

# Hurricane Harvey:

## Where Do We Go From Here?



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Hurricane Harvey resulted in extensive flooding and massive home damage to the Houston region. “We’ve got probably 30,000 to 40,000 homes that have been destroyed,” said Harris County Judge Ed Emmett. Damage estimates surpass \$20 billion.

While the region recovers from the damage, the community is asking what can be done to avoid this type of devastation going forward?

Here we consider some potential courses of action.

But before discussing solutions there are several points to consider.

### **Harvey was a unique storm.**

The Houston area received over 50 inches of rain in a few short days. Nowhere in the US has this much rain fallen in such a short period of time. It’s simply never been seen before. According to Mark Sappington, P.E., President of Sappington Engineering, “If you dump 30 to 50 inches of rain anywhere in the United States you would have massive flooding.” So, in a storm of this magnitude, no amount of preparation would have avoided the flooding.

### **Harvey was a 100-year event with a very low probability of reoccurring.**

“The 100-year storm event is an event that has a one percent chance of occurring in any given year. The probability was minuscule that we would have a Category 4 hurricane that would hit near Rockport and stall and just continue to dump water for days on Houston” says Sappington.

### **What can we afford?**

The cost of putting into place infrastructure that would have kept Harvey from flooding anyone would be astronomical and unaffordable.

### **An initial emotional response is not necessarily the best response for protecting the future.**

Mark Sappington comments, “Flooding is a very emotional issue to anyone who has experienced water in their homes. It ruins their homes and things that are loved by these individuals. This terrible tragedy changes people’s lives. When there is a disaster such as this people tend to lose perspective.

Emotion takes precedence over reality. The immediate response is that we should implement solutions that make it where no one ever floods. Because we have no control over mother nature it’s an impossibility to remove all risk of flooding.”

Going forward, Houston must balance the demand for action with economic considerations. “We need cool heads to prevail. We need to take the emotion out of it and come up with a plan of action that can be done that will protect the public more than before”, says Sappington.

Below we consider several actions that can give the residents of the Houston area the highest level protection that is affordable.

Let’s take reasonable action and not make the development community the easy scapegoat.

## **REALISTIC SOLUTIONS**

### **Raising finished floor elevations.**

Says Mark Sappington, “One thing I would be in favor of would be to raise the minimum floor slab elevation immediately in Houston from one foot to one and a half feet to match the county, or higher. Raising finished floor elevations will give more protection to any new development and any new redevelopment that is going on in the city and in the county. That needs to be the goal for the Houston area, to eliminate as much as possible structural flooding.

### **FEMA buyout of flood plain homes.**

One element of a possible long-term solution to Houston’s flooding woes is to buy out flooded homes and return the land to the water shed where it can soak up more rain.

This subject has been recently discussed in an article in Forbes (Future Flood Control: *Time To Buy And Bulldoze Houston’s Most Flooded Homes*; Christopher Helman, August 31, 2017). Since 1985 the flood district has been working with FEMA to pay homeowners to give up their flood-prone properties that were

**UPDATE**

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\* On Tuesday, September 12th, the Harris County Commissioners Court voted to ask FEMA for \$17 million to purchase 104 flooded homes. If approved, the county will continue a slow process to buy and demolish a total of 3300 homes.

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< Continued from Page 12

"simply built in the wrong place," i.e. "hopelessly deep in the floodplain." More than 3,000 properties on 1,100 acres have been acquired in these buyouts, their structures bulldozed and allowed to return to their natural role in soaking up flood waters before they even get to the bayous and reservoirs.

"Buying up the deepest corners of the floodplain makes enormous sense. Landowners get enough money to start over somewhere else, while the flood district gains valuable acres of absorption capacity. Around the Addicks and Barker reservoirs, some flooded neighborhoods are inside on the boundaries of the vast reservoirs, which are normally kept as natural expanses of woods, parks and bayous, with walls and gates to hold back floodwaters.

If buying more reservoir land through buyouts is cheaper and easier than building another new reservoir, then by all means, use more buyouts," says Sappington.

\* Russell Poppe, executive director of the Harris County Flood Control District was recently interviewed for a story in the Wall Street Journal (*In Harvey's Wake, Houston Rethinks Real Estate Development*; Douglas Belkin and Shibani Mahtani, September 12, 2017). Poppe hopes to leverage the FEMA program to buy hundreds, if not thousands, of homes in vulnerable areas. "We would prefer to buy these homes out now before they start making improvements," Mr. Poppe said.

For about \$2 billion in relief money a FEMA-backed buyout could ensure that 7,000 homes never flood again.

### Addicks Reservoir.

Releasing water from the reservoir is a big topic now. There are many people who are still flooding because of the releases from Addicks & Barker reservoirs. There will be a lot of discussion on what happened and when water was released and when water wasn't released. Should they have released earlier or later or not at all?

Sappington said "There was a finite design for Addicks and for Barker reservoirs in the late 1930s and early 1940s. It was always believed that that

volume amount of volume would never ever be reached. The unprecedented rainfall from Harvey made the dams fill up like they've never ever filled up before and to the point where the spillway was starting to be activated."

One subdivision in that area has three detention ponds within a close proximity to a home that had no flooding. Is the answer a requirement of more retention ponds?

According to Sappington "The Harris County Flood Control District has very recently changed its policy on detention and the areas that drain to the Addicks Reservoir.

They've increased the amount of detention that is required from 0.55 acre-foot per acre to 0.85 acre-foot per acre, which is a substantial increase. The reason being is that an additional 0.3 acre-foot per acre of detention is to be designed in such a way that it can be held back in the detention pond instead of draining immediately to the Addicks reservoir.

The City of Houston, Harris County and Harris County Flood Control District are not sitting back on their laurels. The Harris County Flood Control District has been doing a wonderful job in getting new online detention basins that are limiting the amount of flooding. Firstly, in the upper regions of White Oak Bayou they have done so many projects there that are now online and there was not the significant flooding on White Oak Bayou that we had in other areas because they have been busy building infrastructure, buying out homes, turning areas into regional detention basins that lower the flows as they go down the stream. Going forward, they are modeling the existing problems and proposing solutions to lower flooding."

### Conclusion:

There are reasonable solutions available that can significantly reduce the risk of future flooding in the Houston region. It has been shown that such actions are effective. Let's learn from past successes and move forward together, not simply blame increased development for Houston's problems.

Sappington comments that the regulations in place by the municipalities are a lot more stringent than they've ever been but unfortunately, a lot of our infrastructure, a lot of our past development, has been designed, approved, permitted, and developed using former criteria that weren't nearly as stringent as now. People look at problem areas and the reaction is to deem that the current criteria are totally inadequate, not realizing these areas were developed under older, less stringent criteria.

Sappington continues, "It's a very complex matter and it pains me when I hear that the problem was because of all the development and that we turned all the prairie to concrete and we chopped down all the trees. If you look on Google Earth, at the historical pictures of western Harris County, there were no trees in the past except along the bayous."

Fred Caldwell, president and chief executive of Caldwell Companies, a commercial and residential real-estate developer, said in the above mentioned Wall Street Journal article that he believes the development community has done an "incredible job in protecting natural areas." He disputed the notion that stronger regulations would have mitigated Harvey's impact. The record amount of rainfall—51.88 inches— would have devastated an area with stricter zoning, building regulations and more green space, he said.

There are reasonable actions that can be taken to protect the Houston region from future flooding. Let's come together as a community and take these reasonable actions and not make the development community the easy scapegoat. ■

