### **MEMORANDUM**

**DATE:** February 8, 2023

**TO:** HCFCD/Partners

**FROM:** Jeff Lindner

Meteorologist / Director Hydrologic Operations

**RE:** Immediate Report – Final

January 24, 2023 Heavy Rainfall and Tornado Information

This is the first and final report summarizing the rainfall and minor flooding that occurred across portions of northwest Harris County and the tornado that impacted southeast Harris County.

#### **GENERAL FLOODING STATEMENT**

A powerful storm system moved across Texas on the 24<sup>th</sup> with widespread impacts across the region. Early on the 24th surface low pressure developed over south-central Texas which helped to draw a warm front northward into the upper Texas coast and then inland over southeast Texas, eventually reaching a line from near Sealy to Downtown Houston to Chambers County. This warm front when combined with strong lift from the approaching storm system and impressive low level wind shear, or winds changing direction and speed with height, resulted in the formation of supercell thunderstorms along a line from near Victoria to Sealy to Conroe. For a period from the late morning into the early afternoon hours these storms moved along that same line producing heavy rainfall and significant street flooding over portions of west and northwest Harris County. Eventually a line of thunderstorms evolved and began to quickly move eastward across Harris County during the early afternoon. Rainfall amounts generally along and southeast of US 59 were in the 1.0-2.0 inch range as the line increased in forward speed while areas northwest of US 59 recorded between 2.0-6.0 inches of rainfall. Between 12:30 p.m. and 1:00 p.m. an eastward moving severe thunderstorm over western Fort Bend County began to show signs of low level rotation on radar and produced a tornado across portions of southern Fort Bend County followed by a second tornado over portions of northern Brazoria County near Pearland. As this storm entered southern Harris County just northeast of Pearland, rotation increased and a long tracked damaging tornado occurred across portions of southeast Houston, Pasadena, Deer Park, and Baytown.

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### **RAINFALL**

<u>Duration</u> – The heaviest rainfall occurred over portions of west, northwest, and northern Harris County in a 3 to 6 hr period. Several locations in northwest Harris County recorded 1.0-3.0 inches of rainfall in an hour during the late morning hours. Additionally, as the line of storms moved eastward, numerous locations recorded 1.0-2.0 inches of rainfall in 15-45 minutes which resulted in rapid street flooding over many portions of Harris County during the early to mid afternoon hours.

Duration	Max Rainfall (in)	Duration	Max Rainfall (in)
15-min	2.0	3-hr	5.4
30-min	2.1	6-hr	5.8
1-hr	2.9	12-hr	5.9
2-hr	4.6	24-hr	5.9

<u>Total Amounts</u> – Total 6-hr rainfall amounts ranged from 3.0-6.0 inches from north of Katy along west/north of FM 1960 into the Humble and Kingwood areas. The highest amount was at John Paul Landing Park in northwest Harris County where 5.48 inches was recorded in a 3-hr period.

The heavy rainfall across northwest Harris County occurred across areas that had experienced heavy rainfall on January 8<sup>th</sup> and 9<sup>th</sup> and grounds were still wet from the previous rainfall when the 24<sup>th</sup> event occurred which maximized run-off into area creeks.

Heavy rainfall and flooding can occur every month of the year in Harris County and there have been other recent heavy rainfall events in January. The rainfall duration and intensity of those events are compared in the table below.

Rainfall Duration	1-24-23	1-9-22	1-18-17	1-9-12
15-min	2.0	1.6	1.3	2.0
30-min	2.1	2.4	1.8	2.8
1-hr	2.9	3.7	2.7	4.1
2-hr	4.6	4.8	4.3	5.8
3-hr	5.4	5.2	5.4	6.3
6-hr	5.8	5.7	6.3	6.5
12-hr	5.9	6.3	7.0	6.6
24-hr	5.9	8.5	7.0	6.6

The January 24, 2023 event is similar in intensity and duration to the January 18, 2017 rainfall event. Additionally, these "cool season" events tend to be short in duration with the majority of the rain occurring in 6 hours or less. Interestingly, all of the heavy rainfall events listed above in January occurred with similar meteorological parameters in place, a surface warm front over the region, high moisture levels, and repeat cell movement over the same area for a period of time.

**Exceedance Probability** – Rainfall for the 1-hr to 3-hr time periods averaged between the 50% (2-yr) and 10% (10-yr) exceedance probabilities across portions of the following watersheds: Cypress Creek, Addicks Reservoir, Spring Creek, and the San Jacinto River.

Note: rainfall exceedance probabilities are on NOAA ATLAS 14

### **CHANNEL CONDITIONS**

Wet grounds from recent heavy rainfall in early January, dead and dormant vegetation which reduces soil moisture evaporation, and the high intensity of the rainfall in a short period of time resulted in maximum run-off over much of Harris County, most notably in the northwest and northern portions of the county where rainfall was greatest.

Isolated overbank channel flooding occurred along portions of upper and middle Spring Creek, upper Little Cypress Creek, upper Cypress Creek, lower South Mayde Creek, and the West Fork of the San Jacinto River. No significant flooding of channels occurred and no structures were flooded.

### **Spring Creek**

Minor overbank rural land flooding occurred along Spring Creek upstream (west) of SH 249 with the majority of this flooding upstream (west) of Hegar Rd where a few bridges crossing the creek were inundated.

# **Cypress Creek**

Minor overbank rural land flooding occurred upstream (west) of Katy Hockley where significant run-off from Waller County entered upper Cypress Creek. Portions of Sharp Rd west of the creek were inundated and impassable as well as low land along Mound Creek which drains in upper Cypress Creek.

#### **Little Cypress Creek**

Minor overbank rural land flooding occurred from Becker Rd upstream to the headwaters near Hockley including flooding of portions of Zube Park east of the Roberts Rd bridge crossing. This area had recently experienced similar flooding on January 8 and 9 but lasted longer in duration with the 24<sup>th</sup> event.

### **South Mayde Creek**

Minor overbank flooding occurred along the lower portions of South Mayde Creek near Greenhouse Rd where the creek enters Addicks Reservoir as the creek narrows on the downstream side of the Greenhouse bridge. Flow escaped the channel both upstream and downstream of Greenhouse impacting Saums Rd and much of Cullen Park as well as Greenhouse Rd both north and south of the bridge crossing. No structures were impacted.

#### West Fork of the San Jacinto River

The river rose to bankfull at the US 59 crossing with some very minor overbank flooding between US 59 and West Lake Houston Parkway. Nearly all of the inflow into the West Fork of the San Jacinto River occurred from Spring and Cypress Creeks.

Water levels in Lake Houston rose to near the top of bulkheads near the FM 1960 bridge crossing and inundated a few piers due to run-off entering the lake from the West and East Forks of the San Jacinto River and Luce Bayou.

### HARRIS COUNTY FLOOD CONTROL DISTRICT ACTIONS/RESPONSE

- HCFCD real time flood warning gages reported 234 rainfall notices (1 inch rainfall in 15-min), 21 flooding possible notices (3 ft below bankfull), and 7 flooding likely (bankfull) notices.
- A total of 2,051 alerts were sent from the flood warning system to registered users via text and e-mail from the 24<sup>th</sup> to the 25<sup>th</sup> including both default and custom alerts created by users.
- The HCFCD Flood Warning System website recorded approximately 29,500 users between the 24<sup>th</sup> and 25<sup>th</sup> with a peak of 10,000 users around 2:00 p.m. on the 24<sup>th</sup>.
- One HCFCD gage was out of service due to ongoing bridge construction: 1685
- One HCFCD gage (750) reported low rainfall and was found to be clogged with debris. The rainfall sensor was cleaned of debris and calibrated and returned to full function.
- HCFCD crews conducted 31 discharge (flow) measurements between January 24<sup>th</sup> and January 27<sup>th</sup> along various watersheds across the northern portions of Harris County. The data collected from these measurements is listed in the table below.

Live Creek @ Penick Road	Station Name	Date	Start Time	Team	Stage Begin	Stage End	Stage Ave.	Total Discharge	Quality	Rise_Fall_Steady
Mound Creek @ FM 362	Spring Creek @ Hegar Road	1/24/2023	5:48 PM	RV/FB	213.26	213.27	213.27	854	Good	Rising
Little Cypress Creek @ Becker Road	Live Creek @ Penick Road	1/24/2023	3:33 PM	RV/FB	185.51	185.71	185.61	367	Poor	Rising
Little Cypress Creek @ Becker Road 1/24/2023 2:02 PM RV/FB 194.75 194.75 194.75 303 Poor Steady Halls Bayou @ Airline Drive 1/24/2023 5:33 PM DW/RH 70.07 70.10 70.09 1,077 Fair Rising P138 @ Aldine Westfield Road 1/24/2023 6:31 PM DW/RH 63.42 63.18 63.30 333 Poor Falling Langham Creek @ Longenbaugh Road 1/24/2023 2:28 PM DW/RH 129.91 130.00 129.96 769 Fair Rising South Mayde @ Greenhouse Road 1/24/2023 4:18 PM RV/FB 108.77 108.77 108.77 10.635 Poor Steady Bear Creek @ FM 529 1/24/2023 6:05 PM IS/IL 144.41 144.41 144.41 144.41 164 Poor Steady Spring Branch @ Bingle Road 1/24/2023 2:19 PM DW/RH 58.61 58.63 58.62 1,344 Poor Rising Spring Branch @ Bingle Road 1/24/2023 3:19 PM DW/RH 58.61 58.63 58.62 1,344 Poor Rising Spring Branch @ Bingle Road 1/24/2023 3:51 PM DW/RH 58.61 58.63 66.66 115 Poor Rising Briar Branch @ Campbell Road 1/24/2023 3:51 PM DW/RH 66.28 66.30 66.29 180 Poor Rising San Jacinto River @ FM 2090 1/25/2023 8:25 AM IL/DW 83.85 83.74 83.80 3,433 Poor Rising East Fork San Jacinto River @ FM 2090 1/25/2023 4:06 PM DW, RH 80.00 79.99 80.00 1,084 Poor Falling Spring Creek @ FM 2978 1/25/2023 12:46 PM IL/FB 135.83 135.83 135.83 1,682 Poor Steady Bear Branch @ Kuykendahl Road 1/25/2023 9:35 AM IL/FB 155.34 155.32 155.33 146 Fair Falling Cypress Creek @ Eldridge Parkway N. 1/25/2023 12:46 PM IL/FB 155.34 155.32 155.33 1.948 Good Falling Cypress Creek @ Eldridge Parkway N. 1/25/2023 12:46 PM IL/FB 163.33 163.31 163.32 1,948 Good Falling Cypress Creek @ Eldridge Parkway N. 1/25/2023 12:46 PM IL/FB 155.34 155.32 155.33 1.948 Poor Falling Cypress Creek @ Eldridge Parkway N. 1/25/2023 12:46 PM IL/FB 163.33 163.31 163.32 1,948 Good Falling Cypress Creek @ Eldridge Parkway N. 1/25/2023 1:43 AM IL/FB 153.68 153.68 153.68 544 Poor Steady Clodine Ditch @ Grand Mission Blvd 1/25/2023 1:43 AM IL/FB 153.68 153.68 153.68 544 Poor Steady Clodine Ditch @ Grand Mission Blvd 1/25/2023 1:43 AM IL/FB 153.68 153.68 153.68 544 Poor Steady Clodine Ditch @ Grand Mission Blvd 1/25/2023 1:43 AM IL/FB 153.68 153.68 153.66 233 Good	Mound Creek @ FM 362	1/24/2023	2:52 PM	RV/FB	222.16	222.16	222.16	724	Poor	Steady
Halls Bayou @ Airline Drive 1/24/2023 5:33 PM DW/RH 70.07 70.10 70.09 1,077 Fair Rising P138 @ Aldine Westfield Road 1/24/2023 6:31 PM DW/RH 63.42 63.18 63.30 333 Poor Falling Langham Creek @ Longenbaugh Road 1/24/2023 2:28 PM DW/RH 129.91 130.00 129.96 769 Fair Rising South Mayde @ Greenhouse Road 1/24/2023 4:18 PM RV/FB 108.77 108.77 108.77 1,635 Poor Steady Bear Creek @ FM 529 1/24/2023 6:05 PM IS/IL 144.41 144.41 144.41 164 Poor Steady Spring Branch @ Bingle Road 1/24/2023 2:19 PM DW/RH 58.61 58.63 58.62 1,344 Poor Rising Spring Branch @ Bingle Road 1/24/2023 1:48 PM DW/RH 58.61 58.63 58.62 1,344 Poor Rising Sharlar Cheek @ Hongel Road 1/24/2023 3:51 PM DW/RH 54.70 58.61 56.66 115 Poor Rising Sharlar Cheek @ FM 529 12/24/2023 3:51 PM DW/RH 54.70 58.61 56.66 115 Poor Rising Sharlar Cheek @ FM 242 1/25/2023 8:25 AM IL/DW 83.85 83.74 83.80 3,433 Poor Rising East Fork San Jacinto River @ FM 2090 1/25/2023 4:06 PM DW, RH 80.00 79.99 80.00 1,084 Poor Falling Spring Creek @ FM 2978 1/25/2023 12:46 PM IL/FB 135.83 135.83 135.83 1,682 Poor Steady Bear Branch @ Kuykendahl Road 1/25/2023 9:35 AM IL/FB 155.34 155.32 155.33 416 Fair Falling Spring Creek @ Decker Prairie-Rosehill Road 1/25/2023 10:57 AM RH/IS 110.65 110.53 110.59 4,581 Poor Falling Cypress Creek @ Eldridge Parkway N. 1/25/2023 10:57 AM RH/IS 119.99 119.93 119.96 3,378 Poor Falling Cypress Creek @ Eldridge Parkway N. 1/25/2023 1:41 PM IL/FB 155.68 153.68 153.68 544 Poor Steady Willow Creek @ FM 298 1/25/2023 1:43 AM DW/IC 152.51 152.58 155.55 206 Fair Rising Cheek @ FM 2978 1/25/2023 1:43 AM DW/IC 152.51 152.58 155.55 206 Fair Rising Cheek @ FM 2978 1/25/2023 1:43 AM DW/IC 152.51 152.58 152.55 206 Fair Rising Willow Fork Creek @ Pederson Road 1/25/2023 1:43 AM DW/IC 152.51 152.58 152.55 206 Fair Rising Willow Fork Creek @ Pederson Road 1/25/2023 1:41 PM IL/FB 153.65 136.55 136.56 233 Good Falling Langham Creek @ Longenbaugh Road 1/25/2023 1:43 AM DW/IC 152.51 152.58 152.55 206 Fair Rising Willow Fork Creek @ Pederson Road 1/25/2023 1:43 AM DW/IC 152.51 15	Little Cypress Creek @ Becker Road	1/24/2023	6:43 PM	RV/FB	195.33	195.33	195.33	608	Fair	Steady
P138 @ Aldine Westfield Road	Little Cypress Creek @ Becker Road	1/24/2023	2:02 PM	RV/FB	194.75	194.75	194.75	303	Poor	Steady
Langham Creek @ Longenbaugh Road  1/24/2023  2:28 PM DW/RH  129.91  130.00  129.96  769  Fair Rising South Mayde @ Greenhouse Road  1/24/2023  4:18 PM RV/FB  108.77  108.77  108.77  108.77  1,635  Poor Steady Bear Creek @ FM 529  1/24/2023  6:05 PM IS/IL  144.41  144.41  144.41  164  Poor Steady Spring Branch @ Bingle Road  1/24/2023  1:48 PM DW/RH  58.61  58.63  58.62  1,344  Poor Rising Spring Branch @ Longpell Road  1/24/2023  1:48 PM DW/RH  54.70  58.61  56.66  115  Poor Rising Briar Branch @ Campbell Road  1/24/2023  3:51 PM DW/RH  66.28  66.30  66.29  180  Poor Rising San Jacinto River @ SH 242  1/25/2023  8:25 AM JL/DW  83.85  83.74  83.80  3,433  Poor Rising Spring Creek @ FM 2978  1/25/2023  1:246 PM JL/FB  135.83  135.83  135.83  135.83  1,682  Poor Steady  Rising Spring Creek @ Decker Prairie-Rosehill Road  1/25/2023  1:246 PM JL/FB  155.34  155.32  155.33  416  Fair Falling Cypress Creek @ SH 249  1/25/2023  1/25/2023  1:245 PM RH/IS  110.55 AM RH/IS  110.55 AM RH/IS  110.59  110.59  110.59  110.59  110.59  110.50  110	Halls Bayou @ Airline Drive	1/24/2023	5:33 PM	DW/RH	70.07	70.10	70.09	1,077	Fair	Rising
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Bear Creek @ FM 529	Langham Creek @ Longenbaugh Road	1/24/2023	2:28 PM	DW/RH	129.91	130.00	129.96	769	Fair	Rising
Spring Branch @ Bingle Road         1/24/2023         2:19 PM         DW/RH         58.61         58.63         58.62         1,344         Poor         Rising           Spring Branch @ Bingle Road         1/24/2023         1:48 PM         DW/RH         54.70         58.61         56.66         115         Poor         Rising           Briar Branch @ Campbell Road         1/24/2023         3:51 PM         DW/RH         66.28         66.30         66.29         180         Poor         Rising           San Jacinto River @ SH 242         1/25/2023         8:25 AM         JL/DW         83.85         83.74         83.80         3,433         Poor         Rising           East Fork San Jacinto River @ FM 2090         1/25/2023         4:06 PM         DW, RH         80.00         79.99         80.00         1,084         Poor         Falling           Spring Creek @ FM 2978         1/25/2023         12:46 PM         JL/FB         135.83         135.83         135.83         1,682         Poor         Steady           Spring Creek @ Decker Prairie-Rosehill Road         1/25/2023         9:35 AM         JL/FB         155.34         155.32         155.33         416         Failing           Cypress Creek @ SH 249         1/25/2023         10:57 AM	South Mayde @ Greenhouse Road	1/24/2023	4:18 PM	RV/FB	108.77	108.77	108.77	1,635	Poor	Steady
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East Fork San Jacinto River @ FM 2090 1/25/2023 4:06 PM DW, RH 80.00 79.99 80.00 1,084 Poor Falling Spring Creek @ FM 2978 1/25/2023 12:46 PM JL/FB 135.83 135.83 135.83 1,682 Poor Steady Bear Branch @ Kuykendahl Road 1/25/2023 9:35 AM JL/FB 155.34 155.32 155.33 416 Fair Falling Spring Creek @ Decker Prairie-Rosehill Road 1/25/2023 11:43 AM JL/FB 163.33 163.31 163.32 1,948 Good Falling Cypress Creek @ SH 249 1/25/2023 10:57 AM RH/IS 110.65 110.53 110.59 4,581 Poor Falling Cypress Creek @ Eldridge Parkway N. 1/25/2023 8:28 AM RH/IS 119.99 119.93 119.96 3,378 Poor Falling Little Cypress Creek @ Kluge Road 1/25/2023 9:35 AM RH/IS 126.93 126.89 126.91 1,268 Poor Falling Willow Creek @ SH 249 1/25/2023 1:41 PM JL/FB 153.68 153.68 153.68 544 Poor Steady Clodine Ditch @ Grand Mission Blvd 1/25/2023 1:28 PM IC/DW 82.56 82.54 82.55 157 Fair Falling Cane Island Branch @ Clay Road 1/25/2023 10:40 AM DW/IC 152.51 152.58 152.55 206 Fair Rising Willow Fork Creek @ Pederson Road 1/25/2023 1:43 AM DW/IC 125.27 125.31 125.29 432 Good Falling South Mayde Creek @ Peek Road 1/25/2023 3:10 PM DW/IC 136.56 136.55 136.56 233 Good Falling Spring Creek @ FM 2978 1/26/2023 1:23 AM DW/IC 134.88 134.88 134.88 1,960 Fair Falling Luce Bayou @ SH 321 1/26/2023 10:04 AM DW/IL 127.54 127.52 127.53 394 Poor Falling Tarkington Bayou @ SH 105 1/26/2023 10:04 AM DW/IL 127.54 127.52 127.53 394 Poor Falling	Briar Branch @ Campbell Road	1/24/2023	3:51 PM	DW/RH	66.28	66.30	66.29	180	Poor	Rising
Spring Creek @ FM 2978         1/25/2023         12:46 PM         JL/FB         135.83         135.83         1,682         Poor         Steady           Bear Branch @ Kuykendahl Road         1/25/2023         9:35 AM         JL/FB         155.34         155.32         155.33         416         Fair         Falling           Spring Creek @ Decker Prairie-Rosehill Road         1/25/2023         11:43 AM         JL/FB         163.33         163.31         163.32         1,948         Good         Falling           Cypress Creek @ SH 249         1/25/2023         10:57 AM         RH/IS         110.65         110.53         110.59         4,581         Poor         Falling           Cypress Creek @ Eldridge Parkway N.         1/25/2023         8:28 AM         RH/IS         119.99         119.93         119.96         3,378         Poor         Falling           Little Cypress Creek @ Kluge Road         1/25/2023         9:35 AM         RH/IS         126.93         126.89         126.91         1,268         Poor         Falling           Willow Creek @ SH 249         1/25/2023         1:41 PM         JL/FB         153.68         153.68         153.68         544         Poor         Steady           Clodine Ditch @ Grand Mission Blvd         1/25/2023	San Jacinto River @ SH 242	1/25/2023	8:25 AM	JL/DW	83.85	83.74	83.80	3,433	Poor	Rising
Bear Branch @ Kuykendahl Road 1/25/2023 9:35 AM JL/FB 155.34 155.32 155.33 416 Fair Falling Spring Creek @ Decker Prairie-Rosehill Road 1/25/2023 11:43 AM JL/FB 163.33 163.31 163.32 1,948 Good Falling Cypress Creek @ SH 249 1/25/2023 10:57 AM RH/IS 110.65 110.53 110.59 4,581 Poor Falling Cypress Creek @ Eldridge Parkway N. 1/25/2023 8:28 AM RH/IS 119.99 119.93 119.96 3,378 Poor Falling Little Cypress Creek @ Kluge Road 1/25/2023 9:35 AM RH/IS 126.93 126.89 126.91 1,268 Poor Falling Willow Creek @ SH 249 1/25/2023 1:41 PM JL/FB 153.68 153.68 153.68 544 Poor Steady Clodine Ditch @ Grand Mission Blvd 1/25/2023 1:28 PM IC/DW 82.56 82.54 82.55 157 Fair Falling Cane Island Branch @ Clay Road 1/25/2023 10:40 AM DW/IC 152.51 152.58 152.55 206 Fair Rising Willow Fork Creek @ Pederson Road 1/25/2023 11:43 AM DW/IC 142.03 142.01 142.02 435 Good Falling Langham Creek @ Longenbaugh Road 1/25/2023 8:08 AM DW/IC 125.27 125.31 125.29 432 Good Rising South Mayde Creek @ Peek Road 1/25/2023 3:10 PM DW/IC 136.56 136.55 136.56 233 Good Falling Spring Creek @ FM 2978 1/26/2023 11:23 AM JL/DW 92.86 92.86 92.86 296 Poor Steady Tarkington Bayou @ SH 321 1/26/2023 10:04 AM DW/IL 127.54 127.52 127.53 394 Poor Falling	East Fork San Jacinto River @ FM 2090	1/25/2023	4:06 PM	DW, RH	80.00	79.99	80.00	1,084	Poor	Falling
Spring Creek @ Decker Prairie-Rosehill Road         1/25/2023         11:43 AM         JL/FB         163.33         163.31         163.32         1,948         Good         Falling           Cypress Creek @ SH 249         1/25/2023         10:57 AM         RH/IS         110.65         110.53         110.59         4,581         Poor         Falling           Cypress Creek @ Eldridge Parkway N.         1/25/2023         8:28 AM         RH/IS         119.99         119.93         119.96         3,378         Poor         Falling           Little Cypress Creek @ Kluge Road         1/25/2023         9:35 AM         RH/IS         126.93         126.89         126.91         1,268         Poor         Falling           Willow Creek @ SH 249         1/25/2023         1:41 PM         JL/FB         153.68         153.68         544         Poor         Steady           Clodine Ditch @ Grand Mission Blvd         1/25/2023         1:28 PM         IC/DW         82.56         82.54         82.55         157         Fair         Falling           Cane Island Branch @ Clay Road         1/25/2023         10:40 AM         DW/IC         152.51         152.58         152.55         206         Fair         Rising           Willow Fork Creek @ Pederson Road         1/25/202	Spring Creek @ FM 2978	1/25/2023	12:46 PM	JL/FB	135.83	135.83	135.83	1,682	Poor	Steady
Cypress Creek @ SH 249	Bear Branch @ Kuykendahl Road	1/25/2023	9:35 AM	JL/FB	155.34	155.32	155.33	416	Fair	Falling
Cypress Creek @ Eldridge Parkway N.       1/25/2023       8:28 AM       RH/IS       119.99       119.93       119.96       3,378       Poor       Falling         Little Cypress Creek @ Kluge Road       1/25/2023       9:35 AM       RH/IS       126.93       126.89       126.91       1,268       Poor       Falling         Willow Creek @ SH 249       1/25/2023       1:41 PM       JL/FB       153.68       153.68       153.68       544       Poor       Steady         Clodine Ditch @ Grand Mission Blvd       1/25/2023       1:28 PM       IC/DW       82.56       82.54       82.55       157       Fair       Falling         Cane Island Branch @ Clay Road       1/25/2023       10:40 AM       DW/IC       152.51       152.58       152.55       206       Fair       Rising         Willow Fork Creek @ Pederson Road       1/25/2023       11:43 AM       DW/IC       142.03       142.01       142.02       435       Good       Falling         Langham Creek @ Longenbaugh Road       1/25/2023       8:08 AM       DW/IC       125.27       125.31       125.29       432       Good       Rising         South Mayde Creek @ Peek Road       1/25/2023       9:22 AM       DW/IC       136.56       136.55       136.56	Spring Creek @ Decker Prairie-Rosehill Road	1/25/2023	11:43 AM	JL/FB	163.33	163.31	163.32	1,948	Good	Falling
Little Cypress Creek @ Kluge Road 1/25/2023 9:35 AM RH/IS 126.93 126.89 126.91 1,268 Poor Falling Willow Creek @ SH 249 1/25/2023 1:41 PM JL/FB 153.68 153.68 153.68 544 Poor Steady Clodine Ditch @ Grand Mission Blvd 1/25/2023 1:28 PM IC/DW 82.56 82.54 82.55 157 Fair Falling Cane Island Branch @ Clay Road 1/25/2023 10:40 AM DW/IC 152.51 152.58 152.55 206 Fair Rising Willow Fork Creek @ Pederson Road 1/25/2023 11:43 AM DW/IC 142.03 142.01 142.02 435 Good Falling Langham Creek @ Longenbaugh Road 1/25/2023 8:08 AM DW/IC 125.27 125.31 125.29 432 Good Rising South Mayde Creek @ Peek Road 1/25/2023 9:22 AM DW/IC 136.56 136.55 136.56 233 Good Falling Spring Creek @ FM 2978 1/26/2023 3:10 PM DW/IL 134.88 134.83 134.86 1,960 Fair Falling Luce Bayou @ SH 321 1/26/2023 11:23 AM JL/DW 92.86 92.86 92.86 296 Poor Steady Tarkington Bayou @ SH 105 1/26/2023 10:04 AM DW/IL 127.54 127.52 127.53 394 Poor Falling	Cypress Creek @ SH 249	1/25/2023	10:57 AM	RH/IS	110.65	110.53	110.59	4,581	Poor	Falling
Willow Creek @ SH 249       1/25/2023       1:41 PM       JL/FB       153.68       153.68       153.68       544       Poor       Steady         Clodine Ditch @ Grand Mission Blvd       1/25/2023       1:28 PM       IC/DW       82.56       82.54       82.55       157       Fair       Falling         Cane Island Branch @ Clay Road       1/25/2023       10:40 AM       DW/IC       152.51       152.58       152.55       206       Fair       Rising         Willow Fork Creek @ Pederson Road       1/25/2023       11:43 AM       DW/IC       142.03       142.01       142.02       435       Good       Falling         Langham Creek @ Longenbaugh Road       1/25/2023       8:08 AM       DW/IC       125.27       125.31       125.29       432       Good       Rising         South Mayde Creek @ Peek Road       1/25/2023       9:22 AM       DW/IC       136.56       136.55       136.56       233       Good       Falling         Spring Creek @ FM 2978       1/26/2023       3:10 PM       DW/IL       134.88       134.83       134.86       1,960       Fair       Falling         Luce Bayou @ SH 321       1/26/2023       11:23 AM       JL/DW       92.86       92.86       92.86       296       Poor<	Cypress Creek @ Eldridge Parkway N.	1/25/2023	8:28 AM	RH/IS	119.99	119.93	119.96	3,378	Poor	Falling
Clodine Ditch @ Grand Mission Blvd 1/25/2023 1:28 PM IC/DW 82.56 82.54 82.55 157 Fair Falling Cane Island Branch @ Clay Road 1/25/2023 10:40 AM DW/IC 152.51 152.58 152.55 206 Fair Rising Willow Fork Creek @ Pederson Road 1/25/2023 11:43 AM DW/IC 142.03 142.01 142.02 435 Good Falling Langham Creek @ Longenbaugh Road 1/25/2023 8:08 AM DW/IC 125.27 125.31 125.29 432 Good Rising South Mayde Creek @ Peek Road 1/25/2023 9:22 AM DW/IC 136.56 136.55 136.56 233 Good Falling Spring Creek @ FM 2978 1/26/2023 3:10 PM DW/JL 134.88 134.83 134.86 1,960 Fair Falling Luce Bayou @ SH 321 1/26/2023 11:23 AM JL/DW 92.86 92.86 92.86 296 Poor Steady Tarkington Bayou @ SH 105 1/26/2023 10:04 AM DW/JL 127.54 127.52 127.53 394 Poor Falling	Little Cypress Creek @ Kluge Road	1/25/2023	9:35 AM	RH/IS	126.93	126.89	126.91	1,268	Poor	Falling
Cane Island Branch @ Clay Road 1/25/2023 10:40 AM DW/IC 152.51 152.58 152.55 206 Fair Rising Willow Fork Creek @ Pederson Road 1/25/2023 11:43 AM DW/IC 142.03 142.01 142.02 435 Good Falling Langham Creek @ Longenbaugh Road 1/25/2023 8:08 AM DW/IC 125.27 125.31 125.29 432 Good Rising South Mayde Creek @ Peek Road 1/25/2023 9:22 AM DW/IC 136.56 136.55 136.56 233 Good Falling Spring Creek @ FM 2978 1/26/2023 3:10 PM DW/IL 134.88 134.83 134.86 1,960 Fair Falling Luce Bayou @ SH 321 1/26/2023 11:23 AM JL/DW 92.86 92.86 92.86 296 Poor Steady Tarkington Bayou @ SH 105 1/26/2023 10:04 AM DW/JL 127.54 127.52 127.53 394 Poor Falling	Willow Creek @ SH 249	1/25/2023	1:41 PM	JL/FB	153.68	153.68	153.68	544	Poor	Steady
Willow Fork Creek @ Pederson Road       1/25/2023       11:43 AM       DW/IC       142.03       142.01       142.02       435       Good       Falling         Langham Creek @ Longenbaugh Road       1/25/2023       8:08 AM       DW/IC       125.27       125.31       125.29       432       Good       Rising         South Mayde Creek @ Peek Road       1/25/2023       9:22 AM       DW/IC       136.56       136.55       136.56       233       Good       Falling         Spring Creek @ FM 2978       1/26/2023       3:10 PM       DW/IL       134.88       134.83       134.86       1,960       Fair       Falling         Luce Bayou @ SH 321       1/26/2023       11:23 AM       JL/DW       92.86       92.86       92.86       296       Poor       Steady         Tarkington Bayou @ SH 105       1/26/2023       10:04 AM       DW/IL       127.54       127.52       127.53       394       Poor       Falling	Clodine Ditch @ Grand Mission Blvd	1/25/2023	1:28 PM	IC/DW	82.56	82.54	82.55	157	Fair	Falling
Langham Creek @ Longenbaugh Road       1/25/2023       8:08 AM       DW/IC       125.27       125.31       125.29       432       Good       Rising         South Mayde Creek @ Peek Road       1/25/2023       9:22 AM       DW/IC       136.56       136.55       136.56       233       Good       Falling         Spring Creek @ FM 2978       1/26/2023       3:10 PM       DW/JL       134.88       134.83       134.86       1,960       Fair       Falling         Luce Bayou @ SH 321       1/26/2023       11:23 AM       JL/DW       92.86       92.86       92.86       296       Poor       Steady         Tarkington Bayou @ SH 105       1/26/2023       10:04 AM       DW/JL       127.54       127.52       127.53       394       Poor       Falling	Cane Island Branch @ Clay Road	1/25/2023	10:40 AM	DW/IC	152.51	152.58	152.55	206	Fair	Rising
South Mayde Creek @ Peek Road       1/25/2023       9:22 AM       DW/IC       136.56       136.55       136.56       233       Good       Falling         Spring Creek @ FM 2978       1/26/2023       3:10 PM       DW/JL       134.88       134.83       134.86       1,960       Fair       Falling         Luce Bayou @ SH 321       1/26/2023       11:23 AM       JL/DW       92.86       92.86       92.86       296       Poor       Steady         Tarkington Bayou @ SH 105       1/26/2023       10:04 AM       DW/JL       127.54       127.52       127.53       394       Poor       Falling	Willow Fork Creek @ Pederson Road	1/25/2023	11:43 AM	DW/IC	142.03	142.01	142.02	435	Good	Falling
Spring Creek @ FM 2978       1/26/2023       3:10 PM       DW/JL       134.88       134.83       134.86       1,960       Fair       Falling         Luce Bayou @ SH 321       1/26/2023       11:23 AM       JL/DW       92.86       92.86       92.86       296       Poor       Steady         Tarkington Bayou @ SH 105       1/26/2023       10:04 AM       DW/JL       127.54       127.52       127.53       394       Poor       Falling	Langham Creek @ Longenbaugh Road	1/25/2023	8:08 AM	DW/IC	125.27	125.31	125.29	432	Good	Rising
Luce Bayou @ SH 321       1/26/2023       11:23 AM       JL/DW       92.86       92.86       92.86       296       Poor       Steady         Tarkington Bayou @ SH 105       1/26/2023       10:04 AM       DW/JL       127.54       127.52       127.53       394       Poor       Falling	South Mayde Creek @ Peek Road	1/25/2023	9:22 AM	DW/IC	136.56	136.55	136.56	233	Good	Falling
Tarkington Bayou @ SH 105 1/26/2023 10:04 AM DW/JL 127.54 127.52 127.53 394 Poor Falling	Spring Creek @ FM 2978	1/26/2023	3:10 PM	DW/JL	134.88	134.83	134.86	1,960	Fair	Falling
	Luce Bayou @ SH 321	1/26/2023	11:23 AM	JL/DW	92.86	92.86	92.86	296	Poor	Steady
East Fork San Jacinto River @ FM 2090 1/27/2023 1:39 PM DW, RH 81.61 81.61 1,739 Poor Steady	Tarkington Bayou @ SH 105	1/26/2023	10:04 AM	DW/JL	127.54	127.52	127.53	394	Poor	Falling
	East Fork San Jacinto River @ FM 2090	1/27/2023	1:39 PM	DW, RH	81.61	81.61	81.61	1,739	Poor	Steady

### SOUTHEAST HARRIS COUNTY TORNADO

A large supercell thunderstorm which formed near southern Victoria County around mid morning on the 24<sup>th</sup> moved east-northeast across portions of Jackson, Wharton, Fort Bend, and northern Brazoria Counties before moving into extreme southern Harris County near Beltway 8 and Pearland Pkwy. This thunderstorm would produce a significant tornado across a portion of southeast Harris County between 2:00 p.m. and 3:00 p.m. Forward storm motions associated with the tornado were on the order of 40-60mph across portions of southeast Harris County and video obtained from the City of Deer Park indicated a tornado heavily shrouded in heavy rainfall with very little if any visibility of a condensation funnel or lofted debris. Unlike tornadoes in the Great Plains, many of the tornadoes along the US Gulf coast are hidden within heavy rainfall and very difficult to observe.

The first ever tornado emergency for Harris County was issued at 2:24 p.m.

Product	Start Time	<b>End Time</b>	Area Covered			
Tornado Watch	10:50 a.m.	6:00 p.m.	All Harris County			
Tornado Warning	1:45 p.m.	2:00 p.m.	Eastern Fort Bend + Northern Brazoria			
Tomado Warning	1.45 p.111.	2.00 μ.π.	Counties			
Tornado Warning	2:10 n m	2:30 p.m.	Northern Brazoria + Southeast Harris			
Tomado Warning	2:10 p.m.	2.30 p.111.	Counties			
Tornado	2:24 p.m.	3:00 p.m.	Southeast Harris, Southwest Liberty,			
Emergency	2.24 μ.π.	3.00 p.m.	northwest Chambers Counties			

#### **TORANDO DAMAGE SURVEY**

Damage surveys to determine the intensity and rating of the tornado were completed on January 25<sup>th</sup> with two teams from the National Weather Service. An aerial survey was conducted with the National Weather Service and the Harris County Sherriff's Office to determine the full track extent and survey areas difficult to reach on the ground.

Initial minor wind damage was noted on the east side of El Franco Lee Park north of Dobie High School. EF0 damage was noted on the east side of Hall Rd between Kingspoint Rd and the Beltway 8 eastbound feeder where three power poles were snapped and tree limbs downed. The tornado then crossed Beltway 8 at the Blackhawk Blvd intersection and proceeded east-northeast into an open field and then impacted the Southeast Houston Wastewater Treatment Plant and a subdivision west of Beamer Dr. EF1 damage was noted in this area with a properly bolted detached garage lifted and destroyed at the end of Newton St. The tornado also broadened in this area with damage noted over a three to four block width. The tornado then impacted the Beamer Place Apartments with mid range EF2 damage to all the second floor units along Kirkshire Dr. Several units had the roof completely removed and a few locations experienced properly attached roof rafters lofted and exterior second floor brick walls collapse. Wind damage was confined to the second floor roof and a few exterior walls. The tornado crossed Beamer Rd impacting Beverly Hills Intermediate School (mainly tree damage) and then into the Sagemont Park subdivision along the west side of Sabo

Rd. where a few homes lost portions or most of their roof structures. There was a fairly broad swath of EF0/1 damage across this area. The tornado continued east-northeast crossing I-45 between Kurland Dr. and Gulf Pointe Dr. damaging an apartment complex on the east side of the Interstate (The Parker at Ellington). Several or entire portions of the roof was removed and lofted into a wooded area to the east. Rating in this area was high end EF1.

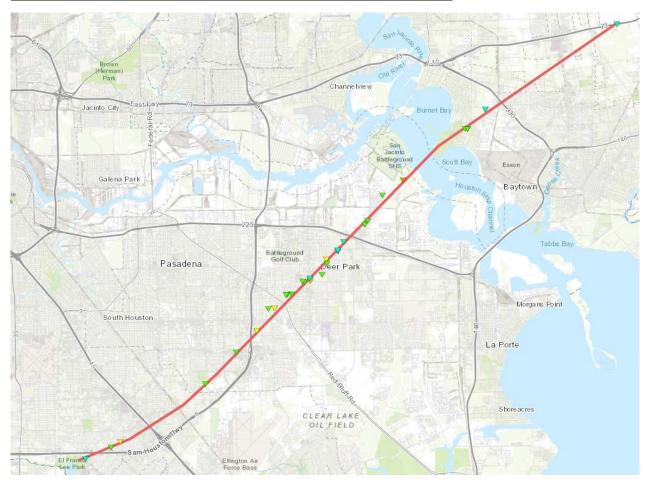
The tornado then weakened and crossed through several industrial areas and a couple of subdivisions bounded by Fuqua St. to the north and Kurland Dr. to the south. Much of this area experienced sporadic EF0 damage with mainly wooden fences and tree limbs downed. The tornado then crossed HWY 3 at the intersection of Fuqua/Genoa Red Bluff. At the southeast corner of this intersection significant damage occurred to a well constructed metal warehouse where properly anchored large metal beams were twisted and torn from the foundation with a high end EF2 rating. The tornado continued along Genoa Red Bluff Rd. and then turned northeast crossing the road between Strawberry Rd and Burke Rd and impacted the Pasadena Animal Shelter. A section of the roof was torn off the building along with nearby roof damage in a subdivision on the east side of Burke Rd across the street from the Pasadena Animal Shelter. Damage in this area was rated EF1. The tornado continued northeast crossing Beltway 8 near Fairmont Pkwy and Vista Rd.

After crossing Beltway 8 the tornado entered the Bliss Meadows subdivision with a broad swath of tree, fence, and roof damage. One structure on S Meadow Dr. suffered extensive damage when the roof lifted and at least one exterior brick wall failed. This isolated point was rated EF2 within a broader swath of EF0/1 damage. The tornado crossed Spencer HWY west of Space Center Blvd with damage to a Post Office and several businesses as well as several homes north of Spencer HWY. Some of the more significant damage was noted along Bramely Dr. east of Randolph Rd. where a church (Mouth of God Ministries) had significant roof and some exterior brick wall failure along with several surrounding houses. A travel trailer in the driveway of a nearby house was flipped on its side.

The tornado continued northeast through highly residential areas between Center St. and Red Bluff Rd. and crossed Pasadena Blvd just west of Center St. and then Center St. between McDermott St. and E P St. A broad swath of EF0/1 damage was observed across this area with isolated pockets of low to mid range EF2 damage. After crossing Center St. the tornado impacted St. Hyacinth Catholic Church with portions of the roof removed and partial collapse of exterior brick walls and then through several residential areas with extensive tree damage and loss of portions of roofs and a few exterior brick walls near Luella Ave. and East X St. The tornado impacted several industrial areas along Independence Pkwy north of SH 225 and south of Miller Cut Off Rd where several freight containers were blown over with damage in the EF1 range. Just south of the San Jacinto Battleground State Park, multiple high tension electrical transmission towers were either completely destroyed or heavy damaged with an EF3 rating with winds near 140mph. This is the maximum rating along the entire track of the tornado.

The tornado crossed the lower San Jacinto River and moved into the northwest portions of Baytown producing damage to trees, power lines, homes, and an apartment complex near and to the east of the Baytown Nature Center A mobile home and single family homes along Weaver St. near Bayway were destroyed. The tornado weakened after crossing Spur 330. Several power poles were knocked down on the east bound feeder road of I-10 between Main St. and Sjolander near the end of the tornado track. There was little to no indication that the tornado continued to the northeast beyond I-10 from either the ground or air surveys.

### Official National Weather Service Surveyed Damage Track



The tornado tracked through highly populated areas of southern and southeastern Harris County impacting numerous structures in the cities of Houston, Pasadena, Deer Park, and Baytown. Damage assessments as of February 7, from the cities impacted indicate approximately 1,635 single family homes were damaged, 855 multi family units, and 15 mobile homes.

#### HISTORY OF HARRIS COUNTY TORNADOES

While tornadoes are frequent in Harris County, most are on the lower end of the EF scale, EF0, EF1 and result in minor damage, however while rare, significant tornadoes have occurred in the county over the last 70 years. Since 1950, a total of 247 reported tornadoes have resulted in 13 deaths, 325 injuries, and 520 million dollars in property damage across Harris County. Interestingly, of the 13 fatalities, 5 were associated with EF/F2 or higher tornadoes. The chart below details the number of Harris County tornadoes and their EF/F rating.

Rating	Number
EF/F0	129
EF/F1	74
EF/F2	34
EF/F3	9
EF/F4	1
EF/F5	0
Total	247

Of the 247 tornadoes in Harris County since 1950, 203 or 82% were rated EF/F0 or 1. There has never been an EF/F5 tornado and only one EF/F4 tornado which impacted the east side of Harris County from near Channelview to Crosby during a significant multi-tornado outbreak on November 21, 1992. This tornado was on the ground for 20 miles and was 1.0 mile in width resulting in 15 injuries.

The following table below summarizes the 10 EF/F3 or 4 tornadoes that have impacted Harris County in context with the January 24, 2023 tornado.

Date	Rating	Length	Width	Injuries	Deaths	Location
		(mi)	(mi)			
2-11-1950	3	12.0	0.6	12	1	La Porte/Baytown
9-11-1961	3	1.0	0.1	22	0	Channelview
9-8-1969	3	8.0	0.1	0	0	Pasadena
10-28-1974	3	3.3	0.1	7	1	Baytown
12-13-1977	3	19.7	.25	35	1	NE Houston/Crosby
2-5-1986	3	5.0	0.1	0	2	Klein
11-21-1992	3	4.0	.25	0	0	Huffman
11-21-1992	4	20.0	1.0	15	0	Channelview/Crosby
3-30-2002	3	0.7	0.1	0	0	La Porte
1-24-2023	3	23.7	.66	5	0	South Houston/Baytown

The January 24, 2023 tornado is the longest recorded in Harris County since 1950 and the second widest. Interestingly, 60% of the recorded EF/F3 tornadoes or higher have occurred in our cool season months (October-February). The September 11, 1961 Channelview tornado was in association with the landfall of a hurricane (Carla) which tend to produce a majority of our summer tornadoes. Our greatest threat for strong tornadoes along the upper Texas coast tends to occur in the winter months and not

during the more "traditional" spring severe weather months although tornadoes can occur year round in Harris County.

Rating	Wind Speed (EF) Scale (mph)	Wind Speed (F) Scale (mph)
0	65-85	< 73
1	86-110	73-112
2	111-135	113-157
3	136-165	158-206
4	166-200	207-260
5	200+	261-318

Note: The Enhanced Fujita (EF) scale became operational on February 1, 2007 replacing the original Fujita Scale introduced in 1971. The EF scale was revised from the original Fujita Scale to better reflect examinations of tornado damage surveys and align wind speeds more closely with associated storm damage.

						Cle	ar Creek	c, A100	
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
100	0.4	1.1	1.2	1.3	1.3	1.4	1.4	1.4	A100 Clear Lake 2nd Outlet @ SH 146
105	0.6	1.4	1.6	1.6	1.6	1.7	1.9	2.0	Mary's Creek @ Winding Road
110	0.6	1.1	1.3	1.4	1.4	1.4	1.5	1.6	A100 Clear Creek @ I-45
115	0.6	0.9	1.0	1.2	1.2	1.2	1.4	1.5	Cowart Creek @ Baker Road
120	0.4	8.0	1.0	1.1	1.1	1.1	1.3	1.4	A100 Clear Creek @ FM 528
125	0.4	0.6	0.8	0.9	0.9	0.9	1.1	1.2	Chigger Creek @ Windsong Lane
130	0.6	1.0	1.3	1.4	1.4	1.4	1.5	1.6	A100 Clear Creek @ Bay Area Boulevard
135	0.5	1.1	1.2	1.3	1.3	1.3	1.5	1.7	A100 Clear Creek @ FM 2351
140	0.6	1.8	2.0	2.1	2.1	2.1	2.4	2.5	A119 Turkey Creek @ FM 1959
145	0.6	1.5	1.8	1.9	2.0	2.0	2.1	2.3	A100 Clear Creek @ FM 1959
150	0.8	2.0	2.1	2.2	2.2	2.2	2.4	2.6	A100 Clear Creek @ Country Club Drive
160	0.6	1.5	1.8	1.9	1.9	1.9	2.2	2.3	A120 Beamer Ditch @ Hughes Road
170	0.3	0.6	0.8	0.9	0.9	1.0	1.1	1.1	A100 Clear Creek @ Nassau Bay
175	0.5	1.3	1.8	2.1	2.1	2.1	2.3	2.4	A100 Clear Creek @ Pearland Pkwy
180	0.4	1.0	1.2	1.3	1.4	1.4	1.6	1.7	A100 Clear Creek @ Mykawa Road
190	0.4	8.0	1.0	1.0	1.1	1.1	1.2	1.3	A100 Clear Creek @ SH 288
200	0.6	1.1	1.4	1.4	1.4	1.5	1.6	1.8	A104 Taylor Lake @ Nasa Road 1

						Arma	and Bay	ou, B100	
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
210	0.4	0.9	1.2	1.2	1.3	1.3	1.5	1.6	B100 Armand Bayou @ Pasadena Lake (Nasa Road 1)
220	0.5	1.4	1.5	1.5	1.6	1.6	1.9	2.1	B100 Armand Bayou @ Genoa-Red Bluff Road
230	0.8	1.6	1.8	1.8	1.9	1.9	2.2	2.2	B106 Big Island Slough @ Fairmont Parkway
245	0.4	0.8	1.0	1.0	1.0	1.1	1.4	1.6	B100 Armand Bayou @ Space Center Boulevard
250	0.4	0.9	1.2	1.3	1.3	1.3	1.6	1.8	B104 Horsepen Creek @ Bay Area Boulevard
270	0.6	1.5	1.6	1.6	1.6	1.6	2.0	2.1	B112 Willow Spring Bayou @ Fairmont Parkway

						Sin	าร Bayoเ	ı, C100	
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
310	0.2	0.6	0.8	0.9	1.0	1.0	1.2	1.4	C106 Berry Bayou @ Nevada Avenue
320	0.2	0.5	0.8	0.9	1.0	1.0	1.3	1.4	C106 Berry Bayou @ Forest Oaks Boulevard
340	0.3	0.6	0.8	0.9	0.9	0.9	1.1	1.2	C100 Sims Bayou @ Telephone Road
360	0.3	0.6	0.8	0.9	0.9	1.0	1.1	1.2	C100 Sims Bayou @ Martin Luther King Road
370	0.4	0.8	0.9	1.0	1.1	1.1	1.2	1.3	C100 Sims Bayou @ SH 288
380	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	C100 Sims Bayou @ Hiram-Clarke Road

						Bra	ys Bayo	u, D100	
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
1020	0.6	1.2	1.3	1.4	1.4	1.5	1.7	1.7	NRG Park
400	0.7	1.3	1.6	1.7	1.8	1.8	2.1	2.2	D109 Harris Gully @ South McGregor Way
405	0.6	1.2	1.4	1.4	1.5	1.5	1.7	1.8	D100 Brays Bayou @ Martin Luther King Blvd
410	0.7	1.6	1.8	1.8	2.0	2.0	2.2	2.3	D100 Brays Bayou @ Lawndale Street
420	0.7	1.6	1.7	1.8	1.9	1.9	2.1	2.1	D100 Brays Bayou @ South Main Street
430	0.6	1.5	1.6	1.7	1.8	1.8	1.9	2.0	D100 Brays Bayou @ Stella Link Road
435	0.8	1.3	1.6	1.7	1.8	1.8	1.9	2.0	D112 Willow Water Hole @ Willowbend Boulevard
440	0.7	1.4	1.7	1.8	1.8	1.9	2.0	2.0	D100 Brays Bayou @ Rice Avenue
445	0.6	1.4	1.8	1.9	2.0	2.0	2.2	2.2	D112 Willow Water Hole @ Landsdowne Drive
460	0.7	1.6	1.9	2.0	2.1	2.1	2.2	2.2	D100 Brays Bayou @ Gessner Road
465	0.7	1.5	1.7	1.8	2.0	2.1	2.2	2.2	D100 Brays Bayou @ Beltway 8
470	0.7	1.2	1.5	1.6	1.7	1.8	2.0	2.0	D100 Brays Bayou @ Belle Park Drive
475	0.6	1.3	1.7	1.8	1.9	2.0	2.1	2.1	D100 Brays Bayou @ Bellaire Boulevard
480	0.7	1.7	1.9	2.0	2.1	2.2	2.3	2.3	D118 Keegans Bayou @ Roark Road
485	0.4	1.0	1.4	1.5	1.7	1.7	2.0	2.0	D100 Brays Bayou @ SH 6
490	0.6	1.5	1.6	1.7	1.8	1.9	2.1	2.1	D118 Keegans Bayou @ Keegan Road
495	0.5	1.1	1.4	1.5	1.6	1.7	1.9	2.0	D118 Keegans Bayou @ Rocky Valley

						White	Oak Ba	you, E100	0
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
510	0.3	0.8	1.2	1.3	1.5	1.6	1.8	1.8	Harris County Flood Control @ Brookhollow
520	0.6	1.3	1.7	1.7	1.8	1.8	1.9	1.9	E100 White Oak Bayou @ Heights Boulevard
530	0.4	1.0	1.5	1.6	1.6	1.7	1.9	2.0	E100 White Oak Bayou @ Ella Boulevard
535	0.3	0.8	1.1	1.3	1.7	1.8	2.0	2.0	E100 White Oak Bayou @ Pinemont Drive
540	0.3	0.8	1.2	1.5	2.4	2.5	2.7	2.7	E100 White Oak Bayou @ Alabonson Road
545	0.3	0.7	1.0	1.5	2.2	2.4	2.5	2.5	E100 White Oak Bayou @ Fairbanks North Houston Road
550	0.3	0.6	1.0	1.5	2.4	2.6	2.8	2.8	E100 White Oak Bayou @ Lakeview Drive
555	0.4	0.8	1.4	2.1	3.1	3.4	3.6	3.7	E100 White Oak Bayou @ Jones Road
560	0.6	1.3	1.6	1.8	1.8	1.9	2.1	2.1	E101 Little White Oak Bayou @ Trimble Street
570	0.4	0.8	1.3	1.5	1.6	1.7	1.9	1.9	E101 Little White Oak Bayou @ Tidwell Road
575	0.2	0.6	1.0	1.2	1.5	1.6	1.8	1.8	E100 White Oak Bayou @ Tidwell Road
580	0.4	0.8	1.2	1.4	1.6	1.7	1.9	1.9	E115 Brickhouse Gully @ Costa Rica Road
582	0.3	0.8	1.3	1.6	2.4	2.4	2.6	2.6	E115 Brickhouse Gully @ Hollister
585	0.3	0.8	1.4	1.6	2.6	2.7	2.9	2.9	E121 Vogel Creek @ Victory Drive
590	0.3	0.6	1.1	1.4	2.0	2.1	2.2	2.2	E117 Cole Creek @ Deihl Road
595	0.3	0.7	1.2	1.6	2.6	2.6	2.9	2.9	E121 Vogel Creek @ Gulf Bank Road

	Little Cedar Bayou, F216													
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site					
605	0.5	1.3	1.9	1.9	2.0	2.0	2.1	2.3	Taylor Lake @ Port Road					
610	0.6	1.3	1.7	1.8	1.8	1.9	2.0	2.1	A104 Taylor's Bayou @ Shoreacres Boulevard					
620	0.7	1.6	1.8	2.0	2.0	2.1	2.2	2.4	F216 Little Cedar Bayou @ 8th Street					
640	0.5	1.2	1.3	1.3	1.4	1.4	1.7	1.9	F101 Lateral @ Sens Road					
650	0.3	0.7	0.9	1.0	1.0	1.1	1.4	1.6	B112-06 Patricks Bayou @ East 8th Street					
660	0.3	0.8	1.0	1.0	1.0	1.1	1.5	1.6	G105 Boggy Bayou @ San Augustine Street					

						San Ja	acinto Ri	ver, G10	3
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
710	0.5	1.1	1.6	1.6	1.7	1.9	2.1	2.2	G103 San Jacinto River @ Rio Villa
720	0.5	1.1	1.5	1.7	1.7	1.8	2.1	2.1	G103 San Jacinto River @ US 90
740	0.3	0.6	1.2	1.5	1.8	2.0	2.2	2.2	G103 Lake Houston @ FM 1960
750	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	G103 Lake Houston Dam Spillway
755	0.5	0.9	1.2	1.9	2.6	2.7	2.8	2.8	G103 San Jacinto River @ Kingwood Country Club
760	0.4	0.9	1.5	2.2	3.5	3.7	4.0	4.0	G103 San Jacinto River @ US 59
765	0.5	0.9	1.6	2.5	4.1	4.5	4.6	4.6	G103 San Jacinto @ SH 99
770	0.3	0.6	1.2	1.9	3.1	3.8	3.9	4.0	G103 San Jacinto @ SH 242
780	0.3	0.6	1.1	1.8	2.8	3.1	3.3	3.3	Caney Creek @ FM 2090
785	0.5	1.0	1.8	2.8	3.9	4.1	4.4	4.4	Peach Creek @ FM 2090
790	0.4	1.0	1.6	2.9	3.8	4.1	4.2	4.2	G103 East Fork San Jacinto @ FM 1485
795	0.4	1.0	1.6	2.7	4.0	4.3	4.5	4.5	G103 East Fork San Jacinto @ FM 2090
796	0.3	0.7	1.3	2.3	3.1	3.3	3.6	3.6	G103 East Fork San Jacinto @ SH 105

						Hunt	ing Bay	ou, H100	
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
820	0.6	1.4	1.7	1.8	1.8	1.8	2.0	2.1	H100 Hunting Bayou @ I-10
830	0.4	1.0	1.4	1.4	1.5	1.5	1.8	1.8	H100 Hunting Bayou @ Loop 610 East
840	0.6	1.2	1.5	1.6	1.7	1.7	2.0	2.1	H100 Hunting Bayou @ Lockwood Drive

						Vin	ce Bayo	u, I 100	
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
920	0.2	0.6	0.9	1.0	1.0	1.0	1.2	1.3	I100 Vince Bayou @ West Ellaine Down Stream
940	0.4	0.8	1.2	1.3	1.3	1.4	1.6	1.7	I101 Little Vince Bayou @ Jackson Avenue
240	0.3	0.8	1.0	1.0	1.1	1.1	1.4	1.5	I101 Little Vince Bayou @ Burke Road

						Spr	ing Cree	k, J100	
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
1040	0.3	0.6	1.1	1.9	3.1	3.6	4.0	4.1	J100 Spring Creek @ FM 2978
1050	0.4	0.9	1.6	2.3	4.0	4.4	4.5	4.6	J100 Spring Creek @ I-45
1052	0.3	0.6	0.9	1.7	3.0	3.6	3.8	3.8	Mill Creek @ FM 149
1054	0.2	0.5	0.8	1.2	1.9	2.5	2.7	2.8	Mill Creek @ FM 1486
1055	0.3	0.6	0.9	1.8	3.2	3.6	4.0	4.1	Bear Branch @ Kuykendahl
1056	0.2	0.3	0.4	0.8	1.3	1.8	2.1	2.2	Mill Creek @ FM 1774
1060	0.4	0.6	1.2	2.0	3.3	3.9	4.2	4.3	J100 Spring Creek @ Kuykendahl Road
1070	0.3	0.8	1.2	2.2	3.4	3.9	4.3	4.4	J100 Spring Creek @ SH 249
1072	0.3	0.7	1.0	1.8	2.9	3.4	3.7	3.7	Walnut Creek @ Nichols Sawmill
1074	0.2	0.4	0.8	1.4	2.1	2.7	3.0	3.0	Walnut Creek @ Joseph Road
1075	0.3	0.7	1.2	2.2	3.4	4.1	4.5	4.6	Tomball Repeater
1076	0.2	0.3	0.6	0.9	1.6	2.0	2.2	2.2	Birch Creek @ Riley Road
1080	0.3	0.8	1.2	2.2	3.7	4.3	4.7	4.7	J100 Spring Creek @ Cypress Rosehill
1084	0.2	0.6	0.9	1.5	2.2	2.7	3.0	3.0	Threemile Creek @ Joseph Road
1086	0.2	0.4	0.6	0.9	1.4	1.8	2.1	2.2	Threemile Creek @ FM 362
1090	0.3	0.7	1.1	2.0	3.0	3.7	4.1	4.1	J100 Spring Creek @ Hegar Road

						Cypr	ess Cree	ek, K100	
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
1110	0.4	1.0	1.6	2.3	3.8	3.9	4.1	4.1	K100 Cypress Creek @ Cypresswood Drive
1115	0.4	0.9	1.4	2.6	4.0	4.4	4.6	4.6	K600 Cypress Creek @ Inverness Forest
1120	0.5	1.0	1.5	2.8	4.0	4.3	4.5	4.5	K100 Cypress Creek @ I-45
1130	0.4	0.9	1.6	2.5	4.0	4.3	4.5	4.5	K100 Cypress Creek @ Kuykendahl Road
1140	0.5	0.9	1.6	2.5	4.3	4.6	4.8	4.8	K100 Cypress Creek @ Stuebner-Airline Road
1150	0.5	1.0	1.6	2.7	4.4	4.9	5.1	5.2	K100 Cypress Creek @ SH 249
1160	0.5	1.0	1.6	2.8	4.1	4.6	4.8	5.0	K100 Cypress Creek @ Grant Road
1165	0.5	1.0	1.6	2.6	4.0	4.5	4.8	4.9	K100 Cypress Creek @ Eldridge Parkway N.
1170	0.4	1.0	1.6	2.4	3.7	4.3	4.7	4.8	K100 Cypress Creek @ Huffmeister Road
1175	0.4	1.1	1.6	2.6	4.3	5.0	5.4	5.6	K100 Cypress Creek @ US 290
1180	0.6	1.3	1.9	2.9	4.5	5.2	5.6	5.6	K100 Cypress Creek @ Katy-Hockley Road
1185	0.6	1.3	1.8	2.8	4.1	4.9	5.4	5.4	K100 Cypress creek @ Sharp Road
1186	0.4	1.2	1.8	2.6	4.2	5.0	5.4	5.4	Live Oak Creek @ Penick Road
1190	0.4	1.0	1.3	2.3	3.5	4.2	4.6	4.6	K166 Little Mound Creek @ Mathis Road
1195	0.3	0.5	0.8	1.5	2.2	2.9	3.2	3.2	Mound Creek @ FM 362
1210	0.4	1.1	1.5	2.6	4.0	4.7	5.1	5.2	L100 Little Cypress Creek @ Kluge Road
1220	0.5	1.1	1.7	2.6	4.0	4.6	5.0	5.1	L100 Little Cypress Creek @ Cypress Rosehill Road
1230	0.4	0.9	1.5	2.4	4.1	4.8	5.1	5.1	L100 Little Cypress Creek @ Becker Road

	Willow Creek, M100													
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site					
1320	0.3	0.8	1.4	2.4	3.8	4.3	4.6	4.7	M100 Willow Creek @ Kuykendahl Road					
1340	0.4	1.0	1.6	2.4	3.6	4.0	4.4	4.5	M100 Willow Creek @ SH 249					

						Carpe	nters Ba	you, N10	0
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
1420	0.6	1.1	1.4	1.6	1.6	1.7	1.9	2.0	N100 Carpenters Bayou @ I-10
1440	0.6	1.3	1.6	1.8	1.8	1.8	2.1	2.2	N100 Carpenters Bayou @ Wallisville Road
1460	0.6	1.4	1.8	1.9	2.0	2.0	2.3	2.3	N100 Carpenters Bayou @ US 90

	Goose Creek, O100													
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site					
1520	0.2	0.6	0.6	0.6	0.7	0.8	1.0	1.0	O100 Goose Creek @ SH 146					
1540	0.2	0.6	0.8	0.8	0.9	1.0	1.2	1.3	O100 Goose Creek @ Baker Road					

						Gree	ens Bayo	u, P100	
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
1600	0.4	1.0	1.3	1.4	1.4	1.6	1.8	1.8	P100 Greens Bayou @ Mount Houston Parkway
1610	0.6	1.2	1.8	1.9	1.9	2.0	2.2	2.2	P100 Greens Bayou @ Normandy Street
1620	0.5	1.2	1.6	1.7	1.8	1.8	2.1	2.1	P100 Greens Bayou @ Ley Road
1630	0.3	0.7	1.2	1.3	1.5	1.6	1.8	1.9	P130 Garners Bayou @ Beltway 8
1640	0.4	0.8	1.3	1.5	1.6	1.7	2.0	2.0	P100 Greens Bayou @ US 59
1645	0.4	1.0	1.3	1.7	2.6	2.7	3.0	3.0	P100 Greens Bayou @ Beltway 8
1650	0.3	0.7	1.1	1.5	2.2	2.3	2.7	2.7	P130 Garners Bayou @ Rankin Road
1655	0.3	0.8	1.2	1.9	3.0	3.2	3.4	3.4	P145 North Fork Greens Bayou @ Ella
1660	0.4	0.9	1.3	1.7	3.2	3.3	3.5	3.5	P100 Greens Bayou @ Knobcrest Drive
1665	0.4	0.8	1.2	1.9	3.2	3.3	3.6	3.6	P100 Greens Bayou @ Bammel N Houston Road
1670	0.4	0.9	1.3	2.0	3.5	3.8	4.1	4.1	P100 Greens Bayou @ Cutten Road
1685	0.4	1.1	1.4	1.4	1.5	1.6	1.8	1.9	P100 Greens Bayou @ Tidwell Road
1695	0.4	0.9	1.4	1.6	2.0	2.1	2.4	2.4	P138 @ Aldine Westfield Road

		Halls Bayou, P118													
Sensor ID	Sensor ID 5-min 15-min 30-min 1-hour 2-hour 3-hour 6-hour 12-hour Site														
1675	0.4	0.9	1.4	1.5	1.6	1.6	1.9	1.9	P118 Halls Bayou @ Tidwell Road						
1680	0.5	1.0	1.4	1.6	1.7	1.7	2.0	2.0	P118 Halls Bayou @ Jensen Drive						
1690	0.3	0.8	1.2	1.4	2.0	2.1	2.4	2.4	P118 Halls Bayou @ Airline Drive						

						Ced	ar Bayo	u, Q100	
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site
1720	0.5	0.8	1.0	1.0	1.1	1.2	1.2	1.2	Q100 Cedar Bayou @ SH 146
1725	0.4	8.0	1.1	1.2	1.3	1.4	1.5	1.6	Smith Gully @ SH 146
1730	0.5	1.1	1.4	1.6	1.7	1.8	1.9	2.0	Q100 Cedar Bayou @ FM 1942
1740	0.4	1.1	1.9	2.4	2.4	2.6	2.8	2.8	Q100 Cedar Bayou @ US 90
1745	0.3	8.0	1.1	1.8	2.2	2.4	2.6	2.6	Q100 Cedar Bayou @ FM 1960

	Jackson Bayou, R100											
Sensor ID	Sensor ID 5-min 15-min 30-min 1-hour 2-hour 3-hour 6-hour 12-hour Site											
1840	0.4	1.0	1.5	1.6	1.7	1.9	2.2	2.2	R102 Gum Gully @ Diamond Head Boulevard			

	Luce Bayou, S100												
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site				
1930	0.2	0.5	0.8	1.5	2.0	2.2	2.3	2.4	Huffman Repeater				
1940	0.4	0.9	1.3	2.1	2.8	2.9	3.1	3.1	S100 Luce Bayou @ FM 2100				
1960	0.4	1.0	1.8	2.9	3.8	4.0	4.1	4.1	S100 Luce Bayou @ SH 321				
1950	0.4	1.0	1.6	2.6	3.5	3.8	3.9	4.0	S100 Luce Bayou @ SH 99				
1975	0.2	0.7	1.3	2.2	3.3	3.5	3.6	3.6	Tarkington Bayou @ SH 105				

	Barker Reservoir, T100												
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site				
2010	0.3	0.7	1.0	1.2	1.3	1.5	1.7	1.7	Barker Dam				
2015	0.4	0.9	1.3	1.4	1.6	1.6	1.8	2.0	Clodine Ditch @ Grand Mission				
2020	0.3	0.7	1.1	1.4	1.8	1.9	2.2	2.3	T101 Mason Creek @ Prince Creek Drive				
2025	0.3	0.8	1.3	1.5	1.7	1.8	2.1	2.2	T100 Buffalo Bayou @ Peek Road				
2030	0.3	0.8	1.0	1.4	1.9	2.0	2.4	2.5	T100 Buffalo Bayou @ Greenbusch Road				
2040	0.4	0.9	1.1	2.0	3.0	3.3	3.7	3.7	T100 Buffalo Bayou @ US 90				
2050	0.3	0.6	1.0	1.9	3.2	3.9	4.3	4.4	Cane Island Branch @ Clay Road				
2060	0.5	0.8	1.2	1.7	2.8	3.0	3.3	3.4	Willow Fork Creek @ Pederson Road				
2090	0.1	0.3	0.6	1.2	2.4	3.5	5.1	5.5	Brookshire Katy Drainage District @ Morrison Road				

	Addicks Reservoir, U100												
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site				
2110	0.2	0.6	1.0	1.2	1.4	1.6	1.8	1.9	Addicks Dam				
2115	0.3	0.6	0.8	1.2	1.9	2.1	2.4	2.5	U100 Langham Creek @ Clay Rd				
2120	0.6	1.0	1.3	2.3	3.3	3.6	3.8	3.9	U100 Langham Creek @ West Little York Road				
2130	0.4	1.0	1.3	2.4	3.3	3.5	3.8	3.8	U106 Horsepen @ Trailside Drive				
2140	0.4	1.0	1.4	2.4	3.7	4.0	4.5	4.6	U100 Langham Creek @ Longenbaugh Road				
2150	0.4	0.7	1.0	1.5	2.3	2.4	2.7	2.8	U101 South Mayde @ Greenhouse Road				
2160	0.4	0.8	1.0	1.7	2.7	2.8	3.2	3.3	U102 Bear Creek @ Clay Road				
2170	0.5	1.0	1.3	2.0	3.1	3.2	3.7	3.8	U101 South Mayde @ Morton Road				
2180	0.4	0.9	1.2	2.2	3.4	4.2	4.6	4.6	U102 Bear Creek @ FM 529				
2185	0.5	1.2	1.7	2.9	4.6	5.4	5.8	5.9	John Paul Landing				
2190	0.4	0.8	1.2	2.0	3.1	3.6	4.0	4.0	U101 South Mayde Creek @ Peek Road				

						Buffa	alo Bayo	u, W100			
Sensor ID	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour	Site		
1000	0.3	0.9	1.2	1.3	1.4	1.5	1.7	1.8	Houston Transtar		
2200	0.3	0.7	0.8	0.9	0.9	1.0	1.4	1.4	2200 Houston Ship Channel @ Juan Seguin Park		
2210	1.0	1.8	1.9	1.9	2.0	2.0	2.3	2.3	W100 Buffalo Bayou @ Turning Basin		
2220	0.6	1.4	1.7	1.8	1.9	2.0	2.2	2.2	W100 Buffalo Bayou @ Milam Street		
2240	0.7	1.4	1.8	1.9	2.0	2.0	2.2	2.2	W100 Buffalo Bayou @ Shepherd Drive		
2245	0.5	1.2	1.6	1.7	1.8	1.9	2.0	2.1	W100 Buffalo Bayou @ Woodway Drive		
2250	0.4	0.9	1.3	1.5	1.8	1.9	2.0	2.0	W140 Spring Branch @ Bingle Road		
2253	0.3	0.8	1.2	1.4	1.9	2.0	2.1	2.1	W140-06 Buttermilk Creek @ Moorberry Lane		
2255	0.4	0.8	1.2	1.4	1.8	1.9	2.0	2.1	W140-01 Briar Branch @ Campbell Road		
2260	0.4	1.1	1.3	1.4	1.6	1.7	1.8	1.8	W100 Buffalo Bayou @ San Felipe Drive		
2265	0.3	0.7	0.8	1.0	1.1	1.2	1.3	1.4	W100 Buffalo Bayou @ Piney Point Rd		
2270	0.4	1.0	1.4	1.5	1.7	1.8	2.0	2.0	W100 Buffalo Bayou @ West Beltway 8		
2280	0.3	0.9	1.3	1.5	1.8	1.8	2.1	2.1	W156 Rummel Creek @ Brittmoore Road		
2290	0.4	0.9	1.4	1.4	1.6	1.7	1.8	1.8	W100 Buffalo Bayou @ Dairy Ashford Road		

	Region 1Addicks, Barker, Cypress, Spring, and Willow												
Period	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour					
2-year	0.6	1.1	1.6	2.2	2.7	3.0	3.6	4.2					
5-year	0.7	1.4	2.0	2.7	3.4	3.9	4.7	5.6					
10-year	0.8	1.6	2.3	3.1	4.0	4.7	5.8	7.0					
25-year	1.0	1.9	2.7	3.6	4.9	5.9	7.5	9.1					
50-year	1.1	2.1	3.0	4.1	5.7	6.8	8.9	11.1					
100-year	1.2	2.4	3.3	4.5	6.5	8.0	10.7	13.4					
500-year	1.5	3.0	4.2	5.9	9.0	11.5	15.9	20.1					

Region 2E	$\label{lem:condition} \textbf{Region 2Brays, Buffalo, Greens, Hunting, Luce, West Fork San Jacinto, and White}$												
Oak													
Period	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour					
2-year	0.6	1.2	1.7	2.2	2.8	3.1	3.8	4.4					
5-year	0.7	1.5	2.1	2.8	3.6	4.1	5.0	5.9					
10-year	0.9	1.7	2.4	3.2	4.3	4.9	6.2	7.4					
25-year	1.0	2.0	2.8	3.8	5.2	6.2	7.9	9.7					
50-year	1.1	2.3	3.2	4.3	6.0	7.3	9.5	11.7					
100-year	1.3	2.5	3.5	4.8	6.9	8.5	11.3	14.0					
500-year	1.6	3.1	4.4	6.2	9.6	12.2	16.7	20.9					

Region 3A	Region 3Armand, Carpenters, Ceder, Clear, Galveston Bay, Goose, Jackson, Lower													
	San Jacinto River, Sims, Ship Channel and Vince													
Period	5-min	15-min	30-min	1-hour	2-hour	3-hour	6-hour	12-hour						
2-year	0.6	1.2	1.7	2.3	2.9	3.2	3.9	4.6						
5-year	0.8	1.5	2.1	2.9	3.7	4.3	5.2	6.2						
10-year	0.9	1.8	2.5	3.4	4.5	5.2	6.6	7.9						
25-year	1.1	2.1	3.0	4.1	5.6	6.7	8.6	10.4						
50-year	1.2	2.4	3.4	4.7	6.6	8.0	10.4	12.6						
100-year	1.4	2.7	3.8	5.3	7.6	9.4	12.5	15.2						
500-year	1.8	3.5	5.0	7.0	10.6	13.4	18.2	22.8						