	
JEFF BILYEU	BRAZORIA CO.	979-849-5755	
Brenda Woods	5218 8th coffee Plata. Rd. Rosharon	281-395-3725 832	brendawoods629@gmail.com
Cecile Booth	209 S Morgan Ansonia	979-849-4929	booth@portfreeport.com
MARK VOGLER	1124 BLUME Rd ROSENBERG	281-342-2863	

Name	Address	Phone	E-mail
Mark Howard	7325 CR3 SWamy	979 248 3882	
Don Bushman	711 PONY TRAIL ANGLETON	979-418-9378	
Allan Parks	2726 CR 34	979-482-7997	
Steven Marshall	4602 CR.671	979-864-5977	
Neal McLAIN	416 CR 912 77422	979-798-2284	
Charles Eastland	13430 NW Fwy, Houston 77040	713-462-3242	ceastland@cobbfoundley.com
John Baker	^{Lake Jackson} 54 Spanish Oak Ct 77566	979-297-8913	LB98@comcast.net
Teresa Borders	City of Brazoria	979 798 2489	citymanager@cityofbrazoria.org
John Capeland	2719 Horseshoe Ranch, TX	713 299-8761	johncapeland713@aol.com
John Ivery	2407 LINDSEY DR D	281-773-3476	jivery@ehrainc.com
John Grands	LJA	713 594 3280	jgrounds@LJA.com
Tim Hart	ELTRA	281-773-3476	thart@ehrainc.com
Tim Finley	206 Rainforest Ln	979-236-0121	TFinley@bw.com
Chris Gallion	101 Talisman L1	979-236-3791	chrisgallion@clarco drainage.org
Chip + Tholoco Melton	2003 Bayou Dr LJ	979-798-7604	Chip.melton@hotmail.com

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Waller County Community Center
21274 FM 1098
Prairie View, TX

SIGN-IN SHEET
Lower Brazos Basin Floodplain Protection Study – Final Public Meeting
July 26, 2018 10:30AM

	Name	Company	Phone	Email
1.	GEORGE KIDWELL	VDD	979-239-8578	gkdwel@strglobal.net
2.	Red Cassidy	Dewberry Engineers Inc	916 770-6216	tcassidy@dewberry.com
3.	Chris Gallion	Velasco Drainage District	979-236-8791	chris.gallion@velascodrainage.co
4.	BUDDY KLUPPEL	PECAN GROVE MUD	281 342-7913	BUDDY_KLUPPEL@MSN.COM
5.	TIM FINLEY	Dow Chemical	979-238-5884	T.FINLEY@Dow.com
6.	ATHLESTAN SANCHEZ	LAKE JACKSON	979-415-2417	ASANCHEZ@LAKEJACKSONTX
7.	EDWARD E. TAYLOR	TOWN OF THOMPSONS	832-721-1745	ee_taylor@hotmail.com
8.	Gina Treadgold	Town of Thompsons	713-557-4843	gtreadgold@aol.com
9.	Sharon Valiante	City of Fulshear	281 346 1796	svaliante@fulshear-texas.gov
10.	Chris Stabing	City of Sugar Land	281-275-2276	cstabing@sugarlandtx.gov
11.	YANCY SCOTT	WALLER COUNTY	713-560-8200	y.scott@wallercounty.us
12.	Joey Ressler	BAKER & LAWSON Inc	929-864-0881	jressler@bakerlawson.com
13.	Brad Brunett	BRA	254-761-3102	brad.brunett@brazos.org
14.	Andy Palermo	EHRA	713-784-4500	apalermo@ehrainc.com
15.	PAT BRUEGGER		432 452 1583	pbruegger@msn.com



Waller County Community Center
21274 FM 1098
Prairie View, TX

Lower Brazos Basin Floodplain Protection Study – Final Public Meeting
July 26, 2018 10:30AM

	Name	Company	Phone	Email
16.	KALLI CLARK-EGAN	USACE	469-367-6036	Kallieclark-egan2@usace.army.mil
17.	PAUL HAMILTON	USACE	409-766-3102	paul.b.hamilton@usace.army.mil
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Waller County Community Center
21274 FM 1098
Prairie View, TX

Lower Brazos Basin Floodplain Protection Study – Final Public Meeting
July 26, 2018 10:30AM

Name	Company	Phone	Email
46. Kristen Weidenfeller	AECOM	281-675-3533	kristen.weidenfeller@aecom.co
47. Paul Henry	Halff		pherry@halff.com
48. Angela Davidson	Halff		adavidson@halff.com
49. Jake Lesue	Dewberry	940-594-9571	jlesue@dewberry.co
50. Neil Goertz	Fort Bend County Drainage District	281-342-2863	Neil.Goertz@fortbendcounty.tx.gov
51. Ross McCall	WASHINGTON COUNTY	979-277-6275	JMCCALL@WACOUNTY.CO
52. Mark Marzahn	Washington County	979-277-6290	mwarzahn@wacounty.com
53. Charles A Kalkoney	Jones/Carter	281-342-2033	ckalkoney@jonescarter.com
54. Juan Ortiz	TWDB	512-468-8184	juan.ortiz@twdb.texas.gov
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Kick-Off Meeting
Tuesday, December 2, 2014

Kick-Off Meeting
Tuesday, December 2, 2014

**LOWER BRAZOS FLOODPLAIN STUDY
KICK-OFF MEETING
DECEMBER 2, 2014**

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Lower Brazos Basin Floodplain Stakeholder Meeting
Thursday, November 30, 2017
Richmond, Texas

Name	Address	Phone	E-mail
Amelia Davidson	4000 FOSSIL CK, FN	817-847-7657	amdaidson@halff.com
Paul Giang	Spring, TX	512-673-6341	pliang@halff.com
Curt Mowery	297 CR 42 ^{SANDY POINT}	713-882-0036	C.M. FARM@ATT.NET
ATHELTAN SANCHEZ	2504K DRIVE LAKE SANCHEZ	979-482-3524	ASANCHEZ@LAKE3AKES.TX.GOV
Jessie Li	City of Sugar Land	281-275-2844	jli@sugarland.tx.gov
Jorge Alba	City of Sugar Land	281-275 2275	jalba@sugarland.tx.gov
GLKIDWELL	YDD	979-239-8518	glkidwell@sbcglobal.net
Chris Gallion	"	979-236-9791	chrisgallion@velasco drainage.org
Wes Birdwell	Halff	512 777 4545	wbirdwell@halff.com
Mark Marzahn	105 W. Main St, Ste 100 Brenham	979-277-6290	mmarzahn@wacounty.com
Richard Stollis	301 Jackson St Richmond	281.633.7506	richard.stollis@fortbendcountytexas.gov

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