Purpose: To provide an update on the Buffalo Bayou & Tributaries Resiliency Study to include and solicit public comment. This presentations will include:

• Background

• Study Overview

• The Public Scoping Process

• Study Update

• Path Forward
Early Houston Floods
31 May 1929, 1-2 June 1929 and 7-10 December 1935
Study Summary

Study: Buffalo Bayou & Tributaries Resiliency Study
Authorization: Section 216 of Flood Control Act of 1970
Appropriation: Bipartisan Budget Act of 2018
Budget: $6 Million (100% Federal)

Purpose: Flood Risk Management (FRM)
Non-Federal Sponsor: Harris County Flood Control District

Study Start: October 2018
Scheduled Completion: October 2021

Scope:
To identify, study, and recommend measures to address flood risk along Buffalo Bayou
To perform a Dam Safety Modification Evaluation on Addicks and Barker Dams, and if necessary, identify, study, and recommend measures to reduce risks associated with the structural performance of the dams.
Public Scoping Period

- **Public Scoping Period:** 29 April – 31 May 2019
- **Public Scoping Meetings**
  1. April 30, 2019 from 5-8 p.m. - Kingsland Baptist Church Activity Center, 20555 Kingsland Blvd, Katy, TX 77450
  2. May 2, 2019 from 5-8 p.m. - St John Vianney Catholic Church Activity Center, 625 Nottingham Oaks Trail, Houston, TX 77079
  3. May 7, 2019 from 5-8 p.m. - Trini Mendenhall Community Center, 1414 Wirt Rd, Houston, TX 77055
  4. May 8, 2019 from 5-8 p.m. - UofH DT, Wilhelmina Cullen Robertson Auditorium, 3rd Floor (Main St Level) of Academic building, 1 Main St, A350, Houston, TX 77002
  5. May 9, 2019 from 6-9 p.m. - Cypress Ridge High School, 9th grade cafeteria, 7900 N. Eldridge Parkway, Houston, TX 77041.

*Presentations at 6:30, 7:30, and 8:30*

Format: Open House, with formal presentation at 5:30, 6:30, 7:30, unless otherwise noted.

All material & presentations will be the same for each meeting.

Submit Your Comment:

1. **Comment card at public meeting**
2. **Email:** BBTRS@usace.army.mil
3. **Mail to:** USACE, Galveston District, ATTN: BBTRS
   P.O. Box 1229
   Galveston, TX, 77553
Problems:

Three primary problem areas have been identified.

1. Flooding downstream of the reservoirs on Buffalo Bayou (Dam Surcharge Releases and from other non-impounded rainfall)
2. Flooding Upstream of the reservoirs from impoundment of water above government owned land and natural runoff traveling to the reservoirs.
3. Performance and risk issues related to flow around and over the uncontrolled spillways.
Buffalo Bayou

<table>
<thead>
<tr>
<th>Event Date</th>
<th>HWM</th>
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<tbody>
<tr>
<td>Harvey-2017</td>
<td>71.6</td>
</tr>
<tr>
<td>4/28/09</td>
<td>65.4</td>
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<tr>
<td>3/4/92</td>
<td>64.5</td>
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<td>4/18/16</td>
<td>65.3</td>
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<td>5/26/15</td>
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Barker Reservoir

Top 5 Pools

<table>
<thead>
<tr>
<th>Date</th>
<th>Elevation</th>
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</thead>
<tbody>
<tr>
<td>Harvey - 2017</td>
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<tr>
<td>Apr 2016</td>
<td>95.22</td>
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<tr>
<td>Mar 1992</td>
<td>93.60</td>
</tr>
<tr>
<td>Nov 2002</td>
<td>93.24</td>
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<td>Nov 1998</td>
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Addicks Reservoir

Top 5 Pools

<table>
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<th>Date</th>
<th>Elevation</th>
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<td>Apr 2016</td>
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<tr>
<td>Nov 2002</td>
<td>96.63</td>
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</table>
**Goal:** Improve the effectiveness of Addicks and Barker project and reduce the upstream and downstream flood risks along Buffalo Bayou and Tribs.

**Objectives**

- Reduce damages from river flooding/reservoir pool flooding on channels upstream and downstream
- Optimize the reservoir operations
- Optimize/improve/safely convey detained water
- Reduce sediment and erosion
- Reduce risk of dam failure
- Reduce risk to health and life safety
Study Opportunities & Constraints

Opportunities
• Improve transportation reliability during flood events
• Engineer with nature and implement nature-based features
• Increase public awareness and education
• Improve flood forecasting and also improve emergency response and coordination
• Provide increased recreational opportunities

Constraints
• No unmitigated adverse impacts
• Limited open land
• Historic opposition to environmental impacts on Buffalo Bayou
Potential Measures

STRUCTURAL

• Tunnels
• Bypass
• Diversion
• Levees
• New Reservoir/Dam
• Detention
• Channel Improvements
• Sedimentation Basin
• Increase Reservoir Storage
• Auxiliary Spillway Improvements
• Remove Dams
• Modify Existing Discharge Capacity
• Relocation of Auxiliary Spillway

NON-STRUCTURAL

• Change Release Schedules in the Addicks and Barker Water Control Manual
• Buyout/Acquisition
• Dry/Wet Flood Proofing
• Flood Warning Systems
• Signage
• Public Education/Outreach about Risk
• Update Emergency Action Plan/Hazard maps
Alternatives Development

Strategies for combining measures into alternatives

• Storage –
  − Detention
  − Levees/Floodwalls
  − Increase Reservoir Storage
  − New Reservoir/Dam
  − Sediment Sump

• Conveyance – to effectively move water
  − Tunnels
  − Bypass
  − Diversion
  − Channel Improvements

• Dam Safety –
  − Additional Spillway
  − Auxiliary Spillway Improvements
  − Relocate Auxiliary Spillway
  − Remove the dams
Storage Strategies

Disclaimers:
1. Graphic shows multiple concepts. Not all illustrated concepts will be recommended for implementation.
2. Concepts shown are generalized and subject to further development/refinement.
Conveyance Strategies

Disclaimers:
1. Graphic shows multiple concepts. Not all illustrated concepts will be recommended for implementation.
2. Concepts shown are generalized and subject to further development/refinement.
## Array of Alternatives

### Strategies for combining measures into alternatives
- **Anchor Measures**
  - Potential to have system wide impact.
  - Potential to generate the majority of benefits by itself

<table>
<thead>
<tr>
<th>Storage</th>
<th>Conveyance</th>
<th>Dam Safety</th>
<th>Comprehensive</th>
<th>Nonstructural</th>
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<td>Alt #2 S1</td>
<td>Alt #4 C1</td>
<td>Alt #7 Dam Safety</td>
<td>Alt #8</td>
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<td>Tunnels</td>
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<tr>
<td></td>
<td>Increase Reservoir Storage</td>
<td>Diversion</td>
<td>Channel Improvements</td>
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*US Army Corps of Engineers*  
*U.S. Army*
The Feasibility Study Process:
Approximate Times to Reach Key Decision & Product Milestones in a 3-Year, $6M Study

- Scoping & Alt. Formulation
  - Alternatives Milestone

- Alternative Evaluation & Analysis
  - Tentatively Selected Plan Milestone

- Feasibility Analysis of Selected Plan
  - Agency Decision Milestone

- Washington-level Review
  - District Final Report Package Transmittal
  - Draft Chief’s Report Released
  - Chief’s Report Signed**
  - Draft Report Released for Concurrent Review*

Key:
- Green Diamond: Decision Milestone
- Blue Stack: Product Milestone

*Scheduled Summer 2020

**Scheduled October 2021
Upcoming Activities

- Continued Concept Development
  - Engineering
  - Environmental & Cultural
  - Real Estate
  - Cost
  - Economics

- Evaluation & Comparison of Alternatives
- Tentatively Selected Plan Milestone – April 2020
- Chiefs Report – October 2021
Follow the study:
email: BBTRS@usace.army.mil
https://www.swg.usace.army.mil