

Buffalo Bayou & Tributaries Resiliency Study

Employing the Comprehensive Benefits Framework

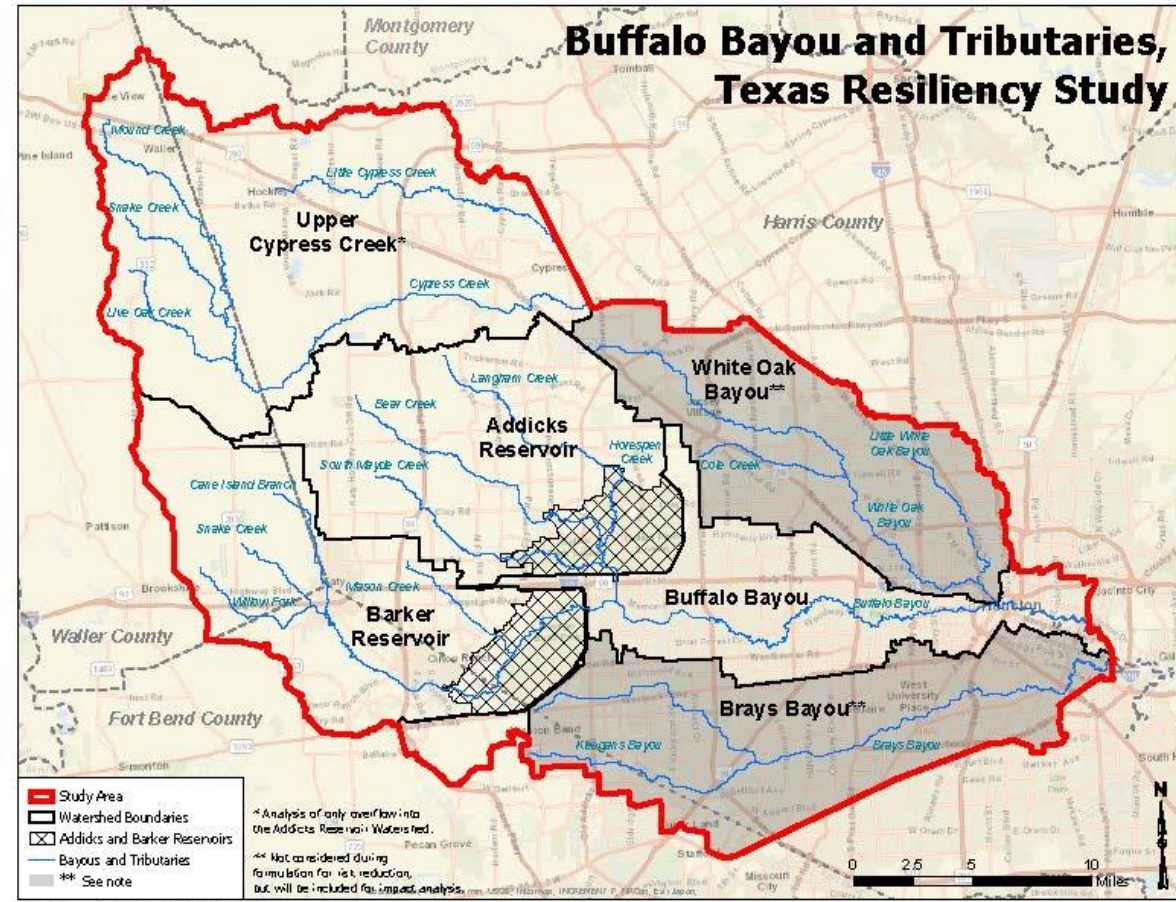
USACE SWG Stakeholder Partnering Forum
February 24, 2022

HCFCFCD: Scott Elmer, PE and Ross Gordon, PE, CFM

USACE: Andrew Weber, PE, PMP

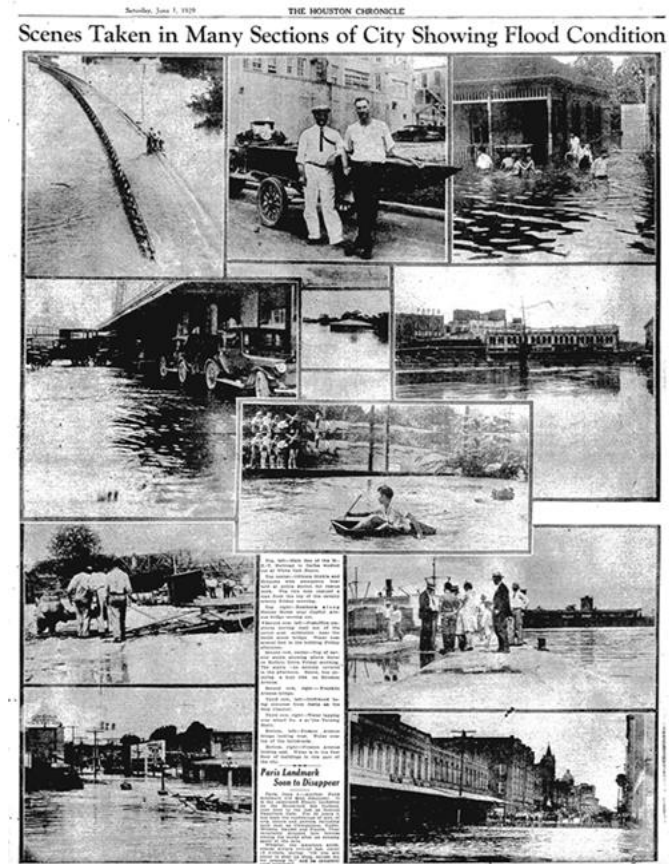
BBTRS Study Overview

- **Authorization:** Section 216 of the Flood Control Act of 1970
- **Appropriation:** Bipartisan Budget Act of 2018
- **Budget:** \$7.8 Million (100% federal) with contributed technical services from HCFCFD
- **Purpose:** Flood Risk Management
- **Non-Federal Sponsor:** Harris County Flood Control District



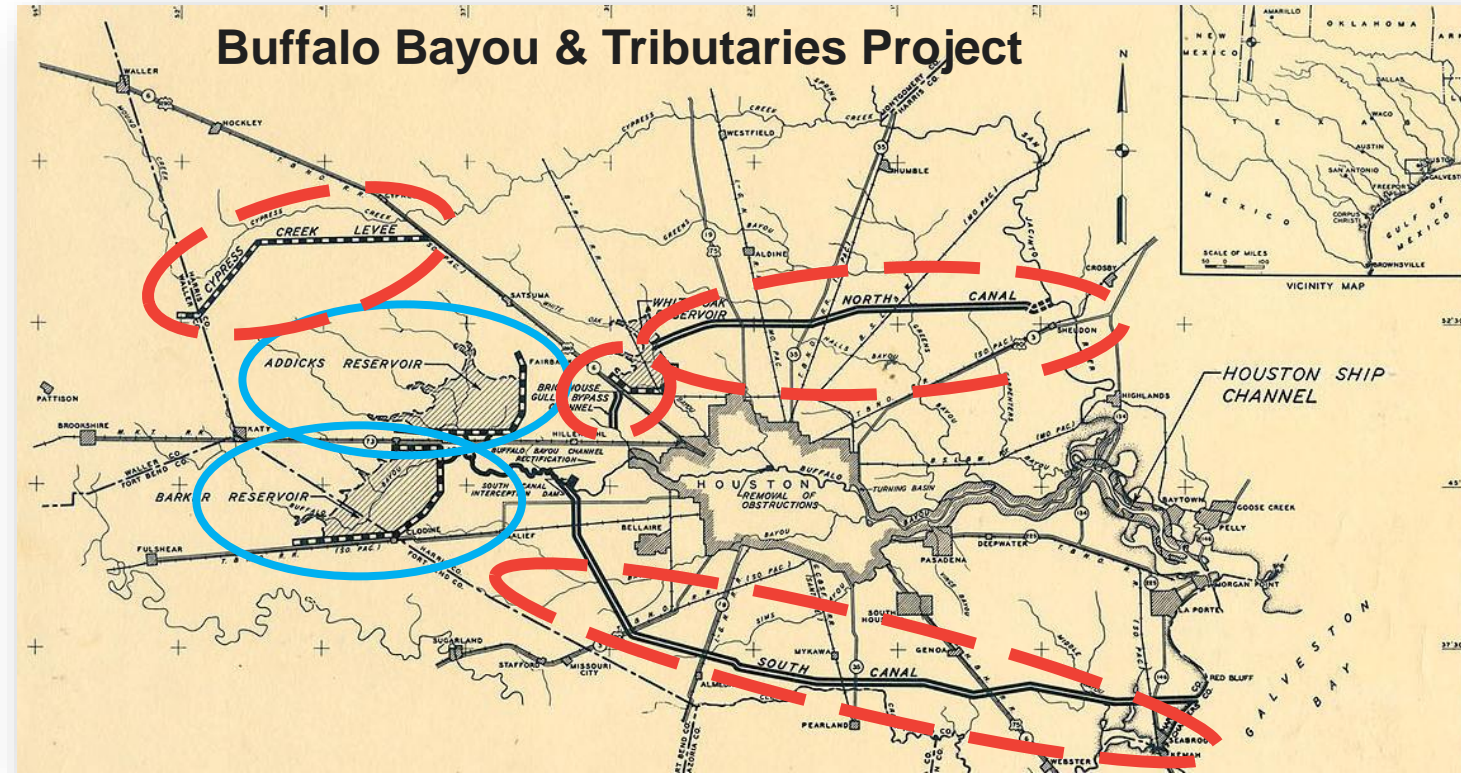
History of Flooding

- Early Flooding: 1929 and 1935
- Buffalo Bayou & Tributaries Project
- Tax Day Flood (2016)
- Hurricane Harvey (2017)



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BBTRS Study Update

Study Objectives:

- Reduce life safety risks associated with Addicks and Barker
- Reduce flood risks / damages upstream and downstream of Addicks and Barker
- Support community resilience and recovery



Alternatives:

	Storage		Conveyance			Dam Safety	Comprehensive	Nonstructural
Alt #1	Alt #2 S1	Alt #3 S2	Alt #4 C1	Alt #5 C2	Alt #6 C3	Alt #7 Dam Safety	Alt #8	Alt #9
No Action	New Reservoir/Dam	Increase Reservoir Storage	Tunnels	Diversion	Channel Improvements	Change to Auxiliary Spillway	Best of Storage & Conveyance Alternatives Combined	Nonstructural

Presentation Agenda

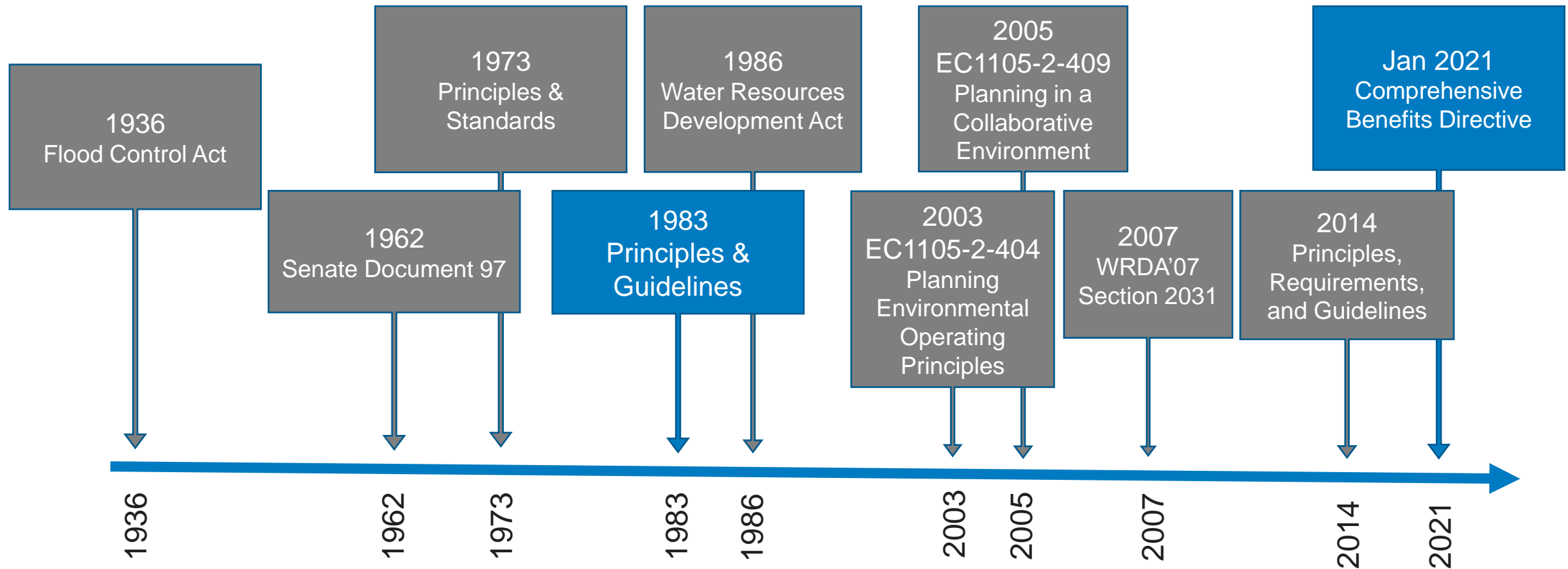


FEDERAL LOCAL
PARTNERSHIPS
WORKING TOGETHER



- **Review:** History of the Federal Objective
- **Discussion:** Jan 2021 Comprehensive Benefits Directive
- **Review:** What are the ‘Four Accounts’?
- **Discussion:** Application of the Comp Benefits Framework for BBTRS
- **Conclusion:** Finding the “Right” Solution for BBTRS

History of the Federal Objective*



* timeline is not inclusive of all issued policy directives or planning guidance

History of the Federal Objective

“Benefits are in excess of the estimated costs”, and considering the lives and social security of people

1936

“to enhance national economic development” and “to enhance the quality of the environment”

1973

“to contribute to national economic development consistent with protecting the Nation’s environment”

1983

Considering “net beneficial effects”, given the full range of effects in all four accounts”

2005

“to maximize public benefits (encompassing environmental, economic, and social goals), with appropriate consideration of costs,”

2014

Continues to the primary determinant of Federal Interest in water resources projects

Jan 2021: Comp Benefits Directive

- Immediately requires that the “decision framework considers, in a comprehensive manner, the **total benefits** of project alternatives, including **equal consideration** of economic, environmental and social categories”
- Directive augments guidance provided in the **Planning Guidance Notebook** and policy requirements stipulated in the **1983 Principles and Guidelines**
- Addresses concerns about **over-reliance on national economic benefits**, in alignment with the 2014 Principles, Requirements, and Guidelines (for which USACE specific procedures are still in development)



DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
CIVIL WORKS
108 ARMY PENTAGON
WASHINGTON DC 20310-0108

SACW

5 January 2021

MEMORANDUM FOR COMMANDING GENERAL, U.S. ARMY CORPS OF ENGINEERS

SUBJECT: POLICY DIRECTIVE – Comprehensive Documentation of Benefits in Decision Document

1. Purpose. This memorandum issues policy direction on the comprehensive assessment and documentation of benefits in the conduct of U.S. Army Corps of Engineers (USACE) water resources development project planning. This policy updates current procedures, and emphasizes and expands upon policies and guidance to ensure the USACE decision framework considers, in a comprehensive manner, the total benefits of project alternatives, including equal consideration of economic, environmental and social categories. This directive pertains to pre- and post-authorization decision documents (reports), as well as other decision documents approved under delegated authorities. In addition, the directive may be applied to benefit-cost analyses required to support budgetary decision-making processes. As stated in my 15 July 2020 memorandum to the Deputy Commanding General for Civil and Emergency Operations, one of my highest priorities is to ensure this policy directive is implemented as soon as practicable.

2. Applicability. This directive applies immediately to all USACE elements having Civil Works planning, engineering, design, construction, and operations & maintenance responsibilities. The policies contained in this directive shall remain in effect and fully applicable unless and until modified, supplemented, amended, or rescinded expressly and in writing by the ASA(CW). See also, paragraph 8, Limitation on Modification.

3. Background. Civil Works planning guidance, contained in Engineer Regulation (ER) 1105-2-100 (Planning Guidance Notebook), provides the overall direction by which Civil Works projects are formulated, evaluated and selected for implementation. ER 1105-2-100, published in 2000, contains a description of the USACE planning process, missions and programs, specific policies applicable to each mission and program, and analytical requirements.

a. This directive supplements the guidance provided in ER 1105-2-100 by requiring comprehensive consideration of total project benefits including economics, environmental, and social categories, until a comprehensive update is accomplished.

b. As outlined in ER 1105-2-100, USACE currently applies the *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (i.e., Principles and Guidelines) when formulating and evaluating Civil Works water resources development project alternatives. The Water Resources Council released the *Principles and Guidelines* (P&G) in 1983.

Jan 2021: Comp Benefits Directive

- All USACE planning studies must “**evaluate and provide complete accounting, consideration and documentation of the total benefits of alternative plans across all benefit categories**”, including both monetized/quantified and qualitative benefits, “across national and regional economic, environmental, and social benefit categories”.
- Reports will explain the “rationale and basis for the recommended plan, including the **full and equivalent considerations of benefits in total and by type**” and will “outline the basis for selecting the plan based on monetary, quantitative, or qualitative outputs and federal, state, local, and international concerns” (including life safety and managing residual risk)



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Jan 2021: Comp Benefits Directive

- **Does not** negate the need to identify the National Economic Development Plan (NED Plan), which meets the Federal objective as defined by the 1983 Principles and Guidelines
- **Does not** negate the need to request an NED Exception from ASA(CW) should a plan other than the NED Plan be recommended.
- **Does not** explicitly dictate which plan should be considered as the “Federal Interest” for the purpose of cost-share, requiring ASA(CW) to make this determination.
- No formal implementation guidance is currently available.



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Overview of the Four Accounts

Considering...
“increases in the net value of the national output of goods and services”, including reduction in flood damages for Flood Risk Management projects.

NED

Considering...
“changes in the distribution of regional economic activity”, including projections of income, employment, output, and economic output not already accounted for in the NED assessment.

RED

Considering...
“positive and negative benefits to the environment” consistent with environmental compliance guidance (NEPA).

EQ

Considering...
“community impacts; life, health, and safety factors; displacement; and long-term productivity”, with a focus on life safety considerations and residual risk to populations

OSE

Challenges for BBTRS

- The Addicks / Barker / Buffalo Bayou system performs well in events up to and including the 50-yr (2% AEP) design storm, resulting in only minimal flood damages in these smaller, more frequent events.
- However, due to changed conditions, significant residual risk exists for large, less frequent events such as Hurricane Harvey, which flooded over 25,000 structures in these three watersheds.
- Traditional economic models struggle to capture the full economic and societal impacts of low probability / high consequence events (such as Hurricane Harvey) on the strength and resilience of a community.
- BBTRS requires a more multi-faceted justification beyond just NED.

Flooding Impact



Harvey flooded an estimated
154,170 structures
in Harris County



600,000 vehicles
were flooded during Harvey

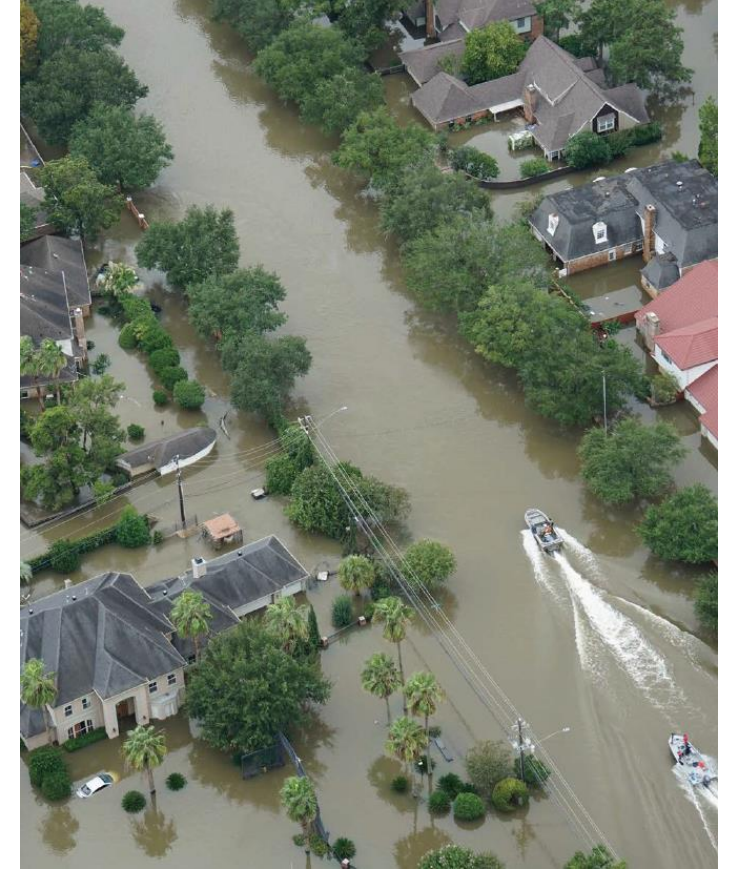


37,000 people
in the region were
relocated to shelters

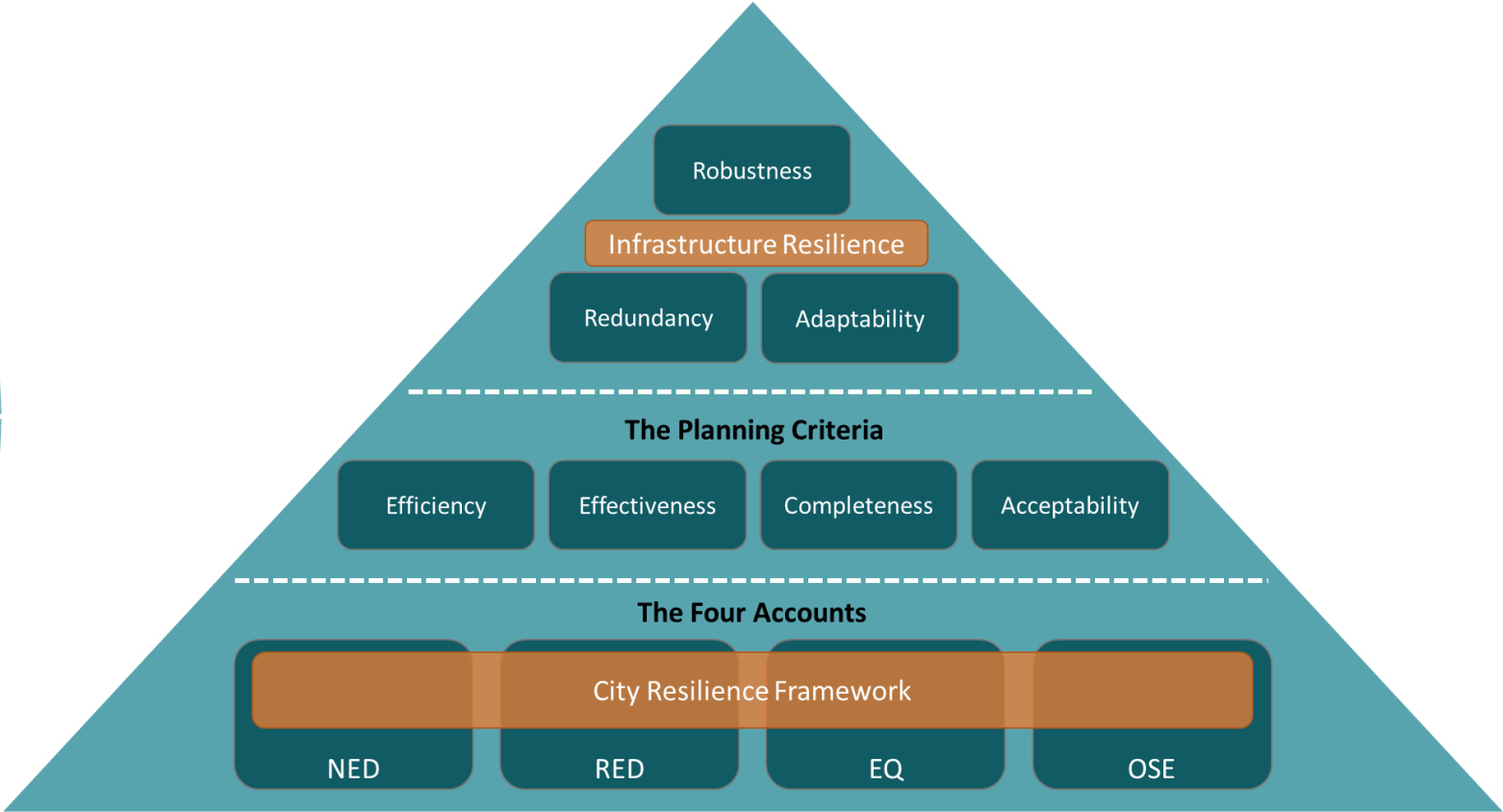


Comp Benefits Approach for BBTRS

- Align decision-making with HCFCD Mission Statement: **“Provide flood damage reduction projects that work, with appropriate regard for community and natural values”**.
- Elevate **“other social effects”** within the decision-making framework to fully consider the impacts of infrastructure projects and flooding on the strength of our communities, considering key concepts of environmental justice, social justice / vulnerability, and community cohesion.
- Employ a **resiliency framework** to better assess the impacts of different alternatives on the ability of our communities to **withstand, recover, and adapt to disturbances, both chronic and acute**.



Comp Benefits Approach for BBTRS



Draft Decision-Making Framework

Getting to the Right Solution

- Identify and recommend a solution which:
 - Solves the problem, today and into the future, by effectively managing residual risk, of all varieties, across the study area
 - Enhances the resiliency of the region, helping Harris County to better withstand and recover from natural disasters
 - Provides flood risk reduction for vulnerable communities with the least ability to withstand and recover from flood events
- Ensure the solution is implementable, with local support and a reasonable path forward.
- Formulate the solution as part of an integrated flood risk management system which is robust and adaptable.



**A new day for Harris County
following Hurricane Harvey**

Questions / Discussion

Buffalo Bayou & Tributaries Resiliency Study

Andrew Weber, PE, PM
Deputy Branch Chief, Proj. Mgmt.
USACE Galveston
andrew.r.weber@usace.army.mil

Scott Elmer, PE
Asst. Director of Operations
HCFCDD
scott.elmer@hcfcd.hctx.net

Ross Gordon, PE, CFM
Principal Consultant
Gordon Consulting Group, LLC
rgordon@gordonconsultinggroupllc.com