Update from Consultant Team

Neches Regional Flood Planning Group

February 23, 2022

1

Agenda

- Task 10 Update
  - Submission on Adopted Final 2023 Neches Regional Flood Plan
- Task 12 Update
  - City of Tyler Master Drainage Plan
  - City of Jasper Master Drainage Plan
- Update on Budget
  - Approval for Technical Consultant to submit written request to TWDB to redirect funds to effort for Tasks 12 and 13.

2

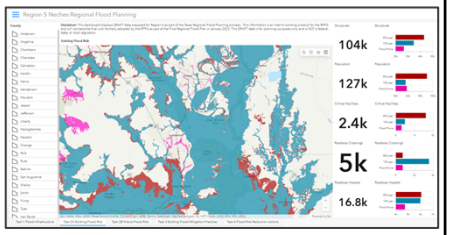
Task 10 Update

- Final 2023 Regional Flood Plan submitted to TWDB on 1/10/2023
  - Volume 1: 314 pages
  - Volume 2: 4,019 pages (Virtual Copy)
  - Volume 2: 1,535 pages (Hard Copy)
- Receipt of Final RFP acknowledged by TWDB on January 11, 2023

3

Final RFP Major Accomplishments

- Compiled and Processed Significant Amount of Flood Data
  - Developed regionwide datasets useful for flood management
    - Existing Flood Infrastructure
    - Ongoing/Proposed Flood Mitigation Projects
    - Critical Facilities and Infrastructure
    - Flood Exposure/Social Vulnerability
  - Developed Interactive GIS Dashboard accessible to public

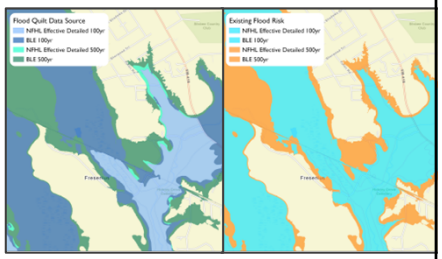


Interactive GIS Dashboard accessible through nechesfloodplanning.org

4

Final RFP Major Accomplishments

- Developed Regionwide Flood Hazard
  - Full regionwide coverage of riverine, coastal, and local flood hazard
  - Developed regionwide flood hazard for both existing and future conditions
  - Identified and incorporated additional flood prone areas
  - Laid the foundation for future cycles of flood planning



5

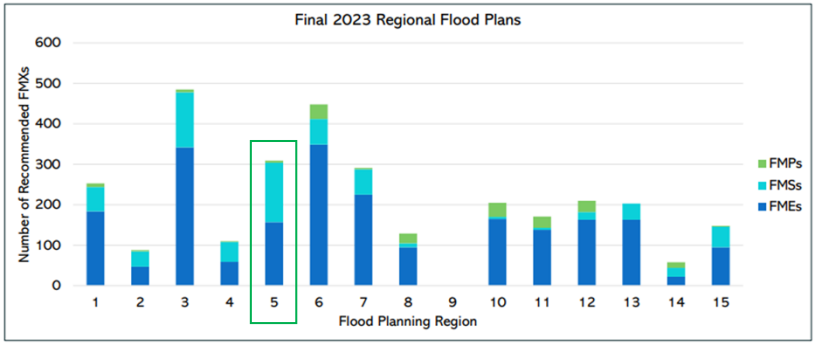
Final RFP Major Accomplishments

- Identified and Recommended Actions to Reduce Flood Risk and Improve Regionwide Understanding of Flood Hazard

Flood Mitigation Action	Number of Recommended Actions	Total Flood Mitigation Action Cost
FME	157	$89,445,825
FMS	147	$175,036,700
FMP	5	$1,111,720,866
Total	309	$1,376,203,391

6

Statewide Comparison



7

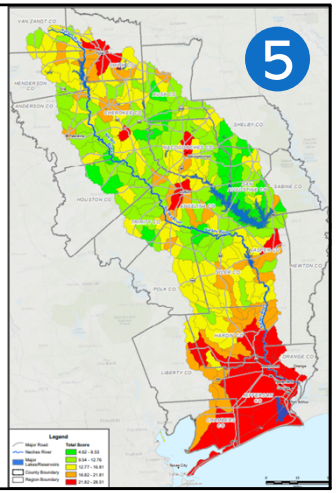
Task 12 Objective

- To perform, within the RFPG's resources and the time available, a portion of currently recommended FMEs to identify additional FMPs for inclusion in the amended regional flood plan due July 14, 2023. Implementing these select FMEs includes the following:
  - Evaluate flood risks in areas with currently limited flood risk data
  - Evaluate flood risk reduction solutions, including feasibility studies
  - Preliminary engineering needed to identify, evaluate, and recommend additional potentially feasible FMPs
- The primary function of each recommended FMP must be flood risk reduction to life and property, and they must include quantifiable flood risk reduction benefits.
- The RFPG ultimately directs the work conducted under Task 12
  - The Technical Consultant team can help craft criteria to balance the desired outcomes of Task 12

8

Task 12 FME Mitigation Need Analysis

- Utilize Task 4A Needs Assessment as initial ranking
  - FMEs that intersect areas of high flood mitigation need
- Intersected 156 recommended FMEs with results of the Needs Analysis
  - 50 FMEs identified within areas of high need
- RFPG ranked FMEs in September 21st meeting
  - 7 Primary FMEs
  - 5 Secondary FMEs
  - 38 Not Recommended FMEs



5

9

Task 12 FMEs (Primary)

5

FME Name	Description	Sponsor	FME Cost
Crane Bayou Channel Improvements*	H&H study to identify alternatives for Crane Bayou Channel	Jefferson County Drainage District 7	$100,000
Main A Channel Improvements*	H&H study to identify alternatives for Main A Channel	Jefferson County Drainage District 7	$100,000
Upper Johns Gulley Upgrade Drainage Channel*	H&H study to identify alternatives for Upper Johns Gulley drainage improvements	Jefferson County Drainage District 7	$100,000
Hardin County SE Area Drainage System	H&H study to identify alternatives for developing a large drainage system to drain Lumberton directly into the Neches River, instead of Pine Island Bayou.	Hardin County	$1,250,000
City of Tyler Master Drainage Plan	Perform H&H modeling to identify and define flood risk, develop conceptual alternatives to reduce flood risk, develop OPCC for conceptual alternatives, and rank projects. Conceptual alternatives should evaluate feasibility of nature based solutions.	City of Tyler	$2,200,000
Bridge City Drainage Outfall Improvement Project	Improve and extend three major drainage ditches and extend a neighborhood outfall to reduce structural flooding in residences within the area.	City of Bridge City	$200,000
City of Jasper Master Drainage Plan	Perform H&H modeling to identify and define flood risk, develop conceptual alternatives to reduce flood risk, develop OPCC for conceptual alternatives, and rank projects. Conceptual alternatives should evaluate feasibility of nature based solutions.	City of Jasper	$440,000

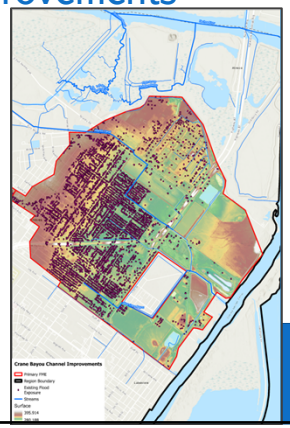
*Modeling effort to be completed by JCDD7

10

Crane Bayou Channel Improvements

5

- FME ID: 051000124
- Sponsor: Jefferson County Drainage District 7
- H&H Study to identify alternatives for Crane Bayou Channel
- Modeling effort to be conducted by JCDD7



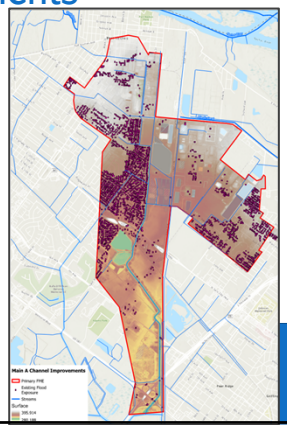
Rank 8

11

Main A Channel Improvements

5

- FME ID: 051000118
- Sponsor: Jefferson County Drainage District 7
- H&H study to identify alternative for Main A Channel
- Modeling effort to be conducted by JCDD7



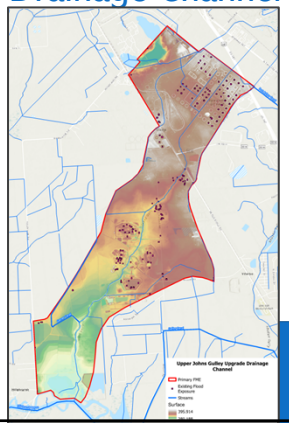
Rank 9

12

Upper Johns Gulley Upgrade Drainage Channel

5

- FME ID: 051000112
- Sponsor: Jefferson County Drainage District 7
- H&H study to identify alternatives for Upper Johns Gulley drainage improvements
- Modeling effort to be conducted by JCDD7



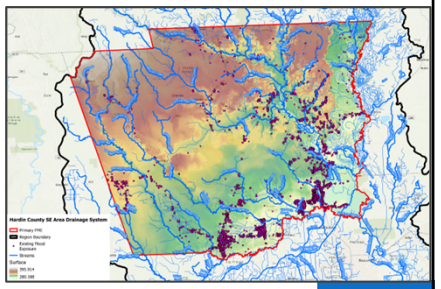
Rank 24

13

Hardin County SE Area Drainage System

5

- FME ID: 051000090
- Sponsor: Hardin County
- H&H study to identify alternative for developing a large drainage system to drain Lumberton directly into the Neches River instead of Pine Island Bayou
- Coordinating with JCDD6 FIF team on modeling results



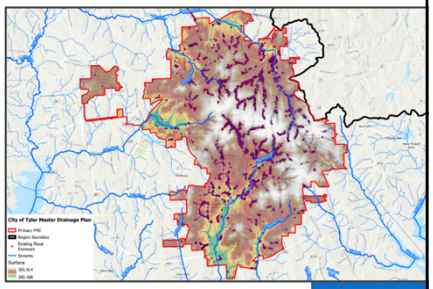
Rank 2

14

City of Tyler Master Drainage Plan

5

- FME ID: 051000058
- Sponsor: City of Tyler
- Perform H&H modeling to identify and define flood risk, develop conceptual alternatives to reduce flood risk, develop OPCC for conceptual alternatives, and rank projects.



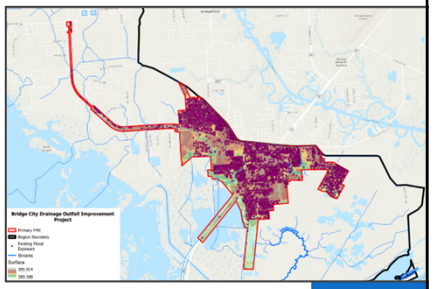
Rank 4

15

Bridge City Drainage Outfall Improvement Project

5

- FME ID: 051000155
- Sponsor: Orange County Drainage District
- Improve and extend three major drainage ditches and extend a neighborhood outfall to reduce structural flooding in residences within the area



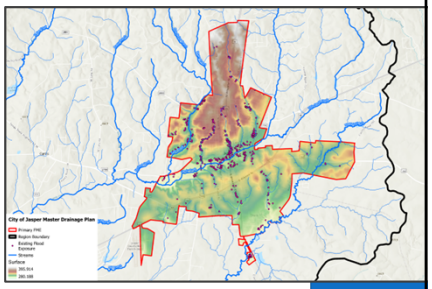
Rank 6

16

City of Jasper Master Drainage Plan

5

- FME ID: 051000052
- Sponsor: City of Jasper
- Perform H&H modeling to identify and define flood risk, develop conceptual alternatives to reduce flood risk, develop OPCC for conceptual alternatives, and rank projects.



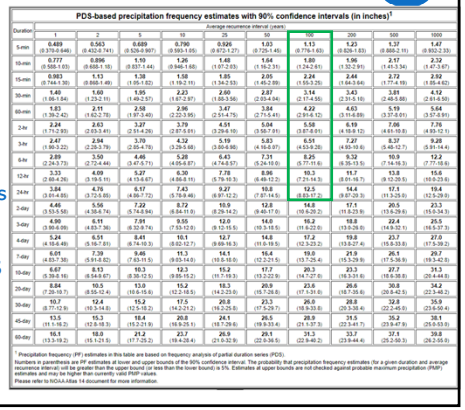
Rank 17

17

Modeling Methodology - Hydrology

5

- Hydrology modeling done in HEC-HMS 4.10 and HEC-RAS 6.3.1
  - 100-YR 24-HR Atlas-14 rainfall being utilized
  - Clark Unit Hydrograph being utilized to correlate with practices established by Lower Sabine FIF study
  - Losses accounted for in HEC-RAS 6.3.1



PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.409 (0.370-0.449)	0.563 (0.402-0.741)	0.689 (0.526-0.907)	0.790 (0.593-1.05)	0.926 (0.672-1.27)	1.03 (0.725-1.45)	1.13 (0.776-1.63)	1.23 (0.826-1.83)	1.37 (0.888-2.10)	1.47 (0.932-2.33)
10-min	0.777 (0.705-0.853)	0.896 (0.648-1.18)	1.10 (0.837-1.44)	1.26 (0.946-1.68)	1.48 (1.07-2.03)	1.64 (1.16-2.31)	1.80 (1.24-2.61)	1.96 (1.32-2.91)	2.17 (1.41-3.34)	2.32 (1.47-3.67)
15-min	0.983 (0.744-1.30)	1.13 (0.868-1.49)	1.38 (1.05-1.82)	1.58 (1.19-2.11)	1.85 (1.34-2.53)	2.05 (1.45-2.89)	2.24 (1.55-3.25)	2.44 (1.64-3.64)	2.72 (1.77-4.19)	2.92 (1.85-4.62)
30-min	1.49 (1.06-1.84)	1.69 (1.23-2.11)	1.95 (1.49-2.57)	2.23 (1.67-2.97)	2.60 (1.88-3.56)	2.87 (2.03-4.04)	3.14 (2.17-4.56)	3.43 (2.31-5.10)	3.81 (2.48-5.88)	4.12 (2.61-6.50)
60-min	1.83 (1.39-2.42)	2.11 (1.62-2.78)	2.58 (1.97-3.40)	2.96 (2.22-3.95)	3.47 (2.51-4.75)	3.84 (2.71-5.44)	4.22 (2.91-6.12)	4.63 (3.11-6.89)	5.19 (3.37-8.01)	5.64 (3.57-8.91)
2-hr	2.24 (1.71-2.80)	2.63 (2.03-3.44)	3.27 (2.51-4.26)	3.79 (2.87-5.01)	4.51 (3.29-6.10)	5.04 (3.66-7.04)	5.58 (3.87-8.01)	6.19 (4.16-9.12)	7.06 (4.61-10.8)	7.76 (4.99-12.1)
3-hr	2.47 (1.90-3.22)	2.94 (2.28-3.79)	3.70 (2.85-4.78)	4.32 (3.29-5.68)	5.19 (3.80-6.98)	5.83 (4.16-8.07)	6.51 (4.53-9.28)	7.27 (4.88-10.6)	8.37 (5.48-12.7)	9.28 (5.91-14.4)
6-hr	2.89 (2.24-3.73)	3.50 (2.72-4.44)	4.46 (3.47-5.71)	5.28 (4.05-6.87)	6.43 (4.74-8.57)	7.31 (5.24-10.0)	8.25 (5.77-11.6)	9.32 (6.35-13.5)	10.9 (7.14-16.3)	12.2 (7.77-18.6)
12-hr	3.33 (2.60-4.26)	4.09 (3.19-5.11)	5.27 (4.13-6.67)	6.30 (4.86-8.15)	7.78 (5.79-10.3)	8.96 (6.49-12.2)	10.3 (7.21-14.5)	11.7 (8.01-16.7)	13.8 (9.12-20.5)	15.6 (10.0-23.6)
24-hr	3.84 (3.01-4.85)	4.76 (3.72-5.85)	6.17 (4.86-7.72)	7.43 (5.78-9.46)	9.27 (6.97-12.2)	10.8 (7.87-14.5)	12.5 (8.83-17.2)	14.4 (9.87-20.3)	17.1 (11.3-25.0)	19.4 (12.5-29.0)
2-day	4.46 (3.53-5.58)	5.56 (4.38-6.74)	7.22 (5.74-8.94)	8.72 (6.84-11.0)	10.9 (8.29-14.2)	12.8 (9.40-17.0)	14.8 (10.6-20.2)	17.1 (11.8-23.9)	20.5 (13.6-29.6)	23.3 (15.0-34.3)
3-day	4.99 (3.95-6.09)	6.11 (4.83-7.38)	7.91 (6.32-9.74)	9.55 (7.53-12.0)	12.0 (9.12-15.5)	14.0 (10.3-18.5)	16.2 (11.6-22.0)	18.8 (13.0-26.0)	22.4 (14.9-32.1)	25.5 (16.5-37.3)
4-day	5.24 (4.16-6.48)	6.51 (5.16-7.81)	8.41 (6.74-10.3)	10.1 (8.02-12.7)	12.7 (9.69-16.3)	14.8 (10.9-19.5)	17.2 (12.3-23.2)	19.8 (13.8-27.4)	23.7 (15.8-33.8)	27.0 (17.5-39.2)
7-day	6.01 (4.83-7.38)	7.39 (5.91-8.82)	9.46 (7.63-11.5)	11.3 (9.03-14.0)	14.1 (10.8-18.0)	16.4 (12.1-21.5)	19.0 (13.7-25.4)	21.9 (15.3-29.9)	26.1 (17.5-36.9)	29.7 (19.3-42.8)
10-day	6.67 (5.39-8.16)	8.13 (6.54-9.87)	10.3 (8.38-12.5)	12.3 (9.95-15.2)	15.2 (11.7-19.3)	17.7 (13.2-22.9)	20.3 (14.7-27.6)	23.3 (16.3-31.6)	27.7 (18.5-39.8)	31.3 (20.4-44.8)
20-day	8.84 (7.29-10.7)	10.5 (8.55-12.4)	13.0 (10.6-15.6)	15.2 (12.2-18.5)	18.3 (14.2-23.0)	20.9 (15.7-26.8)	23.6 (17.1-31.0)	26.6 (18.7-35.8)	30.8 (20.8-42.5)	34.2 (22.3-48.2)
30-day	10.7 (8.77-12.9)	12.4 (10.3-14.6)	15.2 (12.5-18.2)	17.5 (14.2-21.2)	20.8 (16.2-25.8)	23.3 (17.5-29.7)	26.0 (18.9-33.8)	28.8 (20.3-38.4)	32.8 (22.2-45.0)	35.9 (23.6-50.4)
45-day	13.5 (11.1-16.2)	15.3 (12.8-18.3)	18.4 (15.2-21.9)	20.8 (16.9-25.1)	24.1 (18.7-29.6)	26.5 (19.9-33.4)	28.9 (21.1-37.3)	31.5 (22.1-41.7)	35.2 (23.9-47.9)	38.1 (25.0-53.0)
60-day	16.1 (13.3-19.2)	18.0 (15.1-21.5)	21.2 (17.7-25.2)	23.7 (19.4-28.4)	26.9 (21.6-32.9)	29.1 (22.8-36.5)	31.3 (22.9-40.2)	33.7 (23.8-44.4)	37.1 (25.2-50.3)	39.8 (26.2-55.0)

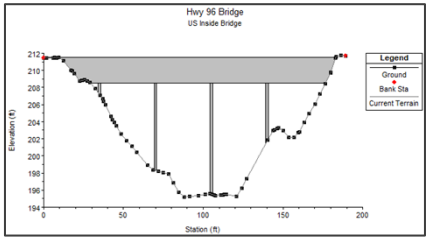
[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
Please refer to NOAA Atlas 14 document for more information.

18

Modeling Methodology - Hydraulics

5

- Hydraulic modeling done in HEC-RAS 6.3.1
  - Soils data taken from SSURGO, parameters taken from Texas GLO SOP Guidance Table 3-15
    - Deficit Constant loss method being utilized for soils
  - Land Cover and Impervious data taken from NLCD 2019
    - Roughness values taken from values calibrated for Upper Sabine FIF study
  - Culvert and Bridge data sourced from information compiled by TXDOT
    - Assumptions made for amount of cover, pier width, and deck thickness



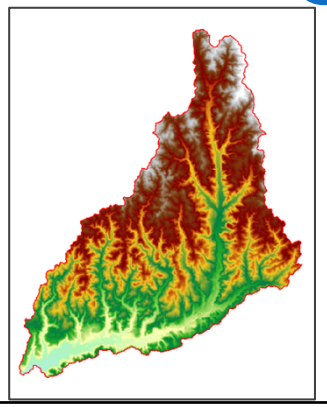
19

City of Jasper Flood Study FME Update

5

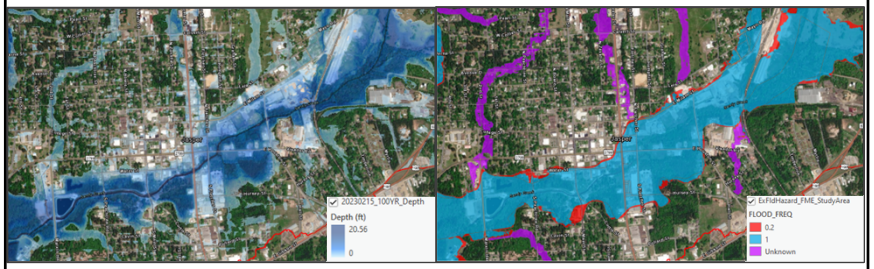
Model Development

- Study Area: Sandy Creek Watershed
  - Boundary created using HUC12 Boundaries from RFP effort
- Land Cover taken from NLCD 2019 and USGS Soils data (SSURGO)
- Precipitation data taken from NOAA Atlas-14
  - Analyzed Existing Conditions using 24-HR 100-YR storm



20

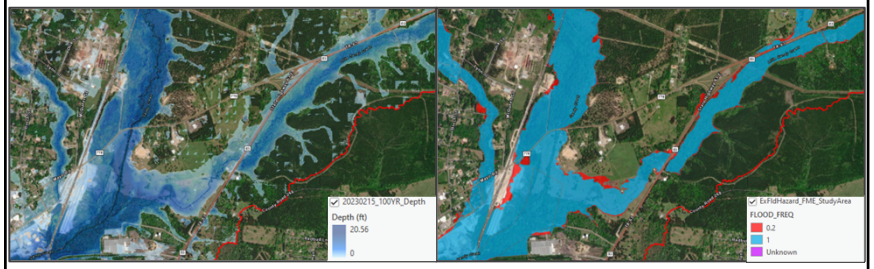
City of Jasper Flood Study FME Update



Preliminary100-YR Maximum Depth Model Output | Task 2A Flood Hazard

21

City of Jasper Flood Study FME Update

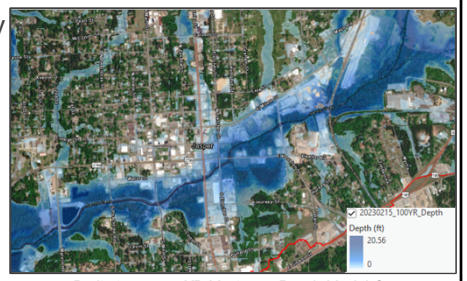


Preliminary100-YR Maximum Depth Model Output | Task 2A Flood Hazard

22

City of Jasper Flood Study FME Update

- Primarily examining portion of Sandy Creek that intersects City of Jasper boundary
  - Channel Improvements
  - Detention Pond
- Next Steps
  - Evaluation of alternative projects for feasibility
  - Proposed conditions model development



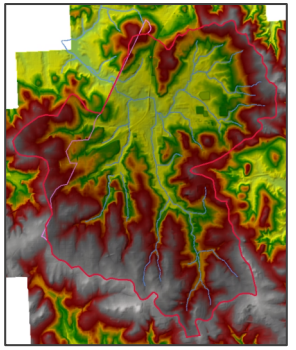
Preliminary100-YR Maximum Depth Model Output

23

City of Tyler Flood Study FME Update

Model Development

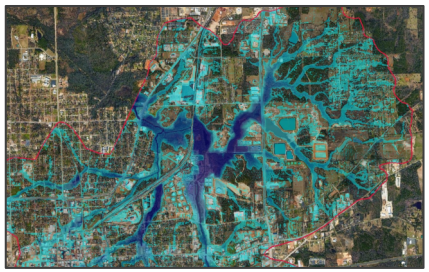
- Study Area: Upper Black Fork Creek Watershed
  - Boundaries updated based on 2016 LIDAR
- Landcover developed from City of Tyler Future Land Use and USGS Soils data
  - Manning's assigned by USACE Table 2-1
  - Curve number assigned
- NOAA Atlas 14 Rain-on-Grid
  - 10-, 25-, and 100-year events
- Refinements for breaklines, roughness, and leaky cells



Study Area 2016 LIDAR

24

City of Tyler Flood Study FME Update



Preliminary 100-YR Maximum Depth Model Output

City of Tyler Consultation

- Met with City staff in November to discuss potential projects
  - Natural Channel Improvements and Regional Detention

Next Steps

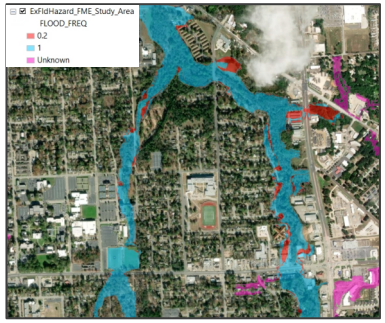
- Evaluation of alternative projects for feasibility
- Proposed conditions model development

25

City of Tyler Flood Study FME Update

Pinkerton Project Area

Preliminary 100-YR Maximum Depth Model Output



Task 2A Flood Hazard

26

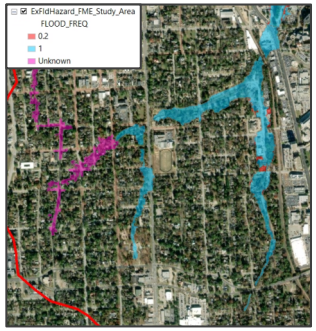
City of Tyler FME Pinkerton Project Area

27

Update on Task 12 (City of Tyler Flood Study)

Azalea District Project Area

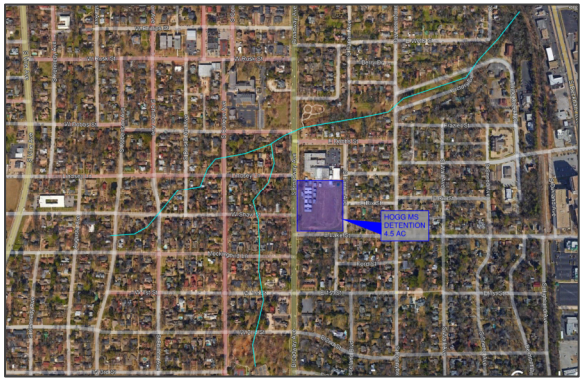
Preliminary 100-YR Maximum Depth Model Output



Task 2A Flood Hazard

28

City of Tyler FME Azalea District Regional Detention

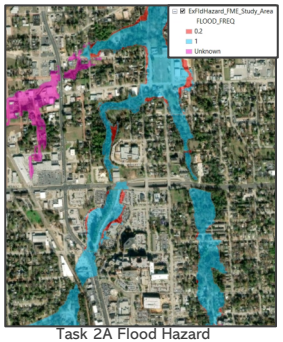


29

Update on Task 12 (City of Tyler Flood Study)

Hospital Confluence Study Area

Preliminary 100-YR Maximum Depth Model Output



Task 2A Flood Hazard

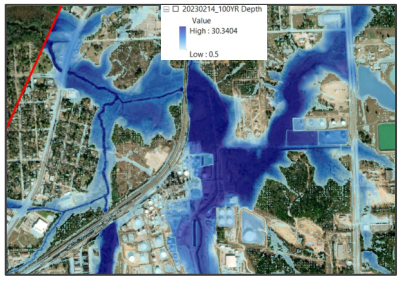
30

City of Tyler FME Hospital Confluence Study Area

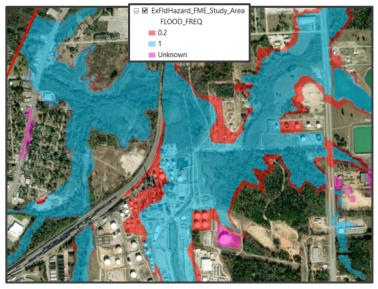
31

Update on Task 12 (City of Tyler Flood Study)

Gentry Regional Detention Project Area



Preliminary 100-YR Maximum Depth Model Output



Task 2A Flood Hazard

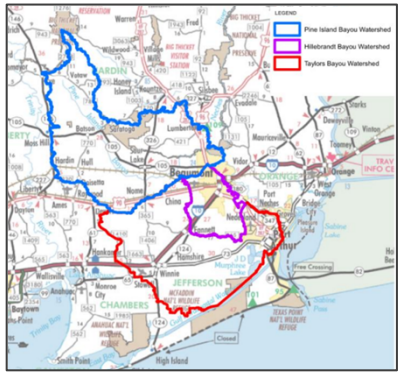
32

City of Tyler FME Gentry Road Regional Detention

33

Additional projects from DD6 FIF Study

- Coordination ongoing with JCDD6 FIF team to acquire projects to be included in the Amended RFP
  - Project list currently in development; focus on projects including channel improvements and construction of new alignments/detention ponds
- Projects located throughout extent of study
  - Taylors Bayou
  - Hillebrandt Bayou
  - Pine Island Bayou
- Incorporation of FMPs require TWDB to approve use of Task 12 funds



34

Budget Update

Task	Original Budget	Revised Budget	Amount Changed	% Change
1	$ 57,445.00	$ 57,399.75	$ (45.25)	- 0.08%
2a	$ 114,890.00	$ 140,886.84	$ 25,996.84	22.63%
2b	$ 114,890.00	$ 132,300.52	$ 17,410.52	15.15%
3a	$ 22,978.00	$ 22,856.28	$ (121.72)	- 0.53%
3b	$ 11,489.00	$ 10,546.04	$ (942.96)	- 8.21%
4a	$ 34,467.00	$ 33,605.42	$ (861.58)	- 2.50%
4b	$ 172,335.00	$ 167,566.14	$ (4,768.86)	- 2.77%
4c	$ 22,978.00	$ 29,990.44	$ 7,012.44	30.52%
5	$ 229,780.00	$ 162,068.18	$ (67,711.82)	- 29.47%
6a	$ 45,956.00	$ 41,404.32	$ (4,551.68)	- 9.90%
6b	$ 11,489.00	$ 7,464.82	$ (4,024.18)	- 35.03%
7	$ 11,489.00	$ 11,998.30	$ 509.30	4.43%
8	$ 11,489.00	$ 11,392.65	$ (96.35)	- 0.84%
9	$ 22,978.00	$ 21,922.69	$ (1,055.31)	- 4.59%
10	$ 195,347.00	$ 234,393.71	$ 39,046.71	19.99%
11	$ 96,465.00	$ 56,447.01	$ (40,017.99)	- 41.48%
12	$ 385,860.00	$ 385,860.00	$ -	-
13	$ 160,775.00	$ 194,996.89	$ 34,221.89	21.29%
Total	**$ 1,723,100.00**	**$ 1,723,100.00**	**$ -**	**-**

35

Planning Schedule

March
- Finalize FME Modeling
- Coordinate with JCDD6 and 7 to acquire projects for inclusion in the Amended RFP
- Present Preliminary FMP findings

April
- Perform BCA on elevated FMEs
- Begin updating RFP with required TWDB FMP information
- Begin updating Amended RFP

May- July
- Finalize Amended RFP
- Vote on adoption and submission of Amended RFP in June 2023
- Submit Amended RFP by July 14th, 2023

36