Hydrologic / Hydraulic Analysis and Gate / Pump Optimization Study for Clear Creek Watershed

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PRESENTED BY:
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INSTITUTE FOR A DISASTER RESILIENT TEXAS

TEXAS A&M UNIVERSITY

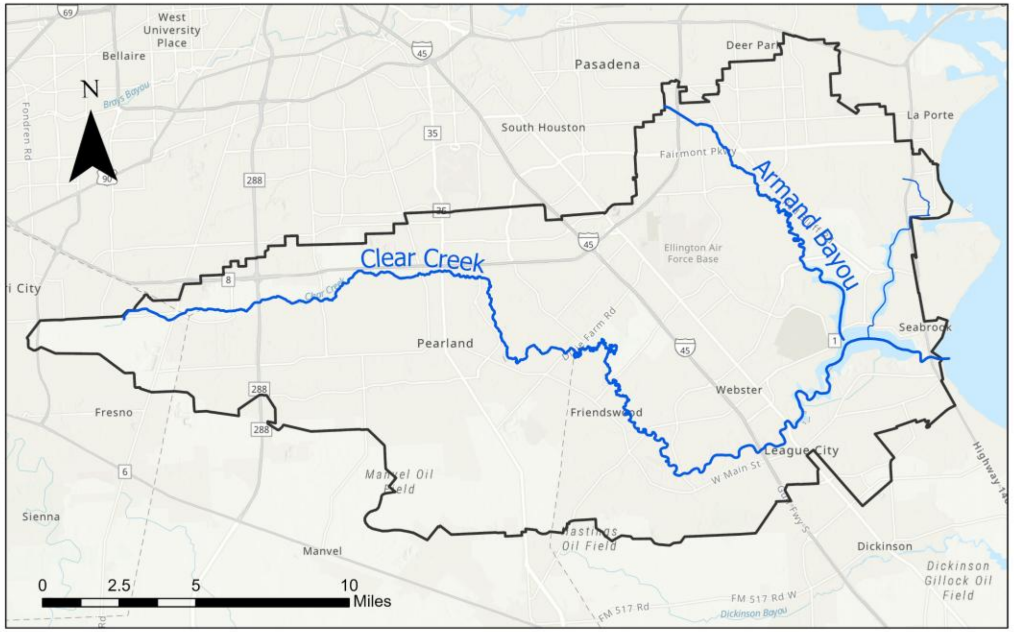
STATEMENT OF WORK

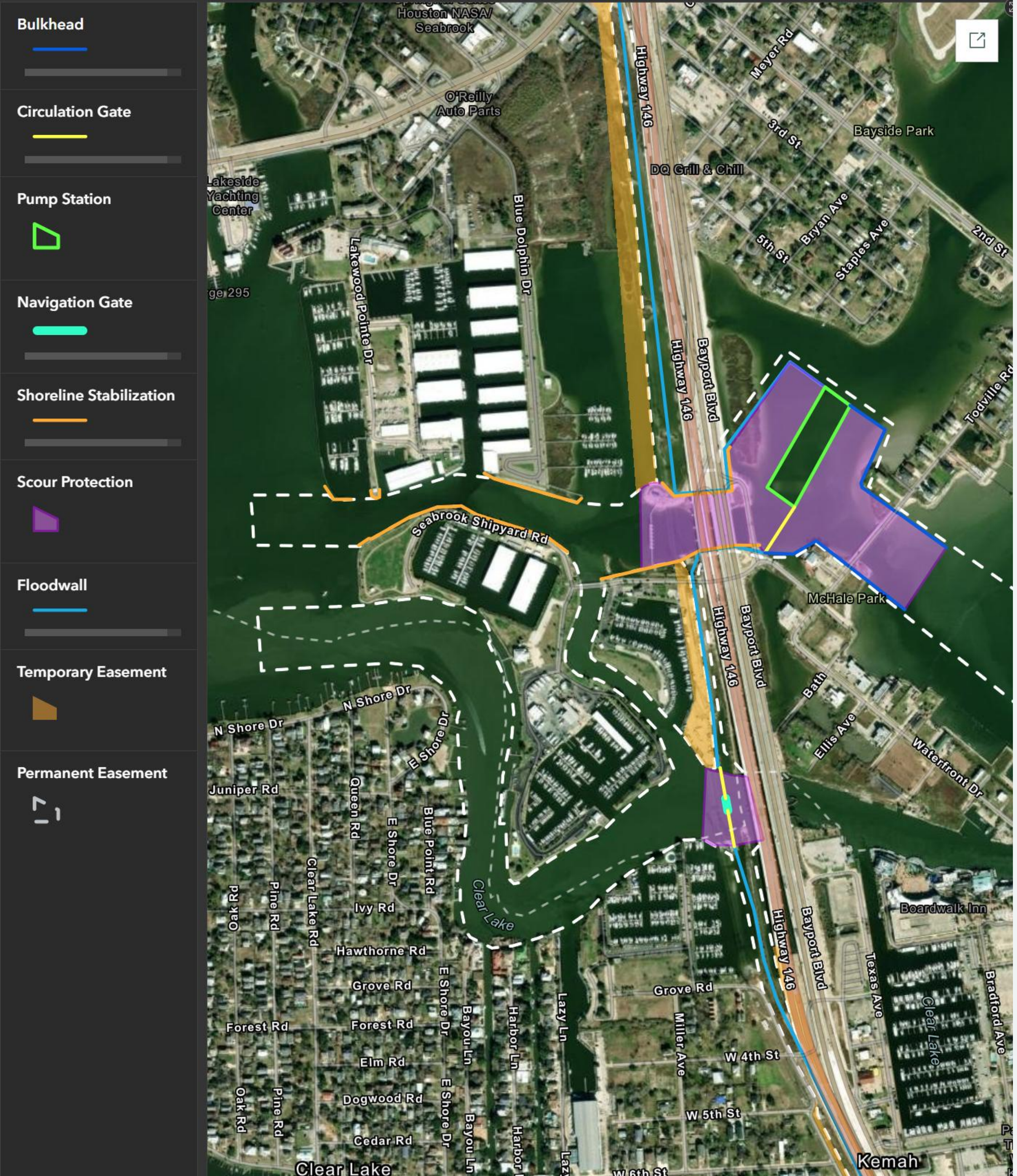
Study Objective

Investigate the flood impacts of the proposed gate and pump station on Lower Clear Creek watershed and evaluate potential configuration options for further flood mitigation

Proposed Tasks:

1. Review the Coastal Texas Protection and Restoration (Coastal TX) Study by USACE and TX-GLO for Clear Creek watershed
2. Baseline hydrodynamic model setup and scenario analysis
3. Pump station and gate scenario analysis and optimization





TASK 1: REVIEW COASTAL TX STUDY

Focus on the Clear Lake gate and pump system

- 75-ft floating sector gate for boat traffic
- Circulation gates for water quality and tidal flow exchange
- Pump station with 20,000 cfs capacity
- 17-ft floodwall

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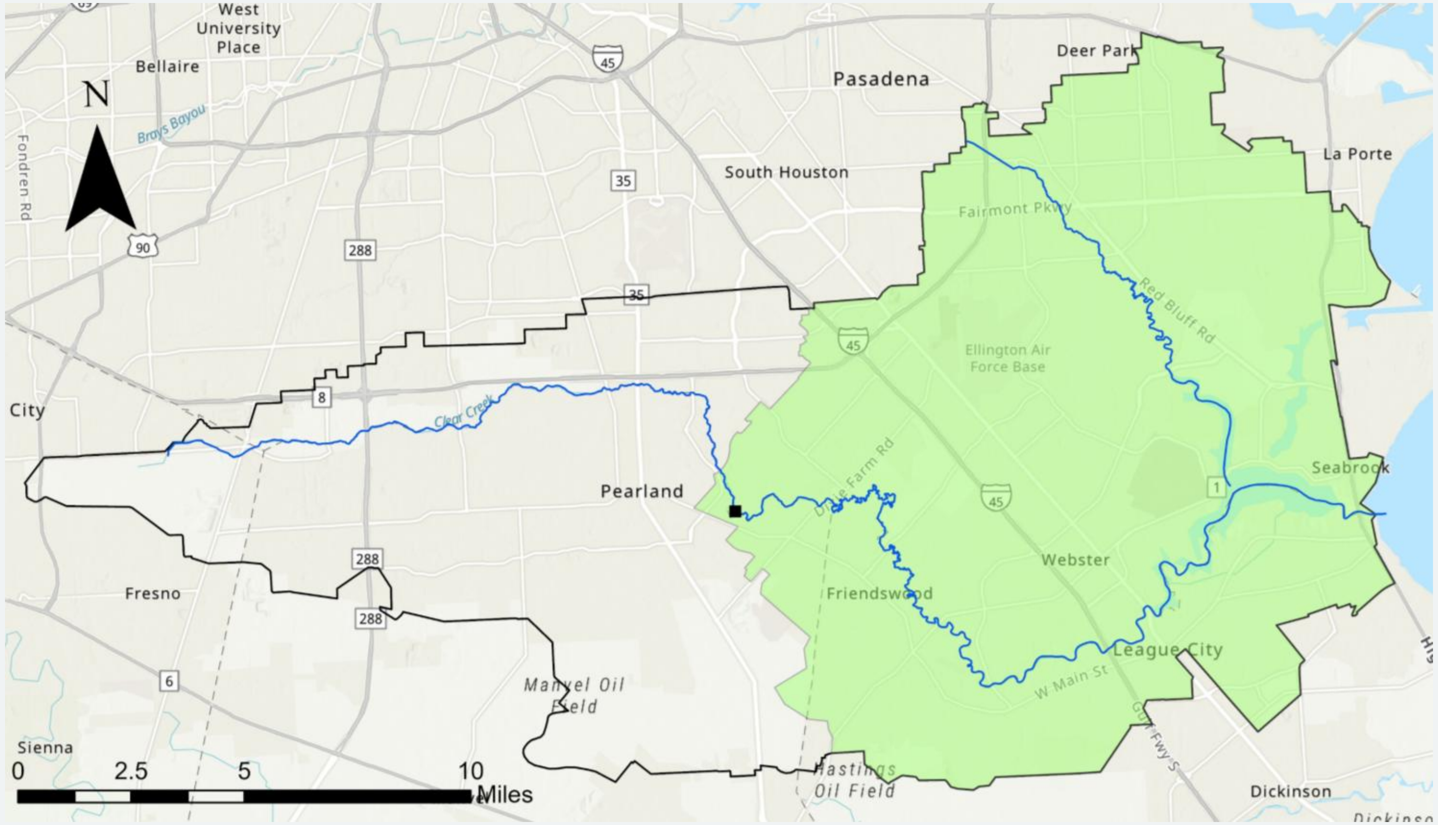
TASK 2: BASELINE HYDRODYNAMIC MODEL



Baseline model setup

- HEC-RAS 2D model of Lower Clear Creek and Armand Bayou watersheds
- HCFCD Map and Model Management (M3) models used as reference
- Baseline model validated / calibrated against recent historical storms (e.g., Harvey 2017, Beryl 2024)

Proposed 2D model domain

HCFCD Gage 150 (Clear Creek at Country Club Dr.)

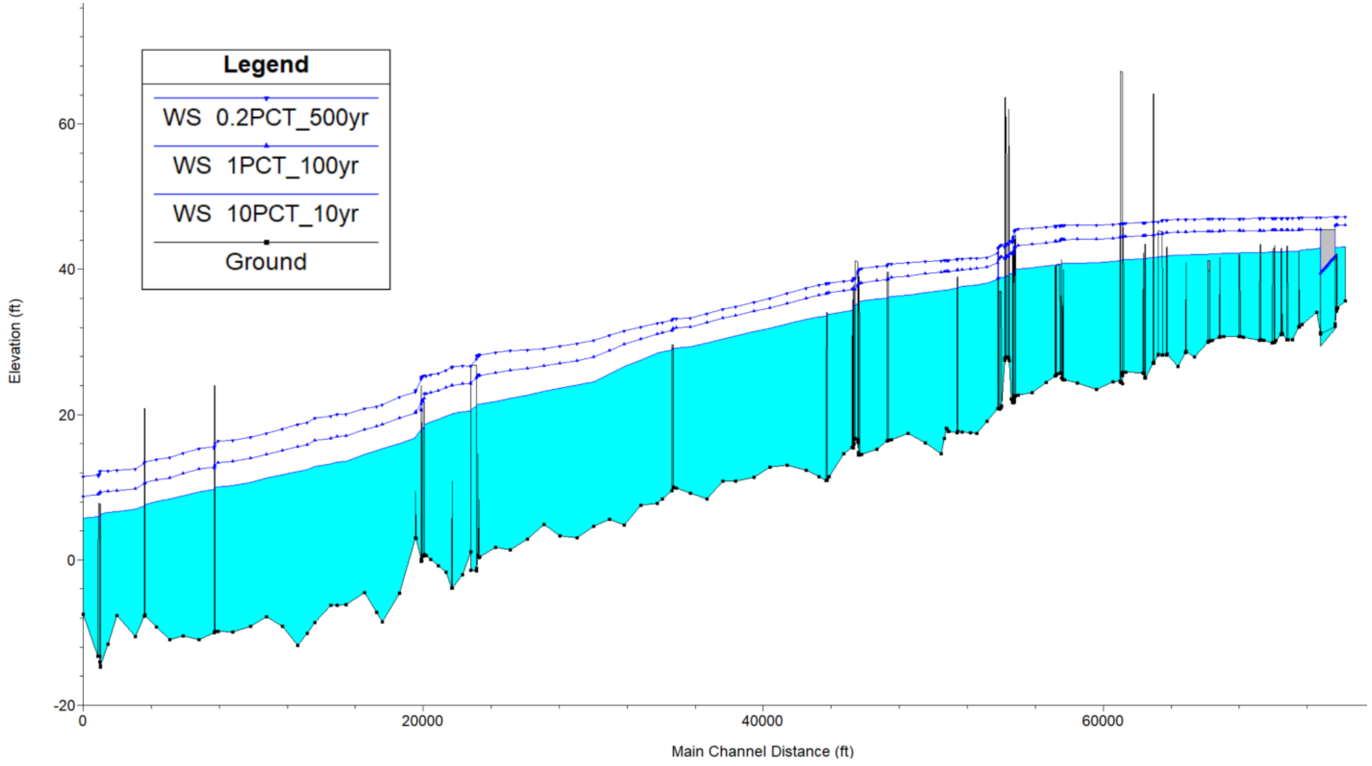
TASK 2: BASELINE HYDRODYNAMIC MODEL

Baseline scenario analysis

a. Surge-only scenarios: 100-yr, 500-yr storm surges

b. Precipitation-only scenarios: 10-yr, 25-yr, 100-yr, 500-yr rainfall

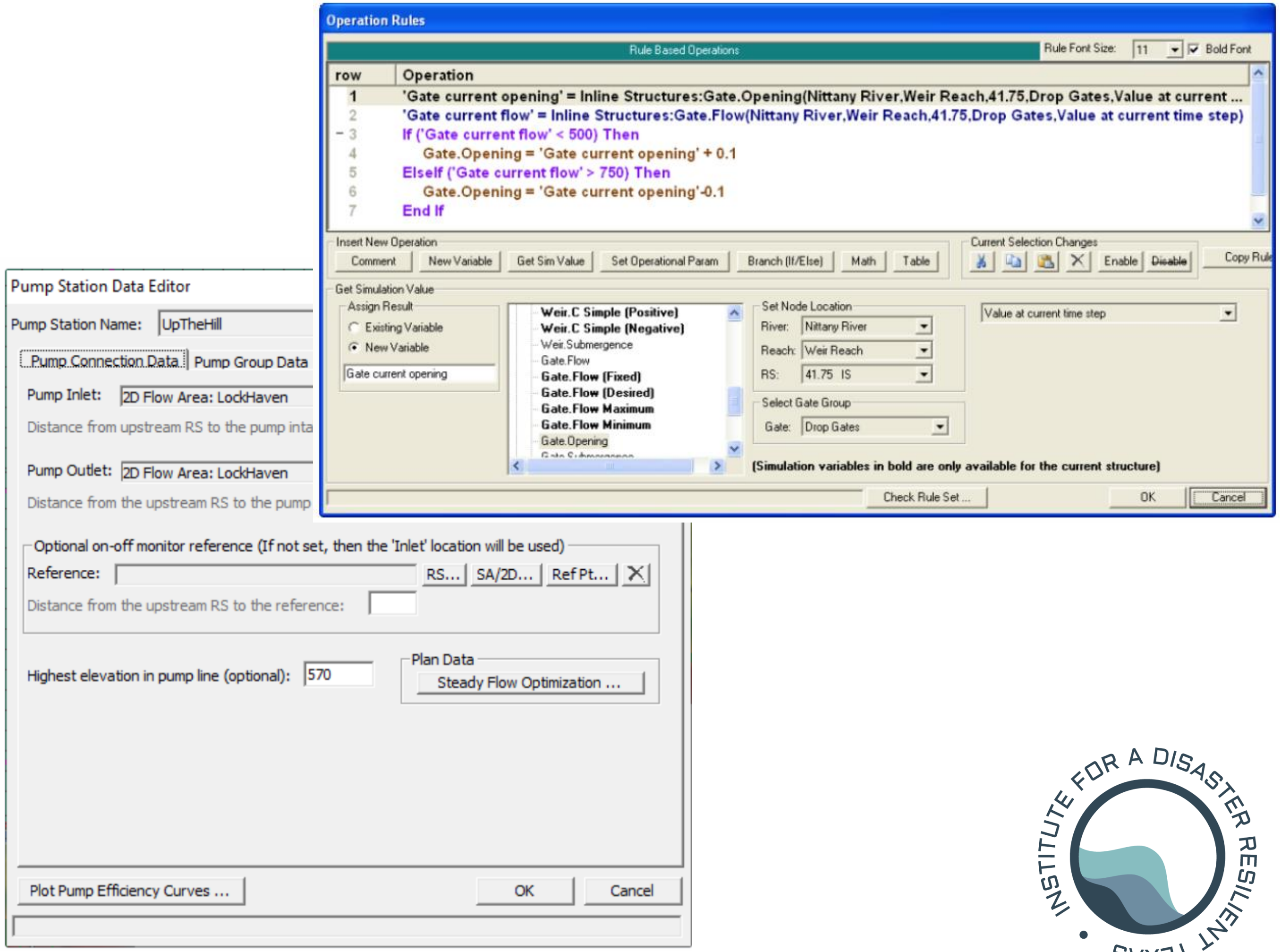
c. Compound scenarios: select combinations of a and b



TASK 3: GATE AND PUMP STATION OPTIMIZATION

Based on findings from Task 2, select gate and pump station configurations will be evaluated.

- Performance metrics: floodplain extent, number of structures / residential properties flooded, flood depth at critical facilities / watch points
- Operation of pumps and gates during a storm (e.g., Harvey 2017)
- Optimize number of pumps and their capacities for targeted flood reduction



STUDY TIMELINE

Task 1: Literature Review (2 months)

Task 2: Baseline model setup (4 months)

Total Project Duration: 1 year
(Apr 2025 – Mar 2026)

APR MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR

2025 **2026**

Final deliverables - report and presentation (1 month)

Task 3: Pump and gate optimization (5 months)

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