



Harris County
Flood Control District

9900 Northwest Freeway
Houston, Texas 77092
713-684-4000

August 5, 2009

Note:

*Received by Director
Gorden via another
utility district.*

Douglas W. Baker, P.E.
Brown and Gay Engineers, Inc.
10777 Westheimer, Suite 400
Houston, Texas 77042

RE: April 27-28, 2009 Flood Event, South Mayde Creek, HCFCD Unit U101-00-00; Key Map
446-V, Precinct 3

Dear Mr. Baker:

We are in receipt of your letter dated July 14, 2009 regarding the flood event at the end of April. The rains that occurred on April 27th-28th were extraordinary. The west and northwest portions of the county were hit particularly hard, and drainage systems were overwhelmed by the extreme amount of runoff produced. This resulted in the flooding of homes and other structures.

The Flood Control District is planning to conduct a selective clearing project on South Mayde Creek beginning at Greenhouse Road and working to the east within the federally owned Addicks Reservoir land. Selective clearing means that small stalk vegetation, fallen trees and limbs will be removed to lessen obstruction to the flow of water. Because this work will largely be done by work crews using hand held equipment, we usually try to perform the work during the fall and winter months. Therefore, we are planning to begin the work on South Mayde Creek later this year.

The Greenhouse Road work that was recently finished was a project engineered and constructed under the supervision and jurisdiction of the Harris County Public Infrastructure Department. I recommend you contact that office for any reviews you believe need to occur.

Sincerely,

Fred Garcia, P.E.
Director of Communications
www.hcfcd.org

AJG:spf

Enclosure: General Flooding Statement

cc: Commissioner Steve Radack
Randy Schilhab, P.E.
Rondy Spardella, HCFCD

RECEIVED

AUG 06 2009

BROWN & GAY ENGINEERS, INC.

General Flooding Statement

A large thunderstorm complex that originated in northwest Texas moved into Harris County late in the afternoon on Monday, April 27, 2009, producing very heavy rainfall and significant street flooding. The complex pushed offshore before midnight and weakened while the old outflow boundary on the western end retreated northward from Matagorda and Brazoria Counties.

As this boundary entered into western Harris County, a cluster of thunderstorms developed between Tomball and Katy and remained nearly stationary. Hourly rainfall rates of 3.0-4.0 inches per hour on top of 4.0-5.0 inches of rainfall in the late afternoon of April 27th produced major flooding across the western half of Harris County. The cluster began to drift east-southeast across the upper portions of Brays, Buffalo, and White Oak Bayous around 5:30 a.m. and then weakened as it tracked into the central part of the county. Rainfall resulted in rapid rises along upper Brays, Buffalo, and upper White Oak Bayous and major flooding of creeks in the western and northern portions of the county. Extensive street flooding closed portions of I-10 W feeder roads, part of US 59 at the 610 Loop, main lanes of I-45 at Spring Stuebner, and parts of the West Sam Houston Tollway.

The event was the third in a series of excessive rainfall events across Harris County which began on April 18th. Grounds were wet going into the rainfall on the afternoon of April 27th, and completely saturated prior to the onset of the excessive rains during the morning hours of April 28th. The saturated grounds and intense rainfall rates led to the rapid and in places near record flood levels. In fact, the flows recorded by the USGS gage at Piney Point on Buffalo Bayou exceeded the flood of record in March of 1992. Tremendous inflow into Addicks Reservoir resulted in the flooding of Hwy. 6 and Eldridge Pkwy. for the first time since October of 2002, and for several hours during the morning of Tuesday, April 28th water from overflowing Bear Creek was flowing across Hwy. 6. High water marks obtained by District crews indicate the highest levels ever recorded along portions of Bear Creek, Langham Creek, and South Mayde Creek.

Heavy rains fell between 4:00 p.m. and 10:00 p.m. on April 27th, with a brief break before the development and onset of excessive rainfall just after midnight on April 28th, and continuing through 8:00 a.m. The most extreme rainfall fell between 1:00 a.m. and 4:00 a.m. over much of Addicks Reservoir. The 24-hr storm totals averaged 6.0-8.0 inches from just west of The Woodlands to northeast of Katy with totals of 9.0-11.5 inches across the upper portions of Bear Creek within Addicks Reservoir. Along and west of US 59 from Kingwood to Sugar Land rainfall totals averaged 4.0-6.0 inches with totals generally less than 2.0 inches east of US 59. Another rainfall maximum of 7.0-9.0 inches fell in a small band from near Hunters Creek Village to just north of The Meadows.

The highest short term rainfalls occurred over Addicks Reservoir and Buffalo Bayou. The maximum 30-min rainfall recorded was 2.9 inches at Addicks Dam which is near

the 1% (100-year) frequency. The 1-hr rainfall totals of 4.2 to 4.8 inches were recorded over Addicks Reservoir, upper Brays Bayou, and upper Buffalo Bayou which equates to over a 1% (100-year) frequency. For the 6-hr to 24-hr time periods the rainfall totals over Addicks, upper Brays, middle and upper Buffalo, Cypress Creek, Spring Creek, and upper White Oak Bayou ranged from a 10% (10-year) to 2% (50-year) event.

The magnitude of rainfall over the central part of Addicks Reservoir especially upper Bear Creek for a 24-hr time period has not been experienced in this part of the county since detailed rainfall analysis collection began in the early 1980's. The last time similar rainfall occurred on upper Buffalo Bayou was in March of 1992, and this event averaged 1.0-2.0 inches higher than the 1992 rainfall. The areas heavily impacted in this event have largely escaped excessive rainfall events in the recent past including the floods of Tropical Storm Allison and Hurricane Ike.

Several bayous and creeks recorded near record or record levels especially across Addicks Reservoir and Buffalo Bayou. The following is a comparison of high water marks to previous floods and flood frequency levels.

Cypress Creek: Levels along Cypress Creek were similar to those of Hurricane Ike below I-45 and higher than Hurricane Ike above I-45 to below SH 249. Above SH 249 levels were similar to the floods of October and November of 1998. The high water marks along Cypress generally equate to around or just below a 10% (10-year) water surface level.

Mason Creek: Levels along Mason Creek are the highest ever recorded at every bridge location that marks were obtained. The previous flood of record was Hurricane Alicia in 1983 and this event surpassed Alicia by 5.0-6.0 feet. The high water marks equate to around a 1% (100-year) water surface level around Prince Creek Drive and around the 2% (50-year) water surface level above I-10.

Langham Creek: Levels along Langham Creek were the highest ever recorded. From Addicks Satsuma upstream to FM 529 water surface levels averaged above the 2% (50-year) levels at each location and were above the 1% (100-year) level by 1.5-2.0 feet below Addicks Satsuma and West Little York.

South Mayde Creek: Levels along South Mayde Creek were the highest ever recorded below Fry Rd. All locations experienced water surface levels at or just below the 2% (50-year) level. Along the upper portion of the watershed, high water marks were similar to the October 1994 flood event.

Bear Creek: Levels along Bear Creek were the highest ever recorded below Fry Rd. Elevations at Fry Rd were just below the 1% (100-year) level and at Clay Rd. exceeded to .2% (500-year) level. The upstream portion of the watershed experienced levels similar to the levels in October 1994 and October 1998.

Buffalo Bayou: Levels in the middle and upper portions of Buffalo Bayou were higher than the record levels set in March of 1992 from the West Belt downstream to around Voss. Above the West Belt levels were slightly lower than those of March of 1992.

A record flow of 7,700 to 7,800 cfs occurred at the Piney Point USGS gage. Water surface levels along Buffalo Bayou from the 610 Loop to Hwy. 6 averaged between the 2% (50-year) and 1% (100-year) levels at each bridge location.

House Flooding Estimates

Extensive house flooding occurred throughout western and portions of central Harris County from channels overflowing their banks and internal drainage systems being overwhelmed by the high intensity rainfall rates. The largest concentration of flooded homes occurred across the lower portions of the creeks feeding in Addicks Reservoir, along Buffalo Bayou and its tributaries, Brickhouse Gully, and the tributaries feeding into upper Brays Bayou. The majority of the houses flooded were outside the mapped 1% (100-year) floodplains. Based on District records the April 28th event resulted in the 4th largest number of flooded homes. It should be noted that count verifications continue and the final number will likely be different from the current number.

June 2001 (TS Allison)	73,000
June 19, 2006	3,370
October 1994	3,248
April 28, 2009	2,168
October 2002	1,999

Between 280-290 homes were flooded along the lower end of Langham Creek downstream of Hwy. 6 and just north of Clay Rd. west of the channel. An additional 290-300 homes flooded along the lower part of Bear Creek with 70-80 homes flooded along South Mayde Creek. This was the first time for many of the homes in these locations to experience house flooding as previous heavy rainfall events have not greatly impacted this part of the county.

Over 860 homes flooded within the Buffalo Bayou watershed from above the 610 West Loop to below Addicks. The majority of the house flooding resulted from tributaries and internal drainage systems being overwhelmed along with significant flows in Buffalo Bayou. The worst flooding was in the far upper reaches of the watershed where 7.0-8.0 inches of rain fell in a little over 3 hours resulting in widespread inundation of the area just below Addicks Reservoir. Record levels on the portion of Langham Creek below Addicks Dam flooded nearly 150 homes. This flood event is by far the worst house flooding ever recorded along the middle and upper portion of the Buffalo Bayou watershed and its tributaries.

Drainage Infrastructure

The majority of the drainage infrastructure is not designed to handle extreme rainfall events. Our area's topography is very flat, with a slope toward Galveston Bay that is so gradual it is equivalent to placing dimes under two legs of a 6-foot pool table. As a result, when we receive extreme amounts of rain in a relatively short period of time, we will experience flooding. Flooding can occur from bayous and tributaries topping their banks or from stormwater that ponds in streets, yards, and houses because the roadside ditches or street storm sewers become overwhelmed and cannot drain the stormwater fast enough. Storm sewers and roadside ditches are only designed to handle about an inch to two inches of rain in an hour. When these amounts are exceeded, we expect stormwater to pond in the streets and roads. If it continues to rain the stormwater runoff will sheet flow overland often times inundating houses.

Protect Yourself, Buy Flood Insurance

Despite all of the projects we construct, such as widening and deepening channels and excavating stormwater detention basins, we cannot eliminate the risk of flooding in this region altogether. That is why we strongly encourage residents to become aware of their flooding risks and take the appropriate precautions, most especially having flood insurance no matter where they live.

We often hear people say that because they are not located in a 100-year floodplain on the Federal Emergency Management Agency's Flood Insurance Rate Maps that they do not need flood insurance. This is one of many myths we try to dispel. While the maps show flooding risks from a bayou or stream topping its banks during certain theoretical storms, they do *not* show other types of flooding that occur in our area. The maps do *not* show flooding that can occur from roadside ditches and underground storm sewers exceeding their capacity, which is typically the first type of flooding we experience during times of very heavy rain. Often times, we see streets filling up with water and inundating homes long before nearby tributaries and bayous reach their capacity.

Furthermore, while Harris County has more than 2,500 miles of channels, only about 1,300 miles have been studied to determine if a floodplain is associated with those channels. If a home is located near an unstudied channel or stream, it may be located in a floodplain that has not yet been identified on a map.

In addition, floodplain maps do *not* show flooding risks from storms greater than a 500-year flood. Remember Tropical Storm Allison? About 65 percent of the area that flooded during Allison was not located in a mapped floodplain. This is because the flood registered in many places, specifically the northeast part of town, well-beyond a 500-year flood.

We also hear people say, "I didn't flood during Tropical Storm Allison, so I'll never flood." However, this could be a huge mistake. Many may not realize that Allison did not distribute rain evenly over the county. The greatest rainfall hit the northeast part of town, near Greens and Halls bayous, dropping more than 28 inches of rain in 12 hours and 35 inches of rain in five days. Many parts of Houston and Harris County received

less than 5 inches. If that same damaging rainfall had hit other parts of the county, they too, would have experienced similar flooding.

We also hear, "I've lived in my house for more than 40 years, and I've never flooded. Therefore, I don't need flood insurance because my house stays high and dry." It's important to remember that this area has flooded for centuries, long before we ever settled here. We don't want people to look at one small snapshot of time to predict their flooding risks. Flooding is all about the rain: where it falls, how long it falls and how much falls. There are many areas in the county without an extensive flooding past. However, the "right" rainfall – such as the rain that fell over the west and northwest parts of town April 27th – April 28th – can quickly change that fact. That is why we encourage all residents to become familiar with their flood risks and not count on the past to predict the future.



We recommend that all Harris County residents have flood insurance. Even if your home is not in a mapped floodplain and even if it is elevated to current standards above the 100-year floodplain. In a sense, all of Harris County is in a floodplain, and all of us are at risk for flooding to varying degrees. If you're not in a mapped floodplain, it doesn't mean you don't need flood insurance, it means you get cheaper flood insurance!

We would also like to encourage you to visit our Web site at www.hcfd.org for a much broader overview of all our projects and efforts to help the residents of Harris County.