

United States Army Corps of Engineers

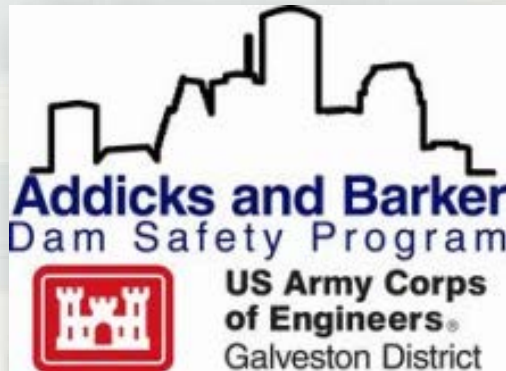
Addicks and Barker Dam Safety Overview

COL Richard P. Pannell
District Commander, Galveston District
U.S. Army Corps of Engineers
Oct. 29, 2014



Purpose & Agenda

Inform the public on the role of the U.S. Army Corps of Engineers (USACE) Galveston District and improve awareness and understanding of the Addicks and Barker Dam Safety Program.



- History of Addicks & Barker Reservoirs
- Dam Safety Findings
- Interim Risk Reduction Measures
- Remediation Measures



USACE Vision

Engineering solutions for the nation's toughest challenges.

USACE Mission

Deliver vital engineering solutions, in collaboration with our partners, to secure our nation, energize our economy and reduce risk from disaster.

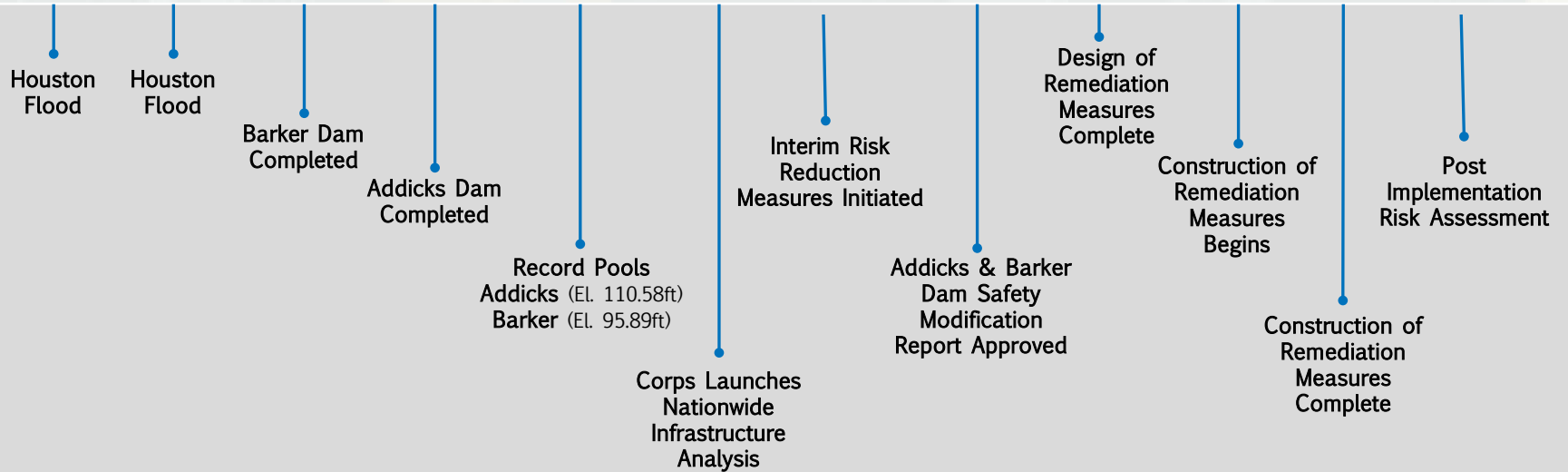


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Timeline



1929 | 1935 | 1946 | 1948 | 1992 | 2005 | 2009 | 2013 | 2014 | 2015 | 2018



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Early Houston Floods 1929 and 1935



HOME EDITION THE HOUSTON CHRONICLE SATURDAY, DECEMBER 7, 1935

FLOODED BAYOUS ARE THREATENING HOUSTON

Coastwise Dock Dispute Settled

SANCTIONISTS AGAIN DEFIED BY MUSSOLINI
Torn Bodies of Men, Women and Children—Italians' Gift of "Civilization" to Ethiopia

CONTRACTS TO BE SIGNED BY GROUPS TODAY

PHAIL IS TO HEAD COUNTY PAROLE BOARD

MEM. CAMPAIGN TO BE LAUNCHED AT DINNER JANUARY 6

TWO MEN ARE FOUND INJURED NEAR TRACKS
Governor Denies That Sleuth Gave Him Name Of Lindbergh Suspect

8 CONTRACTS AWARDED BY COUNTY COURT

ELDERLY MAN

MED M
Deep
Port I

TWO STREAMS SWOLLEN BY HEAVY RAINS

Water Grows Larger Run in Heights as White Oak, Hummer, Buffalo Run on Rise

J. A. and Four Steamship Operators Reach Agreement on New Rules, Ship Main Companies

Board to Appoint by Council in Deal to Problems of Ex-Convicts

THE CITY CAMPAIGN TO BE LAUNCHED AT DINNER JANUARY 6



CITY, COUNTY ORDER FLOOD CONTROL PLAN

Officials Ask Engineers to Prepare Program; Fugate Has Plan He Begun Work On in 1929.

With days sanctioned through a number of a century gathering dust in the city engineering department, city and county officials met at the noon hour Tuesday and advised a motion picture and ready engineers to prepare a program to prevent a recurrence of the disastrous flood.

It is the first official of the city will be completed, and a world through engineer, began work, the first on a plan for improvement in Buffalo and other creeks beyond what would have kept the present high water within their banks.

The city and county officials also passed a motion picture to advise what flood control was the most progress might have.

"We had Action."

In the motion picture the meeting Mayor Hughes said.

"We already have a lot of work," the Mayor said in a statement.

The motion picture will be shown at the next meeting and will be shown in the city and county.

STATE RELIEF BUDGETED TO NEXT MARCH

All Employables "Will Be Dropped January 1; Last U. S. Allotment Received at Austin."

JONES DOING "GREAT JOB," ALDRICH SAYS

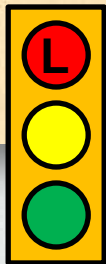
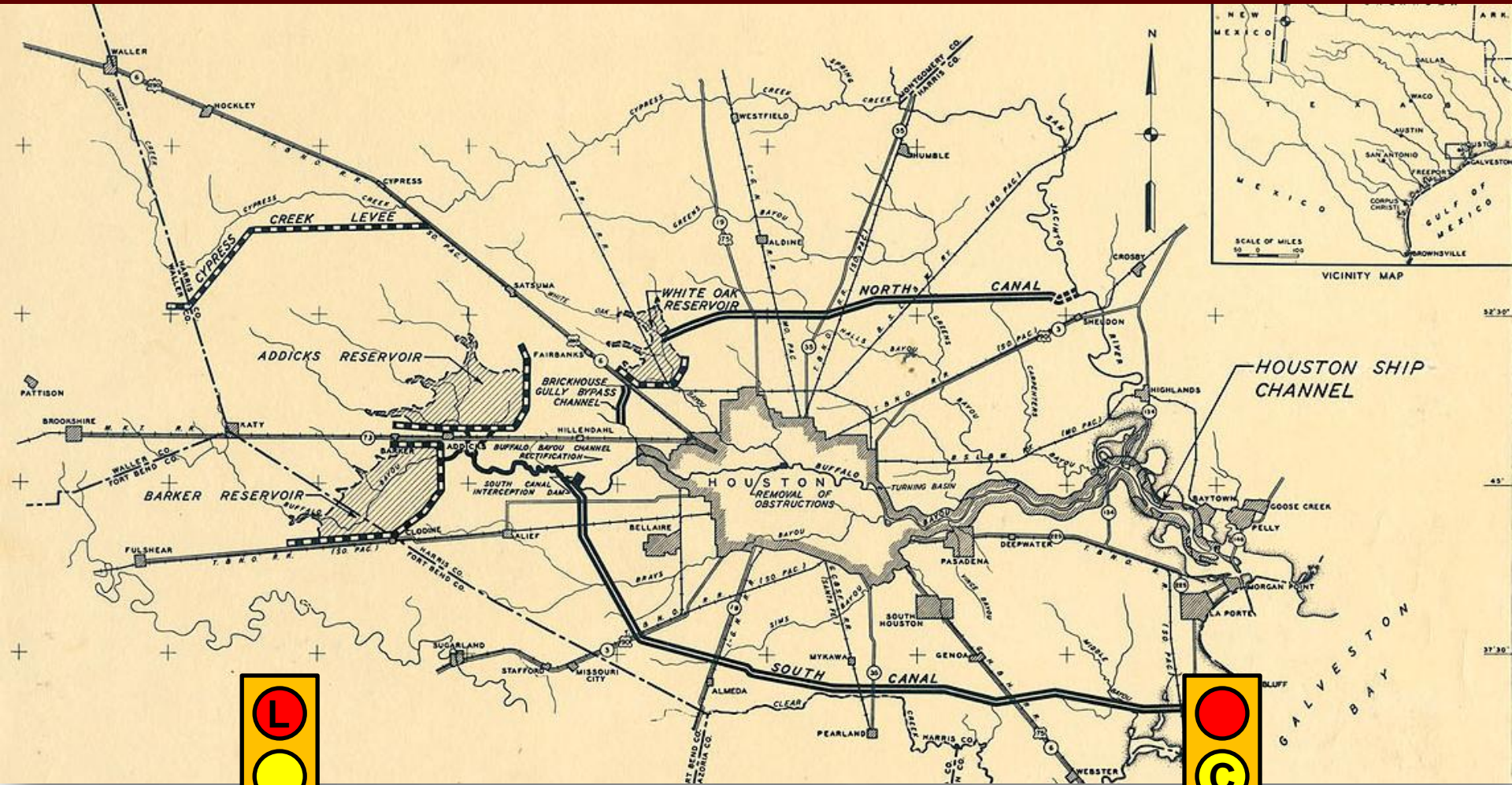
N. Y. Banker, Here to Talk at C. of C. Banquet, Lauds Chairman of Finance Agency.

Washington W. Aldrich, Chairman of the Board of American Service, is here to talk at a banquet of the C. of C. at 10 o'clock at the C. of C. building at 10 o'clock at the C. of C. building.



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Houston Proposed Plan 1940

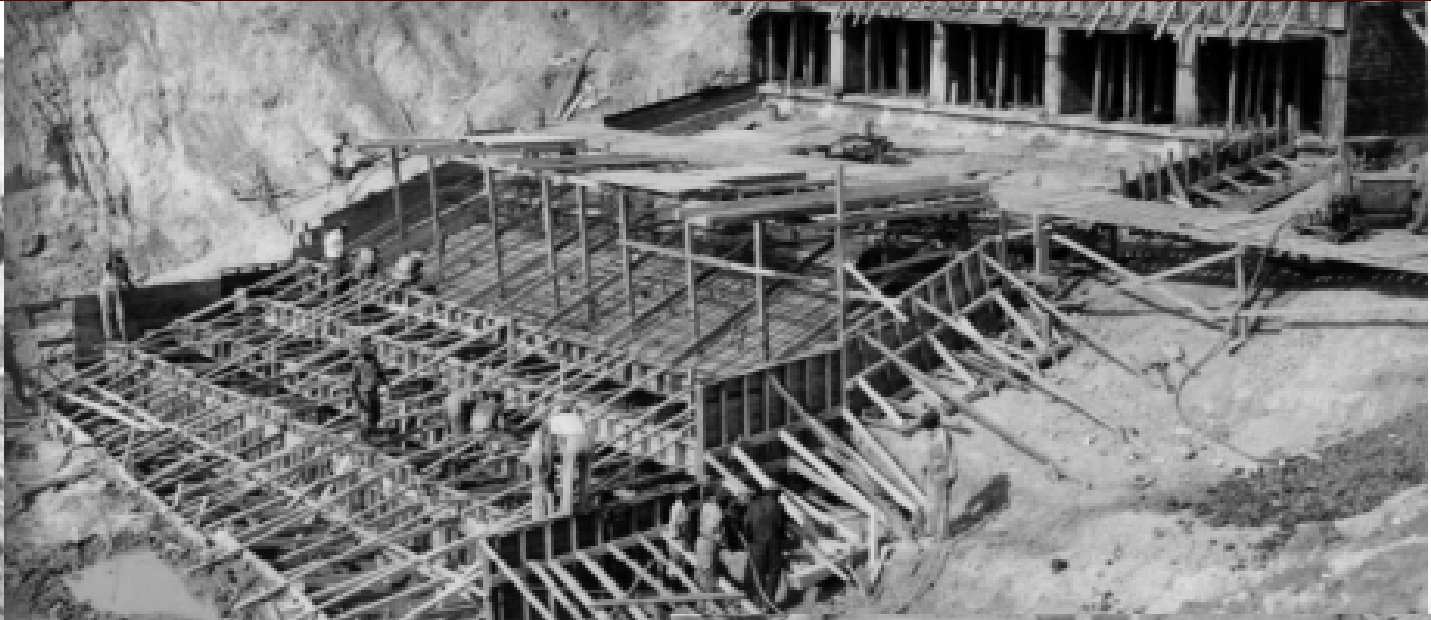


L – Likelihood of Flood Risk
C – Consequences to Greater Houston Community



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Construction of Addicks and Barker Dams 1942-1948



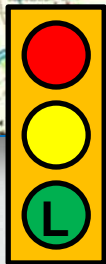
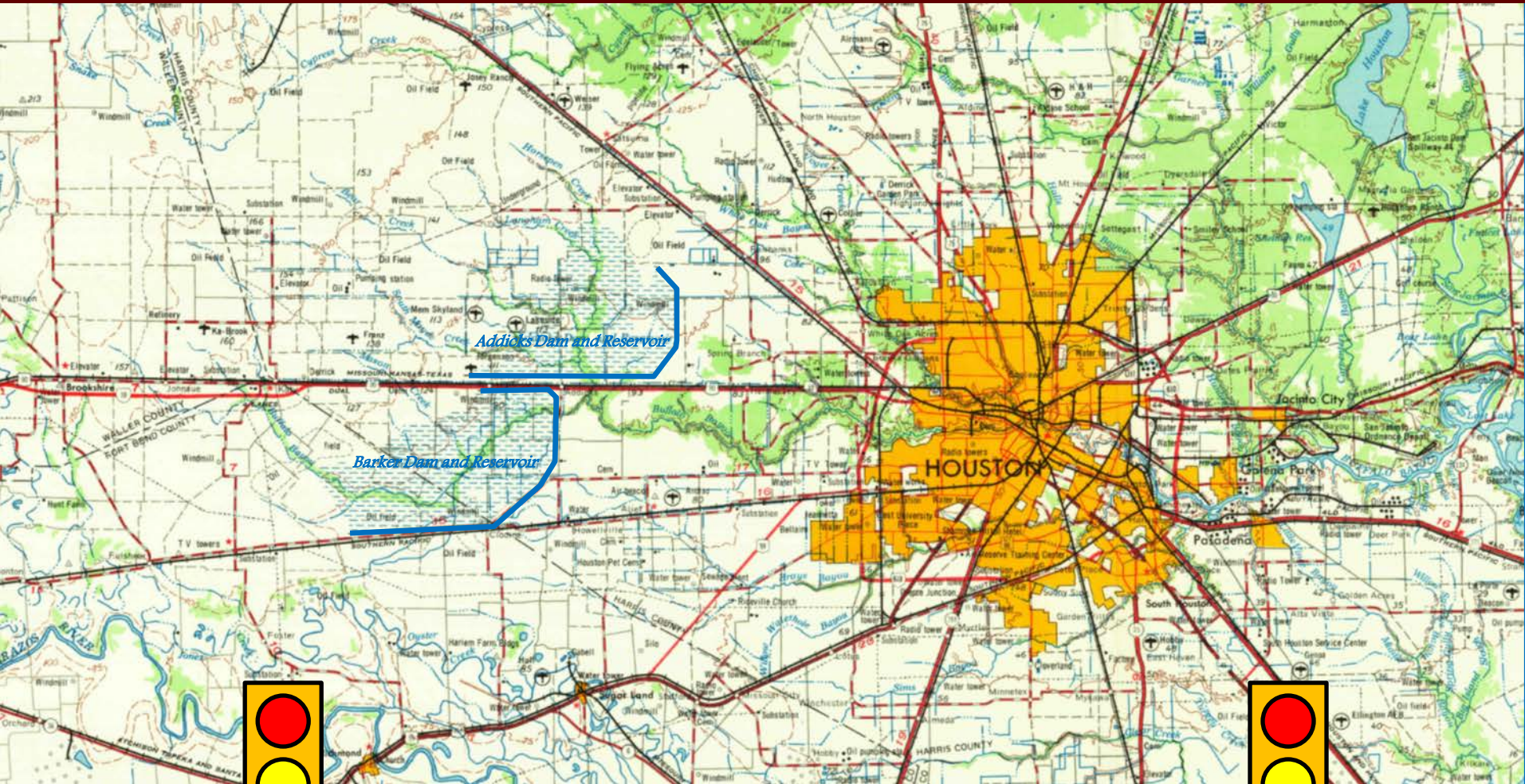
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Construction of Addicks and Barker Dams 1942-1948



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Houston with Addicks & Barker Dams 1950's



L – Likelihood of Flood Risk

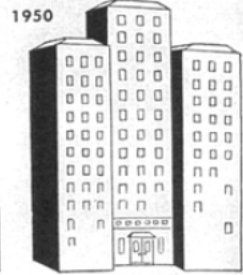
C – Consequences to Greater Houston Community



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Houston - 1950's

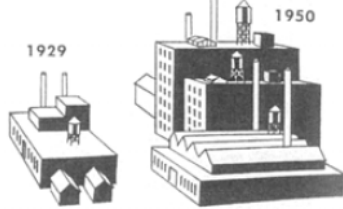
BUILDING PERMITS



1930 \$17,616,202

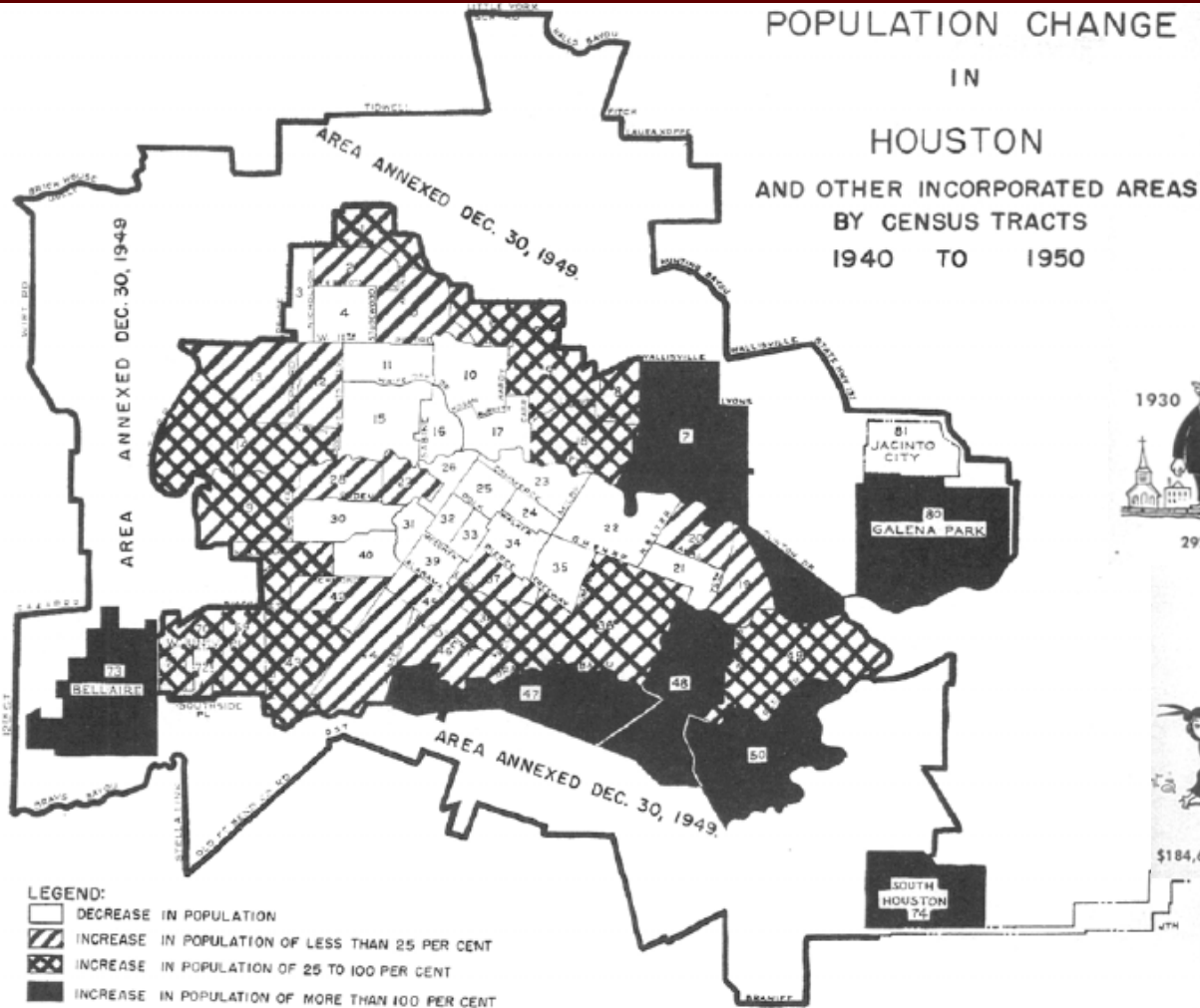
1950 \$176,932,907

NUMBER OF FACTORIES



1929 429

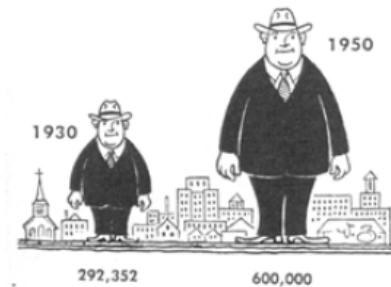
1950 1079



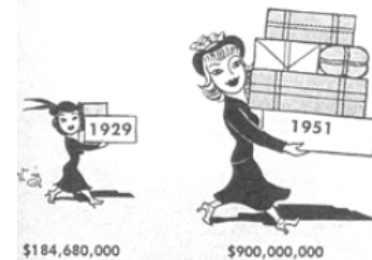
No percentages could be computed for the territory marked "Area Annexed" because no 1940 Census figures are available. However, the available data do show that this annexed area as a whole more than doubled in population during the decade. This also applies to Jacinto City, which was not incorporated in 1940.

PREPARED BY THE RESEARCH AND STATISTICS COMMITTEE
HOUSTON CHAMBER OF COMMERCE

POPULATION



RETAIL SALES



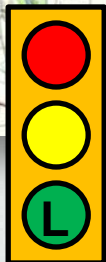
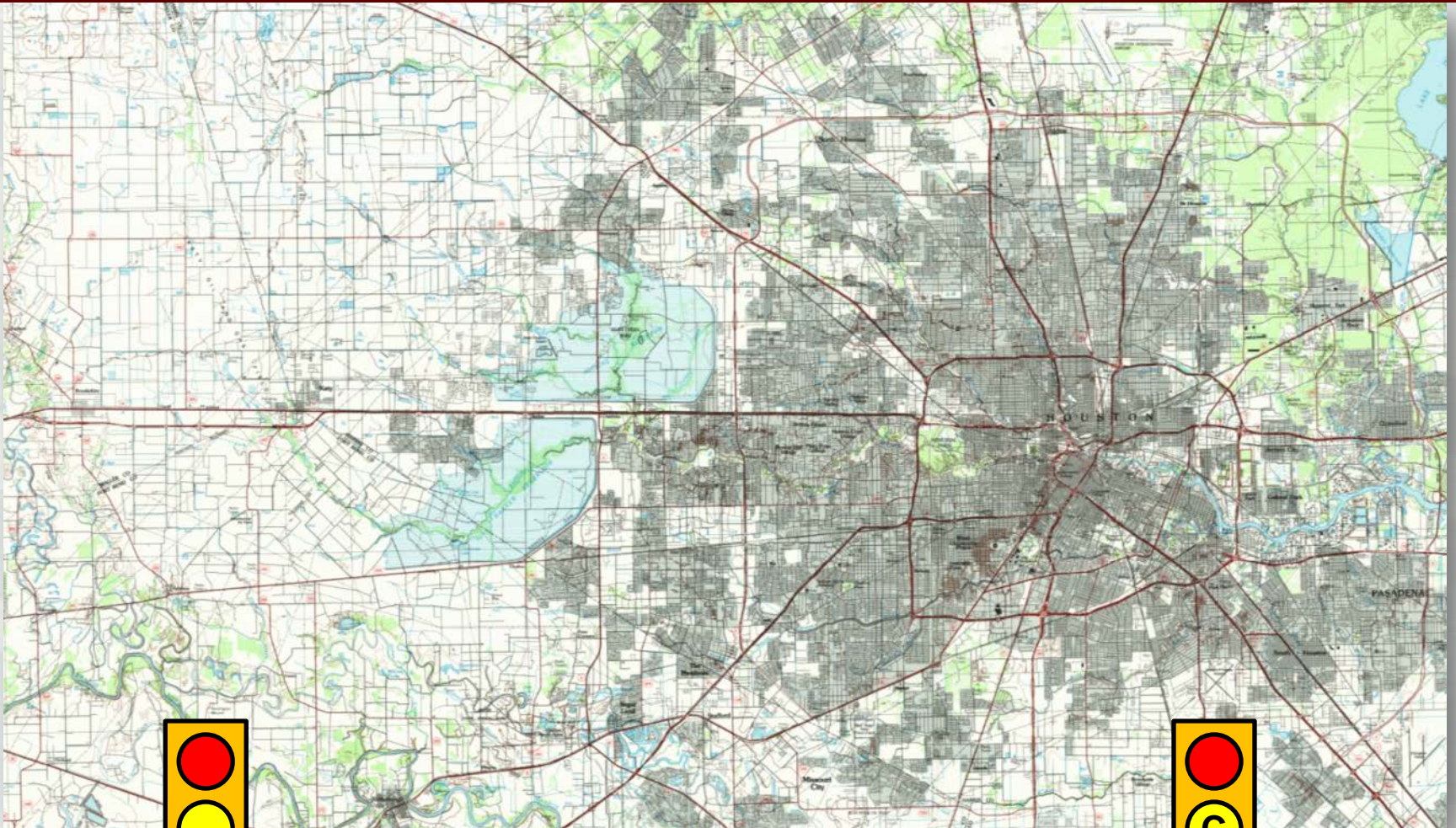
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Improvements to Addicks and Barker Dams

- 1963
Gated the conduits to provide additional protection from flooding to the downstream
- 1978-1982
Constructed seepage control at both dams (included slurry trench cutoff walls and seepage blankets)
- 1986-1991
Raised the main dam embankment to provide freeboard (eliminate possibility of waves overtopping)
- 1987-1988
Armored the uncontrolled spillway at the ends of the dams with roller-compacted-concrete



Houston - 1992



L – Likelihood of Flood Risk
C – Consequences to Greater Houston Community



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Reservoir Record Pools



City of Bunker Hill - March 4, 1992



- ▶ **Addicks Reservoir (Top of Dam – El. 122.7)**
 - ▶ Record High Pool - El. 100.58 ft. on March 9, 1992
 - ▶ Recent High Pool – El. 100.02 ft. on April 30, 2009
- ▶ **Barker Reservoir (Top of Dam – El. 114.7)**
 - ▶ Record High Pool - El. 95.89 ft. on March 7, 1992
 - ▶ Recent High Pool - El. 91.14 ft. on May 1, 2009



Addicks Reservoir - April 29, 2009



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Corps' Dam Safety Assessment

- Corps continually inspects its dams nationwide. It owns and operates 707 dams at 557 projects. These projects reduce risk and strengthen the nation's economy through infrastructure.
- Life and safety are paramount.
- Living with dams is a shared responsibility.
- Addicks and Barker Dams Assessment (2009)
 - Reliability of Structural Features
 - Outlet Structures Seepage and Piping
 - Ends of the Dams
 - Potential Consequences
 - Densely Populated Urban Environment
 - Critical Economic Infrastructure



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Dam Safety Findings – Seepage, Piping & Voids

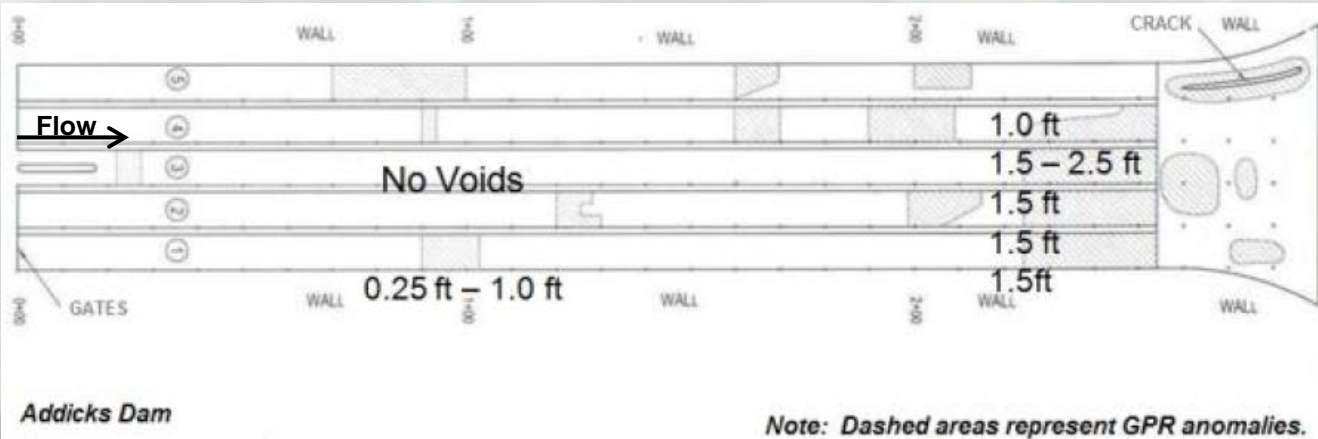
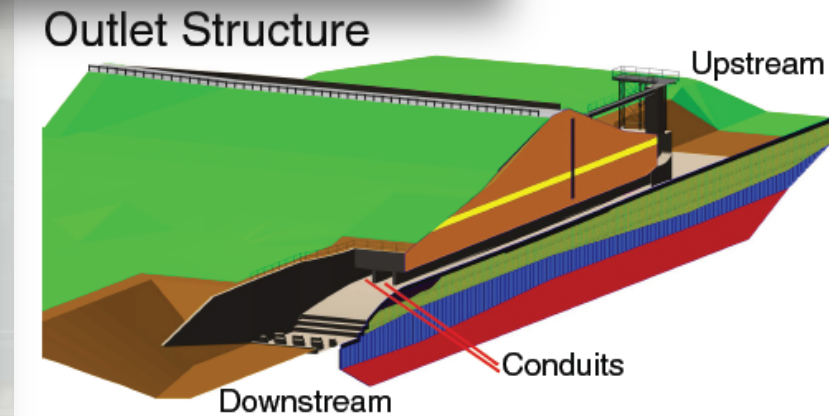
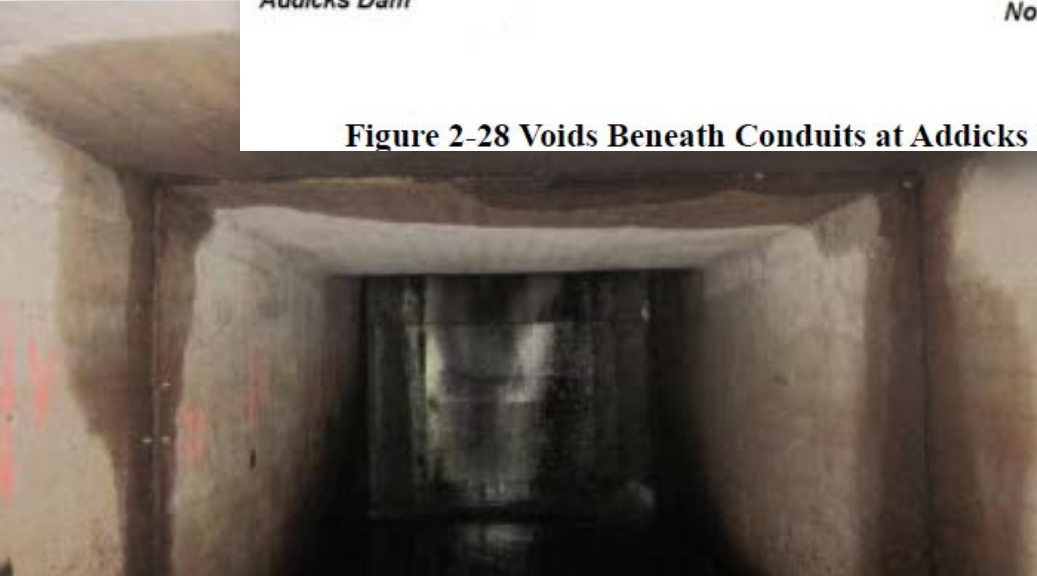
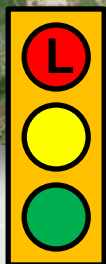
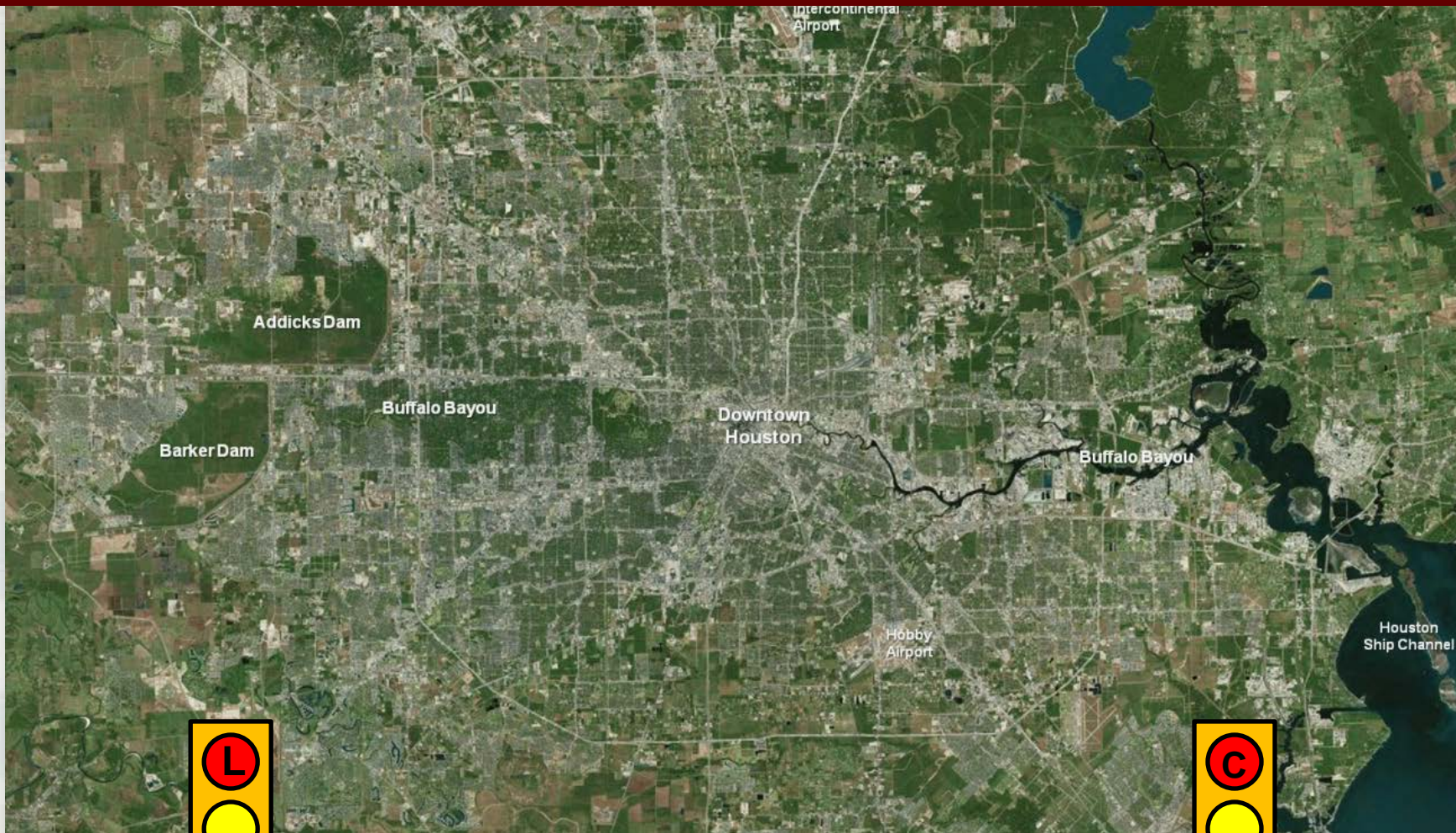


Figure 2-28 Voids Beneath Conduits at Addicks Dam, Generalized Locations.



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Houston 2009



L – Likelihood of Flood Risk
C – Consequences to Greater Houston Community



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Interim Risk Reduction Measure (IRRM) Grouting of Conduits



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IRRM - Granular Filter Around Ends of Conduits



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IRRM - Gate Replacement at Barker



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IRRM - Gate Operators & Emergency Generators



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IRRM - Parabolic Chute Slab Steel Plate



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Dam Safety Modification Study



Addicks and Barker Dam Safety Modification Report

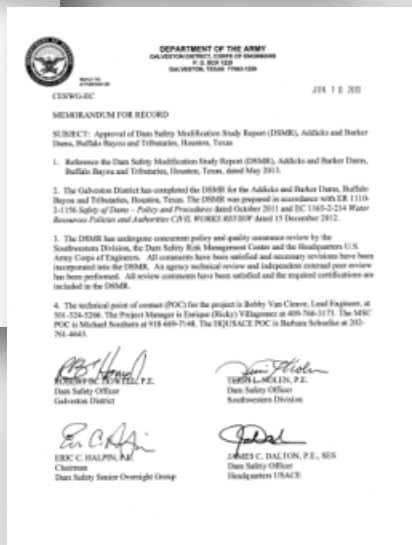


Buffalo Bayou & Tributaries
Houston, Texas
May 2013

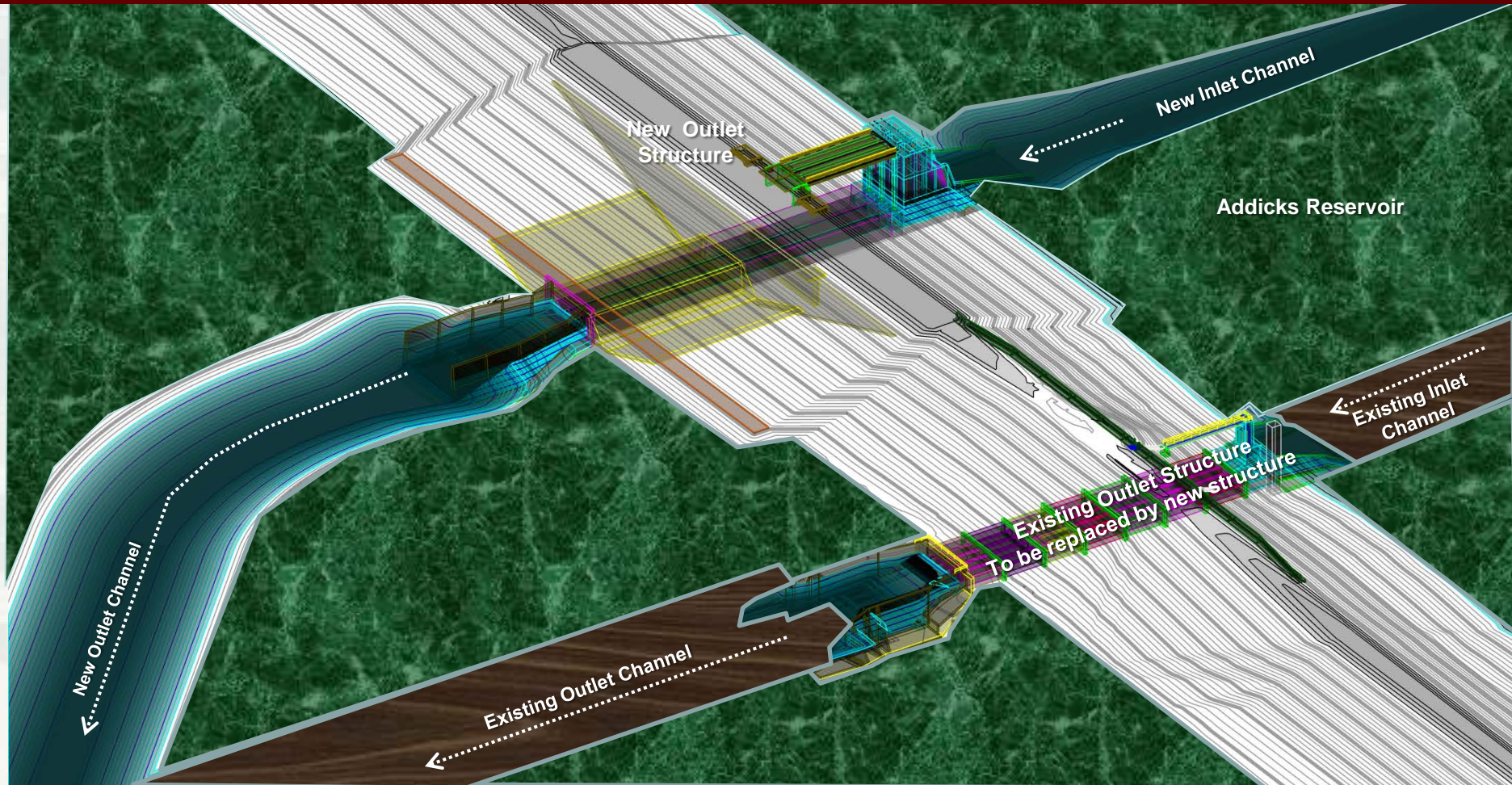


Summer 2013

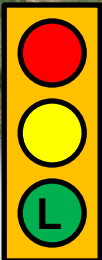
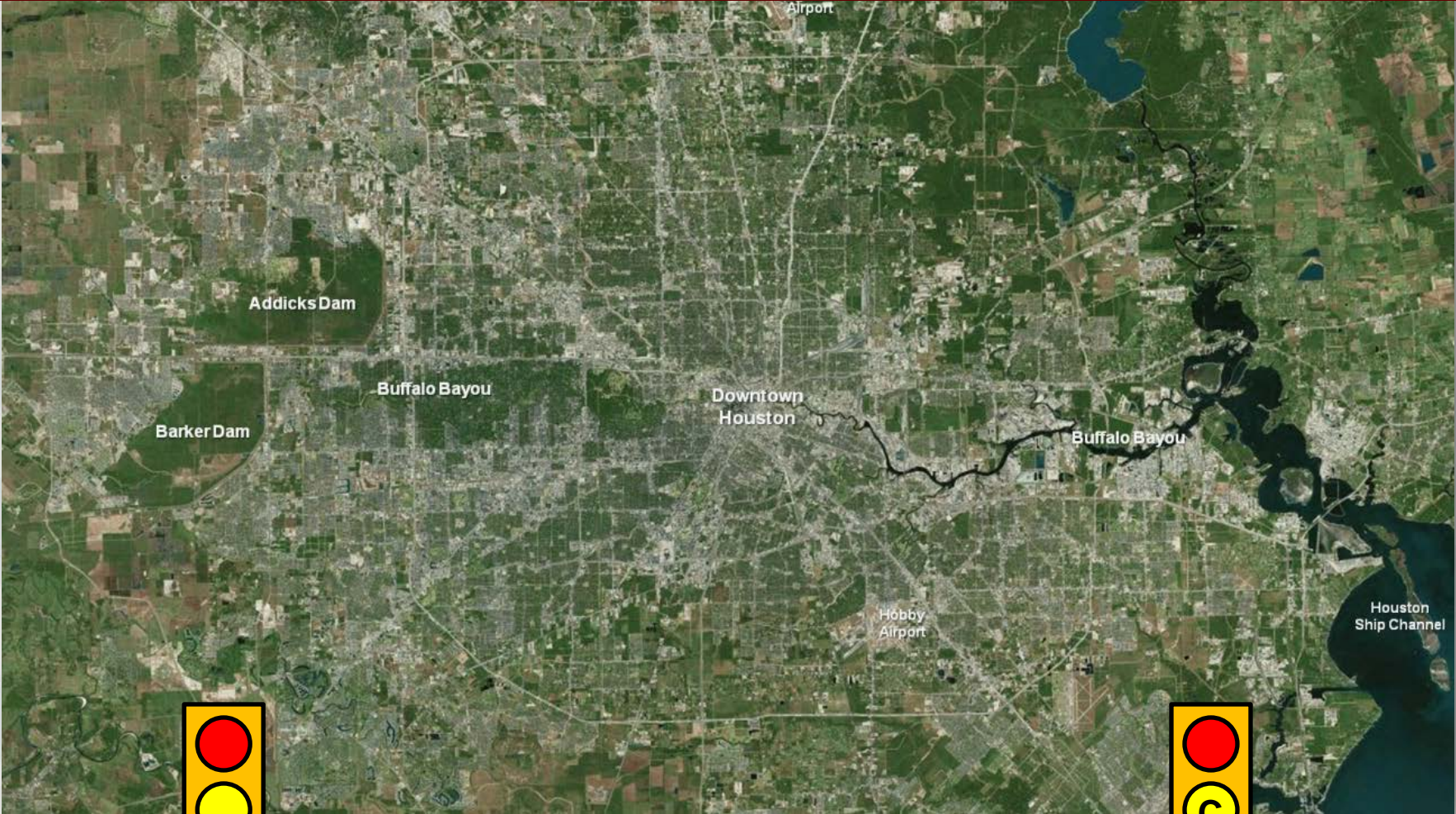
- Dam Safety Modification Report and Environmental Assessment Approved
- Finding of No Significant Impact Signed
- Dam Safety Modifications will address issues related to seepage and piping beneath, around and near the conduits.
- Approved Risk Management Plan consists of the construction of new:
 - outlet structures
 - parabolic spillway
 - stilling basin and outlet channel



Addicks Dam Proposed Modification Design 3-D Model Rendering



Houston 2018



L – Likelihood of Flood Risk
C – Consequences to Greater Houston Community



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Benefits



- Has protected the 4th largest city in the nation against loss of life for nearly 70 years
- Has enabled continued growth to city
- Protects against \$60 billion in potential flood damage
- Reduces risks against loss of life and property
- Provides recreational opportunities



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Summary

- Houston is NOT in imminent danger of flooding from Addicks and Barker
 - ▶ Addicks and Barker are normally dry reservoirs
 - ▶ Addicks and Barker are continually monitored, inspected, and maintained
 - ▶ Improvements have been undertaken over the years—this is an ongoing process
- Public safety is our number one priority
- Dam failure is not likely due to completed “Interim Risk Reduction Measures”
- Living with dams is a shared responsibility. We will continue to work closely with local agencies and partner with the greater Houston Community for flood reduction and recreation
- Construction updates will be posted online at www.swg.usace.army.mil



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ON TWITTER

www.twitter.com/USACEgalveston



ON YOUTUBE

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ON DVIDS

www.dvidshub.net/units/USACE-GD



ONLINE

www.swg.usace.army.mil



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Addicks Dam Proposed Modification Design 3-D Model Rendering

