Alternative to Increasing Storm Sewer Size

Meet the Presenters

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Project Location

- Sites located in Berry Bayou (C106-00-00), Tributary to Sims Bayou (C100-00-00) in Southwest Harris County
- City of Houston Storm Sewer Capital Improvement Projects (CIPs) at 3 Sites
Project Background

- Existing pond to mitigate for one-lane expansion of Shaver Road
- Harris County Flood Control District Maintained
- City’s 3 CIPs include Drainage Improvements as Component to Roadway Reconstruction Projects

Challenges

- History of Flooding in Subject Areas
- Multi-jurisdictional
- High Tailwater Present at Outfalls
- Significant Offsite Sheet Flow

Project Issues

- Different Methodologies (Storm Sewer vs. Watershed Level)
- Established Neighborhoods
- Utilities Sharing ROW

Relation of CIPs to Watershed
Alternative to Upsizing

Project Issues

- High Tailwater at Receiving Channels
- Low-Lying Areas in Project Prone to Flooding

Software Choice

- Utilized xpSWMM for Storm Sewer Modeling and Flow Routing
- Utilized HEC-HMS and HEC-RAS for Watershed Modeling of Detention Basin

Typical Storm Sewer Improvement Approach

- Develop Storm Sewer to Maintain 2-yr HGL at Gutter and 100-yr HGL Within Road ROW
  - Larger Storm Sewer Results in Increased Flows Downstream
  - Mitigation Includes Upsizing Storm Sewer to Handle More of the 100-yr Volume and Adding Restrictor at Outfall
  - Results in Oversized Storm Sewer with Lower Velocities
Recommended Alternative

- Inline Detention Pond Upstream of CIPs
- Joint City-HCFCD Pond
- Restricted flows upstream result in better functionality of the proposed storm sewer system CIPs
- Reduces roadway ponding from the channel

Project Results

- Reduced storm sewer sizes
- Lower construction costs
- Reduced flooding levels
- Structures removed from floodplain
  - HCFCD structural inventory
  - City survey of slabs
- General agreement between City and HCFCD on joint project approach
- Pitfalls
  - Timing (storm sewer vs. watershed)
  - Model sensitivity
  - Limitations with accepted methodologies

ANY QUESTIONS?

WE HOPE TO WORK WITH YOU IN THE FUTURE

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