From: Colin Leach
To: CESWT-BBTRS
Cc: Foster, Jodie R CIV USARMY CESWF (US)
Subject: [Non-DoD Source] Public Information Meeting - Buffalo Bayou and Tributaries Resiliency Study
Date: Friday, May 3, 2019 10:37:47 AM
Attachments: 05-03-19ThePlan Colin Leach.pdf

Thank you for the information discussed in last nights meeting (2nd May) at St John Vianney activity center in Houston.

It was informative and well put together. It was a pleasure talking with the staff including:

Dr. Edmond J Russo
Andrew Weber
Lori Thomas
Melinda Fisher
Jodie Foster

Please copy them on this e-mail.

I have lived in West Houston (Briarhills) since 1983. I have a degree in Chemical Engineering (Cambridge, UK). We were not flooded during Harvey, though we could not get to our house for a few days and lacked electricity for 10 - we were very lucky!

I have had the opportunity to look at what could be done to mitigate a recurrence of a Harvey-like event. I also looked back to review the history of past events.

The 1940 Army Plan to mitigate such an event was impressive - it was a great pity that "Phase 2" was not executed!

I humbly submit my thoughts on the underlying situation and on what could be done to mitigate such a future event. It is critical (for the viability of Houston) that such action is considered (and probably taken).

I would be happy to discuss any of this further - I think there is a very good team in place to consider the available options. As citizens we need to give such efforts as much support as we can.

Yours sincerely (and thank you again)

Colin Leach
1019 Trapper Hill Drive
Houston, TX
77077-1133

leachcp@swbell.net

cell = 832 452 3729

Houston/Harris County

Dealing with future storm events

Planning for the Future – a path forwards

Goals are to prevent or minimize flooding/destruction to areas that have flooded in the past (including Meyerland, Greens Bayou, White Oak Bayou, Downtown (theater district), Kingwood, Cypress, Memorial, Katy – i.e. much of the Houston area) and areas that could be impacted in the future given different types of storm events.

Prevention and mitigation are likely to be much less expensive than repeated mopping up and certainly much less traumatic for the resident population (voters).

-01 **Houston is a "working" city. If businesses are significantly impacted* by flooding (examples such as BP (Memorial), Toyota (Enclave)) they will re-locate. Their staff and the numerous associated work positions will simply re-locate.**

Planning for the future must be on a "Systems Wide" approach, i.e. looking at the whole system, rather than identifying/implementing solutions that just apply to one isolated issue.

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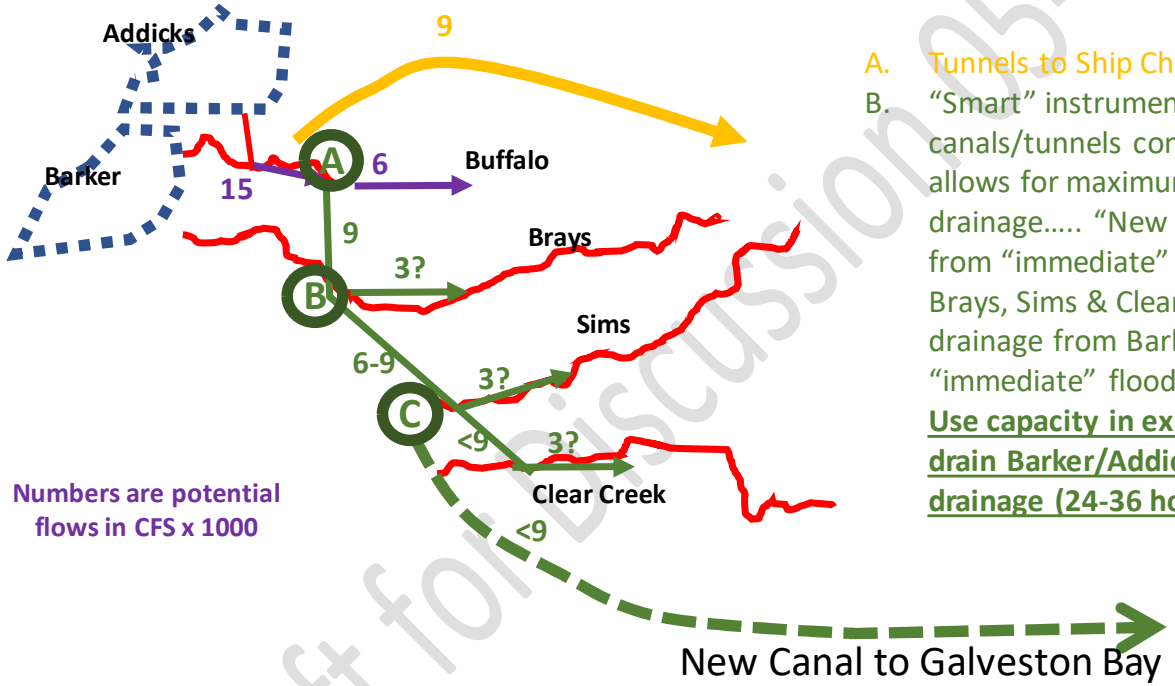
***significantly impacted suggests that if a repeat occurs then this will be significant – if it is understood that this type of event will occur frequently in the future then the business will re-locate. Houston will become non or less viable.**

Overall Plan – Enhance Conveyance in Buffalo Bayou AND Either (A) Tunnels to Ship Channel OR (B) "Smart South Canal" to distribute water to Galveston Bay using the new canal and any capacity in the existing Bayous

-02 .... For either (A) or (B) will require pumps which provide elevation and as a result water will flow faster & will require smaller tunnels and/or canal width

This suggestion focuses on the "Smart South Canal" – It is more flexible than a tunnel which by its nature goes directly from A to B



A. Tunnels to Ship Channel

B. "Smart" instrumented system with canals/tunnels connecting bayous allows for maximum flexibility wrt drainage..... "New canal" enables relief from "immediate" flooding for Buffalo, Brays, Sims & Clear Creek Bayous & drainage from Barker & Addicks once "immediate" flooding has subsided – **Use capacity in existing bayous to drain Barker/Addicks once immediate drainage (24-36 hours) has subsided**

A B C

Are pump stations (New Orleans type pumps), used to pump/lift drain water 20-30 ft such that a storm canal can have a downwards gradient. A storm canal to carry 10,000 CFS may be 35 ft wide (40 ft deep)?, but much smaller than a canal that relies on existing topography

For immediate rains Barker & Addicks dams are closed and Pump Station B can be used to potentially reduce flooding in lower Brays bayou

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Example of What Can be Achieved

The Dujiangyan irrigation system, located in the western portion of the Chengdu flatlands at the junction between the Sichuan basin and the Qinghai-Tibet plateau, is an ecological engineering feat originally constructed around **256 BC**. Modified and enlarged during the Tang, Song, Yuan and Ming dynasties, it uses natural topographic and hydrological features to solve problems of diverting water for irrigation, draining sediment, flood control, and flow control without the use of dams. Today the system comprises two parts: the Weir Works, located at an altitude of 726m, the highest point of the Chengdu plain 1km from Dujiangyan City, and the irrigated area. Three key components of the Weir Works control the water from the upper valley of the Minjiang River: the Yuzui Bypass Dike, the Feishayan Floodgate, and the Baopingkou Diversion Passage. Together with ancillary embankments and watercourses including the Baizhang Dike, the Erwang Temple Watercourse and the V-Shaped Dike, these structures ensure a regular supply of water to the Chengdu plains. The system has produced comprehensive benefits in flood control, irrigation, water transport and general water consumption. Begun over 2,250 years ago, it now irrigates 668,700 hectares of farmland.

https://whc.unesco.org/en/list/1001

https://en.wikipedia.org/wiki/Dujiangyan

So, if we did a job as well as was apparently carried out here the system would still be operational in the year 4293 !!!

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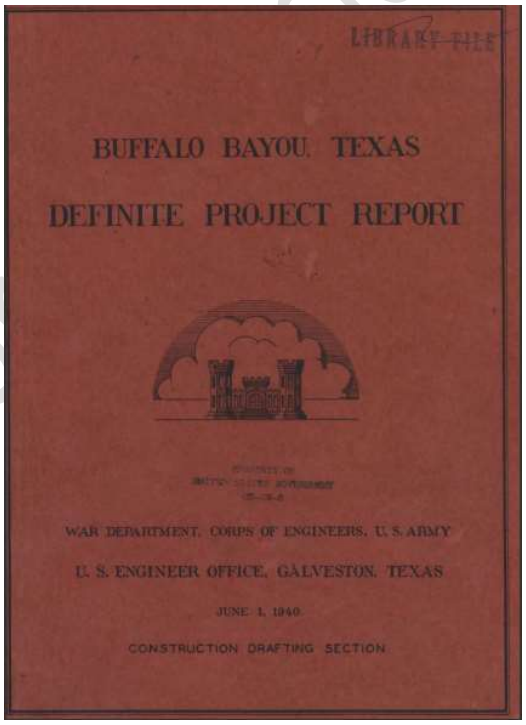
Consider History

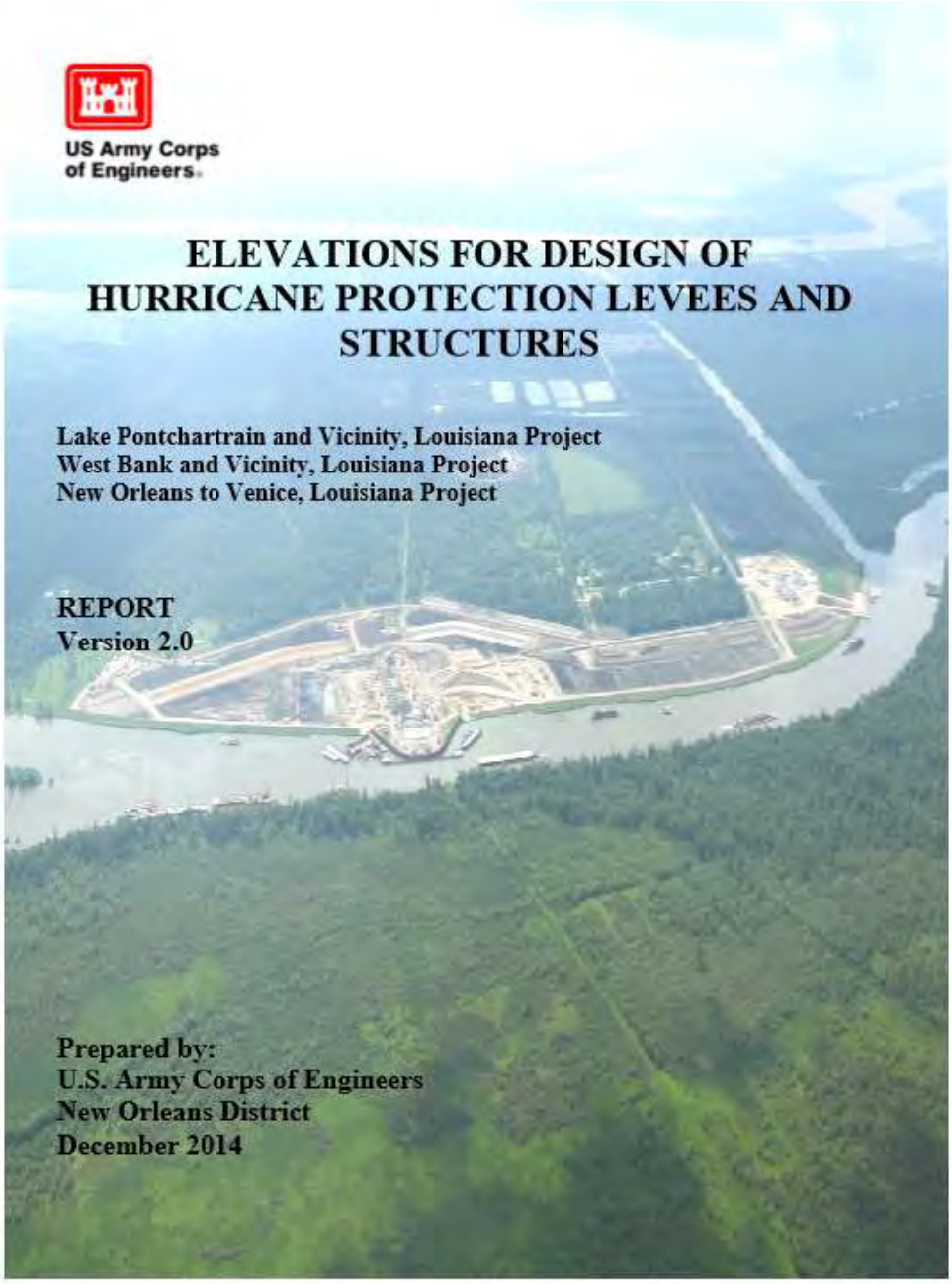


More drainage canals & dams/retention required. North & South Canals were NOT built (lack of local authority funding/enthusiasm in 1954/55).

Government failed to act – look what happened as a result!

Update Understanding (New Orleans for example – see below)

Most Important – Look Forwards! … key is modeling



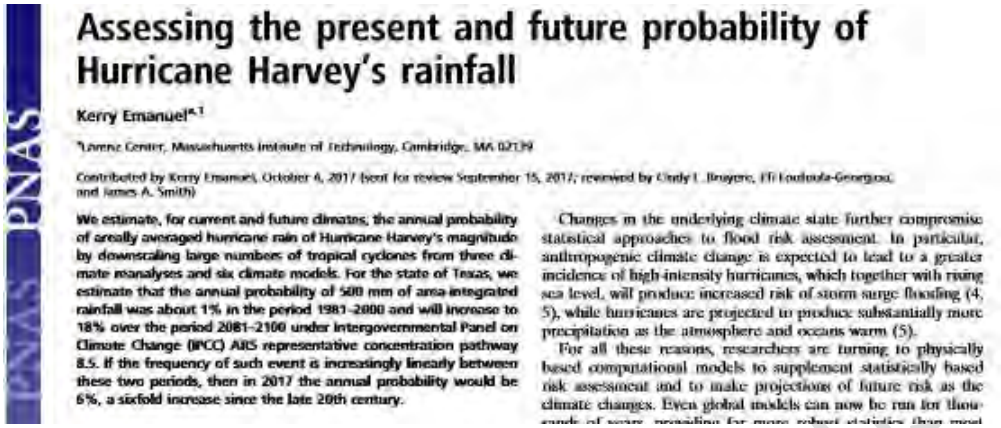
-03

ACE ran 150+ storm scenarios to test potential levee/pump options. This type of modeling has probably been carried out (should be updated) for Houston.

ACE to work closely with Harris County Flood Control & other bodies.

Will storms such as Harvey occur in the Future and if so how frequently and how Intensely?

Prof. Kerry Emanuel (MIT) has addressed this issue:



PNAS

Assessing the present and future probability of Hurricane Harvey's rainfall

Kerry Emanuel[a,1]

[a]Lorenz Center, Massachusetts Institute of Technology, Cambridge, MA 02139

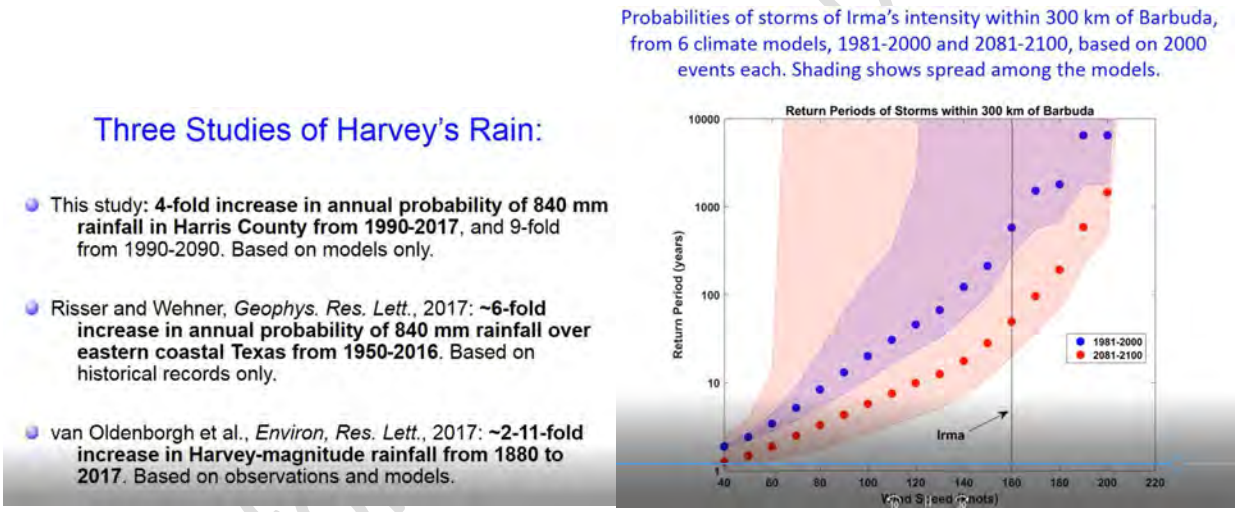
Contributed by Kerry Emanuel, October 4, 2017 (sent for review September 15, 2017; reviewed by Cindy L. Bruyere, Efi Foufoula-Georgiou, and James A. Smith)

We estimate, for current and future climates, the annual probability of areally averaged hurricane rain of Hurricane Harvey's magnitude by downscaling large numbers of tropical cyclones from three climate reanalyses and six climate models. For the state of Texas, we estimate that the annual probability of 500 mm of area-integrated rainfall was about 1% in the period 1981–2000 and will increase to 18% over the period 2081–2100 under Intergovernmental Panel on Climate Change (IPCC) AR5 representative concentration pathway 8.5. If the frequency of such event is increasingly linearly between these two periods, then in 2017 the annual probability would be 6%, a sixfold increase since the late 20th century.

Changes in the underlying climate state further compromise statistical approaches to flood risk assessment. In particular, anthropogenic climate change is expected to lead to a greater incidence of high-intensity hurricanes, which together with rising sea level, will produce increased risk of storm surge flooding (4, 5), while hurricanes are projected to produce substantially more precipitation as the atmosphere and oceans warm (5).

For all these reasons, researchers are turning to physically based computational models to supplement statistically based risk assessment and to make projections of future risk as the climate changes. Even global models can now be run for thousands of years, providing for more robust statistics than most

-04



Three Studies of Harvey's Rain:

- This study: **4-fold increase in annual probability of 840 mm rainfall in Harris County from 1990-2017**, and 9-fold from 1990-2090. Based on models only.
- Risser and Wehner, *Geophys. Res. Lett.*, 2017: **~6-fold increase in annual probability of 840 mm rainfall over eastern coastal Texas from 1950-2016**. Based on historical records only.
- van Oldenborgh et al., *Environ, Res. Lett.*, 2017: **~2-11-fold increase in Harvey-magnitude rainfall from 1880 to 2017**. Based on observations and models.

Probabilities of storms of Irma's intensity within 300 km of Barbuda, from 6 climate models, 1981-2000 and 2081-2100, based on 2000 events each. Shading shows spread among the models.

Other studies (see above) suggest similar results (rainfall, e.g. Harvey) & for wind intensity, which along with some sea level rise will tend to increase the storm surge – a real problem for Galveston Bay and the Houston Ship Channel in the case where a storm like Ike makes landfall west of Galveston.

Even now we have seen a very elevated frequency of rain events in the last few years (see ACE presentation- extract below) – this frequency is not likely to diminish significantly in the future

Buffalo Bayou

Event Date	HWM
Harvey	71.6
4/28/09	65.4
3/4/92	64.5
4/18/16	65.3
5/26/15	62.9

In addition, a thesis (in December 2004) described what would have happened if TS Allison (June 2001) had been approximately 20 miles to the west.

FLOOD CONTROL RESERVOIR OPERATIONS FOR CONDITIONS

OF LIMITED STORAGE CAPACITY

A Dissertation

by

HECTOR DAVID RIVERA RAMIREZ

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

-04 Part of the summary of the thesis:

The methodology was applied and tested using the Addicks and Barker Reservoir system in Houston, TX as a case study. Upstream flooding is also a major concern for these reservoirs. Modifications to the current emergency policies that would allow emergency releases based on the probability of upstream flooding are evaluated. Risk-based EOS were tested through a series of flood control simulations. The simulations were performed using the HEC-ResSim reservoir simulation model. Rainfall data recorded from Tropical Storm Allison was transposed over the Addicks and Barker watersheds to compute hypothetical hydrographs using HEC-HMS. Repeated runs of the HEC-ResSim model were made using different flooding and residual storage scenarios to compare regulation of the floods under alternative operating policies. An alternative application of the risk-based EOS in which their associated risk was used to help quantify the actual probability of upstream flooding in Addicks and Barker was also presented.

The results of this thesis were remarkably similar to the actual events seen during Harvey, with significant flooding downstream of the dams in the event of significant water release from these dams (and flooding upstream of these dams in addition).

The combination of the climate work shown earlier and the results of the above thesis strongly suggest that a heavy rain event such as Allison or Harvey is quite likely (not a 500 year event). Where-ever such an event occurs, the resulting consequences will be severe and it is prudent to think through what can be done to (at least partially) mitigate such events.

Draft for discussion

The legal opinion (Richard Harrison, Army Corps of Engineers, 1996) is very precise as to when the US government may be liable for flood damages in relation to Barker & Addicks dams. It is worth reading in full, an excerpt is below:

ADDICKS and BARKER RESERVOIRS
LEGAL TAKINGS ANALYSIS
FOR INCLUSION INTO SECTION 216
RECONNAISSANCE STUDY

This analysis will discuss the potential liability of the United States for damages caused by induced floodwaters which may occur as a result of the construction operation and maintenance of the Addicks and Barker Reservoirs. The analysis will first discuss applicable legal principles then apply them to the facts of the reservoirs. The final conclusion is that under current operating conditions, flooding of private lands should not cause a legal taking under existing case law.

ELEMENTS OF A TAKING

For flood damages to rise to the level of a taking which requires compensation under the 5th Amendment, the flooding must be sufficiently frequent, inevitably recurring, and produce substantial economic damage to the market value of the property. See Bagwell v. United States, 21 Cl.Ct.722 (1990). The flooding must also be a natural and probable consequence of the government act. Richard v. United States, 282 F.2d 901,904,154 Cl.Ct. 225,230 (1960). Of course the plaintiff must also show that it is in fact the governments' action or inaction that is the factual or proximate cause of the flood damage.

Leading cases seem to indicate that flooding property on an occasional and sporadic basis does not rise to the level of a 5th Amendment taking. As such, if no taking is found, there is no compensation owed under tort law due to the immunity statute, 33 U.S.C. 702c.

A one time flood will not normally be considered as "inevitably recurring " under existing case law unless it is proven that it will reoccur with predictable frequency. In National By-Products, Inc. v. United States, 405 F.2d 1256, (Ct.Cl.1969), the court held that inevitably recurring meant more than one occasion and that even two or three floods may not be enough.

The conclusion here is that there is NO liability if a flooding event is "occasional and sporadic". However if it is more frequent then such a liability may exist. It is suggested that historical data reflects "occasional and sporadic" frequency. The cited climate studies suggest that this is not the case looking forwards – a complete change in direction is required!

At least 3 Types of Storm Event must be Considered (including):

1. **Immediate heavy rain (typical problems 0-48 hours after heavy rainfall, then problem subsides)**

   Meyerland, White Oak Bayou, Theater District and Greens Bayou flooding on August 26/27 (and previous "tax day" floods) are examples of this. Allison was an additional example.

   This includes street (flash) flooding (not enough drainage to Bayous) and flooding from Bayous (e.g. White Oak Bayou on Aug 26th /27th 2017)

   Additional drainage of the Bayous (mechanical means etc.. the suggested (new North Canal near downtown) and additional detention (dams & retention/**addition of porous surfaces**) are potential mitigations. The amount of concreting/building etc. as the City has developed has significantly contributed to this issue.

-05 Note: In Europe (and Bellaire?) the use of porous surfaces for driveways, patios etc. is mandatory – perhaps Houston City Council should introduce this into its building codes.

2. **Prolonged heavy rain (west) & filling of Barker/Addicks dams**
   (dam gates shut during heavy rain, drainage occurs between 2 days & 15 days after rain event – if system in place can use existing Bayous to drain after the "immediate heavy rain" drainage has subsided)

   Flooding in Memorial on Aug 28th (and afterwards) following the opening of the dam gates is an example. There is currently a lack of drainage capability from these dams. Adding a 3rd reservoir may help, but will not solve the actual issue.

3. **Storm surge up Houston Ship Channel**

   This would have occurred had Hurricane Ike made landfall approx. 20 miles west of where it did. The damage implications (physical and monetary) from such an event would be catastrophic. It is most important that a "Coastal Spine" be built to mitigate such an event.

   Such a spine might allow water levels in Galveston Bay to be lower when significant storm events approach. In turn this may help both 1. And 2. Above.

The discussion that follows centers on Items 1. And 2. Above. **It is assumed that action on Item 3 will be taken.**

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Starting Point – 1940 ACE Plan

The 1940 plan (see above) was comprehensive. It was based on a projected rainfall of about 24" (based on the 1929 and 1935 floods) and a 50 % allowance for contingency. The key objective was to protect downtown and the industries along Buffalo Bayou and the Houston Ship Channel from such catastrophic floods. The plan included both Detention and Drainage.

Phase 1 included the Addicks and Barker Dams. It was executed in 1946 to 1948.

Phase 2 included a South Canal, a Cypress Creek Bayou Levee and a White Oak Bayou dam and North Canal.

Phase 2 was never executed. It "disappeared" from the Army Corps reports in 1954/55. Perhaps this was due to a "lack of enthusiasm" on the part of the entities that would have had to finance the work, or perhaps it was due to the lack of major rainfall events in the period from 1935 to 1954/55 … certainly the impact of the war had an impact. There is some suggestion (Kerry Emanuel) that increased industrial production in Europe in this period led to increased SO2 (Sulfur Dioxide) emissions wafting across the Sahara and suppressing the spawning of hurricanes in this period – but this is conjecture rather than proven.

Without Phase 2 we were left with Addicks and Barker dams but no means of discharging water from these dams through a dedicated and specifically designed system.

Without the White Oak Bayou dam flooding has re-occurred periodically along the banks of White Oak Bayou and in the downtown Theater District.

Draft for Discussion

General (Greater Houston) Observations – Could the Plan be Implemented Today? What Measures could be Taken (in a general sense)?

In general, a successful plan should incorporate Detention, Drainage Flow-ways and potentially means of flowing water down these drainage flow-ways at an optimum and significant rate.

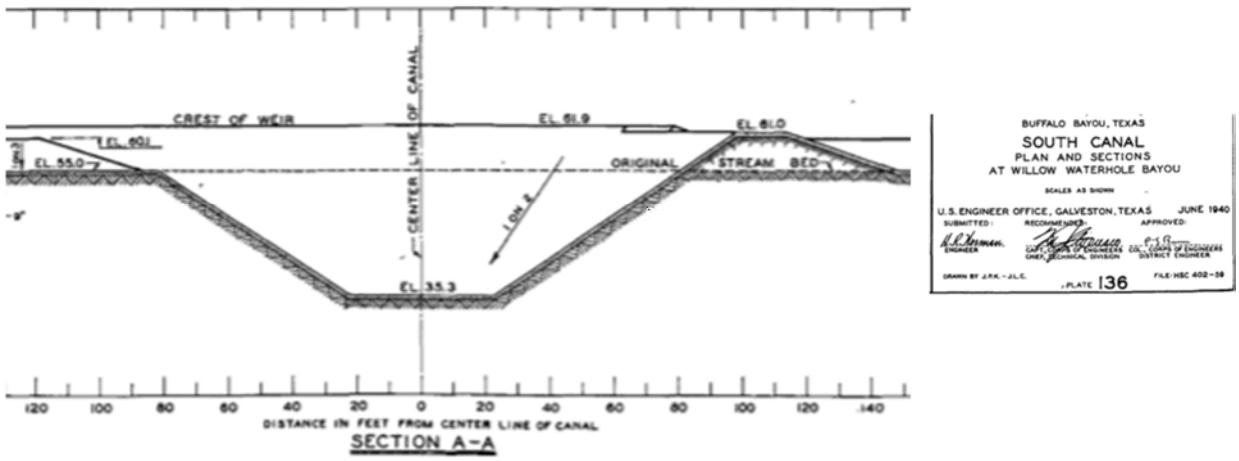
The 1940 Plan was devised at a time when the area surrounding Houston was almost 100% pasture. There was plenty of cheap land to build retention and drainage flow-ways.

This was still the case in 1954/55. For West Houston the developed area stopped west of "The Villages" at about where Beltway 8 is now and where the South Canal was proposed. (The South Canal effectively follows the route of Beltway 8 to Ellington Field and then east to Galveston Bay).

The design for the South Canal was based on natural flow, using the underlying topography.

A typical x-section for this canal is shown below:

South Canal (near Brays Bayou) – Design to Handle ~15,000 Cu ft/s water



Note that the canal is nearly 200 ft wide. **It is doubtful that a canal 200 ft wide (and near the South Canal route) could be fitted within the space currently available within Harris County.**

-06 It may be possible to implement other parts of the 1940 plan. For example, it may be possible to install a "spur" running from Greens Bayou to the San Jacinto river. The route shown in the figure below is almost exactly that of the 1940 North Canal. It is very possible that this canal could be "enhanced" with mechanical means (pumps) such that the size of the canal can be reduced AND the level of Greens Bayou at the start of the canal reduced (by pumping) thereby reducing the overall level of flood waters in Greens Bayou and the associated Bayous.

-06

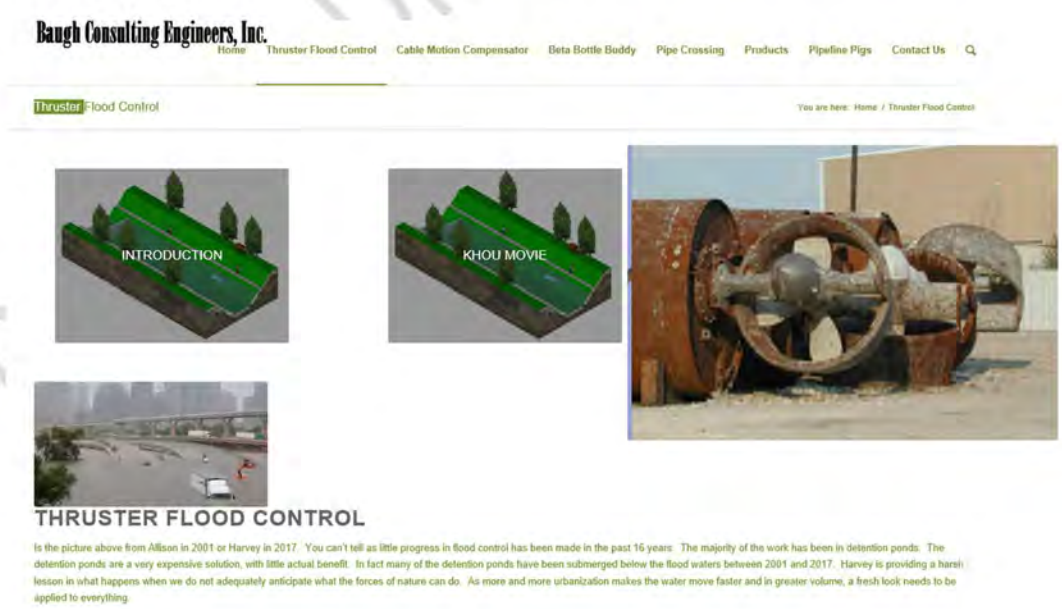
Canal Linking Greens Bayou & San Jacinto River – approx. track of 1940 North Canal

Mechanical means to enhance drainage have been suggested.

An example of this is the use of "thrusters" to move water more quickly in the lower reaches of the Bayous, such that the overall water level in the Bayous is reduced and flooding minimized, is shown below.

-07

Mechanically Enhanced Flow – Thrusters placed in Bayous near downtown where Bayou gradient is very low to move water faster & lower Bayou level – protect Theatre District & Meyerland?



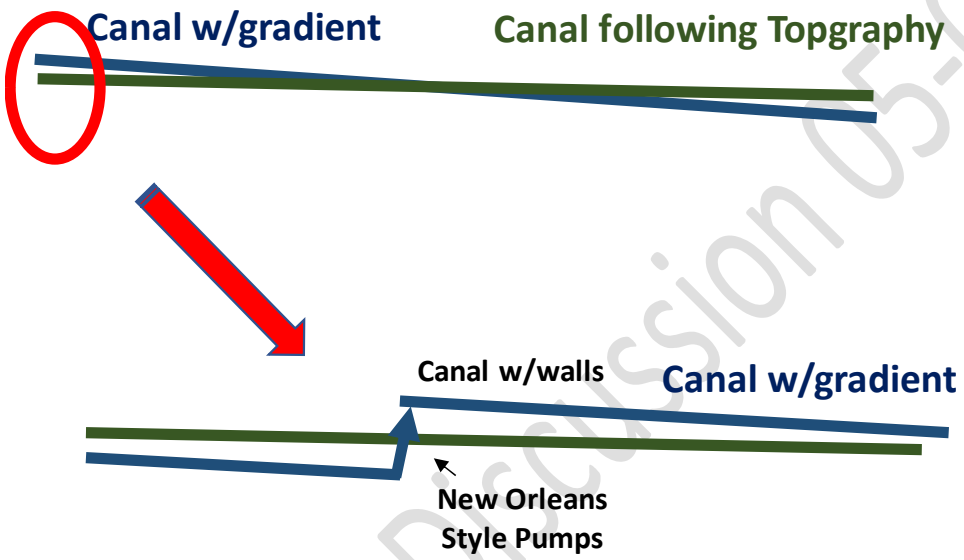
http://baughconsultingengineers.com/thruster-flood-control/

“New Orleans” style pumps could be used to alter the levels and flow-rates in any built storm canal. These pumps are capable of about 1800 CFS flowrate.

Details of actual pumps and the requirement for gradient with respect to flow-rate are beyond this discussion. A sketch to show the type of arrangement is given below. Pump stations could be positioned at strategic locations along the length of a storm canal (for example for a replacement South Canal at Buffalo and Brays Bayous).

Using Pumps to lower Bayou Levels & Flow more water through Storm Canals

-08



It is suspected that a 35 ft wide/40 ft deep storm canal (with gradient) could be used to move 15,000 CFS of water.

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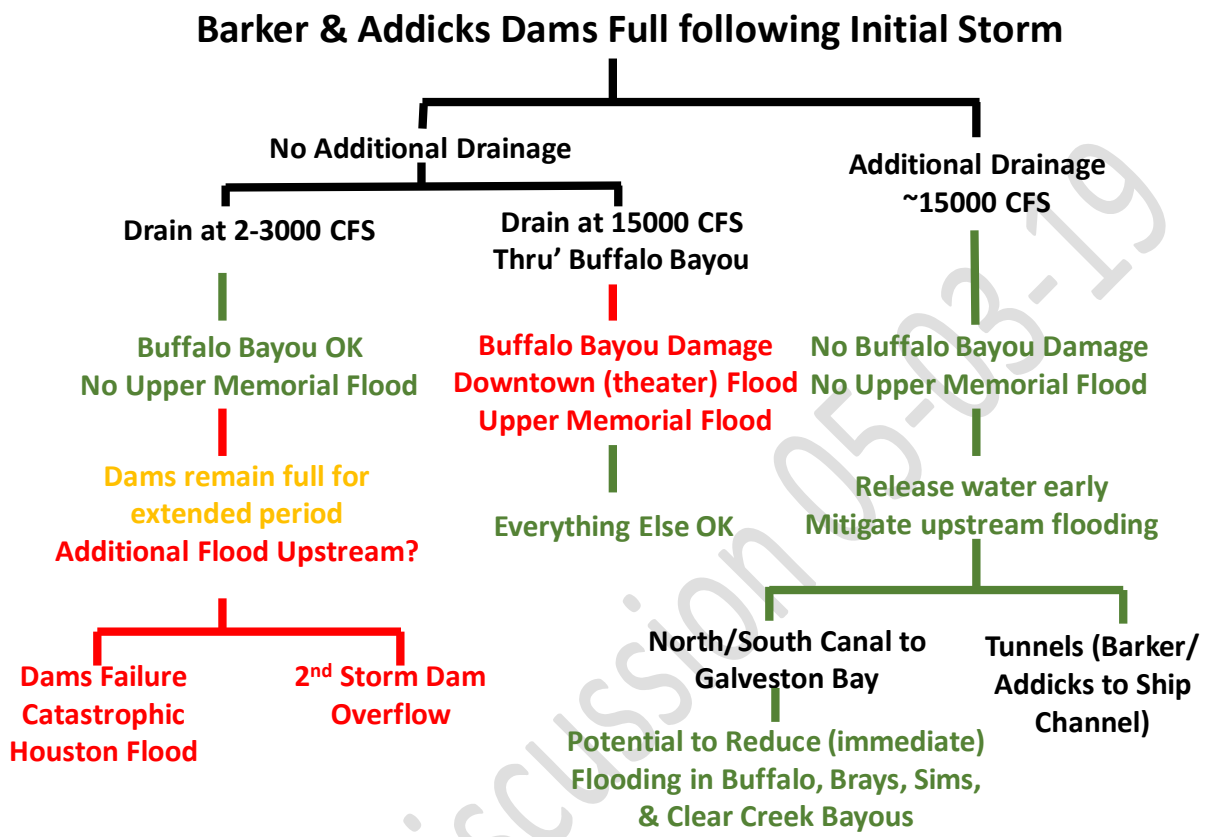
Focus on Buffalo Bayou and Barker/Addicks Dams

The options available with respect to drainage from Barker & Addicks dams are shown below.



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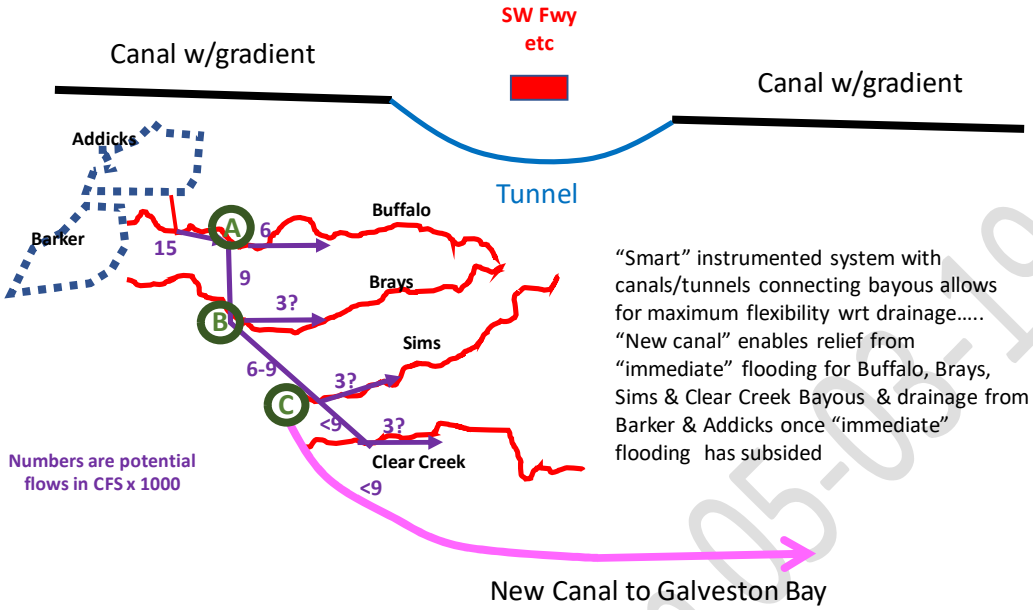
Doing nothing will result in additional flooding in the future (sooner than history would suggest).

The use of large diameter tunnels is not discussed here – they should be perfectly feasible (if Houston soils allow) given the success of projects such as London's Crossrail.

-09 A storm canal is suggested almost following the route of the 1940 South Canal. Some specifics are shown in the following figures:

-10 What is most important is that there could be a combination of new canal, some tunneling, pumps to add mechanical energy to the system and reduce the size of the canal and "smart" instrumentation and control of the system such that the most use could be made out of the system and it could be used to deal with almost any storm scenario thrown at it.

Combination of Canal(s) & Tunnels – Potential New Storm Canal

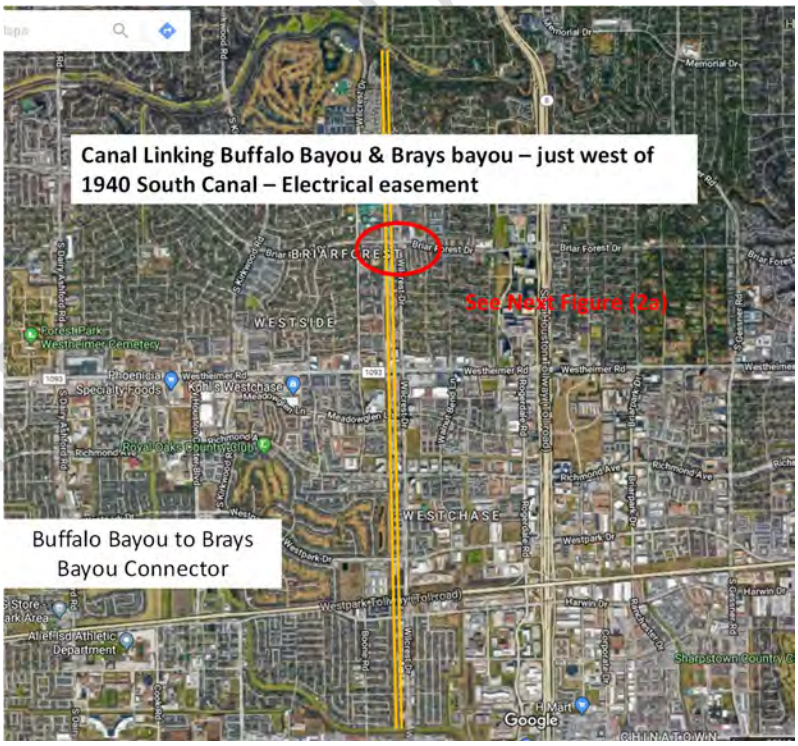


"Smart" instrumented system with canals/tunnels connecting bayous allows for maximum flexibility wrt drainage….. "New canal" enables relief from "immediate" flooding for Buffalo, Brays, Sims & Clear Creek Bayous & drainage from Barker & Addicks once "immediate" flooding has subsided

A B C Are pump stations (New Orleans type pumps), used to pump/lift drain water 20-30 ft such that a storm canal can have a downwards gradient. A storm canal to carry 10,000 CFS may be 35 ft wide (40 ft deep)?, but much smaller than a canal that relies on existing topography

For immediate rains Barker & Addicks dams are closed and Pump Station B can be used to potentially reduce flooding in lower Brays bayou

-09



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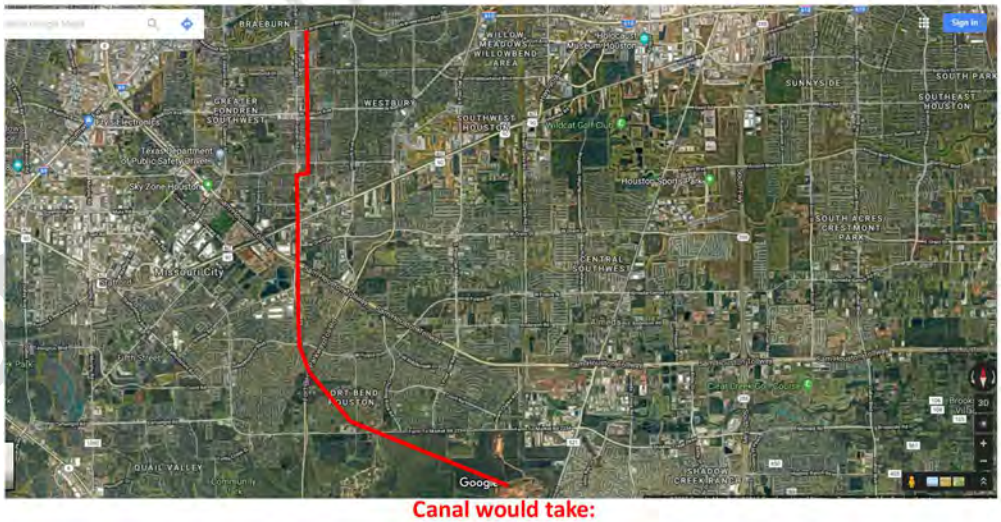
Electrical Easement – Looking North and South on Briarforest, just west of Wilcrest

Plenty of Room for a Storm Canal?

-09

Alternative – Construct New Canal from Brays Bayou to Galveston Bay

Part 1: Brays Bayou to South of Beltway 8 – uses part of Fondren Road? – or may need part tunnel



Canal would take:

1. **Initial water to relieve initial (1st 48 hour) flooding in Brays, Sims and Clear Creek Bayous**
2. **Detained water (from Barker/Addicks) once initial flows subsided**

Part 2: Continuation

-09 Part 3: Continuation

Part 4: Mission Accomplished!

-09

Of course, this type of analysis, approach must be thought through for the other regions within the greater Houston area.

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Sum Up – Concluding Comment

Process (initial)

Identify potential mitigations

Model how (multiple) example storms are handled by these mitigations

Assess the cost and benefit of each potential mitigation

Select mitigations which appear to give the best cost benefit/risk mitigation

Report to authorities and citizens

This work generates a plan (or rather a number of versions of a plan). It is then up to government to decide which plan is most appropriate (somewhere between nothing and way too expensive!)

Financing

Initial (detailed) report – Federal (ACE) with input and potential contribution from City/County/State

Executing chosen mitigations – Federal/State (City/County to ensure progress is not stymied by local regulations/interests – maybe adjustments to local property tax etc.. to provide some matching)

Overall

The overall effort requires the co-operation of City, County, State and Federal authorities. It is a "system" wide approach, rather than dealing with each part of the system separately.

It requires one heck of a sales job …. It is for the good of us all …. Even those who did not flood …

Without such action, Houston will wither following the next storm or event.

Draft for Discussion 05-03-19

From: ahdenson@usa.net
To: CESWT-BBTRS
Cc: Barbara
Subject: [Non-DoD Source] Buffalo Bayou Study
Date: Friday, May 3, 2019 1:09:59 PM

We attended the presentation at St John Vianney yesterday evening. We have a comment and a couple of suggestions.

-01 First, the comment. It borders on criminal negligence to only be 3 months into this study, 20 months after Harvey. The level of detail shown at the meeting looked like the level that should have been prepared prior to study funding rather than 6 months after funding. Not completing the study until over 4 years after Harvey demonstrates the worst of governmental bureaucracy.

-02 One of the options being considered is to increase storage capacity within the existing borders of COE land for both the Barker and Addicks reservoirs. This option has numerous advantages. One of the most important is that no additional land is needed. This option should be fast tracked to conclusion as a partial answer. It is unlikely that Houston has 20 years to wait for at least some relief from the flooding issues.

-03 No resources should be spent on studying the “no dams” option. It is blindingly obvious that the dams are needed and have been beneficial. Studying removal of the dams is a negligent waste of time and money which adds to the delays in a solutions.

Regards,

Al and Barbara Denson

802 Peachwood Bend Dr

Houston, TX 77077

ahdenson@usa.net

281.701.6661

From: Norm Eisenberg
To: CESWT-BBTRS
Subject: [Non-DoD Source] Flood control Addicks Reservoir
Date: Friday, May 3, 2019 1:40:22 PM

-01 Your solution will cause more flooding in my neighborhood because your do not take into account where the water will go. I have already flooded twice because of poor building control, concrete covering natural ground absorbtion. You MUST take into account where waters will go. I do not think the Army Corp of Engineers has done this. It certainly has not passed this information on to the public.

-02 My house had never flooded before - READ NEVER! But the "tax day flood" and "Harvey" did flood us and our neighbors. Your plan falls short of addressing our neighborhood. In fact, it appears to be overlooked because Addicks is not real close (10 miles?). The flood maps that I have seen are vague and do not cover our area.

The Army Corp of Engineers has made some big mistakes in history, don't repeat that incompetence now.

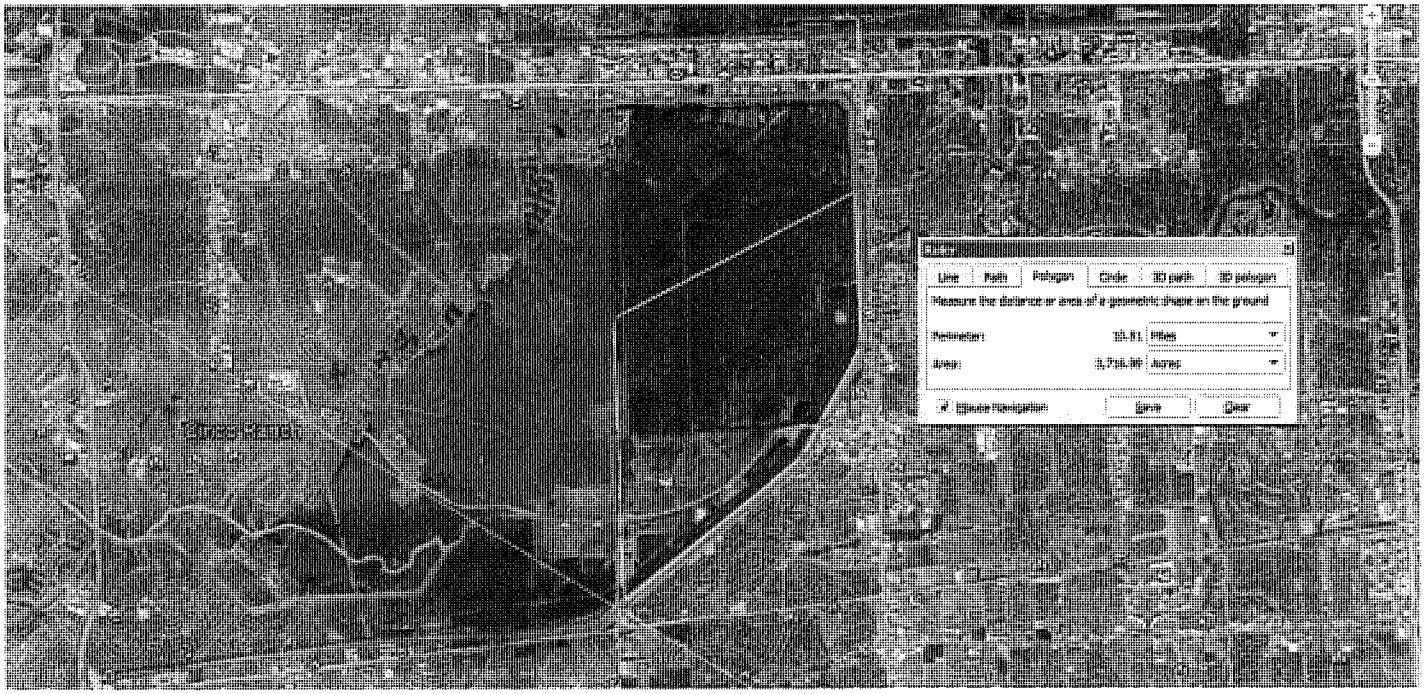
Norm Eisenberg
14947 Dunwoody Bend
Cypress, Texas 77429

03MAY19

Create a taller reservoir within the existing Barker Reservoir (5-1-19)

Noel McInnis 713-397-0515 nj3m@sbcglobal.net

- Create a ~3700 acre sub reservoir with the existing Barker reservoir with a levee that reaches 125' elevation safe usage level
- Utilize approximately half of the existing levee that is raised to match the 125' intra-levee
- Excavate from within and outside of the sub-reservoir to build the levee that increases retention capacity both inside and outside the new reservoir and minimizes requirement to move extraordinary volumes of fill long distances
- Utilize pump station screws similar to those at the Texas City Dike for moving water into the new reservoir and traditional flood gates to allow drainage during non-flood times
- Assuming 3700 acres and an existing max level of 104', 3700 acres X (125'-104') = 78000 acre-feet additional capacity, also assuming the excavated materials used to build the heightened levee equal to the new levee volume added
- 130' usable levee gives 96000 acre-feet capacity
- Would likely create a permanent standing water lake within Barker (I love to fish so you have to make it kayak accessible)
- Won't impact normal Buffalo Bayou flow
- Will require abandonment of some roads and commercial structures along Westheimer Parkway
- Sub-reservoir size could be adjusted to not affect the existing commercial development but would require materially more new levee
- Creating additional topography in West Houston would be a pleasant change



-01

From: Linda Wilshire
To: CESWT-BBTRS
Subject: [Non-DoD Source] Cypress Creek Levee
Date: Saturday, May 4, 2019 2:07:36 PM

-01 I understand there is consideration of building a levee south of Cypress Creek in the western part of Harris County. I have been told that would deprive Cypress Creek of some of its historical drainage area thus pushing more water downstream the Cypress Creek Watershed. With the history of flooding in a very large area, especially along Cypresswood Drive, I do not believe the Creek can handle any more water. There have been 3 devastating floods in the past few years. Harvey was unprecedented, but the others were heavy storms, which can happen over and over again. We need relief, not more burden.

Yours truly,

Linda Wilshire
14207 Bonney Brier DR
Houston TX 77069

From: allen.berryman01@gmail.com
To: CESWT-BBTRS
Subject: [Non-DoD Source] Public Information Meeting
Date: Sunday, May 5, 2019 1:18:45 PM

My wife and I attended the public information meeting for the Buffalo Bayou and Tributaries Resiliency Study held at Kingsland Baptist Church on April 30, 2019, and are providing our comments via this email. We were flooded out of our home by hurricane Harvey, and so this is a topic of extreme importance to us.

Overall, we found the meeting helpful, and provided us with a good overview of the scope of the project, the measures being considered to prevent or mitigate future flooding events, and the timeline for entire project.

It's clear that this is a long-term effort, and I think we and the other attendees appreciate that fact. However, we were disheartened that there was no discussion of the measures being considered that might help in the interim. Given the extent of the flooding caused by Harvey, including the severe economic cost and personal toll on hundreds of thousands of individuals, I have to believe that short-term measures are being considered that could help prevent or mitigate a flooding event until the long-term solution is in place. That is, in our mind, a crucial priority and should be discussed in these meetings as well. -01

Thank you for allowing us the opportunity to provide comments.

Regards,

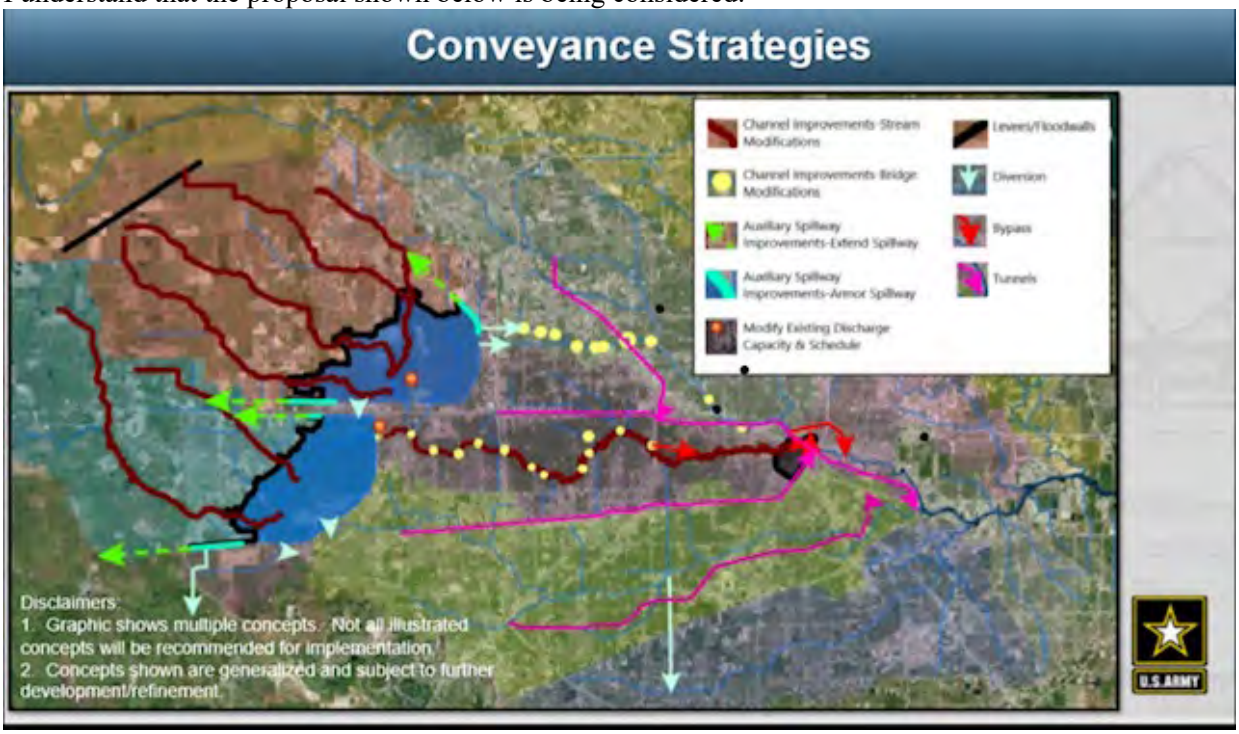
Jennifer and Allen Berryman

21503 Ganton Drive

Katy, TX 77450

From: TeriIP"s Birdsall
To: CESWT-BBTRS
Subject: [Non-DoD Source] Cypress creek proposal
Date: Sunday, May 5, 2019 4:27:24 PM

I understand that the proposal shown below is being considered:



-01 Please do not sacrifice our homes and well being to preserve those down stream from us. The flooding in our area (Stuebner and Louetta) and worsened year by year. For the first time in 35 years we were flooded.

Teri

From: Diana Howie
To: CESWT-BBTRS
Subject: [Non-DoD Source] comments on development of your study
Date: Sunday, May 5, 2019 4:48:20 PM

-01

My house (and some 60 others) back up to the City of Houston Ditch #W148-00-00-A, that normally carries any water in it to Buffalo Bayou. (Occasionally, when the Bayou itself was high, water would flow into the ditch from the Bayou, and then drain back out into the Bayou within 24 hours.) I have observed this ditch since 1985 and have never seen water in it for over a 24-hour period.

This ditch was flooded for about a month after Harvey and has not yet recovered as the drain into Buffalo Bayou is now above the creek bed level. Stagnant pools now exist where before the creek was essentially a trickle of water headed into the Bayou.

We are now "storing water" rather than being an area for "conveying water" into the Bayou & beyond. Mosquitos and snakes are breeding.

I am assuming this is not the only ditch in the Bayou floodplain that has suffered this particular type of damage. I am hoping that these ditches are being taken into consideration in the renewed plan for the conveying of water.

Diana Howie

9603 Bayou Brook St.

Houston TX 77063

713-784-1750

dmhowie@swbell.net <mailto:dmhowie@swbell.net>

(This street address is part of the 228-home Woodlake Forest IV subdivision. About 85 of our 228 homes were flooded post-Harvey as our subdivision is almost encircled by the Bayou and this ditch. Gessner Drive is the street access into the subdivision. Across the ditch from me is the Woodlake Forest II subdivision of 106 homes, all of which flooded post-Harvey.)

Diana Howie

713-784-1750, dmhowie@swbell.net <mailto:dmhowie@swbell.net>

From: jmc2500@comcast.net
To: CESWT-BBTRS
Subject: [Non-DoD Source] Cypress Creek watershed and a levee
Date: Monday, May 6, 2019 9:17:49 AM

-01 It greatly concerns us to hear about a proposal to construct a levee to protect Addicks Reservoir by pushing more water down Cypress Creek. As residents who have lived near Cypress Creek for nearly thirty years, we can tell you it cannot accept anymore water and needs more places to drain. Even a fairly minor rain event causes it to flood.

-02 While we are very sympathetic with the residents in the flood pool for Addicks Reservoir, creating a greater flood hazard along the Cypress Creek watershed simply does not make sense. Another reservoir to accept runoff and overflow from Cypress Creek and/or an extensive system of detention ponds such as we have going in along Little Cypress Creek makes much better sense.

Robert and Janice McNeil

PO Box 1205

Cypress, Texas 77410-1205

From: J.Larry Railey
To: CESWT-BBTRS
Subject: [Non-DoD Source] Cypress Creek
Date: Monday, May 6, 2019 11:39:18 AM

-01 We are adamantly against building a berm or levy south of Cypress creek. This will only cause more flooding in the Cypress Creek area. There are other, better solutions.

J. Larry & Rosalind F Railey

JLR/bal

From: ron sapio
To: CESWT-BBTRS
Subject: [Non-DoD Source] Cypress creek drainage
Date: Monday, May 6, 2019 6:17:49 PM

-01 My comment for the march 9th meeting is this. All I hear about is efforts to speed the flow of water down Cypress Creek without any improvements to the lower portion as the creek slams into I 45 creating a partial dam for the flow. You can add more lanes to a freeway with little success if in the end it narrows down to a two lane freeway.

From: Wanda Kannarr
To: CESWT-BBTRS
Subject: [Non-DoD Source] Flooding in Harris County
Date: Monday, May 6, 2019 7:44:56 PM

-01 I have read the information regarding your plans for a new study on the flooding. I do not understand we received information before the bond election was held. It showed how this bond money was going to be used. So why are we doing another study? We get 5 inches of rain and Cypress Creek is out of its banks in some places. I think if you would dredge all the locations it would do a lot for the flooding problems. I can drive by Cypress Creek and see the thrash and trees in Cypress Creek. We are smart people we know what water takes with it when it recedes. I am afraid this problem will be studied to death then the people will forget until the next flood and nothing will have been done.
Thank you,
Wanda Kannarr
Sent from my iPhone

No Substantive Comments Identified

Comment #: ES42

From: Phyllis Zapp
To: CESWT-BBTRS
Subject: [Non-DoD Source] Cypress Creek Flooding
Date: Monday, May 6, 2019 8:47:32 PM

This is absolutely absurd!!! This whole area after having been flooded several times...n the BIGGIE...with HARVEY...
will most likely have a MASS EXODUS...the CORP IF ENGINEERS is definitely NOT INTERESTED n the future of our friends n neighbors!!!
Go to “the meeting” n NOT b able to VOICE AN OPINION!!!!!Well....they can’t stand up to the heat.....

Sent from my iPhone

06MAY19

Comment #: ES43

US Army Corps of Engineers

Public Information Meeting

Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

Comment Period: April 29, 2019 through May 31, 2019

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Re: Water Conveyance Tunnels

On a recent vacation bus tour that included much of Norway, we drove through many tunnels bored through the mountains of Norway including the longest road tunnel in the world, 24.5KM long, well ventilated, big enough for two busses going in opposite directions at 60mph smoothly, well lighted and with intermittent turnaround spaces in case of accidents. They are a master at boring tunnels in adverse rock & weather conditions. You

-01 should learn from them, borrow their expertise and techniques and earth moving machinery. You can learn a lot from their experience in this area.

I am a retired Civil Engineer, Bachelor Civil Engrg, CCNY 1963, MS in Engineering Mechanics from Columbia University NYC 1966.

Name / Nombre: Albert A. Adams

Affiliation / Afiliación: Retired Engineer, Chevron

Address / Dirección de Envío: 10906 Holly Springs Dr.

City / Ciudad: HOUSTON

State / Estado: TX

Zip Code / Código Postal: 77042

E-mail / Correo Electrónico: Adams.andrew@att.net

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

Comment #: ES44

From: Tom Hurley
To: CESWT-BBTRS
Subject: [Non-DoD Source] Buffalo Bayou and Tributaries Resiliency Study - Recommendations
Date: Tuesday, May 7, 2019 12:10:09 PM

-01 Focusing on the upstream flooding from Barker Reservoir, we need solutions that are cost effective and that can be implemented quickly to ensure that upstream flooding never occurs again. Years of further delay to solve the flooding problem is unacceptable.

-02 The most obvious and quickest solution is to increase the holding capacity of Barker Reservoir. This can be done by creating numerous large/deep detention basins in the park and expanding/deepening existing ponds. The excavated dirt from these projects could be used to build levees at the back end of the reservoir to protect homes and divert any remaining water to non-residential channels.

-03 In conjunction with increasing the holding capacity of Barker Reservoir, Buffalo Bayou in the park needs to be cleared of debris and widened/deepened to drastically improve conveyance of water through and then out of the reservoir. This also requires much better management of the Barker Dam allowing water to be released sooner than
-04 under existing dam management regulations. Gradual/earlier releases throughout the duration of a storm would prevent excessive buildup of water in the reservoir. Obviously, this also requires Buffalo Bayou downstream of the
-05 reservoir to be cleared of debris and deepened to improve flow.

-06 Longer term, a tunnel system along I-10 corridor that would capture excess water from Addicks and Barker Reservoirs and convey the water to the ship channel appears to be cost effective based on latest tunneling technology and very effective. A tunnel would not disrupt above ground businesses, traffic or homes and would be attractive to communities along the route if they could funnel their excess water into the system. The cost of this solution is probably comparable to buying out all the homes that are in the flood pool.

-07 The US Army Corps of Engineers has been aware of the lack of reservoir holding capacity for many decades and virtually nothing has been done to solve the residential flooding problem they knew existed in a major storm. We can't afford to let more years go by without solutions – storms are predicted to increase in intensity and duration. Please accelerate the "study" project and get solutions implemented in the near term – not decades from now.

Thank you.

Tom Hurley

20603 Hidden Shore Circle

Katy, TX 77450

From: pgrahama
To: CESWT-BBTRS
Subject: [Non-DoD Source] Addicks Dam Modificatio re; Cypress Creek
Date: Tuesday, May 7, 2019 1:27:31 PM

The very idea preventing the flow of water off the upper reaches of Cypress Creek to reach the Addicks Resovoir is horrible. I understand it is really bad to flood the million dollar homes below the dam (because the Corp screwed up on the amount of land needed)
But. In Trump era I guess we know who wins.
-01 Why not condemn the homes below the dam?
Who builds million dollar home in the shadow of an earthen dam?
Given the history of Wimbleton, Lakewood, Grant Road, to mention a few flooding areas why would anyone consider such a stupid idea?
Just answer one question, good or bad for Cypress Creek residents and why?

Perry Graham P.E.

Sent from my T-Mobile 4G LTE Device

5/7/19

Comment #: ES46

Public Information Meeting

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Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

Comment Period: April 29, 2019 through May 31, 2019

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-01 (1) Removing restrictions in Buffalo Bayou, ~~which~~ some of which are consequence of private land owners hardening their banks without the permit. Often rip-rap is dumped into the bayou/bank and causes channel restriction, especially section between BW 8 and Shepherd

-02 (2) Preserve the conveyance improvement which was created by weeks of high release rates during Harvey. Bayou channel cross section was increased by hundreds of thousands cu yd of material which were removed by Harvey water flow. These "channel improvements" should be preserved, and not back filled, with or without permit.

-03 (3) Remove constructions between BW-8 & Shepherd. Over 20 oxbows & over 10 bridges ~~[illegible]~~ restrict conveyance capacity of Buffalo Bayou. The oxbows can be selectively addressed, with willing landowners, to provide high-water by pass*. Bridges impeding flow can be raised, or cross section increased.

*this ~~[illegible]~~ channel improvement will reduce erosion at bends & reduce maintenance dredging at ship channel

Name Nombre: Michael Huffmaster

Affiliation Afiliación: Buffalo Bayou ~~Advocates~~ (for Conveyance) Briar Forest Super Neighborhood

Address Dirección de Envío: 102 Cove Creek Ln

City Ciudad: Houston **State** Estado: Tx **Zip Code** Código Postal: 77042

E-mail Correo Electrónico: michael.huffmaster@att.net

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

From: Katherine V
To: CESWT-BBTRS
Subject: [Non-DoD Source] Citizen comment on Buffalo Bayou--please act with all possible speed
Date: Wednesday, May 8, 2019 8:37:33 AM

Dear Army Corps of Engineers,

Thank you for the opportunity to comment and for your work on this issue. I live not far from Buffalo Bayou at Gessner, and it is clear that something must be done to take the pressure off Buffalo Bayou during flood times. In
-01 fact, I understand from various meetings that there will be MORE water going into Buffalo Bayou due to the repair of various tributaries, etc. Thus, a plan such as a third reservoir or tunnels, or both, would be great.

What worries me is that we are nearly two years after Harvey, and just the STUDY of these projects is beginning.
-02 For those of us living along the bayou, this is an urgent matter. I am not an engineer and cannot begin to guess which plan would be best, but I urge you to act quickly. During the dam releases, people died in their houses, and we watched the water come up so fast I could hardly believe it. Please think of us living downstream from the dams and act quickly.

Best regards,
Katherine Vukadin

Comment #: ES48

From: Croston, Scott
To: CESWT-BBTRS
Subject: [Non-DoD Source] Comment Form - Buffalo Bayou Resiliency Study
Date: Wednesday, May 8, 2019 5:55:16 PM
Attachments: Public Comment Form - Scott Croston - Buffalo Bayou Resiliency Study.pdf

---

Please see attached form with comment

Thanks

Scott Croston

832-486-4720

scrosto@citgo.com

Public Information Meeting

US Army Corps of Engineers®

Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

Comment Period: April 29, 2019 through May 31, 2019

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See Attachment A

Name Nombre: Scott Croston

Affiliation Afiliación: Homeowner, Twin Lakes Subdivision

Address Dirección de Envío: 13242 Oregold Dr.

City Ciudad: Houston **State** Estado: TX **Zip Code** Código Postal: 77041

E-mail Correo Electrónico: scrosto@citgo.com

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

Attachment A
Buffalo Bayou and Tributaries Resiliency Study- Comments Form

Comments by Home Owner:

Scott Croston
13242 Oregold Dr
Houston, TX 77041
scrosto@citgo.com

Levies to Protect the upper pool structures – Comments:

- **Levies as Key Option** - Levies appear to be on the options list for installation in the upper pools of Addicks and Barker reservoirs. These can be designed to channel the water flows from the feeding bayous and tributaries and will protect existing structures outside of the government owned land.
- **Levies + Reservoir Harding Required** - Levies will only work if installed in combination with improving the holding capacity of the two reservoirs. Not a stand alone solution

-01

  - Just increasing holding capacity of reservoirs will still keep the neighboring structures in risk from flooding and still require the Corps to make management decisions of protecting upper homes or lower homes on the Buffalo Bayou
- **Advantages** - Levies will have the following Key advantages (just want to make sure being considered in the economics)
  - Removes the cost of the options of buying properties out, or extreme cost of raising property levels (which will not raise property values)
  - **Property Values** - Property values are depressed for each home and structure that flooded in Harvey. Levies will restore property values and restore property tax rolls to previous Harvey levels. Tax jurisdictions will generate huge gains in taxes as property owners are kept whole.
  - Levy districts could be created to maintain the levies after built and homeowners could be taxed for the cost to maintain.

-02

  - **Flexibility** - Once levies installed, Corps can raise reservoir dam levels if needed, move spillways, etc and takes the impact to the neighboring homes off the table. In addition, Corps will be more flexible to respond to heavy rain events and able to make release decisions based on pooling and lower Bayou levels concerns.
  - **No Real Estate Issues** - Much of the levies can be built on government controlled land
  - **Solves Part of Soil Removal Issues** - Soil removed from the reservoirs that deepen the holding space can hopefully be used for most of the levies. This solves part of the disposal issue if reservoirs are made deeper.
  - **Cost** - The size of the levies in many of the locations may end up being very short (5' to 10 ' range) and thus small foot-print.

5/8/19

No Substantive Comments Identified

Comment #: ES49

US Army Corps of Engineers

Public Information Meeting

Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

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(1) ~~EXPLAIN HOW WE WOUND UP WITH DEVELOPMENTS~~ INSIDE ~~THE RESERVOIRS~~

(2) IN YOUR STUDY YOU WILL HAVE COLLECTED DATA. DOES THE PUBLIC HAVE TO WAIT UNTIL YOU PUBLISH YOUR RECOMMENDATIONS BEFORE YOU MAKE PUBLIC THE DATA YOU COLLECTED?

(3) I HOPE YOU ARE WATCHING THE INSANE "NORTH HOUSTON PROJECT" BY TXDOT TO SEE HOW THEY ARE ABOUT TO DESTROY THE EVACUATION ROUTES BY SUBMERGING ALL THREE INTERSTATES IN THE PROXIMITY OF DOWNTOWN.

Name Nombre: JIM HONEY

Affiliation Afiliación: RESIDENT

Address Dirección de Envío: 1607 FRANCIS ST

City Ciudad: HOUSTON **State** Estado: TX **Zip Code** Código Postal: 77004-2934

E-mail Correo Electrónico: ~~jhoney~~ jhoney1958@gmail.com

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

From: ron sapio
To: CESWT-BBTRS
Subject: [Non-DoD Source] Cypress creek/addicks reservoir
Date: Thursday, May 9, 2019 12:32:39 PM

-01 Adding a Levi to divert water from entering Addicks reservoir from the Cypress Creek watershed benefits the Memorial area who has Buffalo bayou. IF your not going to build a reservoir for the Cypress creek area then by all means speed up the flow down Cypress Creek and when it runs into the the levi built to protect invernes forest area east of 45 than it will flood dozens of subdivisions even quicker including the Kingwood area. If the San Jac River can't handle all the new run off due to continued building then more retention/reservoirs are needed up stream in waller/Cypress areas where there is still plenty of land to divert water. Sounds like the Core wants to follow in the steps of the highway dept by widening certain freeways only to narrow down to a two lane highway at some point.

-02 Point; There is no answer to down stream capacity so create up stream capacity and use that water to recycle into the neighborhoods for irrigation or if necessary a MUD dist for drinking water. I have heard of several MUD's now recycling surface water for drinking water and saving huge dollars vs taking it out of the ground and creating more subsidence adding the flood problem.

From: Tracy Thorleifson
To: CESWT-BBTRS
Cc: Nancy Thorleifson
Subject: [Non-DoD Source] Buffalo Bayou and Tributaries Resiliency Study - Feedback
Date: Thursday, May 9, 2019 6:16:27 PM

Dear Sir or Madam,

I am unfortunately unable to attend any of the public meetings on the subject topic, but I have reviewed the PowerPoint presentation and study storyboard .pdf in detail. Of the proposed flood prevention and mitigation measures, I disfavor improvements to conveyance (channelization improvements and like measures). In a major hurricane event, storm surge may prevent drainage from Buffalo Bayou into the bay. In such a situation, improving conveyance upstream merely serves to increase flood risk downstream. While my home (located in the Grayson Lakes subdivision in the Barker Reservoir watershed, near the confluence of the Willow Fork and the upper reaches of Buffalo Bayou) is in little danger of flooding, I have no desire to place those who live along the lower reaches of Buffalo Bayou in harm's way. Attempting to move storm water off the Katy prairie does no good if it has nowhere to go. -01

In my view, options which improve detention and storage (new dams, detention areas, increased reservoir capacity), and/or limit exposure/vulnerability (especially land acquisition) are to be preferred. There is no end in sight to development in the Houston metropolitan area, and the accompanying increase in impermeable surface area virtually guarantees future losses in vulnerable areas. The most humane option for those at risk is to buy out properties in vulnerable areas, and restore these areas to riparian habitat status. This would promote flood mitigation through natural means, as well as increase green space for recreation purposes. -02

Sincerely yours,

Mr. J. Tracy Thorleifson
2034 Lake Fountain Drive
Katy, Texas 77494-4786
281.684.1582
jtthorleifson@gmail.com <mailto:jtthorleifson@gmail.com>

5/9/19

Comment #: ES52

Public Information Meeting

US Army Corps of Engineers

Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

Comment Period: April 29, 2019 through May 31, 2019

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-01 NO levees on Cypress Creek!
Cy Creek had 10,000 homes damaged by Harvey. We have too much water now. There must be some downstream relief now - we have had 9 floods in 20 years on Cy Creek and no Corps or HCFCD projects are proposed.

Name Nombre: PAUL ESCHENFELDER

Affiliation Afiliación: cypresscreekstopthefloods.com

Address Dirección de Envío:

City Ciudad: **State** Estado: **Zip Code** Código Postal:

E-mail Correo Electrónico: eschenfelder@compuserve.com

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

5/9/19

Comment #: ES53

Public Information Meeting

US Army Corps of Engineers

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-01 Please incorporate language that includes the addition of rain barrels to new and old structures. They may not help Harvey water but they certainly will help multiple shower bursts & act as small retention ponds off of every roof to play the

-02 Also upland woody forest hold equal import as wetlands. They need to be preserved. NOT Mitigated or clear cut. Planting water/up solving plants such as tall ~~water~~ prairie grasses in every possible place. Rather than remove prairie grass incorporate the natural purposes of local vegetation. A moratorium on development for one year alternating A-P developers or (2 month B-2 the next six month. Please Loudly

Name / Nombre: the Pennys of trees

Affiliation / Afiliación: The Clear Cutting is so devastating. The loss of local wildlife,

Address / Dirección de Envío:

-03 Ground bugs & birds totally decreases the

City / Ciudad: sustainability of our

State / Estado: communities & globally.

Zip Code / Código Postal:

E-mail / Correo Electrónico: Patsy Gillham 13110 Cheville Cypress TX 29

patsygillham@gmail.com

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

From: Fisher James
To: CESWT-BBTRS
Subject: [Non-DoD Source] MITIGATION OF FLOODING - ADDICKS DAM VS CYPRESS CREEK - NEW PROPOSALS ???
Date: Friday, May 10, 2019 8:47:16 AM

-01 I am writing to express my concern related to the Army Corps of Engineers recent proposal to mitigate flooding in the Addicks Dam area. The proposal to erect a berm or levee south of CYPRESS CREEK in the western part of Harris County would prevent the normal flow of waters spilling out of CYPRESS CREEK from flowing south to Addicks. This would result in all flood waters being contained in the CYPRESS CREEK watershed and more flooding for those residing in or having businesses in this area.

The flooding conditions experienced over the last 3 years certainly emphasize that CYPRESS CREEK, a rural waterway, certainly does not need to be burdened with more flood waters. The FLOODING along Harris County's longest stream and largest watershed will only worsen if the proposed levee is constructed. Mitigating flooding in one area and causing to worsen in others is not the solution.

James E. Fisher
Harris County Resident
Gleannloch Farms

From: Jim Stevens
To: CESWT-BBTRS
Cc: kszelei@sbcglobal.net
Subject: [Non-DoD Source] US Corps of Engineers: flood prevention comments - Buffalo Bayou Corridor
Date: Friday, May 10, 2019 9:30:47 AM

I understand you are accepting comments from the public concerning planning and execution of flood prevention projects.
I live downstream of the Barker and Addicks Reservoirs near Beltway 8, south side of the bayou.

*
Our home flooded after the dam release.

*
A very big hardship from which I am still recovering both financially and emotionally.
*
My 12 year old daughter was having flashbacks last night while it was raining hard (5/9/2019).

*
She was physically shaking because she was so upset about the prospect of our home flooding again.

My comments for flood prevention:

*
I don't believe stopping development or believe razing homes along the bayou to get them out of the flood plain are realistic proposals.

*
Politically this would be impossible I believe. Greater Houston is growing and there are thousands of acres of land available for growth.
*
By passing the bayous with additional channels is the way to save the bayou.

*
I support additional channels to the Gulf from the reservoirs in order to reduce the pressure on the Buffalo Bayou system.

*
Underground tunnels seem feasible - from my research tunnel boring machines used for building subways would be a perfect fit.
*
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*
Digging underground tunnels accomplishes several things:

*
The "Save the Bayou" People can have their semi-wild bayou - they don't accept position this as true but it is.

*
I think the only way to save the existing bayou is to bypass it, otherwise future generations will demand it be dredged and channelized to save their homes.

-01

*
Underground tunnels will be out of sight and also lessen the impact on ground level roads and bridges.

*
With the gradient from the bottom of the reservoirs to sea level being almost 100 feet they will flow.

*
I also support increasing the storage volume available in the existing reservoirs by excavation.

*
This could be done concurrently with the tunnels as westward development puts more and more pressure on the storage/drainage system

*
The Barker and Addicks reservoirs cannot handle runoff of existing development.

*
During rainy times the roads through them often need to be closed.

*
Development of the hwy 99 corridor is coming.

*
-02 Runoff from 3 flood plains will be increased: Barker, Addicks and Cypress Creek drainage areas will be under even more pressure to drain and, at the moment, all that drained water needs to pass through this prehistoric little bayou behind my house.

*
Dry creeks and drainage canals in the greater Katy area are being channelized to reduce local flooding.

*
This will mean the reservoirs will fill even faster than before.

*
A faster fill rate will put more water into the reservoirs and they will reach their topping off capacity more quickly.

*
This will mean high volume releases to save the dam.

*
This will result in downstream flooding, again. UNACCEPTABLE!

*
-03 I support building another dam for a reservoir west of the Katy area to provide additional water detention during high demand periods and reduce strain on the Bayou.

*
If we can't have the tunnels at least slow down the flow rate into the Bayou.

regards,
James Stevens, PE (TX)

From: Paul Dolan
To: CESWT-BBTRS
Subject: [Non-DoD Source] Comments on Buffalo Bayou and Tributaries Resiliency Study
Date: Friday, May 10, 2019 7:07:55 PM

I attended the presentation at St. John Vianney on May 2nd.

-01 1/ Priority should be given to a new catchment/storage area in the Upper Cypress Creek area. The opportunity to create an additional reservoir in the Upper Cypress Creek area could be time-constrained by potential growth and development in the area. Therefore the decision on this option should be given some priority as this will require longer lead times for design and approval, permitting and construction.

-02 2/ Given the history of growth and development in the Houston area, and the previous experience of development encroachment onto what should have been designated non-development areas, i.e the reservoir, we really need to be thinking long term. Additional storage and detention is imperative and should be given priority over smaller scale improvement of existing infrastructure.

3/ Shorter term alternatives should include the ability to move water between Addicks and Barker reservoirs, and vice versa, if this facility does not already exist.

-03 4/ The plans already approved in White Oak and Brays Bayous, and their ongoing implementation, must allow for the potential of additional diversion volumes from Addicks and Barker. Plans should be modified in order for diversion options from these areas not to be precluded.

-04 5/ Dam operations: New protocols must be built into operational procedures that allow local authorities a veto in the decision-making process during emergencies/flood situations. Protocols must ensure clear and true communications, to the public, of the actions that will be taken and the consequences envisaged. The CoE handling of the Harvey flood was poor: failure of communication and failure to operate the dams in a controlled manner.

-05 6/ The focus of ACE/HCD is inevitably on infrastructure and solutions within their area of control. However there is a risk that this could constrain solutions too much solely on White Oak, Buffalo and Brays bayous for conveyance into the Houston Ship Channel and beyond. Should the ACE also be studying drainage solutions outside of these watersheds. A more regional study with the help of the USGS would seem to be an essential addition to local studies.If we are going to look at diversion of flood volumes into other watersheds via tunnels, channels or canals, this would be essential.

Paul Dolan
14735 Bramblewood Dr.
Houston, Texas, 77079

1-832-235-0363
pj.dolan@yahoo.com <mailto:pj.dolan@yahoo.com>

10MAY19

No Substantive Comments Identified

Comment #: ES57

Public Information Meeting

US Army Corps of Engineers

Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

Comment Period: April 29, 2019 through May 31, 2019

We need your thoughts and comments on the effort to develop the Buffalo Bayou and Tributaries Resiliency Study. Your participation is a key element in producing a meaningful and useful feasibility report. The information presented at the public information meetings can be viewed at the website listed below. Please write your questions, comments, or suggestions in the space provided below. Feel free to use additional pages if needed. Forms may be submitted at the public information meeting, mailing to the address on the back of this form, or emailed to BBTRS@usace.army.mil. Comments should be postmarked by May 31, 2019. Thank you for your participation!

COMMENT: 05/04/19

I have complete understanding of the challenge and complexity of the August 29, 2017 decisions regarding the flood control issue due to the Harvey Storm!

I do have an issue and complaint regarding the warning system or lack of!

We had a call from a friend in police department advising to to get out of house and neighborhood immediately! "They are about to open up the Addicks Dam and you are going to flood" We left within minutes with basically the clothes on our backs. No time to salvage anything! House contents clothes & vehicles - all under 2-3 feet of water. This was unexcusable.

Name Nombre: RONALD G. POOLD, Sr

Affiliation Afiliación: Home Owner

Address Dirección de Envío: 4819 Riverforest Dr

City Ciudad: Houston

State Estado: TX

Zip Code Código Postal: 77079-6324

E-mail Correo Electrónico: rgpoold-tx@aol.com

713-899-0452

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

From: Shramik Patel
To: CESWT-BBTRS
Subject: [Non-DoD Source] Comments about Flood management in the Energy Corridor (Buffalo Bayou)
Date: Saturday, May 11, 2019 2:24:46 PM

Hi,

-01 I am writing in accordance to your request for comment on the flooding situation in the energy corridor. I have a proposition that you may find valuable for the community supported the Buffalo bayou reservoir. My company and I have 20 acres of land that is between Barker Cypress rd and Greenhouse rd, which I am aware is near, but not in the flood plain. I would love to offer my land as a fill location for any land your remove to increase the Bayou's retaining volume, at no cost. In exchange, I would like to be given a purchasing option for the levee road land that extends off Barker Cypress and towards greenhouse.

I will send you images of the land if you think it may help.

Let me know what you think, This is one way I think I can serve the community.

Thank you,

--

Shramik Patel

--

Shramik Patel
PES Student Sales Professional
University of Houston | C. T. Bauer College of business
Stephen Stagner Sales EXCELLENCE Institute
m: 832-671-1887 e: Shramikpatellp@gmail.com <mailto:Shramikpatellp@gmail.com>

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From: Eric Ren
To: CESWT-BBTRS
Subject: [Non-DoD Source] Buffalo Bayou and Tributaries Resiliency Study
Date: Saturday, May 11, 2019 4:30:54 PM

Dear Sir/Madam,

-01 I am writing to you to voice my concern about flooding of Cypress Creek that could be caused by the proposed levees south of Cypress Creek. I understand that flood control is a holistic issue and cannot be focused on one point only. But I am strongly against building levees to mitigate flooding in one area while causing flooding in another area. I strongly support drainage control by improving existing streams (such as dredging) or construct new waterways.

I voted for the bond for the Harris County flood control. I am willing to shoulder my fair share of tax money to support all the work to improve the drainage systems and mitigate potential flooding. There may be many ways to achieve the goal, but building levees is not one of them.

Thank you!

Eric Ren

2818 Barclay Lake Ln

Spring, TX 77388

Comment #: ES60

From: David Clark
To: CESWT-BBTRS
Subject: [Non-DoD Source] Buffalo Bayou Resiliency Study Comments
Date: Saturday, May 11, 2019 8:45:59 PM
Attachments: BBTRS Comments 1.pdf

Attached are my comments regarding the Buffalo Bayou Resiliency Study.

David Clark

US Army Corps of Engineers

Public Information Meeting

Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

Comment Period: April 29, 2019 through May 31, 2019

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-01
- A significant increase in conveyance capacity from Barker and Addicks Reservoirs during rainfall events is needed to adequately address flooding issues downstream and upstream of the reservoirs. Solutions without added conveyance capacity will not be adequate.

-02
- Flood prevention and mitigation options along the lower Buffalo Bayou should be evaluated on an equal basis with upstream options. In addition to conveyance options USACE has already identified, significant capacity improvements such as straightening and channelizing the lower sections of Buffalo Bayou should be evaluated. This is especially important if tunnel options are determined to be infeasible.

-03
- I am strongly opposed to extending the Barker auxiliary spillways. This measure will increase level of the flood pool putting more upstream homes and businesses at risk.

-04
- Instead, the study should set the objective to reduce the Barker flood pool to the elevation of current government owned land (95 feet). The USACE and government should not have the right to flood property on land it does not own.

-05
- I am opposed to large-scale property buyouts by the government upstream of the Barker Reservoir. This proposal would destroy existing neighborhoods and businesses and significantly reduce the tax base. USACE should not bulldoze existing upstream communities to protect downstream homes.

Name / Nombre: DAVID CLARK

Affiliation / Afiliación:

Address / Dirección de Envío: 19211 EVENDALE CT

City / Ciudad: HOUSTON

State / Estado: TX

Zip Code / Código Postal: 77094

E-mail / Correo Electrónico: dvclark4@gmail.com

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

Comment #: ES61

From: David Clark
To: CESWT-BBTRS
Subject: [Non-DoD Source] Buffalo Bayou Resiliency Study Comments
Date: Sunday, May 12, 2019 2:58:21 PM
Attachments: BBTRS Comments 2.pdf

Attached is my suggestion regarding an alternative conveyance option associated with the Buffalo Bayou Resiliency Study.

David Clark

US Army Corps of Engineers

Public Information Meeting

Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

Comment Period: April 29, 2019 through May 31, 2019

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-01 I believe increasing flood water conveyance capacity from the Barker and Addicks watersheds is needed to adequately reduce flood risks in Houston both upstream and downstream of these reservoirs. In addition to the other conveyance options USACE has identified, I suggest evaluating a new south channel from Barker reservoir to the ship channel following the new proposed Grand Parkway sections C and B routes. These sections are planned from US 59 to near the ship channel and are estimated to cost around $2 billion. Following this route may reduce right of way issues, shorten implementation schedule and be cost effective versus other options.

I would also suggest evaluating constructing these freeway sections below grade to serve as a conveyance channel during extreme flooding events. In other words, close the freeway and use briefly for a flood water channel during extremely heavy rainfall that may occur only every 10 years or more. Provide adequate drainage so the freeway stays open during moderate rainfall events.

Name Nombre: DAVID CLARK

Affiliation Afiliación:

Address Dirección de Envío: 19211 EVENDALE CT

City Ciudad: HOUSTON **State** Estado: TX **Zip Code** Código Postal: 77094

E-mail Correo Electrónico: dvclark4@gmail.com

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

Comment #: ES62

From: Jack Liu
To: Weber, Andrew R CIV USARMY CESWG (USA)
Cc: CESWT-BBTRS; Hudson, Ian
Subject: [Non-DoD Source] Idea for Buffalo Bayou and Tributaries Resilience
Date: Monday, May 13, 2019 10:05:57 AM
Attachments: Super Bayou for Buffalo Bayou and Tributaries Resilience Study.pdf

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Dear Mr. Weber,

Thank you for your introduction of the Buffalo Bayou and Tributaries Resilience Study and thank you for your effort in flood mitigation and protection of local residents from future flooding!

I like this transparent and openness in which a prestige federal company like yours is willing to seek the public's comments and ideas. I sincerely hope more ideas/solutions will be brought up to your attention.

As a Civil engineer myself, I have been at many spots of bayous/reservoirs, bottlenecks of the Buffalo Bayou and White-oak Bayou and construction sites searching for an answer. The Super Bayou concept seems to be able to address the flood problems and various other issues of the region. Attached is a pdf version of Super Bayou, revised from the initial paper copy handed over to you at the Downtown public meeting. The Super Bayou concept is to be patented soon.

For a year and half, I have been introducing the concept to various levels of agencies. Over the course, I did meet your colleagues and personnel of Harris County flood control district. I would like take this moment to thank Cheridan Willey for her advice and Coraggio Maglio for his encouragement.

If I can be of assistance to this study or other flood control projects in any type of arrangements, please let me know.

Best regards,

Jack X. Liu, PE, Ph.D
Liuxon
2717 Commercial Center Blvd, Suite E200
Katy, TX 77494
Phone: (281) 609-0660

Super Bayou and Its Potential Application in Buffalo Bayou and Beyond

Jack X. Liu, PE, Ph.D, Liuxon, Katy, TX 77494

Phone: 281-609-0660, Email: jack.liu@liuxon.com

How Does Super Bayou Work?

Super Bayou® uses reinforced concrete conduits (RCCs) to retain earth banks, create enclosed channels and support traffic in the bayou during most weather conditions. During extreme precipitations, the entire space is available to drain storm water to seas. It uses cost-effective and long-lasting materials to achieve multiple-functions. Fig.1 shows one RCC embedded into the river bed and retains one bank. Alternatively, the second bank can be protected by another RCC.

In the Greater Houston region, the soils are clay that can be easily eroded. The RCC serves as a retaining wall that is stable by its weight and the weight of water during extreme precipitations. The RCC is made of strong materials, and can support heavy loads for traffic and channel maintenance. This RCC also lays a firm foundation for other erosion control measures such concrete mats and plants.

Fig.1 Super Bayou with a Trail

How Does Super Bayou Mitigate Flood?

Unlike other means such as raising houses and bridges, Super Bayou mitigates flood by lowering the water level effectively in the watersheds. Fig.2 shows an artist view of a different Super Bayou configuration with a railroad on one side and a trail on the other side. The RCC below the platforms/roads replaces soils at each bank with an enclosed channel for water conveyance. It could triple conveyance capacity without widening an existing bayou. As the bayou is deepened, detention basins fluidly connected to the bayou can be deepened and able to detent more water even with gravity flow. Preliminary study shows that the Barker and Addicks reservoirs could hold all the rainfalls from Harvey within their watersheds if they are deepened by 15 ft.

-01

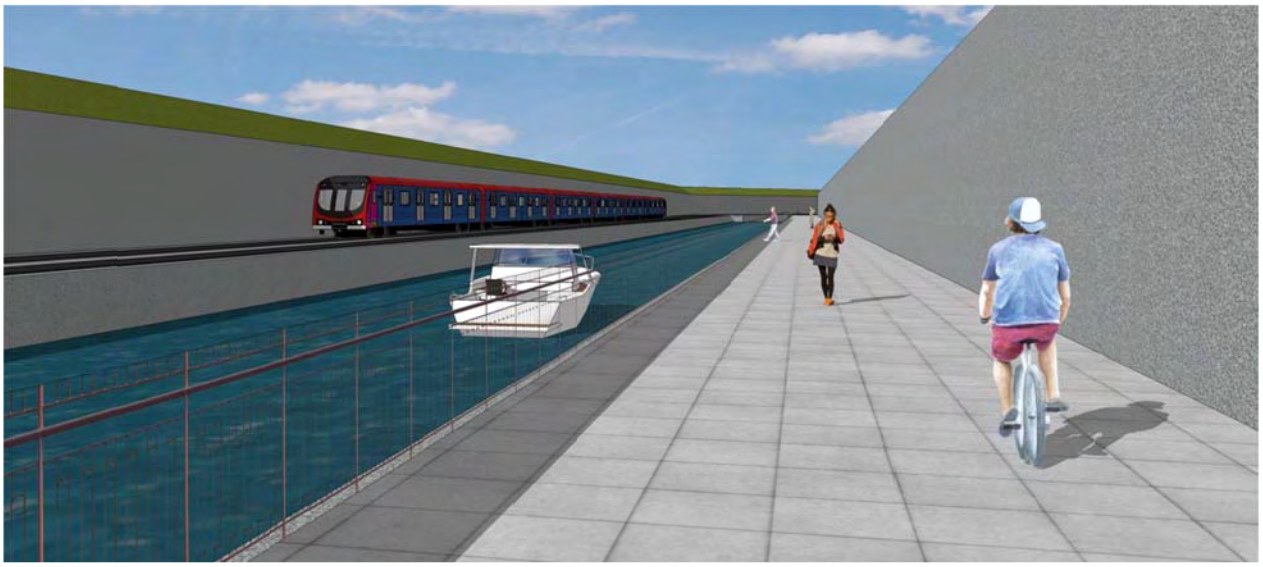

Fig.2 Super Bayou with Light-Rail Track and Trail

What Economic Impacts Super Bayou May Bring?

Houston is the bayou city with numerous bayous that occupy vast spaces throughout the region. However, during most weather conditions, there is only small amount of smelling water mainly from treatment plants. The Super Bayou® concept allows the city to revitalize the vast water fronts into multiple-function facilities and create business opportunities. Fig.3 is an imagination that Super Bayou concept could do to Houston with a light rail network mostly along existing bayous and ditches. Specifically, beside flood mitigation, Super Bayou can bring the following benefits to the region:

- Flowing clean water in open channel & attracting leisure activities during most weather conditions

- Minimizing soil erosion along the earth banks and sediments in the shipping channel
- Having min disturbance to surrounding neighborhoods during construction and maintenance
- Storing storm water in reservoirs and turning the trouble maker into asset (fresh water resources)
- Serving traffic inside some bayous during normal weather conditions without interference with normal traffic at the ground level.

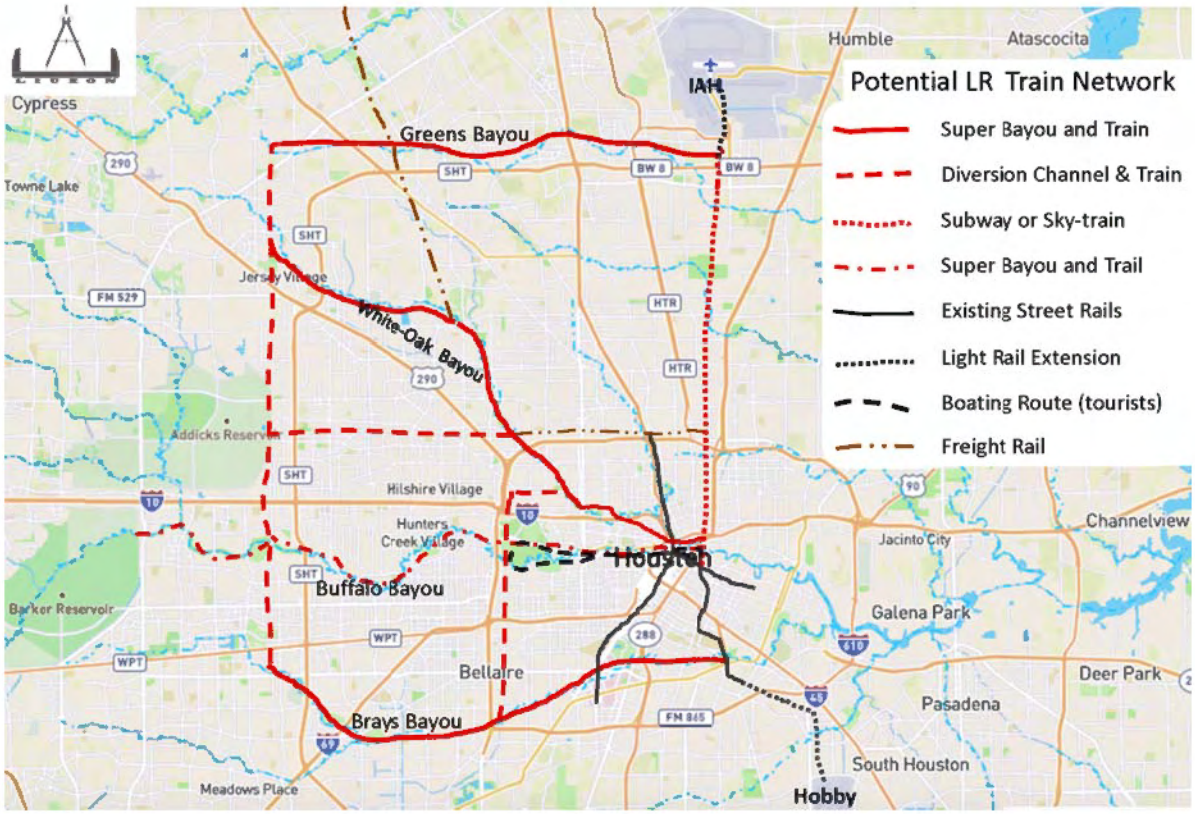

Fig.3 Bayous and Potential Light-Rail Network in Houston

How does Super Bayou Benefit Buffalo Bayou and Tributaries Resilience Study?

The proponent has researched flood mitigation solutions to Buffalo Bayou and its Tributaries from Day 1 (right after Harvey). Numerous bank failures along the Buffalo Bayou as well as potential spaces/streets for straightening/diverting Buffalo Bayou have been inspected. Various means have been considered including temporary barriers to individual houses, underground storage, deepening and widening bayous with bank stabilization, multiple-function tunnels, etc. This preliminary investigation indicates that the Super Bayou concept is a viable alternative for the watersheds.

The Super Bayou concept can benefit the Buffalo Bayou and beyond in three levels: Basic Level, Complete Level and Superior Level. The differences among these three levels are listed in Table 1 for comparison, including definition, goals, comments and value to cost ratio. Among these three levels, the Superior Level seems to be a favorable option in light of Houston's long term prosperity, pending jointed study and verification by the Army Corps of Engineers (USACE) and Harris County Flood Control District (HCFCD).

Table 1 Application Levels of Super Bayou Concept

	Basic Level	**Complete Level**	**Superior Level**
Definition	Applying Super Bayou concept to Buffalo Bayou only	Applying Super Bayou concept to Greater Houston region toward flood resilience	Applying Super Bayou concept to Greater Houston region towards multiple-function infrastructures
Goals	1. Bank erosion control 2. Increasing water conveyance using Fig.1; 3. Increasing detention capacity by deepening two reservoirs 4. Having a trail for leisure activities and maintenance	Goals from Basic Level **+** 5. Applying Fig.1 to other bayous/creeks; 6. Diverting water and draining two reservoirs through White Oak Bayou, and/or Brays Bayou when needed	Goals from Complete Level **+** 7. Incorporating traffic function (Fig.2) and establishing light-rail network (Fig.3); 8. Turning two reservoirs into lakes for fresh water resources
Comments	**Options to increase the resilience are very limited** since Buffalo Bayou is meandrous and lack of access from Beltway 8 to Shepherd Dr., as the only exit channel to the Barker and Addicks reservoirs	**Bring more solutions to the table** through regional planning (after upgrading and extending, Brays and White-oak bayous may serve as an secondary exit channel for the two reservoirs)	**Bring more solutions and more money to the table** by solving traffic jams, fresh water shortage and air pollution all together in limited space, especially when high spending in transit and others is underway
Value/ Cost *	1	~1.5	~3

Note * - Normalized to the value-to-cost ratio of Basic Level

Basic Level

In this level, the Super Bayou concept with a trail shown in Fig.1 is applied along at least one side of the entire Buffalo Bayou. It can double conveyance capacity, increase detention capacity of two reservoirs by at least 30% through deepening, and provide a maintenance road for the bayou which is not currently available from Beltway 8 to Shepherd Dr. Along with other erosion control measures, the clay banks can be protected from erosion and the maintenance cost can be reduced significantly. The concern for this level of application is that the increase in conveyance of Buffalo Bayou and detention capacity of two reservoirs may not be sufficient as the precipitation data are expected to increase in its tributaries. On the other hand, building a new channel such as a tunnel will cost several billions and take at least 10 years to complete. Tools to resilience are very limited if considerations are confined to the watershed.

Complete Level

Brays Bayou and White-Oak Bayou are next to Buffalo Bayou. They have wide space and easy access. If they are upgraded with Super Bayou concept shown in Fig.1, these two bayous could be an alternative exit channel to the Barker and Addicks reservoirs. With three exit channels as shown in Fig.3, the risk of dam failure could be completely eliminated. In this case, a diversion channel extended from the reservoirs to these two nearby bayous is needed (Refer to Fig.3 for a diversion channel to White-Oak Bayou on the north side of I-10). This diversion channel can be upgraded from an existing ditch using a different configuration of the same Super Bayou concept. As the amount of rainfall varies always, this regional approach should cut the overall cost significantly through sharing conveyance capacity among bayous.

Superior Level

This level is included here for consideration since the region needs fresh water resources and public transportation. When deepened, two reservoirs can be turned into lakes serving both water resources and flood control functions. In order to accommodate millions more people, Metro is planning to spend over 7 billions USD (http://MetroNext.org) and Houston-Galveston Area Councils are planning to spend over 100 billions USD (htt://2045RTP.com) in transit. Running light rails in less curved bayous is the most cost-effective and efficient way to move people, and causes the least impact to the ground-level traffic and surrounding areas. When multiple-function infrastructures are considered in regional planning, billons dollars of extra money may be poured into the flood mitigation projects for resilience. Because of the tremendous benefits to the region, local residents and agencies will appreciate USACE's efforts and help USACE/HCFCD achieve mission impossible.

Comment #: ES63

From:	Bruce Nichols
To:	CESWT-BBTRS
Cc:	BF Nichols
Subject:	[Non-DoD Source] public comment - Buffalo Bayou & Tribs Resiliency Study
Date:	Monday, May 13, 2019 11:45:56 AM
Attachments:	Comments to Corps of Engineers May 13-2019.docx

Hello. Attached is my public comment on the Buffalo Bayou Tributaries & Resiliency Study. Thanks. — Bruce Nichols, cel 713-249-7133, email bnichols17@gmail.com <mailto:bnichols17@gmail.com>

Re the Buffalo Bayou & Tributaries Resiliency Study:
May 13, 2019
Comment from a member of the public
Bruce Nichols, 12439 Huntingwick Drive, Houston, TX, 77024. Cel 713-249-7133. Email bnichols17@gmail.com

1. A major focus of the Buffalo Bayou and Tributaries Resiliency Study needs to be improving stormwater conveyance in Buffalo Bayou downstream from Addicks and Barker Dams. When the Corps of Engineers built the dams, it streamlined a stretch of the bayou immediately below the dams, but it didn't finish the job all the way through Houston. U.S. Rep. George H. W. Bush blocked the Corps from continuing the work eastward from what is now Beltway 8. The future President was responding to advocacy-group pressure at a time when the nation was recoiling from environmental abuses. He was well-intentioned, but history would prove him wrong about Buffalo Bayou. Houston's future depends on the spine of its drainage system -- Buffalo Bayou -- being adequate to handle increasing runoff due to growth and, many argue, climate change. Today, it is inadequate. The winding, unimproved stretch between the dams and downtown slows flow and, in the worst case, backs water up all the way to the dams, flooding homes and businesses along the way. Because there isn't enough capacity in Buffalo Bayou, Harris County Flood Control forbids
-01 increasing rates of flow into the bayou, which effectively blocks needed drainage improvements outside the bayou. No one wants to see Buffalo Bayou concreted all the way to the ship channel, but green-friendly options are available to ease the choke point the bayou has become. Tunneling, high-water bypasses at oxbows, improvement of bridge crossings, partial straightening or a combination of all these could help. The Corps-improved stretch of the Bayou from the dams eastward to Beltway 8 has evolved into a very nice park. The unimproved stretch is anything but a nice park. It is loved by many naturalists who see it as "wild," but most nature-lovers realize it hasn't been truly natural for decades, and most of the public can't use or enjoy it. Individual

property owners who own the banks of the bayou have made "improvements," and the result is a tangled mess except at Buffalo Bayou Park downtown. As it is, the bayou is not user-friendly, either for most outdoor-lovers or for advocates of improved drainage. The Corps should work with Harris County Flood Control, the City of Houston and the State of Texas to make the Bayou work better for all the citizens of Houston.

-02

2. If a third flood-control reservoir is built behind Addicks and-or Barker, it needs to be dedicated fully to relieving flooding around and downstream of existing development, not simply to accommodating more new development. If this requires the Corps to buy more land, so be it. If this requires the Corps conditioning its contribution on the city and county freezing development in the vicinity of the reservoir, so be it. Hurricane Harvey taught us what happens if developers simply use a flood-control reservoir as an excuse for more development.

-03

3. The Barker Ditch, which comes from Fort Bend County near the Grand Parkway and bypasses Barker Reservoir, needs to be controlled. Right now, it is free-flowing and, because of recent development between the Grand Parkway and Buffalo Bayou, adds too much runoff to Buffalo Bayou, dumping Fort Bend County water on Harris County residents. It frustrates the purpose of Barker Dam, which is to protect property downstream of the dam.

-04

4. If tunneling is an answer, let's get on with it. When the State of Texas rebuilt the Katy Freeway, engineers at the Harris County Flood Control District suggested tunneling underneath it to carry excess stormwater from Addicks and Barker Dams to the Houston Ship Channel. The fact that their suggestion was ignored does not keep us from using modern tunneling technology without disturbing existing reconstruction of the Katy Freeway. It's expensive. But not doing it is more expensive.

5. The Corps should support city and county detention projects to slow the outflow of stormwater into the Buffalo Bayou system. Detention is imperfect in that it tends to fill up in really big storms and stay full, sending excess stormwater along its pre-detention path. But in lesser

-05

-05 storms, of which Houston has many that cause flooding, detention can be an important tool to mitigate flood damage.

-06 6. In doing cost-benefit analysis, the impact on people needs to be counted. Property values alone do not capture the social impact of flooding, which can destroy whole communities. Too often, depressed property values due to flooding are used in calculating cost-benefit. That is grossly unfair. If you wait long enough, the cost-benefit will be zero because we'll all be washed out to sea and you won't be called upon to do anything.

13MAY19

Comment #: ES64

Public Information Meeting

US Army Corps of Engineers

Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

Comment Period: April 29, 2019 through May 31, 2019

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-01 Inclusion of rain barrels & planting of tall prairie grasses & a moratorium on clear cutting would be visible, fast, and appropriate (in addition to the lengthy study (needed of course) and years of completion.

-02 My opinion only: Rain barrels need to be mandatory on all Houston / Harris County structures. Billions of gallons of water could be retained & used for watering etc. Please consider campaign to do so.

Name Nombre: Patsy Gillham

Affiliation Afiliación: Tower Oaks Plaza

Address Dirección de Envío: 13110 Charile

City Ciudad: Cypress Tex **State** Estado: TX **Zip Code** Código Postal: 77429

E-mail Correo Electrónico: patsygillham@gmail.com

Great job on presentations & post for the Script readers. Would think speakers would know the info. Appreciate the work

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

From: Jay Callahan
To: CESWT-BBTRS
Subject: [Non-DoD Source] Comment Buffalo Bayou Study
Date: Tuesday, May 14, 2019 11:07:53 AM

-01 First, a comment on the timing of this study which is going to be completed in 2021. 4 years to "study" an issue is crazy long.

Second, I flooded downstream from the ACOE reservoir releases post-Harvey on Wednesday, August 31, long after Harvey was over. The ACOE knew who would be flooded by these releases in advance. Why was there not information provided to the people on the inundation maps so that they could at least take actions like moving their cars and belongings and themselves to a higher location? This should be a primary goal of any study. Protecting people's safety and property.

-02 Third, the best and quickest fix for the reservoirs is to increase their capacity. Dig out the reservoirs and increase the height of the levees. Now, in my lifetime. I am 65. 1

-03 Fourth, manage the reservoir levels better. My wife and I often walk the levee of the Addicks Reservoir between Kirkwood and Eldridge. We were surprised when walking on August 20, 2017, (1 week before Harvey), that the Addicks reservoir was half full (halfway up the levee) when it had not rained at all in two weeks. (We had a 6-inch rain on August 6). We could not understand why the ACOE was keeping that much water in the reservoir. The ACOE needs to keep these reservoirs drained during hurricane/tropical storm season so that they can take an Aliison or Harvey rainfall and protect both downstream and upstream residents.

James E. Callahan
14359 Kellywood Ln
Houston, TX 77079

Comment #: ES66

From: Mark Miller
To: CESWT-BBTRS
Subject: [Non-DoD Source] Buffalo Bayou Resiliency Study
Date: Tuesday, May 14, 2019 11:16:47 AM

Enjoyed the meeting on May 2, 2019. Thanks for all the hard work.

-01 The main concern/suggestion I have is what I saw in the paper and at the meeting regarding the final study proposal. It appears that ONE plan will be proposed which will give Congress ONE choice...yes or no. I'd strongly suggest a menu of options be proposed starting with the most cost effective & obvious (clean out the Bayou up to the top banks). Second most obvious seems to me to be to increase the capacity of Barker & Addicks reservoirs. Perhaps that is the plan but the Chronicle seemed to say otherwise.

-02 After Harvey, I noticed that the Corps web site had inundation maps showing the areas that would be flooded should the Dam gates be opened all the way. These maps (or the new ones after modification) must be circulated/provided to the impacted neighborhoods below the Dam. Had we known AND had any warning, much could have been saved.

Mark E. Miller
943 Bayou Pkwy
Houston, TX 77077

From: Dave Burkepile
To: CESWT-BBTRS
Subject: [Non-DoD Source] Buffalo Bayou & Tributaries Resiliency Study
Date: Tuesday, May 14, 2019 4:09:22 PM

Re the Buffalo Bayou & Tributaries Resiliency Study:

May 13, 2019 Comment from a member of the public

Dave Burkepile, 12330 Overcup DR, Houston, TX, 77024.

713 498 4422

dburkepile2000@yahoo.com

1. The Buffalo Bayou and Tributaries Resiliency Study should focus on improving storm water conveyance in Buffalo Bayou downstream from Addicks and Barker Dams.

The Corps should work with Harris County Flood Control, the City of Houston and the State of Texas to make the Bayou work better for all the citizens of Houston.

-01 2. If a third flood-control reservoir is built behind Addicks and-or Barker, it needs to be dedicated fully to relieving flooding around and downstream of existing development and strictly control new development that would counteract this measure..

-02 3. The Barker Ditch, which comes from Fort Bend County near the Grand Parkway and bypasses Barker Reservoir, needs to be controlled. At present, it is free-flowing and adds too much runoff to Buffalo Bayou, dumping water from above the dams to the bayou below the dams..

4. If tunneling is an answer, let's get on with it. When the State of Texas rebuilt the Katy Freeway, engineers at the Harris County Flood Control District suggested tunneling underneath it to carry excess storm water from Addicks and Barker Dams to the Houston Ship Channel. The fact that their suggestion was ignored does not keep us from using modern tunneling technology without disturbing existing reconstruction of the Katy Freeway. It's expensive. But not doing it is more expensive.

5. The Corps should support city and county detention projects to slow the outflow of storm water into the Buffalo Bayou system.

USACE Galveston District
ATTN: BBTRS
P. O. Box 1229
Galveston, Texas 77553-1229

May 16, 2019

I am writing to comment on the Buffalo Bayou And Tributaries Texas Resiliency Study.

I live in the town of Katy, and specifically in the Pine Forest subdivision. I have been a resident in that subdivision since 1984.

-01 The Cane Island Branch of the Buffalo Bayou is very near to my subdivision. The Cane Island Branch has not been dredged or cleaned out since around 1990. As a result, my subdivision has been flooded on Tax Day in 2016 and Hurricane Harvey in 2017. There is an immediate need for work to **dredge, widen, deepen, and clean out the Cane Island Branch from US Hwy 90 northward to Clay Road** in order to reduce flooding in the Katy area and the Pine Forest subdivision.

-02 I also want to see **a third reservoir built in the northwest part of Harris County**. Cypress Creek has overflowed into the town of Katy several times recently; particularly Tax Day and Hurricane Harvey. Significant flooding has occurred to houses and businesses. I have written to Representative Michael McCall about this reservoir, and he has stated that this reservoir is a very high priority for him. I know that the Corps Of Engineers is currently assessing alternatives, but this reservoir needs to be built, and in an accelerated fashion, regardless of other alternatives. This additional reservoir has the added benefit of reducing runoff to the Barker Reservoir.

-03 With ever increasing development in the Katy and Houston areas, the use of **retention or detention is needed** to not only maintain, but to decrease runoff.

There should **be increased regulation by government entities to require developers to increase retention and use other flood mitigation measures**. Not the status quo, but increased measures. Break even scenarios are not the answers.

The Barker and Addicks Reservoirs should be deepened to increase their capacities.

In summary, there are three connected issues. (1) Overflow from Cypress Creek into the town of Katy, (2) subsequent flooding into the upstream portion of the Barker Reservoir, and (3) then subsequent flooding into the downstream portion of the Barker Reservoir.

With the vast number of people impacted by flooding in the Katy and Houston areas the last several years, all of this work needs to be performed, and in an accelerated and timely manner.

Melvin L Derong

Melvin L. Derong
2810 Redbud
Katy, Texas 77493
salesderong@aol.com

No Substantive Comments Identified

Comment #: ES69

From: Catherine Strong
To: CESWT-BBTRS
Subject: [Non-DoD Source] BBTRS Comment
Date: Friday, May 17, 2019 5:54:19 PM

I attended the Buffalo Bayou and Tributaries Resiliency Study, and I don't have any additional questions or suggestions at this time, but I do have a couple of comments:

* My home was flooded with over one foot of water after the Corps of Engineers opened the dams to release the collected Harvey rainfall. I am not in the flood plane, but I did have NFIP insurance. Even though many flooded households suffered to a greater degree than I did, I know that I have never been through such a traumatic, emotionally distressing, and disruptive circumstance as the process of being flooded and endeavoring to recover afterward. My home is 50-years-old and had never flooded before; now, I don't feel safe. The items in the study that seem most likely to make a difference in my future safety are:

    * Drainage tunnels (under I-10) from Addicks and Barker Dams to the Houston Ship Channel.
    * Drainage canals to drain Barker Reservoir from the south and southwest side.
    * A levee separating Cypress Creek from the Addicks Reservoir basin.
    * Another reservoir to be built in the northwestern part of Harris County.

Comment #: ES70

From: David Van Bergen
To: CESWT-BBTRS
Cc: Spring Shadows; Robert Cooms
Subject: [Non-DoD Source] Buffalo Bayou and Tributaries Resiliency Study
Date: Friday, May 17, 2019 8:16:50 PM

I am representing the Spring Shadows Subdivision which consists of just under 2000 homes. Spring Shadows is located just south of Clay Road, and about 1.5 miles due east of Addicks Dam in Western Spring Branch. As such, we have a vital interest in the condition of Addicks Dam, Addicks Reservoir, and future flooding conditions.

-01 Spring Shadows strongly urges that the Corps of Engineers dredge the areas behind Addicks Dam to a depth that will hold enough water to prevent over topping or flows around the uncontrolled spillways, especially at the North end of Addicks Dam. This plan should include the redesign and reworking of all waterways within Addicks Reservoir to increase it's capacity also. We recommend that the dredged material be used, if suitable, to raise Addicks Dam at least five feet in order to insure that there will not be over topping like what almost occurred during Harvey. This raising will require, of course, lengthening the dam at all uncontrolled spillways.

-02 We further believe that the uncontrolled spillways need to be rebuilt and turned into controlled spillways with a substantive plan in place for controlled releases in the case of another catastrophic flood situation similar to Harvey.

-03 Additionally, we believe that the upper reaches of the Cypress Creek Watershed should be separated from the Addicks Reservoir/ Buffalo Bayou Watershed by construction of a Levee to prevent cross-flow from the Upper Cypress Creek Water Shed South and East into the Buffalo Bayou Watershed. The detention storage in the Upper Cypress Creek Watershed and all of the Cypress Creek Watershed should be substantially increased to help prevent the cross-flow. THIS IS CRITICAL TO ANY SOLUTION DEALING WITH THE ADDICKS RESERVOIR FLOODING.

-04 We also recommend that Buffalo Bayou be reworked and dredged from both Addicks and Barker dams to downtown in order to substantially increase its flow capacity. This does not necessarily include concreting the bayou, but this should be a solution that is studied and implemented in some fashion.

Thank you for your consideration of these suggestions. Due to our location, Spring Shadows believes that it has a huge stake in this situation, especially since the dam came so close to over topping/breaching during Harvey. Please let us know if you would like us to elaborate on any of these recommendations.

<Blockedhttps://ssl.gstatic.com/ui/v1/icons/mail/images/cleardot.gif> --
David Van Bergen
Executive Vice President
Spring Shadows Civic Association
sect3b.ssca@gmail.com <mailto:sect3b.ssca@gmail.com>

<Blockedhttp://www.avg.com/email-signature?utm_medium=email&utm_source=link&utm_campaign=sig-

email&utm_content=webmail> Virus-free. Blockedwww.avg.com <Blockedhttp://www.avg.com/email-signature?utm_medium=email&utm_source=link&utm_campaign=sig-email&utm_content=webmail>

Comment #: ES71

From: David S. May
To: CESWT-BBTRS
Subject: [Non-DoD Source] Comments on BBTRS
Date: Saturday, May 18, 2019 12:50:43 PM
Attachments: NEPA Comment Form for Bayou.pdf

US Army Corps of Engineers®

Comment Form Instructions

Buffalo Bayou and Tributaries Resiliency Study
Public Information Meeting

Comment Period: April 29, 2019 through May 31, 2019

The U.S. Army Corps of Engineers is in the process of developing the Buffalo Bayou and Tributaries Resiliency Study which includes both Flood Risk Management and a Dam Safety Modification Study (DSMS). The flood risk management will identify and evaluate alternatives to reduce flooding upstream of the Addicks and Barker Dams as well as below in the Buffalo Bayou watershed. The DSMS will identify and evaluate alternatives to address Phase II measures of the Dam Safety Modifications on Addicks and Barker. Public input is especially needed regarding alternatives to consider.

USACE Galveston District
ATTN: BBTRS
P.O. Box 1229
Galveston, TX 77553-1229

Place Stamp Here

USACE Galveston District
ATTN: BBTRS
P.O. Box 1229
Galveston, TX 77553-1229

Public Information Meeting

US Army Corps of Engineers

Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

Comment Period: April 29, 2019 through May 31, 2019

We need your thoughts and comments on the effort to develop the Buffalo Bayou and Tributaries Resiliency Study. Your participation is a key element in producing a meaningful and useful feasibility report. The information presented at the public information meetings can be viewed at the website listed below. Please write your questions, comments, or suggestions in the space provided below. Feel free to use additional pages if needed. Forms may be submitted at the public information meeting, mailing to the address on the back of this form, or emailed to BBTRS@usace.army.mil. Comments should be postmarked by May 31, 2019. Thank you for your participation!

My family lives about 100 yards from Buffalo Bayou on the south side downstream of the Addicks & Barker Reservoirs near the Kirkwood bridge. We purchased our house in 1991. A great attraction was the wild land behind our house that allowed us to enjoy large native trees and wildlife. We realized that we were close to the bayou, but the normal water level in the bayou is 10 to 15 feet below our foundation level and the bayou is controlled by a dam. The house was built in 1983 and never flooded until August 27, 2017. We had 1&1/2 feet of water on our first floor. We understand that we flooded because the floodgates were opened on the dam. We also understand that the Corp of Engineers (COE) because of a concern that the water was starting to flow around the floodgates. We obviously don't want to be flooded again.

We understand from a COE representative at a hearing we attended that the original floodgates were not designed to close. But, now, the COE is installing floodgates that will close all the way. Our requests are that the COE

-01 1) strengthen the walls around the floodgates to prevent water from flowing around their sides;

2) Dredge the reservoirs to increase their water storage capacity;

-02 3) It is difficult to straighten the bayou because: a) it would destroy natural areas, and 2) much of the land is developed close to the bayou. Instead, dig a tunnel from the reservoirs to Galveston Bay. It need not carry all of the water from the reservoirs, but it should carry enough to prevent the surface bayou from flooding and could prevent upstream land from flooding.

4) Build an additional dam upstream of the present reservoirs to capture additional runoff before it reaches the present reservoirs;

-03 5) Design all reservoir and flood prevention structures to handle predicted extreme events like Hurricane Harvey, or worse.

Name / Nombre: David S. May

Affiliation / Afiliación: Home Owner

Address / Dirección de Envío: 11846 Castle Ridge Dr.,

City / Ciudad: Houston

State / Estado: Texas

Zip Code / Código Postal: 77077-2611

E-mail / Correo Electrónico: dsmay43@gmail.com

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

Form Master #1

Comment # ES72

From: wendyduncan@comcast.net
To: CESWT-BBTRS
Cc: Williford Marlin; "Erich Schroeder"; Patrick Friend; "Susana Dias"; "Chancie Davis"; "Libby Clark"; "David Clark"; "tim miller"; jjwheeler@att.net; "James Uhl"; john.t.barrett@gmail.com
Subject: [Non-DoD Source] Public Comments for the Buffalo Bayou Resiliency Study
Date: Sunday, May 19, 2019 11:44:11 AM
Attachments: Barker Flood USACE Recomendation 05162019.docx

Dear Sir/Madam:

Thank you for the opportunity to provide public comment on the Buffalo Bayou and Tributary Resiliency Study. We appreciate the series of community engagement meetings delivered recently and the work the Corps is doing to provide additional protection against future rain events. Please see attached the letter which provides input from Barker Flood Prevention. For more information on our advocacy group, please visit Blockedwww.barkerfloodprevention.org <Blockedhttp://www.barkerfloodprevention.org> .

Thank you for your time and attention to this matter.

Sincerely,

Wendy Duncan

Director at Willow Fork Drainage District

Co-founder Barker Flood Prevention

2020 Candidate Commissioner Fort Bend County Precinct 3

Barker Flood Prevention
brfloodprevention@gmail.com
www.barkerfloodprevention.org www.facebook.com/barkerfloodprevention

May 16, 2019

U.S. Army Corps of Engineers Galveston District
Attn: BBTRS
P.O. Box 1229
Galveston, TX 77553-1229

Dear Sir/Madam:

On behalf of the Barker Flood Prevention advocacy group, thank you for the opportunity to provide community input for the Buffalo Bayou and Tributaries Resiliency Study meeting held on April 30. We were pleased with the turnout and hope it will yield valuable feedback.

Our steering committee members also attended, and after careful consideration, have adopted the following recommendations:

-01 1. Limit the Barker Reservoir flood pool to the current government owned land.
2. Increase conveyance out of the Barker and Addicks Reservoirs. Solutions we support include flood tunnel(s), diversion channels, channel improvements and/or bypass.
-02 3. Improve and restore channel conveyance and capacity upstream and downstream of Barker Reservoir and within the reservoir, including dredging, desilting and de-snagging.
-03 4. Add capacity within Barker and Addicks Reservoirs through select excavation in the reservoirs. (Ex. 737-acre project that has been presented to the Corps located due east of Canyon Gate in the Cinco Ranch Area.)
5. Add intermediate detention/retention capacity upstream and downstream of Barker and Addicks Reservoirs.
-04 6. Build infrastructure through a combination of viable solutions to manage Cypress Creek overflow to prevent Cypress Creek runoff from adversely impacting the Barker and Addicks watersheds.
7. Do not increase the Barker Reservoir flood pool by extending spillways.
-05 8. Do not destroy existing neighborhoods, schools and businesses via large scale buyouts.

Barker Flood Prevention has a membership and support base of more than 600 people. We expect that the Corps can rely on this substantial support base in addition to our steering committee and leadership when considering and valuing these recommendations.

We would welcome the opportunity to discuss these further with you.

Yours sincerely,

Marlin Williford and Wendy Duncan
Founding Partners
Barker Flood Prevention

Steering Committee Members:
John Barrett, David Clark, Libby Clark, Chancie Davis, Susana Dias, Patrick Friend, Tim Miller, James Uhl, Erich Schroeder, Jay Wheeler

Form Letter #1

Comment # ES73

From: Diana steinman
To: CESWT-BBTRS
Subject: [Non-DoD Source] Addicks Barker Dam and flood prevention community input
Date: Sunday, May 19, 2019 7:14:40 PM

Dear Sir/Madam:

Thank you for the opportunity to provide community input for the Buffalo Bayou and Tributaries Resiliency Study

1. Limit the Barker Reservoir flood pool to the current government owned land.

2. Increase conveyance out of the Barker and Addicks Reservoirs. Solutions I support include flood tunnel(s), diversion channels, channel improvements and/or bypass.

3. Improve and restore channel conveyance and capacity upstream and downstream of Barker Reservoir and within the reservoir, including dredging, desilting and de-snagging.

4. Add capacity within Barker and Addicks Reservoirs through select excavation in the reservoirs. (Ex. 737-acre project that has been presented to the Corps located due east of Canyon Gate in the Cinco Ranch Area.)

5. Add intermediate detention/retention capacity upstream and downstream of Barker and Addicks Reservoirs.

6. Build infrastructure through a combination of viable solutions to manage Cypress Creek overflow to prevent Cypress Creek runoff from adversely impacting the Barker and Addicks watersheds.

7. Do not increase the Barker Reservoir flood pool by extending spillways.

8. Do not destroy existing neighborhoods, schools and businesses via large scale buyouts.

I am a retired woman living on a fixed income, 30 years of possessions were taken from me during the hurricane Harvey flooding. At 10:00 am on August 29,2017 I heard a dog bark and reasoned there must be a boat nearby. Only then did I have the courage to walk out my front door, after sitting on my headboard for 8 hours. Keep in mind every day you delay keeps me in suspense and escalating stress for my future.

Yours sincerely,

Diana Steinman

Form Letter #1

Comment # ES74

From: Sherry Babb
To: CESWT-BBTRS
Subject: [Non-DoD Source] Barker Flood Prevention
Date: Sunday, May 19, 2019 11:01:43 PM

May 19, 2019

U.S. Army Corps of Engineers Galveston District
Attn: BBTRS
P.O. Box 1229
Galveston, TX 77553-1229

Dear Sir/Madam:

On behalf of the Barker Flood Prevention advocacy group, thank you for the opportunity to provide community input for the Buffalo Bayou and Tributaries Resiliency Study meeting held on April 30. We were pleased with the turnout and hope it will yield valuable feedback.

Our steering committee members also attended, and after careful consideration, have adopted the following recommendations:

1. Limit the Barker Reservoir flood pool to the current government owned land.
2. Increase conveyance out of the Barker and Addicks Reservoirs. Solutions we support include flood tunnel(s), diversion channels, channel improvements and/or bypass.
3. Improve and restore channel conveyance and capacity upstream and downstream of Barker Reservoir and within the reservoir, including dredging, desilting and de-snagging.
4. Add capacity within Barker and Addicks Reservoirs through select excavation in the reservoirs. (Ex. 737-acre project that has been presented to the Corps located due east of Canyon Gate in the Cinco Ranch Area.)
5. Add intermediate detention/retention capacity upstream and downstream of Barker and Addicks Reservoirs.
6. Build infrastructure through a combination of viable solutions to manage Cypress Creek overflow to prevent Cypress Creek runoff from adversely impacting the Barker and Addicks watersheds.
7. Do not increase the Barker Reservoir flood pool by extending spillways.
8. Do not destroy existing neighborhoods, schools and businesses via large scale buyouts.

Barker Flood Prevention has a membership and support base of more than 600 people. We expect that the Corps can rely on this substantial support base in addition to our steering committee and leadership when considering and valuing these recommendations.

We would welcome the opportunity to discuss these further with you.

Yours sincerely,

Michael and Sherry Babb
Cinco Ranch Residents

19 MAY 19

No Substantive Comments Identified

Comment #: ES75

Public Information Meeting

US Army Corps of Engineers®

Comment Form (Formulario do Comentarios Escritos)

Buffalo Bayou and Tributaries Resiliency Study

Comment Period: April 29, 2019 through May 31, 2019

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Please study the impact of the I-45 bridge at Cypress Creek. Both the regular I-45 bridge and access road bridge are too low and narrow to accommodate the waters during TAX DAY and HARVEY floods. Result – massive flooding in Enchanted Oaks, Lakes of Cypress Forest and other subdivisions to the west of I-45 along Cypress Creek.

Thank you,

Rev. Raymond VanBuskirk

281-838-5875

Name / Nombre: Rev. Raymond VanBuskirk

Affiliation / Afiliación: Lakes of Cypress Forest

Address / Dirección de Envío: 2514 Alan Lake Lane

City / Ciudad: Spring

State / Estado: Texas

Zip Code / Código Postal: 77388

E-mail / Correo Electrónico: vanbuskirk@ineva.com

Additional information can be found at:
https://www.swg.usace.army.mil/Missions/Projects/Buffalo-Bayou-and-Tributaries-Resiliency-Study/

From: Beth Marcinek
To: CESWT-BBTRS
Subject: [Non-DoD Source] Consider Cypress Creek
Date: Monday, May 20, 2019 8:35:12 AM

Hello,

-01 As a resident of Lakes of Cypress Forrest (18531 Duke Lake Drive in Spring), I am writing to ask that any plan consider how changes will impact Cypress Creek and the many many homes around it. Our home took in about 2 feet of water in Harvey and we hope that never happens again.