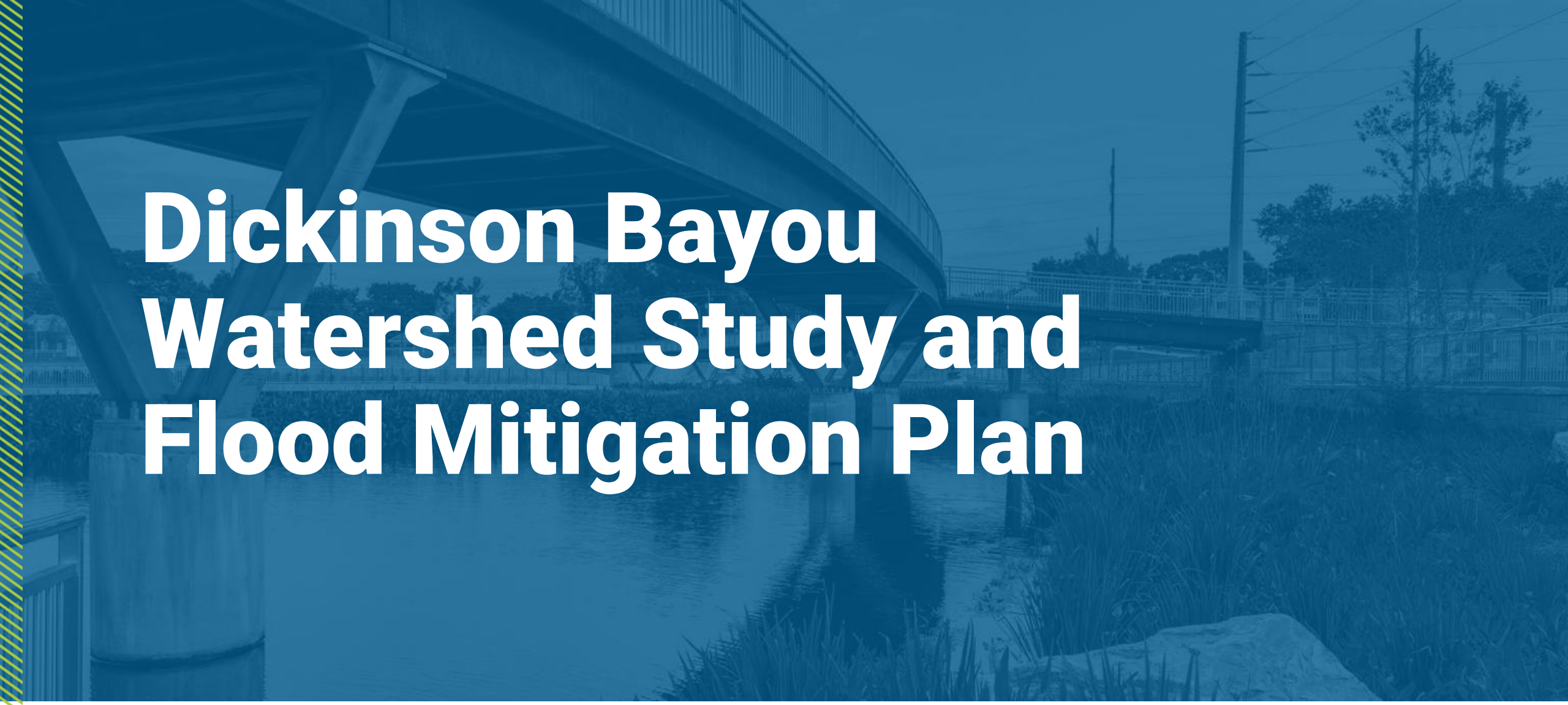


Dickinson Bayou Watershed Study and Flood Mitigation Plan

Agenda

- Project context and history
- Study area and planning reaches
- Baseline flood risk
- Alternatives evaluated and recommended path forward
- Funding strategy and near-term next steps

Project History

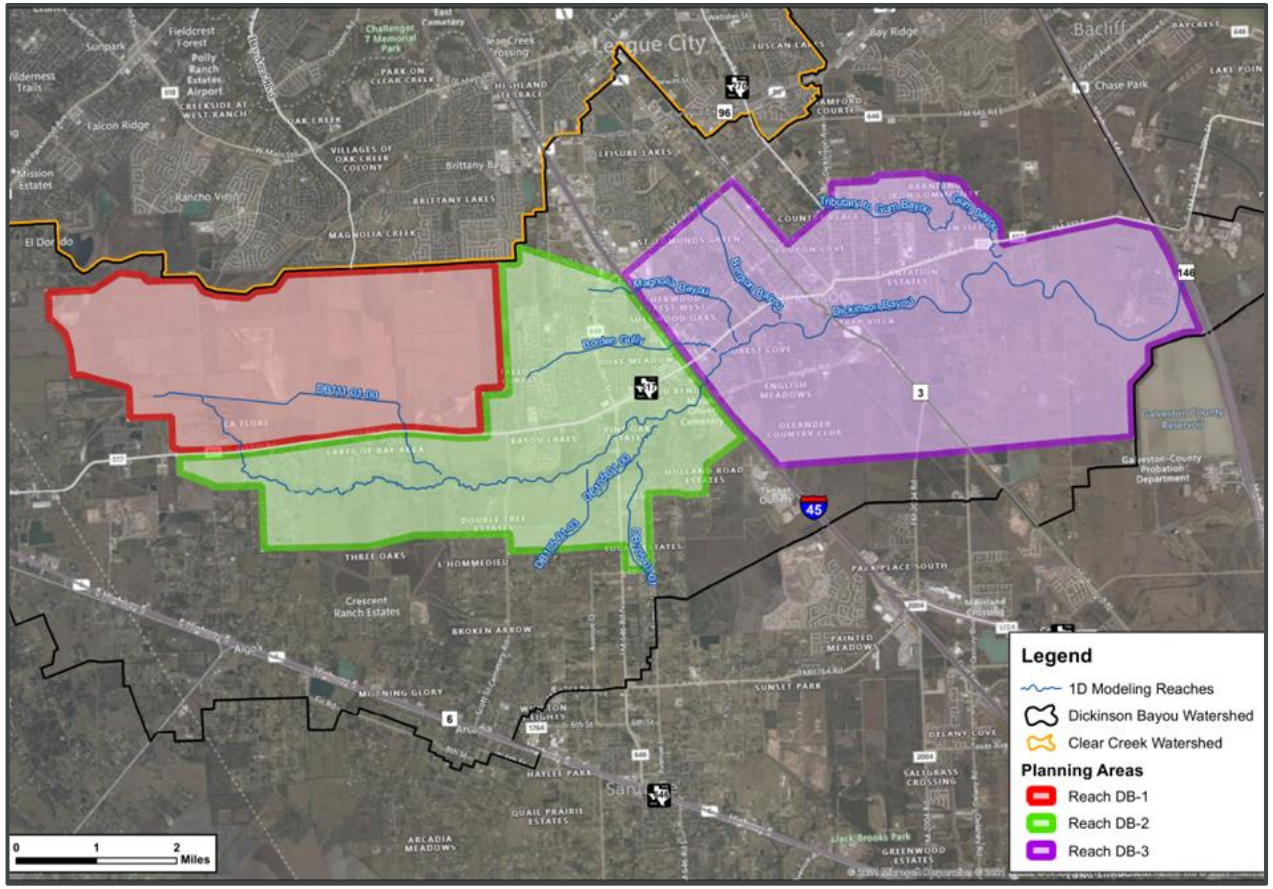
- 2017 - Post-Harvey: plan initiated to identify conceptual flood reduction alternatives
- 2021 - LCCDB Watershed Study completed: – Proposed 2 primary alternatives each consisting of multiple mitigation actions and submitted to WRDA
- 2022 - LCCDB project included in WRDA
- 2022-2025 – Some progress with locally led project or maintenance efforts
- 2026 – Advance large scale alternative under 203 authority

Why this Project

- Catalyst: Hurricane Harvey (Aug 2017) and historic flooding in Clear Creek and Dickinson Bayou
- Goal: comprehensive flood mitigation plan for Lower Clear Creek and Dickinson Bayou with focus on riverine impacts along the main channels
- Storm focus: extreme events (Harvey / Allison-type) plus smaller, more frequent storms
- Performance target: multiple feet of flood depth reduction at I-45 during the 100-year storm

Study Area

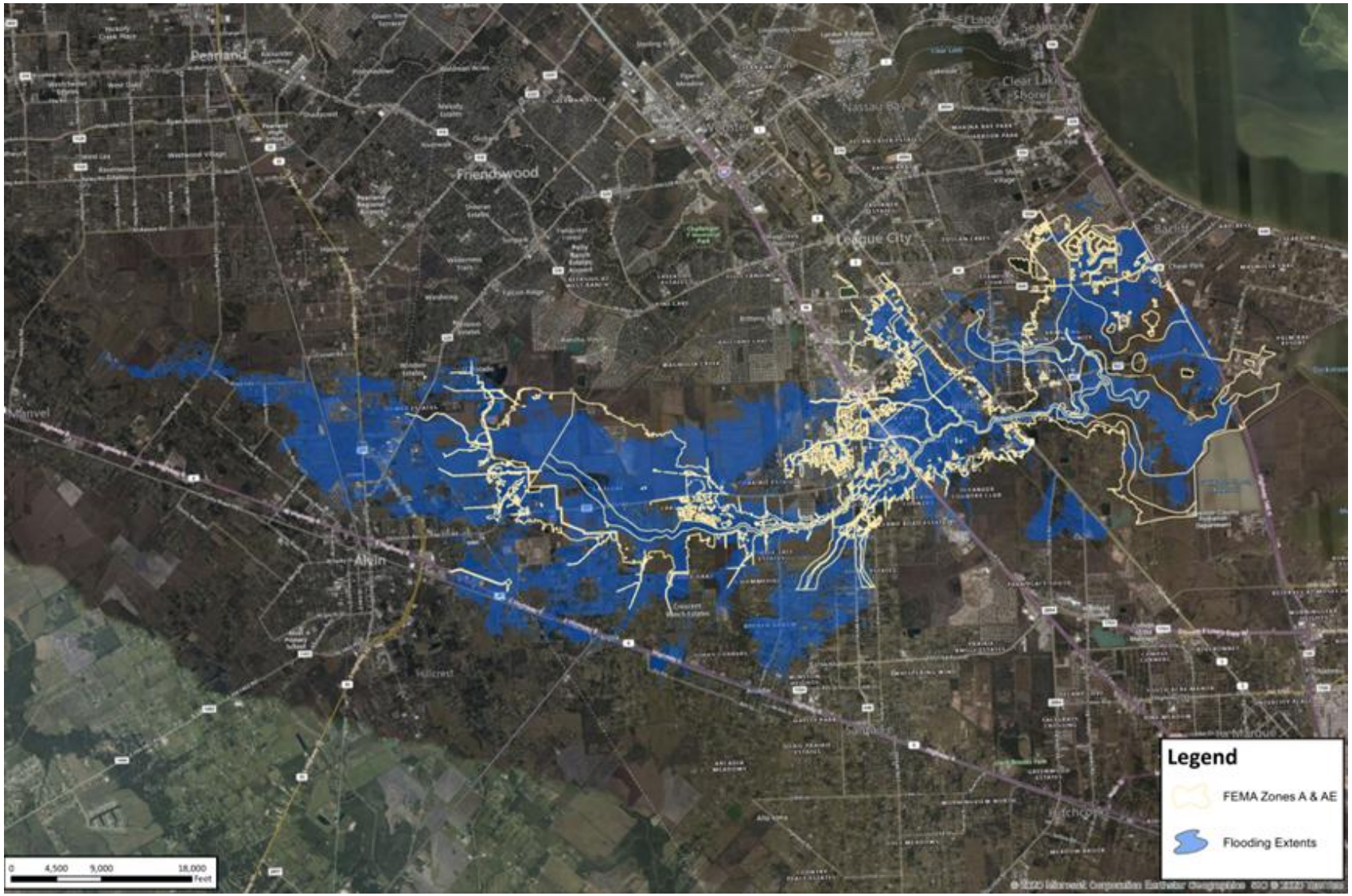
- Detailed planning area: American Canal (downstream of FM 528) to outlet upstream of SH 146
- DB-1 (upstream): largely undeveloped / future-growth area
- DB-2 (middle): transitioning development + key confluences
- DB-3 (downstream): highly developed + low-lying Dickinson “Bowl” around I-45
- Downstream boundary conditions include tidal and storm surge stages



Study Approach

- Rainfall: NOAA Atlas 14 24-hour (2-, 5-, 10-, 50-, 100-, 500-year) + Hurricane Harvey hyetograph
- Terrain: 2018 LiDAR (high-resolution topography)
- Hydraulics: HEC-RAS 5.0.7, detailed 1D/2D unsteady model for main stem + major tributaries
- Downstream boundary: tidal / storm surge stages per USACE guidance
- Future conditions: fully-developed flows + sea level rise (+1.52 ft over 50-year horizon) + major projects since 2018
- Damages/instances: GIS-based structure inventory + depth-damage relationships (USACE)

Updated Mapping



Baseline Flood Risk

$405M

Structural damages (100-year storm)

8,996

Flooded structures (100-year storm)

$712M

NPV damages over 50-year design period

Event	Structural damages ($M)	Flooded structures
500-year	818.5	14,630
100-year	405.5	8,996
50-year	283.6	6,824
10-year	107.7	2,625
5-year	54.4	1,325
2-year	28.4	582
Harvey (riverine)	553.3	11,175

- DB-2 and DB-3 account for nearly all damages and flooded structures
- The “Dickinson Bowl” (low-lying area around I-45) drives a large share of frequent-event flooding

Projects Evaluated

10 discrete projects modeled individually to understand usefulness

Detention basins (Grand Parkway, McFarland Rd, W. Cemetery Rd., E. Cemetery Rd, Hilton Ln., Magnolia Bayou + Borden Gully)

Diversions (Hilton Ln., Desel Dr.)

Also considered subsurface diversion (tunnel), FM 517 flood wall, and voluntary buy outs or structure elevations

Evaluation Framework

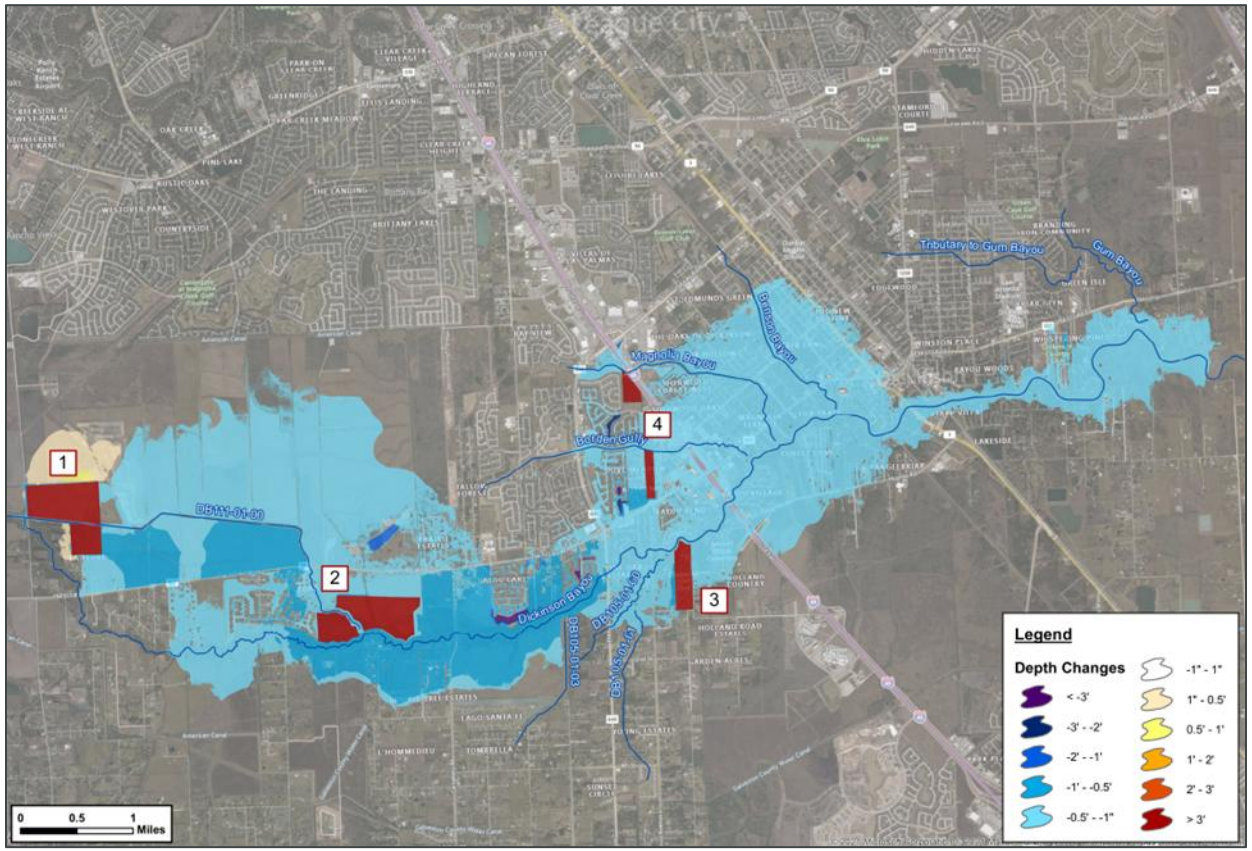
• Quantitative: flood instances, damages reduced, capital cost (ROM), transportation impacts

• Qualitative: land acquisition, community impacts/aesthetics, O&M/resiliency, agency coordination, speed of implementation

Outcome

- Discrete project results were combined into two “combination alternatives” to optimize benefits while avoiding adverse impacts.
- Proposed 2 alternative options with different combinations of projects

Alternative 1 - Detention

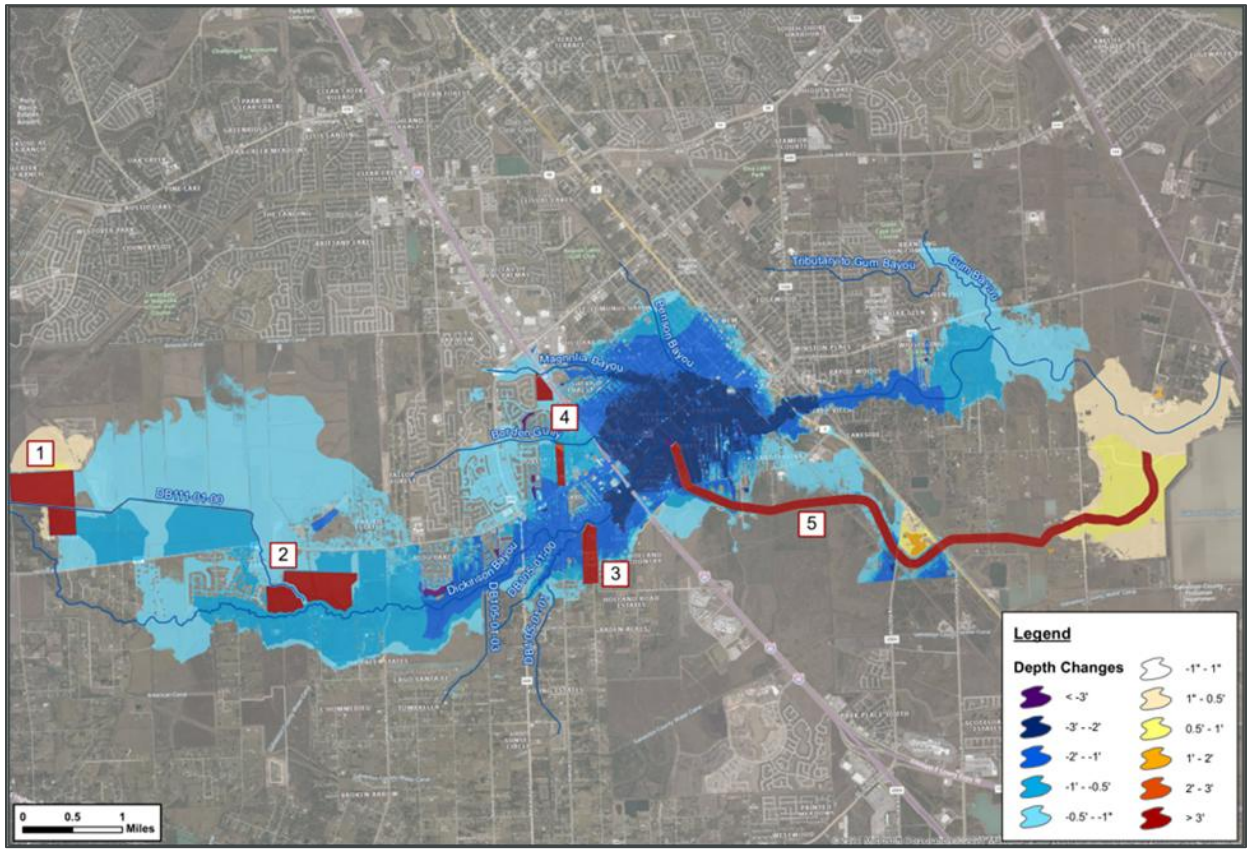


- ROM capital cost: $220M
- Benefit-cost ratio (BCR): 0.19
- 50-yr: −$40M damages; −2,490 flooding instances

100-yr WSE reduction (peak):

- Cemetery Rd: 0.59 ft
- I-45: 0.37 ft
- Upstream detention is important for future development, but offers limited benefit in the Bowl
- Significant residual risk remains even with construction of Alternative 1

Alternative 2 – Detention + Bypass



- ROM capital cost: $500M
- Benefit-cost ratio (BCR): 0.49
- 50-yr: −$245M damages; −15,100 flooding instances

100-yr WSE reduction (peak):

- Cemetery Rd: 0.88 ft
- I-45: 2.29 ft
- Up to 2 ft WSE reduction in DB-2 just upstream of I-45
- Up to 3 ft WSE reduction in DB-3 near the bypass intake

Combination Alternatives Comparison

Alternative 1 – Detention

- Mc Farland Rd. detention
- W Cemetery Rd. detention
- Hilton Ln. detention
- Magnolia Bayou + Borden Gully detention
- Cost: $220M
- Reduces damages over 50-yr design life by $40M with 2,490 flood instances eliminated

Alternative 2 – Detention + Bypass Channel

- Same detention basins as Alternative 1
- Adds Desel Dr. diversion channel (11,000 cfs) to outlet
- Cost: $500M
- Reduces damages over 50-yr design life by $245M with 15,100 flood instances eliminated

Alternative WSE Comparison

Figure 8: Alternative 1 100-Year Water Surface Profile

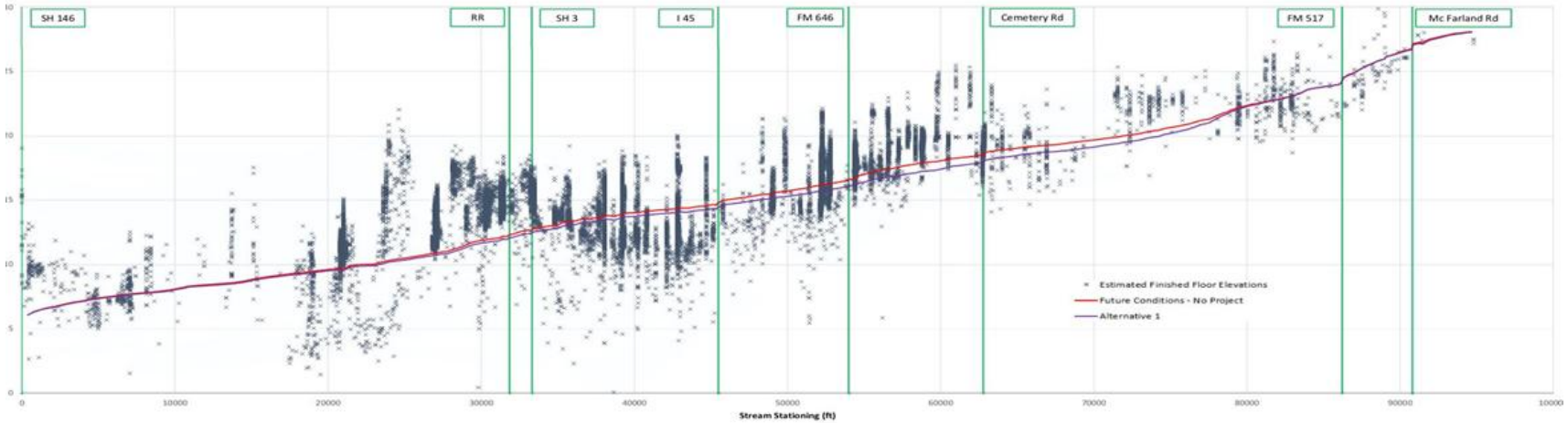
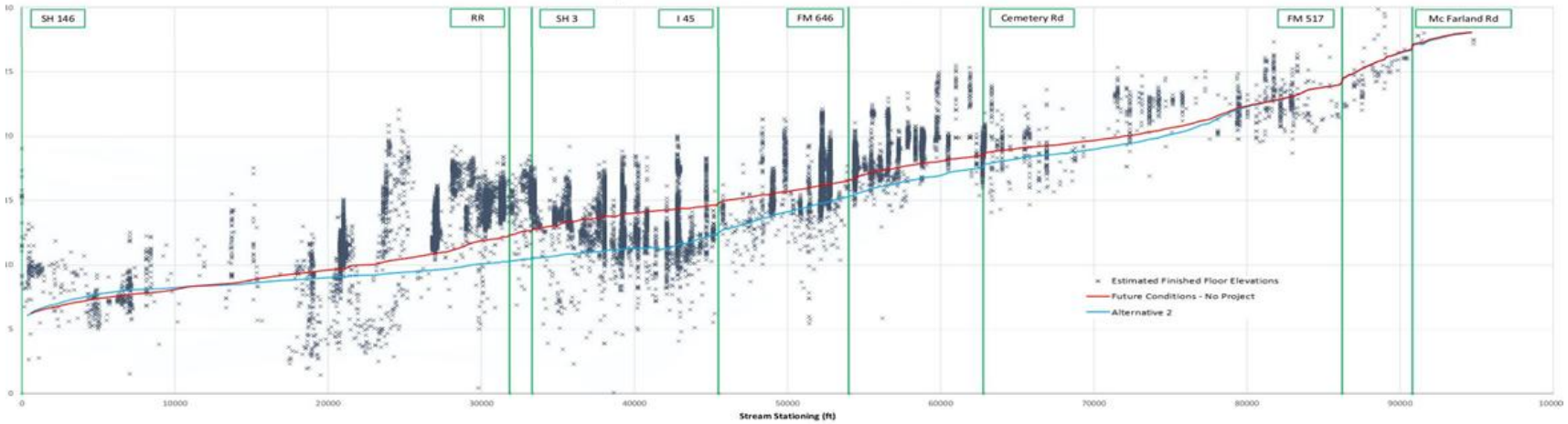


Figure 12: Alternative 2 100-Year Water Surface Profile



Recommendations

Alternative 2 recommended for further evaluation in a feasibility study

- Delivers the multi-foot reduction at I-45
- BCR closer to feasible for funding opportunities
- Diversion channel capacity can be further optimized

- Study in WRDA allows USACE to proceed if funding allocated by Congress
- Through 2025 funding has not been allocated to advance the feasibility study

Next Steps

- Section 203 Study allows local communities (non-federal sponsor) to complete a planning study to determine if a federal project is feasible
- Must follow USACE planning guidelines to be eligible for civil works federal funding

- League City and local partners are advancing the study as a 203 study and will be kicking off very soon

- Local input is critical to developing project alternatives that have community support

Thank you

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