GIWW Brazos River Floodgates - Colorado River Locks System Feasibility Study

Galveston District Dredging Conference

Franchelle Craft

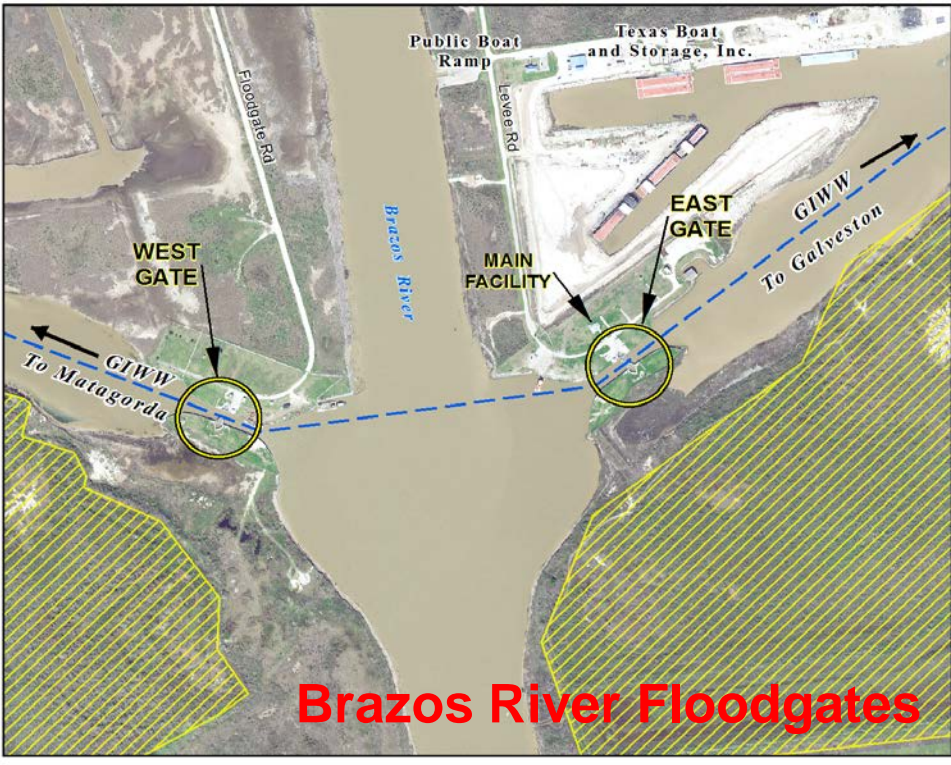**Project Manager**

October 2017
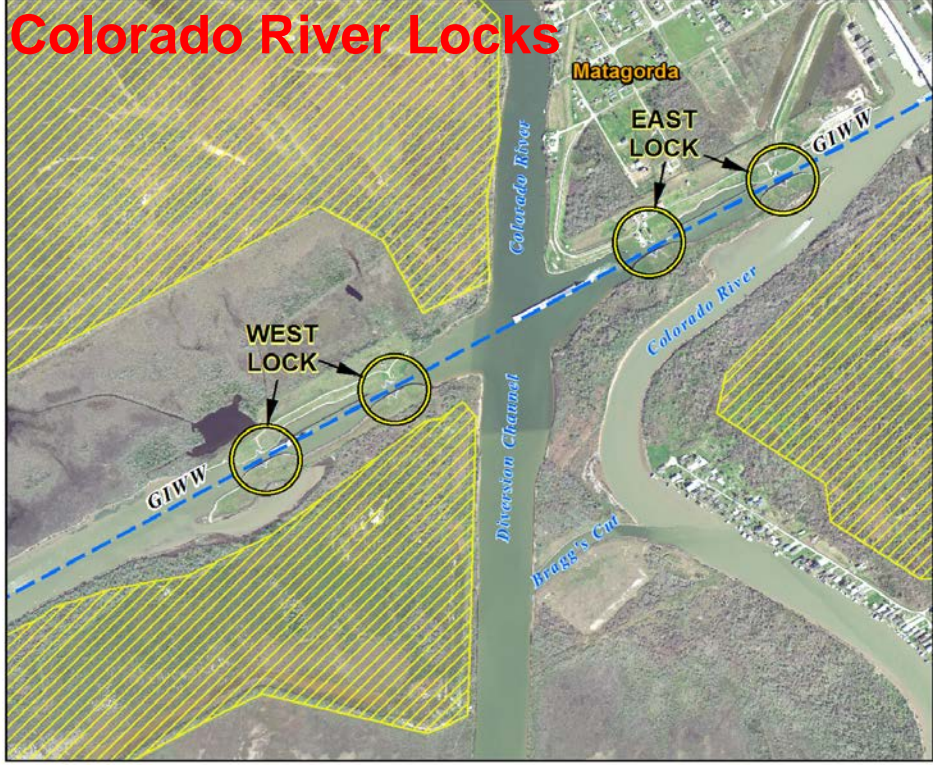
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BRAZOS RIVER FLOODGATES & COLORADO RIVER LOCKS SYSTEM COMPONENTS

Colorado River Locks

Brazos River Floodgates

SYSTEM COMPONENTS

75' WIDE

AVG TOWS/DAY = 38

FUNCTION:
SEDIMENT CONTROL & NAVIGATION

5

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STUDY PROBLEMS

- Modern barges/ships have to navigate through outdated 75ft. width alignments and narrow floodgates and locks that lead to frequent strikes, damaging guidewalls.

- Outdated lock/floodgate construction at sector gates leads to structural, electrical and mechanical maintenance issues.

- Shutdown of operations during high water periods and to repair strikes causes significant economic impacts to navigation industry.

- Sedimentation at Gulf outlet (Brazos/Colorado).

- Bankline erosion on south end of the rivers and GIWW crossings (Brazos/Colorado).

AGING RIVER INFRASTRUCTURE COULD **LEAD TO MORE INJURIES ON THE WATERWAYS.**

Many of the locks and dams in operation today were constructed during the 1930s.

The design life of locks and dams is generally 50 years and most of our locks have exceeded that.

Since 1970, vessel sizes have increased, affecting channel width and depth requirements

WIDER AND DEEPER WATERWAYS ARE NEEDED TO ALLOW FOR MODERN SHIPS AND TO REDUCE COSTS AND DANGER.

NARROW, SHALLOW CHANNELS AND OUTDATED FACILITIES COST BILLIONS IN DELAYS AND ARE POTENTIALLY DANGEROUS TO WORKERS.

This spring, two bills were introduced in Congress – "Waterways are Vital for the Economy, Energy, Efficiency, and Environment Act" (WAVE 4, H.R. 1149) in the House and the "Water Resources Development Act" (WRDA, S.601) in the Senate – that address waterway concerns.

ASCE

STUDY OBJECTIVES

- Reduce navigation delays/tripping/allisions of vessels traveling through the structures.

- Improve channel alignments and hydraulic flows for vessels approaching structures and traveling through crossings during high river periods.

- Improve overall operations/functions of the floodgate/lock structures which experience frequent mechanical failures due to age and outdated systems.

- Manage sedimentation in the GIWW per the study authority.

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FOCUSED ALTERNATIVES PRESENTED

- Six alternatives (including no action) presented and approved at AMM for Brazos River Floodgates (BRFG) and Colorado River Locks (CRL).

Brazos River Floodgates
Rehab Existing + Guidewalls (2a)
Rebuild New Floodgates (3a)
Open Channel (9a)
New Alignment- Gates (9b)
New Alignment- Gates + Control Structure (9c)
New Alignment- Locks (9d)

| Colorado River Locks |
| --- |
| Rehab Existing (2b) |
| Open Channel (3b) |
| Convert Locks to Floodgates (4b) |
| Build New Locks – Same Location (6) |

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HURRICANE HARVEY IMPACTS

- Category 3 Hurricane

- Landfall: August 26, 2017

- High River Stages: CRL – 8.6 ft, BRFG – 6 ft

- Increased sediment at Colorado River Locks rendered locks inoperable: 30 Days
  - Dredge operation: 6000 cy per day for 30 Days.

- Shipping Delays: 6 weeks

- Significant sedimentation increases in the overall system
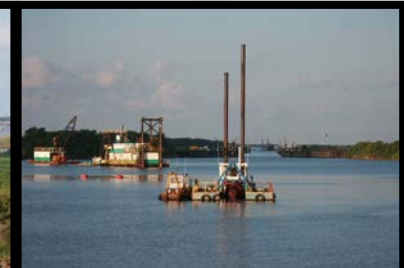
COMPARE ALTERNATIVE PLANS

- Assessed Hurricane Harvey Impacts to Alternatives
  - Recalibrated Models to account for increased sediment with flows
  - Navigation impacts to other studies
    - Freeport Harbor

- Alternatives refined based on cost (construction and O&M), navigation impacts, environmental impacts, and benefits.
  - Increased O&M Dredging Cost
  - Increased Offshore Placement Cost

- Modified Alternatives – Systems Approach
  - Colorado River Locks:
    - Alternative (4b-1): Remove riverside locks and a retain the gates creating a longer fore-bay which would make navigation through the structures easier

  - Brazos River Floodgates:
    - Alternative 3a-1: Remove floodgates on west (open channel) and add a 125' gate on the east

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ALTERNATIVE COMPARISON

- Colorado River Locks Alternatives

  - Alternative 2B: Rehab Existing Facilities
    - Full Rehab – Replace all lock system components at existing structures
    - Reduced Rehab – Critical components (i.e. guidewalls/update computer systems)
  - Alternative 3B: Open Channel – Screened
    - Significant navigation impacts at cross channels and downstream (Freeport)
    - Significant environmental impacts (sediment/salinity increases)
  - Alternative 4B-1: Removes Riverside Locks/Retains Gates

- Brazos River Floodgates Alternatives
  - Alternative 2A: Rehab Existing Facilities – Screened
    - No benefits realized – Does not reduce accidents
  - Alternative 3A: Build New Gates on Existing Alignment (125 feet)
  - Alternative 3A-1: Includes 3A with open channel on west end with new floodgates on east end to reduce downstream sedimentation
  - Alternative 9A: Open Channel – Screened (reasoning same as CRL)
  - Alternative 9B: New Alignment with New Gates
  - Alternative 9C: New Alignment/Gates with Control Structures

NEXT STEP…..

• TSP will be selected on 19 December 2017

• The PDT will perform some additional economic assessments to confirm our shift of mode assumptions

• The PDT will submit the draft report for public review

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CURRENT STUDY SCHEDULE

	Activity	Milestones Dates
Study Start	PMP Approved	**July 2016**
Alternative Evaluation and Analysis	Alternatives Milestone	**September 2016**
Exemption	Exemption Approval by Senior Leaders	**Submit after Agency Decision Milestone**
Alternative Evaluation and Analysis	Tentatively Selected Plan (TSP) Milestone	**December 2017**
Feasibility Level Analysis	Agency Decision Milestone	**June 2018**
	Feasibility Report Complete	**October 2018**
	Civil Works Review Board (CWRB)	**April 2019**
	S&A Review	**May 2019**
	Chief's Report	**June 2019**