Tributary C124-00-00 Feasibility Study

HCFCD Project ID: **C124-00-00-P001**
Bond ID: **F-93**

TFMA Annual Meeting 2023, March 9th
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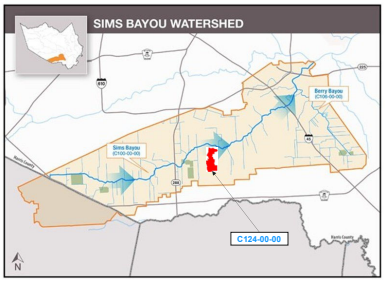
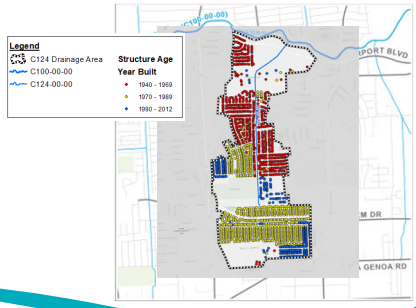
Sims Bayou Overview

- Includes Sims Bayou and Berry Bayou
- Covers 94 square miles
- Includes 121 miles of open streams
- Shared with Fort Bend County and includes the Cities of Houston, Missouri City, Pasadena, and South Houston

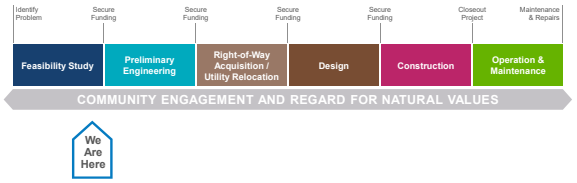


Study Area

- Tributary length: 1.5 miles
- Project area: 641 acres
- Residential (most homes built 1960s-1980s)
- Flooding history
  - Hurricane Harvey and Halloween 2015



Project Lifecycle



Key Considerations

- Recommend measures to reduce flood risks to provide equitable flood risk reduction solutions
- Encourage multi-functional uses(i.e. potential joint detention/park use)
- Avoid or minimize the acquisition of homes and businesses
- Must not transfer flood risk (zero downstream impact)
- Appropriately consider costs and benefits
- Minimize operations and maintenance costs
- Seek and incorporate stakeholder and general community input

Goals and Objectives

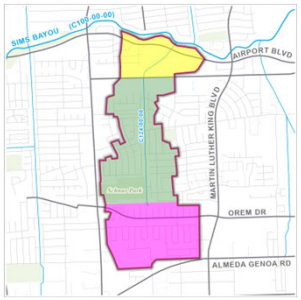
- Identify persistent flooding problems
- Evaluate and analyze source of problems
- Develop strategies for improvements
- Evaluate and analyze alternatives/strategy
- Determine the road map for implementation

Project Area Drainage Issues

- Insufficient internal drainage system capacity
- Overflows from area channels (C127 overflow, C124)
- Tailwater Conditions (C100)

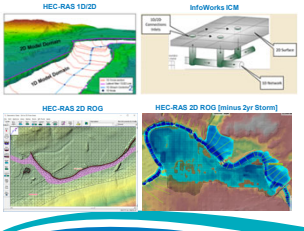
Flooding Concerns by areas of Tributary C124-00-00

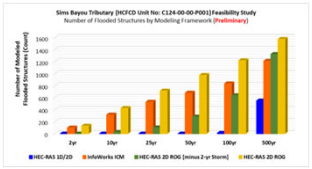
- Upstream Reach (Purple)
- Mid-Reach (Green)
- Downstream Reach (Yellow)



Capturing the Flood Risk

Modeling Approaches for Consideration

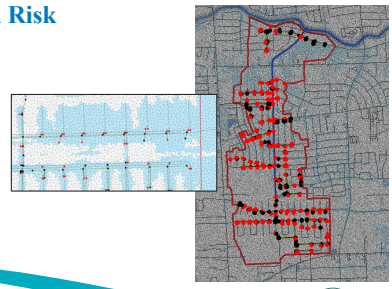




Capturing the Flood Risk

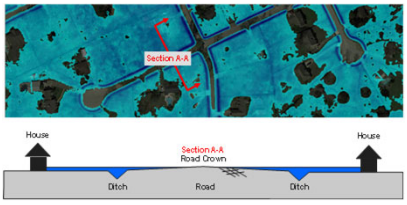
Selected Modeling Approach

- Combined Storm Sewer (1D) and Surface Flood Modeling (2D) (InfoWorks ICM)
- Houston GIMS Storm Sewer Data
- HCFCD Structure Inventory 2013
- 2018 LIDAR, 2016 NLCD Land Use Data
- Atlas14 Storms (2yr, 10yr, 25yr, 50yr, 100yr, 500yr)



Capturing the Flood Risk

Understanding Neighborhood Ponding Conditions



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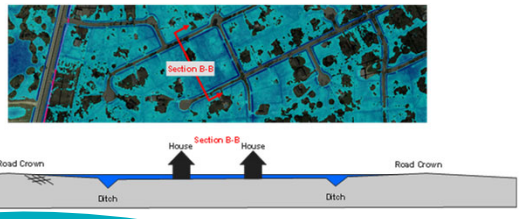
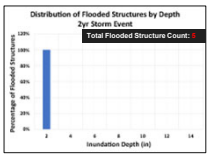
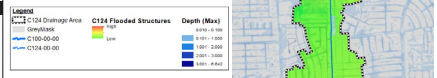
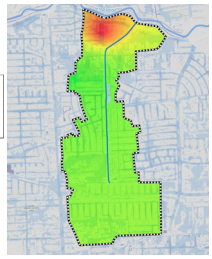


Capturing the Flood Risk

Modeled Results, Flooded Structures by Depth (2yr)



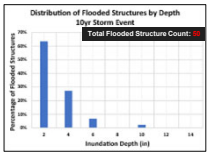


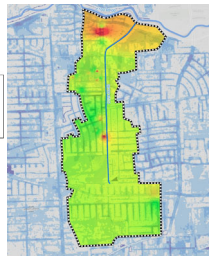


Tributary C124-00-00 Feasibility Study DRAFT

Capturing the Flood Risk

Modeled Results, Flooded Structures by Depth (10yr)

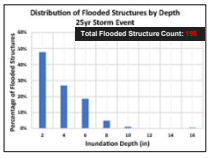


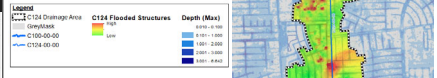


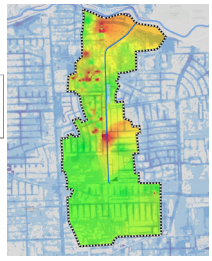
Tributary C124-00-00 Feasibility Study DRAFT

Capturing the Flood Risk

Modeled Results, Flooded Structures by Depth (25yr)







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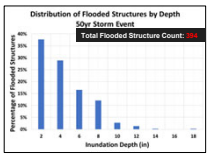
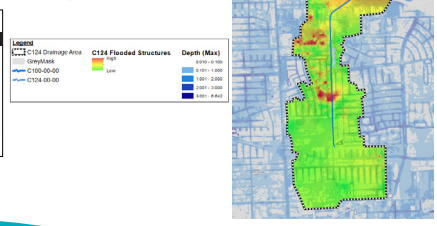
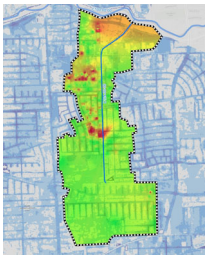
Capturing the Flood Risk

Modeled Results, Flooded Structures by Depth (50yr)



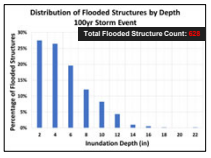


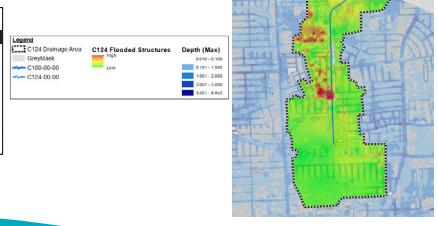


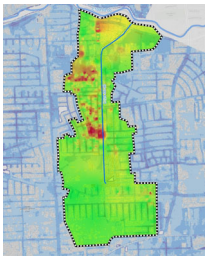
Tributary C124-00-00 Feasibility Study DRAFT

Capturing the Flood Risk

Modeled Results, Flooded Structures by Depth (100yr)



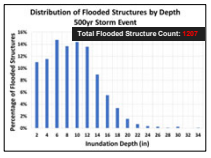


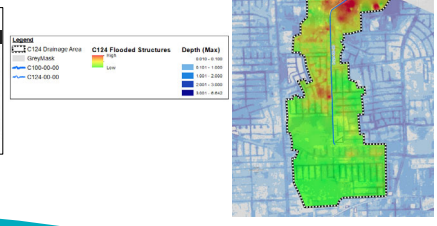


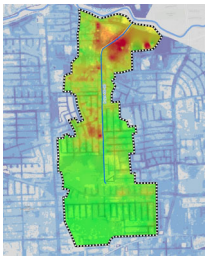
Tributary C124-00-00 Feasibility Study DRAFT

Capturing the Flood Risk

Modeled Results, Flooded Structures by Depth (500yr)





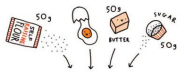


Tributary C124-00-00 Feasibility Study DRAFT

Flood Mitigation Tools

Tools…

- Drainage Improvements
- Channel Improvements
- Detention Mitigation
- "Strategic" Buyouts
- Overflow Mitigation
- Utility Relocation, Bridge Elevation
- Sheet flow interception



Concepts Formulation…

- Strategic Buyouts and Sheet flow interceptors
- Local Drainage Improvements and Detention
- Utility Relocation and Channel Improvements
- Channel Improvements / Detention

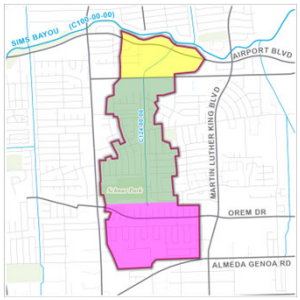
Proposed Recommendations

Upstream Reach (Purple)

- Storm sewer improvements upstream of the C124-00-00 tributary
- Stormwater detention basin

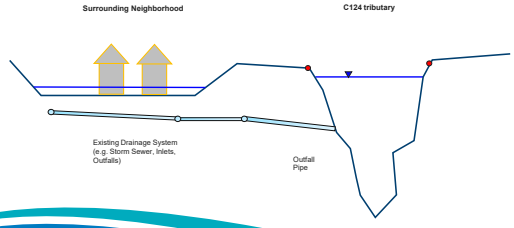
Mid-Reach (Green) & Downstream Reach (Yellow)

- Storm sewer improvements in the middle and lower reaches
- Stormwater detention basins



Concept Formulation

Storm Sewer Improvs. + Detention Mitigation



Concept Formulation

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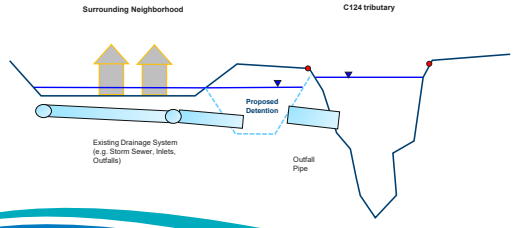


Mitigation Concept #3

SS Improvs. (Upper/Mid) + Regional Det. (Lower) + SS Realignment

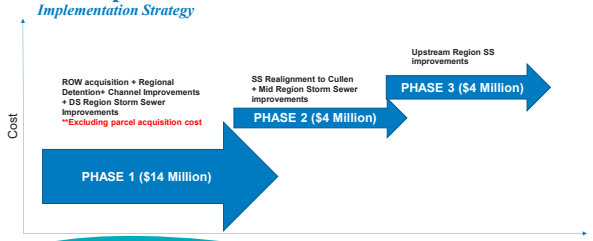
- Could be built as Inline Detention
- Storm Sewer Improvements
- Would mitigate for future improvements
- System wide benefits

Overview & Cost Summary

Mitigation Concept	Benefitted Structures (100-year)	Benefitted Structures (10-year)	Estimated Cost
System-wide Drainage Improvements and Stormwater Detention Basins Totals include: • Regional Stormwater Detention Basin (290 acre-feet) • Joint-Use City of Houston/Flood Control District Stormwater Detention Basin (95 acre-feet) • City of Houston Storm Sewer Improvements (2.4 miles)	287	49	$42 million

Concept #3

Implementation Strategy



Next Steps

- Initiation Preliminary Engineering Stage (PER)
- Continue to seek project and funding partners, joint implementation needed to realize full benefits
- Jurisdiction limitation:
  - Flood Control District = open channel and regional detention
  - City of Houston = neighborhood drainage
- F-93 bond budget: $10million

Thank You!

For More Information, please refer to (https://www.hcfcd.org/F93)

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