

North Canal: A New Approach To an Old Idea, Reducing Flooding along Buffalo and White Oak Bayous

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1. Introduction

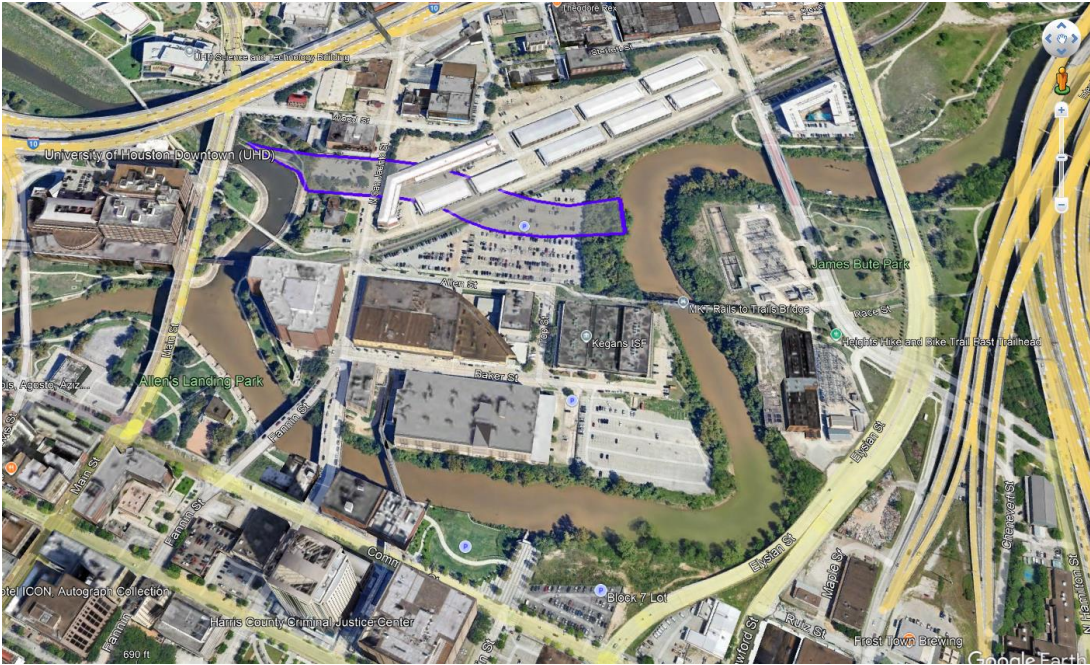
- The North Canal Project includes design and construction of watershed level drainage improvements for segments of both White Oak Bayou and Buffalo Bayous.
- The concept for the North Canal diversion channel began in the 1980s, and in the mid-2010s, the Flood Control District initiated the precursor to the North Canal channel design.
- In early 2018, following Hurricane Harvey, the City of Houston and Harris County received \$2.3 billion for disaster relief through the Federal Emergency Management Agency’s Hazard Mitigation Grant Program (HMGP); administered by Texas Division of Emergency Management (TDEM); in 2019, TDEM issued a sub-grant to the City of Houston to initiate design for the proposed North Canal High Flow Diversion Channel project
- The current project combines Federal funding with local funding collaboration between the City of Houston, Texas Department of Transportation, Harris County Flood Control District and TIRZ 5 to bring significant floodplain improvements.
- The PER phase was completed in 2022, final design scheduled to complete in early 2026; 60% submitted last month in February, 2025.

2. Project Objectives:

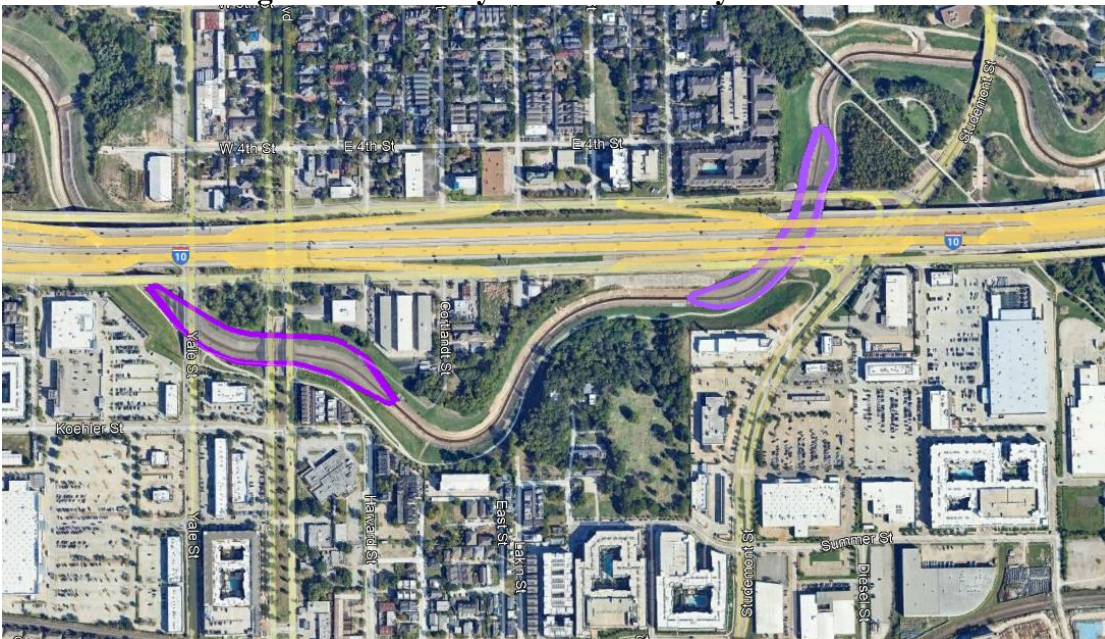
- Design and construct a new, partial bypass channel and other channel improvements to alleviate flooding at the confluence of the White Oak and Buffalo Bayous, and extend those benefits further up White Oak Bayou.
- Improvements to conveyance via new channel and channel widening
 - major benefit of this project is the reduction of the flood risk to downtown Houston, and along Buffalo, White Oak, and Little White Oak Bayous, and the alleviation of flooding in Buffalo Bayou due to the current winding condition and intersection of tributaries which restricts flow at the confluence (meeting) of White Oak Bayou and Buffalo Bayou.

- Purpose of the federal grant fund program (HMGP), is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented during the recovery from a disaster in a way that reduces, or mitigates, future disaster losses.

3. Location – Three Project Areas Included in the Original Project Scope



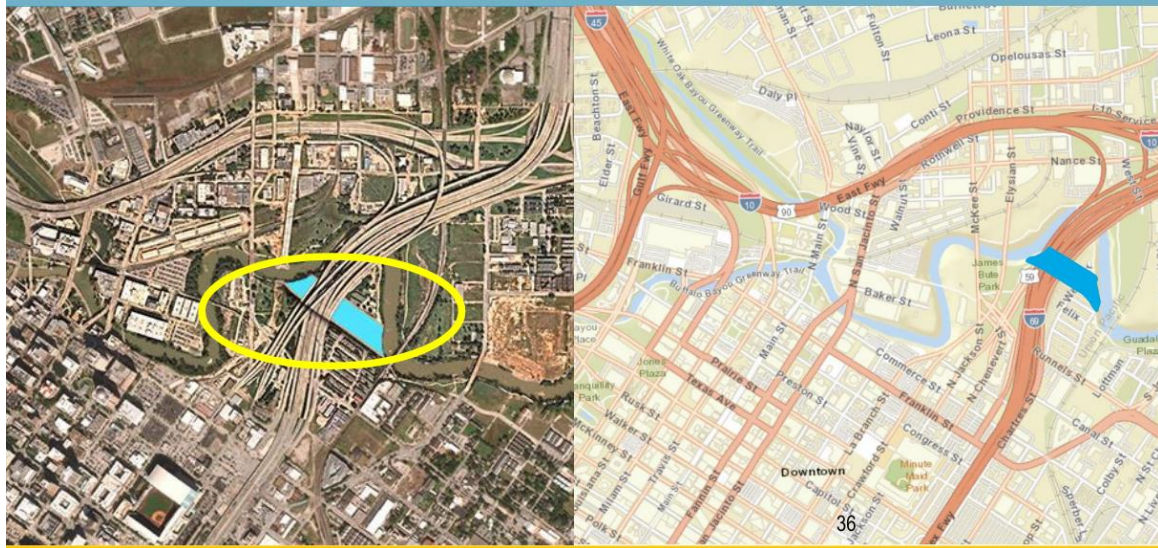
North Canal: New Channel, partial bypass (purple) – just north of downtown Houston connecting White Oak Bayou to Buffalo Bayou



Yale-Heights: Channel widening, east & west (purple) – White Oak Bayou at

Yale/Heights (west) and under IH-10 (east)

South Canal Channel Diversion/Detention Area



South Canal Project Area:

- Part of the original grant application, South Canal is now being progressed by TxDOT in Segment 3C-2 of the North Houston Highway Improvement Project (NHHIP), phased after the North Canal Project.
- The North Canal Project continues to engage with the South Canal future design through hydraulic study and hydraulic criteria, in partnership with TxDOT.

4. Project Details To-Date:

- Following the 2013 project by Harris County Flood Control District, TxDOT incorporated options for the North Canal in the underlying hydraulic studies for NHHIP through 2019.
- The North Canal Project continued the study and preliminary design of the recommended TxDOT options through the Preliminary Engineering Report (PER) phase in 2021 and 2022.
- Key recommendations and design features from the North Canal PER phase being carried forward through Final Design include:
 - a. An approximate 200-FT wide bypass channel in North Canal, shifted south from the TxDOT alignment to preserve existing structures.
 - i. A wet channel bypass in North Canal, utilizing vertical walls and terracing to achieve the channel with a 60 FT wide center channel
 - ii. Interior maintenance access along both sides of the North Canal with connection to street grade; grading for future pedestrian access by others.

- b. New roadway bridge at North San Jacinto Street
 - c. New rail bridge at the proposed channel serving the existing Union Pacific Railroad (UP) rail alignment
 - d. Significant utility relocation and street reconstruction in the San Jacinto Street and Wood Street corridors
 - e. In Yale-Heights, use of vertical, anchored walls to accomplish an increase in hydraulic cross section at the bridges, removal of abandoned section of rail bridge
- Hydraulic Results and Considerations:
 - a. The North Canal and Yale Heights improvements as planned will remove approximately a net 260 acres from the 50 year floodplain and a net 150 acres from the 100 year floodplain.
 - b. The upstream benefits from the North Canal Project, plus NHHIP future improvements, will result in higher flows in the Buffalo Bayou downstream of South Canal, where channel capacity and additional freeboard is greater. The current plan is to procure additional easement, if needed, for the minor water surface increases downstream of the South Canal to the Ship Channel.
 - a. Ongoing hydraulic study in collaboration with TxDOT will assess the additional results expected from future NHHIP South Canal improvements (construction coming post 2027).
 - Ongoing Project Challenges to Navigate:
 - a. Geotechnical conditions, requiring more expensive channel retaining wall.
 - b. Construction cost escalation in general, funding availability and FEMA grant compliance.
 - c. Accommodating the schedule (period of performance) for the Hurricane Harvey HMGP grant.
 - d. Private utility relocation – and those schedule impacts (understood after the 60%).
 - e. Coordination with ongoing projects (TxDOT and others).
 - f. Property need and impacts, including METRO relocation and flowage easements.
 - g. Approval by Union Pacific Railroad.
 - h. Permit approval.

5. References

- City of Houston's project webpage: <https://www.engagehouston.org/northcanal>