

# Scope and Budget to Perform FMEs

## Table of Contents

FME ID Number	FME Title	County	Sponsor	Estimated Study Cost	Page
101000043	Edison & Creek Street	Gillespie	Fredericksburg	\$49,000	2
101000035 (FMP)	Creek Street at Barons Creek	Gillespie	Fredericksburg	\$60,000	5
101000116 & 101000165	Whitman Branch Bypass; Oak Ridge Dr Creek, including Detention	Burnet	Marble Falls	\$89,000	8
101000167	Broadway Street at Whitman Branch Low Water Crossing	Burnet	Marble Falls	\$62,000	11
101000027	FM 812 at Little Alum Creek	Bastrop	Bastrop Co.	\$86,000	14
101000102	Piney Creek Benching	Bastrop	Bastrop Co.	\$88,000	17
101000189	Wastewater Treatment Plant Floodproofing	Jackson	Edna	\$66,000	20
<b>Total</b>				<b>\$500,000</b>	

# Flood Management Evaluation (FME) STUDY

## Lower Colorado-Lavaca REGIONAL FLOOD PLANNING GROUP

REGION 10

Title Edison & Creek Street ID# 101000043  
Sponsor (name of entity) Fredericksburg (Municipality) Commitment  Yes  No  
Technical committee recommend  Yes  No RFPG recommend  Yes  No

### Study Type

Emergency preparedness  Floodplain modeling, mapping and risk assessment  Feasibility study  Preliminary project engineering  
 Other

### Problem Area

City Fredericksburg County Gillespie  
Watershed Pedernales  
name(s)  
Tributary(ies) Unnamed Tributary  
HUC# 12090206 Stream miles (est.) 0.25  
Drainage area: square miles, est 0.05 or acreage, est. 32  
Social vulnerability index 0.1  
(SVI score 0.0 indicates least vulnerable; 1.0 indicates most vulnerable.)  
Other Roadway/Crossing Improvements



### Flood Risk Description

The existing crossing is undersized and overtops. The existing crossing is a multi-box (2) culvert. The proposed improvements include upgrades to the subject crossing. The existing road is a 2-lane road with an average daily traffic count of 117.

Population at risk 0 Structures at risk 0 Critical facilities at risk 0  
Farm/Ranch land impacted (acres) 0 Roadway(s) impacted (miles) 0.00

### Scope of Study

Conduct a study to evaluate upsizing the existing culvert crossing. Study will include hydrologic and hydraulic modeling (with Atlas 14 rainfall), preliminary design of improvements, risk reduction analysis, verification of no adverse impacts, preparation of cost estimates and a benefit-cost-analysis, and an evaluation of potential constraints (environmental, utility conflicts, right-of-way needs, and constructability).

### Related Goal(s)

6.1 Reduce the number of structures and critical facilities that are at high risk of repetitive loss through the implementation of structural flood mitigation projects.

### Estimated Study Cost

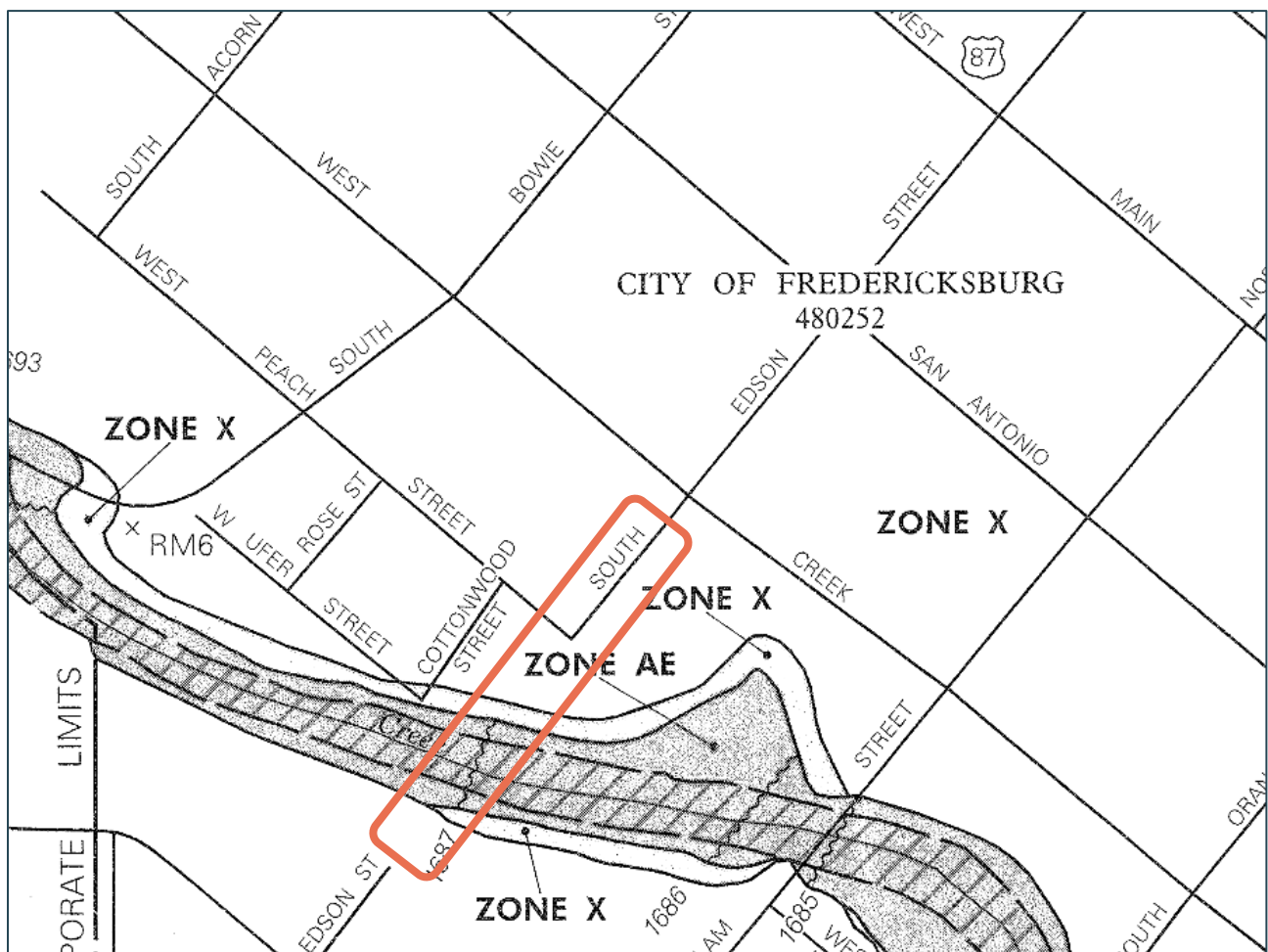
Cost \$100,000 Potential funding source(s) TBD

# Scope and Budget to Perform FMEs

FME ID	Title	County	Sponsor	Source
101000043	Edison & Creek Street	Gillespie	City of Fredericksburg	Fredericksburg Drainage Master Plan

## Study Objective

Develop a preliminary design of improvements to increase the capacity of the channel to reduce overtopping which inundates Edison St. and may threaten adjacent houses. The channel is conveyed through undersized driveway culverts to Barons Creek as shown on the figure below. This FME will include updating the FEMA flood hazard analysis and mapping with Atlas 14 rainfall data, more current LiDAR terrain data, more advanced modeling, and evaluation of flood mitigation alternatives. This FME will also include development of preliminary capital cost estimates, quantification of flood risk reduction benefits, benefit-cost analyses, evaluation of potential adverse impacts to flooding of adjacent properties, and a high-level evaluation of potential constraints including environmental impacts, permitting, utility relocations, land acquisition, and constructability issues per adopted FMP screening criteria. With completion of the study a determination will be made as to whether this FME meets criteria for reclassification as a Flood Mitigation Project.



# Scope and Budget to Perform FMEs

## Required Information for FMP

A new HEC-RAS version 6.2 model will be developed using rain-on-grid hydrologic methodology and 2-dimensional (2D) hydraulic analysis to model the shallow flood characteristics of the site. The 2D modeling may also be supported by culvert hydraulic modeling. These methods are more efficient and accurate compared to the rainfall-runoff model and 1D hydraulics used in the effective FEMA flood insurance study. The new model will use 2019 LiDAR terrain data for the watershed and stream channel available from TNRIS, and NWS Atlas 14 rainfall data.

## Sponsor Outreach

Mr. Garret Bonn, Assistant City Engineer and Interim Director of Development Services, was contacted via phone to confirm the City’s interest in having this FME included in the Regional Flood Plan. In a phone call on August 29, 2022 Mr. Bonn affirmed the City’s interest and support in having the RFPG perform this FME, as described herein, as part of the Task 12 effort. Mr. Bonn confirmed the general nature of the flood problem, is supportive of the study, and will assist as needed with local information, access to the site, and review of deliverables.

## Scope and Budget

Task	Description	Estimated Cost	Estimated Time to Complete (weeks)
1	Data collection / site visits	\$4,000	2
2	Update H&H modeling	\$8,000	4
3	Update alternatives analysis and/or preliminary design	\$9,000	4
4	Analyze flood risk reduction benefits	\$3,000	1
5	Verify no adverse impact	\$3,000	1
6	Develop/update cost estimate	\$5,000	1
7	Conduct cost-benefit analysis	\$4,000	1
8	Evaluate potential constraints (e.g., environmental, utility conflicts, right-of-way needs, permitting, and constructability)	\$3,000	2
9	Document study results in a sealed technical memorandum	\$10,000	4
<b>Totals</b>		<b>\$49,000</b>	<b>20</b>

Note: If task cost is blank, this task is not needed for this study.

## Recommendations

Proceed     Do not Proceed     Technical Committee Concurrence     RFPG Approval

**Prepared by:** FNI

**Date:** 8/30/2022

# Flood Mitigation Project (FMP)

Title  ID#   
Sponsor (note if City or County)  Commitment  Yes  No  
Technical committee recommend  Yes  No RFPG recommend  Yes  No

**REGION 10**

## Project Type

### STRUCTURAL

Detention  Channel modification  Bridge/culvert  Storm drain  Levee/floodwall

Other

### NON-STRUCTURAL

Property buyouts  Floodproofing  Flood readiness/resilience  Flood warning system/gauges

Other

## Problem Area

City  County   
Watershed name(s)   
Tributary(ies)   
HUC#(s)  Stream miles (est.)   
Drainage area: square miles, est  or acreage, est   
Social Vulnerability Index (SVI)   
*(SVI score 0.0 indicates least vulnerable; 1.0 indicates most vulnerable.)*  
Other



## Flood Risk Description

Creek Street overtops by approximately 11 feet during the 100-year event. The city has identified this crossing as a candidate for a flood early warning system because improving the roadway/crossing is not feasible.

Proposed level-of-service  Status  Atlas 14 rainfall used

## Project Description

Evaluate the type of flood early warning system (flashers, barricades, signage) and communication system requirements, select and install the flood warning system.

## Related Goal(s)

2.1 Increase the number of communities with warning and emergency response capabilities, or which participate in regional flood warning systems (e.g., City of Austin Flood Early Warning System) that can detect flood threats in real time and provide timely warning of impending flood danger.

## Estimated Project Cost

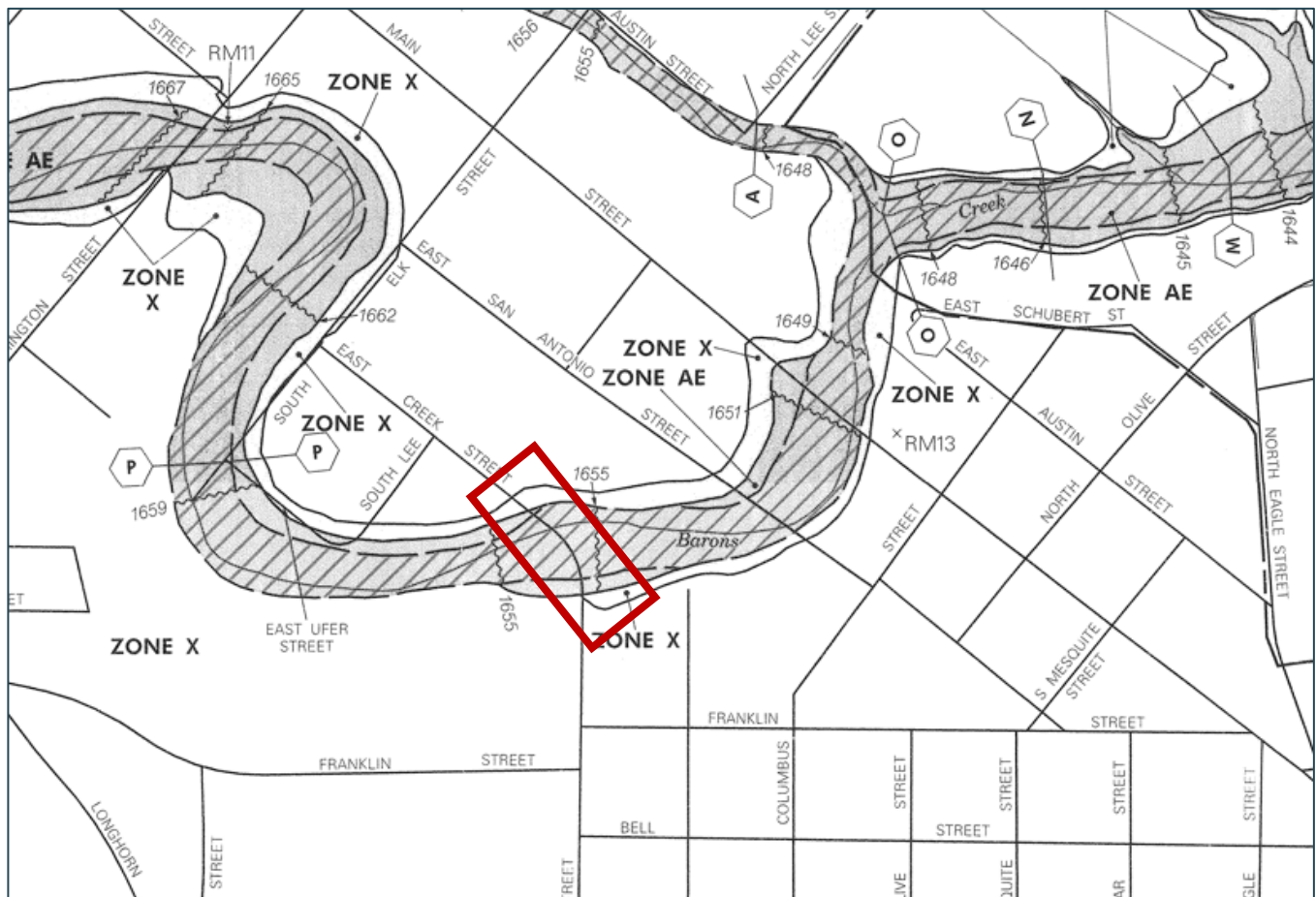
Capital cost  Ongoing O&M costs  Cost/benefit analysis   
Potential funding source(s)

# Scope and Budget to Perform FMEs

FMP ID	Title	County	Sponsor	Source
101000035	Creek Street at Barons Creek	Gillespie	City of Fredericksburg	Fredericksburg Drainage Master Plan

## Study Objective

Develop a preliminary design of improvements to increase the capacity of the low water crossing and reduce overtopping of South Creek Street. This potential FME was originally described and classified as an FMP to install a flood early warning system with no structural improvements to the roadway. This FME will include updating the FEMA flood hazard analysis and mapping with Atlas 14 rainfall data, more current LiDAR terrain data, more advanced modeling, and evaluation of flood mitigation alternatives. This FME will also include development of preliminary capital cost estimates, quantification of flood risk reduction benefits, benefit-cost analyses, evaluation of potential adverse impacts to flooding of adjacent properties, and a high-level evaluation of potential constraints including environmental impacts, permitting, utility relocations, land acquisition, and constructability issues per adopted FMP screening criteria. With completion of the study a determination will be made as to whether this FME meets criteria for reclassification as a Flood Mitigation Project.



# Scope and Budget to Perform FMEs

## Required Information for FMP

The existing FEMA effective HEC-RAS model will be updated to incorporate Atlas 14 rainfall data and updated to the latest version. The modeling may also include culvert hydraulic modeling. The new model will use 2019 LiDAR terrain data for the watershed and stream channel available from TNRIS, and NWS ATLAS 14 rainfall data. Current transportation code and criteria will be used to redesign/realign the intersection.

## Sponsor Outreach

Mr. Garret Bonn, Assistant City Engineer and Interim Director of Development Services, was contacted via phone to confirm the City’s interest in having this FME included in the Regional Flood Plan. In a phone call on March 29, 2022 Mr. Bonn affirmed the City’s interest and support in having the RFPG perform this FME, as described herein, as part of the Task 12 effort. Mr. Bonn confirmed the general nature of the flood problem, is supportive of the study, and will assist as needed with local information, access to the site, and review of deliverables.

## Scope and Budget

Task	Description	Estimated Cost	Estimated Time to Complete (weeks)
1	Data collection / site visits	\$5,000	2
2	Update H&H modeling	\$11,000	5
3	Update alternatives analysis and/or preliminary design	\$13,000	5
4	Analyze flood risk reduction benefits	\$3,000	1
5	Verify no adverse impact	\$3,000	1
6	Develop/update cost estimate	\$6,000	1
7	Conduct cost-benefit analysis	\$5,000	1
8	Evaluate potential constraints (e.g., environmental, utility conflicts, right-of-way needs, permitting, and constructability)	\$3,000	2
9	Document study results in a sealed technical memorandum	\$11,000	4
<b>Totals</b>		<b>\$60,000</b>	<b>22</b>

Note: If task cost is blank, this task is not needed for this study.

## Recommendations

- Proceed  
  Do not Proceed  
  Technical Committee Concurrence  
  RFPG Approval

**Prepared by:** FNI

**Date:** 8/30/2022

# Flood Management Evaluation (FME) STUDY

## Lower Colorado-Lavaca REGIONAL FLOOD PLANNING GROUP

Title  ID#   
Sponsor (name of entity)  Commitment  Yes  No  
Technical committee recommend  Yes  No RFPG recommend  Yes  No

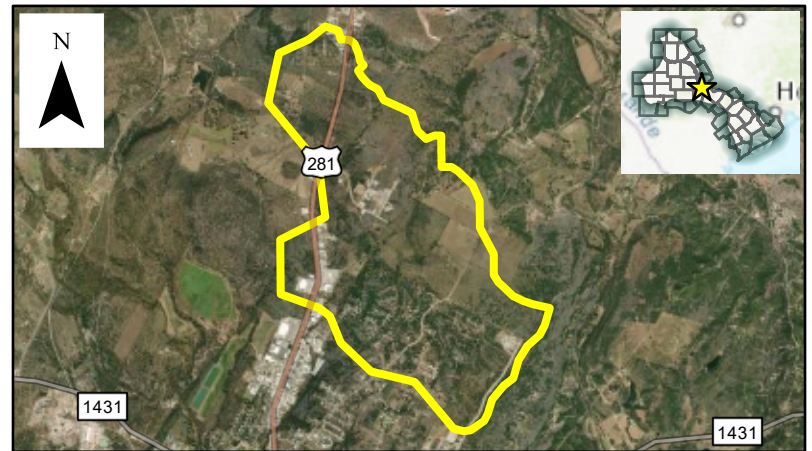
REGION 10

### Study Type

Emergency preparedness  Floodplain modeling, mapping and risk assessment  Feasibility study  Preliminary project engineering  
 Other

### Problem Area

City  County   
Watershed   
name(s)   
Tributary(ies)   
HUC#  Stream miles (est.)   
Drainage area: square miles, est.  or acreage, est.   
Social vulnerability index   
*(SVI score 0.0 indicates least vulnerable; 1.0 indicates most vulnerable.)*  
Other



### Flood Risk Description

The existing crossing is undersized and overtops, potentially impacting surrounding structures. The proposed improvements include installing a 50 foot wide bypass channel. The existing road is a 2-lane road with an average daily traffic count of 265. The existing risk indicators are based on available data and will be better defined as part of the study. Study results will include detailed assessments of existing flood risk and potential flood risk reduction to be used in evaluating projects for future funding cycles.

Population at risk  Structures at risk  Critical facilities at risk   
Farm/Ranch land impacted (acres)  Roadway(s) impacted (miles)

### Scope of Study

Conduct a study to evaluate the area. Study will include hydrologic and hydraulic modeling (with Atlas 14 rainfall), preliminary design of improvements, risk reduction analysis, verification of no adverse impacts, preparation of cost estimates and a benefit-cost-analysis, and an evaluation of potential constraints (environmental, utility conflicts, right-of-way needs, and constructability).

### Related Goal(s)

6.1 Reduce the number of structures and critical facilities that are at high risk of repetitive loss through the implementation of structural flood mitigation projects. 6.2 Increase the number of entities that mitigate flood risk at vulnerable roadways or waterways (e.g., low-water crossings, irrigation canals).

### Estimated Study Cost

Cost  Potential funding source(s)

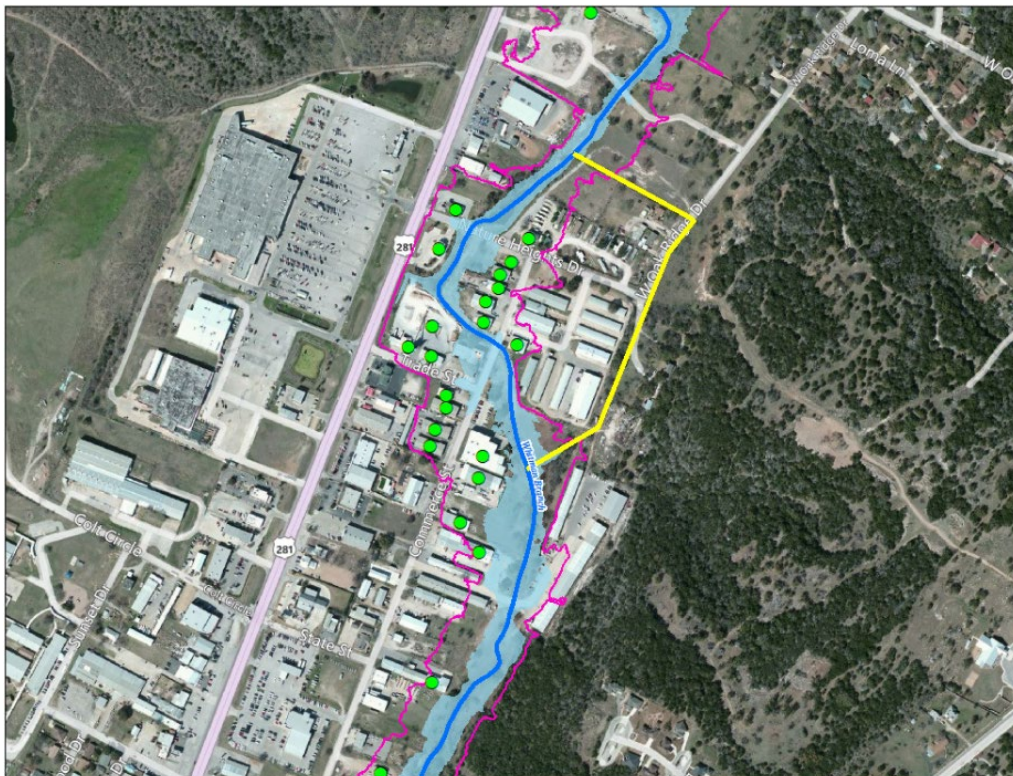


# Scope and Budget to Perform FMEs

FME ID	Title	County	Sponsor	Source
101000116 101000165	Whitman Branch Industrial Area Flood Mitigation – Bypass and Detention	Burnet	City of Marble Falls	Flood Protection Planning Study

## Study Objective

Perform a flood mitigation alternatives analysis and select a preferred solution for final design to protect the industrial area along Commerce Street near US 281 and the Nature Heights area from floodwaters from Whitman Branch. These areas are located directly adjacent to Whitman Branch as shown in the figure below. These areas sustained heavy flood damage in 2007. Whitman Branch has existing flood hazard data mapped for these areas by FEMA effective in 2019 including Zone AE special flood hazard data with a floodway. This FME will include updating the FEMA flood hazard analysis and mapping with Atlas 14 rainfall data, more current LiDAR terrain data, more advanced modeling, and evaluation of flood mitigation alternatives. Alternatives to be considered include a bypass channel along West Oak Ridge Drive and a regional flood detention reservoir as conceptualized in the 2014 Marble Falls Flood Protection Planning Study, as well as channel modifications and culvert/bridge upgrades. Also included in this study will be development of preliminary capital cost estimates, quantification of flood risk reduction benefits, benefit-cost analyses, evaluation of potential adverse impacts to flooding of adjacent properties, and a high-level evaluation of potential constraints including environmental permitting, utility relocations, land acquisition, and constructability issues per adopted FMP screening criteria. With completion of the study a determination will be made as to whether this FME meets criteria for reclassification as a Flood Mitigation Project.



# Scope and Budget to Perform FMEs

## Required Information for FMP

A new HEC-RAS version 6.2 model will be developed using rain-on-grid hydrologic methodology and 2-dimensional (2D) hydraulic analysis to model the bifurcated flow characteristics of the bypass channel alternative. These methods are more efficient and accurate compared to the rainfall-runoff model and 1D hydraulics used in the effective FEMA flood insurance study. The new model will use 2020 Texas Strategic Mapping LiDAR terrain data for the watershed and stream channel available from TNRIS, and Atlas 14 rainfall data.

## Sponsor Outreach

Ms. Kacey Paul, City Engineer, was initially consulted in person and via email multiple times in March of 2022 to confirm the City’s interest in having this FME included in the Regional Flood Plan. Mr. Caleb Kraenzel, Assistant City Manager, was subsequently contacted via email on August 24, 2022 to confirm the City’s interest in having the RFPG perform this FME, as described herein, as part of the Task 12 effort. Mr. Kraenzel confirmed the general nature of the flood problem and is fully supportive of the study and will assist as needed with local information, access to the site, and review of the deliverables.

## Scope and Budget

Task	Description	Estimated Cost	Estimated Time to Complete (weeks)
1	Data collection / site visits	\$5,000	2
2	Update H&H modeling	\$16,000	4
3	Update alternatives analysis and/or preliminary design	\$16,000	6
4	Analyze flood risk reduction benefits	\$6,000	1
5	Verify no adverse impact	\$6,000	1
6	Develop/update cost estimate	\$8,000	1
7	Conduct cost-benefit analysis	\$8,000	1
8	Evaluate potential constraints (e.g., environmental, utility conflicts, right-of-way needs, permitting, and constructability)	\$8,000	2
9	Document study results in a sealed technical memorandum	\$16,000	3
<b>Totals</b>		<b>\$89,000</b>	<b>21</b>

Note: If task cost is blank, this task is not needed for this study.

## Recommendations

Proceed     Do not Proceed     Technical Committee Concurrence     RFPG Approval

**Prepared by:** HDR

**Date:** 8/25/22

# Flood Management Evaluation (FME) STUDY

## Lower Colorado-Lavaca REGIONAL FLOOD PLANNING GROUP

Title **Broadway Street at Whitman Branch Low Water Crossing** ID# **101000167**  
Sponsor (name of entity) **Marble Falls (Municipality)** Commitment  Yes  No  
Technical committee recommend  Yes  No RFPG recommend  Yes  No

REGION 10

### Study Type

Emergency preparedness  Floodplain modeling, mapping and risk assessment  Feasibility study  Preliminary project engineering  
 Other

### Problem Area

City **Marble Falls** County **Burnet**  
Watershed **Hamilton Creek - Lake Travis**  
name(s)  
Tributary(ies) **Whitman Branch**  
HUC# **12090205** Stream miles (est.) **TBD**  
Drainage area: square miles, est. **5.65** or acreage, est. **3,617**  
Social vulnerability index **0.19**  
(SVI score 0.0 indicates least vulnerable; 1.0 indicates most vulnerable.)  
Other **Roadway/Crossing Improvements & Channel Improvements**



### Flood Risk Description

The existing culvert crossing is undersized and overtops. The proposed improvements include enlarging the existing culverts. The existing road is a 2-lane road with an average daily traffic count of 2,220. The existing risk indicators are based on available data and will be better defined as part of the study. Study results will include detailed assessments of existing flood risk and potential flood risk reduction to be used in evaluating projects for future funding cycles.

Population at risk **0** Structures at risk **0** Critical facilities at risk **0**  
Farm/Ranch land impacted (acres) **0** Roadway(s) impacted (miles) **0.20**

### Scope of Study

Conduct a study to evaluate upsizing the existing culvert crossing. Study will include hydrologic and hydraulic modeling (with Atlas 14 rainfall), preliminary design of improvements, risk reduction analysis, verification of no adverse impacts, preparation of cost estimates and a benefit-cost-analysis, and an evaluation of potential constraints (environmental, utility conflicts, right-of-way needs, and constructability).

### Related Goal(s)

6.2 Increase the number of entities that mitigate flood risk at vulnerable roadways or waterways (e.g., low-water crossings, irrigation canals).

### Estimated Study Cost

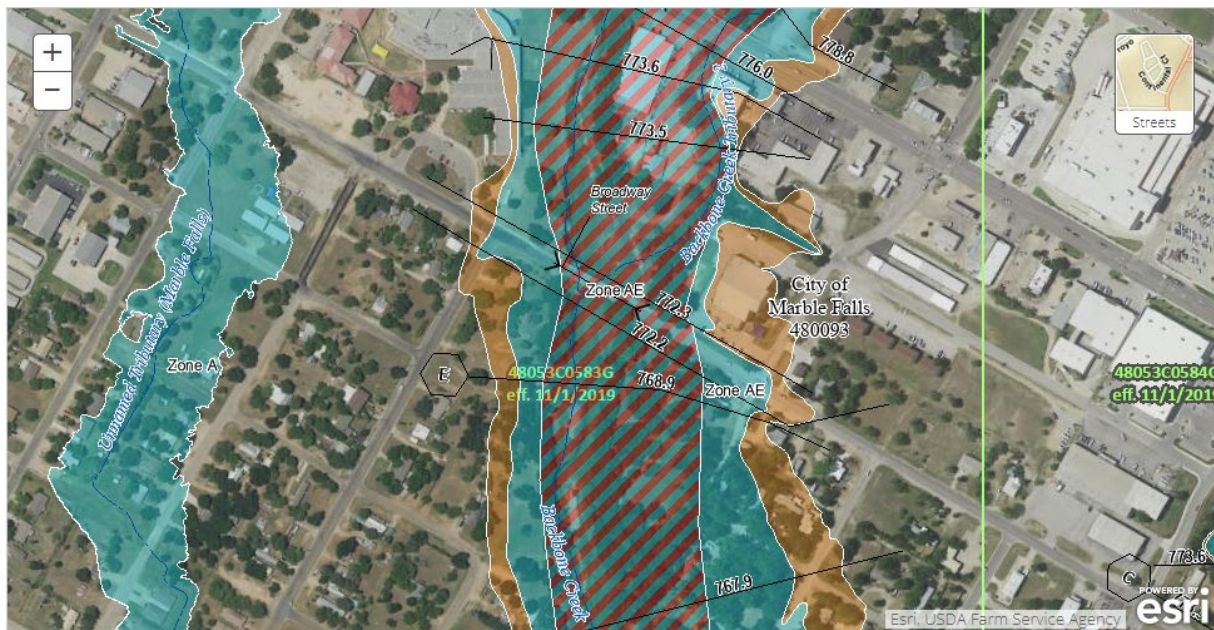
Cost **\$100,000** Potential funding source(s) **TBD**

# Scope and Budget to Perform FMEs

FME ID	Title	County	Sponsor	Source
101000167	Broadway Avenue at Backbone Creek Low Water Xing Upgrade	Burnet	City of Marble Falls	Staff/City CIP

## Study Objective

Perform a flood mitigation alternatives analysis and select a preferred solution for final design to replace/upgrade the Broadway Avenue bridge crossing at Backbone Creek within the City of Marble Falls as shown on the figure below. The Broadway Avenue bridge is one of the most commonly closed low water crossings in Marble Falls. It is a heavily trafficked street, providing an alternative route to the US 281/1431 intersection, as well as a frequented route for emergency response vehicles which are stationed nearby. Backbone Creek has existing flood hazard data mapped in this area by FEMA effective in 2019 which include Zone AE special flood hazard data with a floodway. This FME will include updating the FEMA flood hazard analysis and mapping with Atlas14 rainfall data, more current LIDAR terrain data, and more advanced modeling, and evaluating bridge replacement and channel modification alternatives. This FME will also include development of preliminary capital cost estimates, quantification of flood risk reduction benefits, benefit-cost analysis, of potential adverse impacts to flooding of adjacent properties, and a high-level evaluation of potential implementation constraints including environmental impacts, permitting, utility relocations, land acquisition, and constructability issues per adopted FMP screening criteria. With completion of the study a determination will be made as to whether to whether this FME meets TWDB criteria to be reclassified as a FMP.



<p><b>PIN</b></p> <ul style="list-style-type: none"> <li>Approximate location based on user input and does not represent an authoritative property location</li> </ul> <p><b>MAP PANELS</b></p> <ul style="list-style-type: none"> <li>Selected FloodMap Boundary</li> <li>Digital Data Available</li> <li>No Digital Data Available</li> <li>Unmapped</li> </ul> <p><b>NO SCREEN</b></p> <ul style="list-style-type: none"> <li>Area of Minimal Flood Hazard Zone X</li> <li>Effective LOMRs</li> <li>Area of Undetermined Flood Hazard Zone D</li> </ul>	<p><b>SPECIAL FLOOD HAZARD AREAS</b></p> <ul style="list-style-type: none"> <li>Without Base Flood Elevation (BFE) Zone A, V, AH9</li> <li>With BFE or Depth</li> <li>Regulatory Floodway Zone AE, AO, AH, VE, AR</li> </ul> <p><b>OTHER AREAS OF FLOOD HAZARD</b></p> <ul style="list-style-type: none"> <li>0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X</li> <li>Future Conditions 1% Annual Chance Flood Hazard Zone X</li> <li>Area with Reduced Flood Risk due to Levee. See Notes, Zone X</li> <li>Area with Flood Risk due to Levee Zone D</li> </ul>	<p><b>OTHER FEATURES</b></p> <ul style="list-style-type: none"> <li>20.2 Cross Sections with 1% Annual Chance Water Surface Elevation</li> <li>17.5 Coastal Transect</li> <li>Base Flood Elevation Line (BFE)</li> <li>Limit of Study</li> <li>Jurisdiction Boundary</li> <li>Coastal Transect Baseline</li> <li>Profile Baseline</li> <li>Hydrographic Feature</li> </ul> <p><b>GENERAL STRUCTURES</b></p> <ul style="list-style-type: none"> <li>Channel, Culvert, or Storm Sewer</li> <li>Levee, Dike, or Floodwall</li> </ul>
--	--	---

# Scope and Budget to Perform FMEs

## Required Information for FMP

A new HEC-RAS version 6.2 model will be developed using rain-on-grid hydrologic methodology and 2-dimensional (2D) hydraulic analysis. These methods are more efficient and accurate compared to the rainfall-runoff model and 1D hydraulics used in the effective FEMA flood insurance study (FIS). The new model will use 2020 Texas Strategic Mapping LiDAR terrain data for the watershed and stream channel available from TNRS, and Atlas 14 rainfall data.

## Sponsor Outreach

Ms. Kacey Paul, City Engineer, was initially consulted in person and via email multiple times in March of 2022 to confirm the City’s interest to have this FME included in the Regional Flood Plan. Mr. Caleb Kraenzel, Assistant City Manager, was subsequently contacted via email on August 24, 2022 to confirm the City’s interest in having the RFPG perform this FME, as described herein, under- Task 12 of the regional flood planning process. Mr. Kraenzel confirmed the general nature of the flood problem and is fully supportive of the study and will assist as needed with additional local information, access to the site, and review of deliverables.

## Scope and Budget

Task	Description	Estimated Cost	Estimated Time to Complete (weeks)
1	Data collection / site visits	\$4,000	2
2	Update H&H modeling	\$8,000	4
3	Update alternatives analysis and/or preliminary design	\$12,000	4
4	Analyze flood risk reduction benefits	\$6,000	1
5	Verify no adverse impact	\$4,000	1
6	Develop/update cost estimate	\$6,000	1
7	Conduct cost-benefit analysis	\$6,000	1
8	Evaluate potential constraints (e.g., environmental, utility conflicts, right-of-way needs, permitting, and constructability)	\$6,000	2
9	Document study results in a sealed technical memorandum	\$10,000	3
<b>Totals</b>		<b>\$62,000</b>	<b>19</b>

Note: If task cost is blank, this task is not needed for this study.

## Recommendations

Proceed     Do not Proceed     Technical Committee Concurrence     RFPG Approval

**Prepared by:** HDR

**Date:** 8/25/22

# Flood Management Evaluation (FME) STUDY

## Lower Colorado-Lavaca REGIONAL FLOOD PLANNING GROUP

Title **FM 812 at Little Alum Creek** ID# **101000027**

Sponsor (name of entity) **Bastrop (County)** Commitment  Yes  No

Technical committee recommend  Yes  No RFPG recommend  Yes  No

REGION 10

### Study Type

Emergency preparedness  Floodplain modeling, mapping and risk assessment  Feasibility study  Preliminary project engineering  
 Other

### Problem Area

City **N/A** County **Bastrop**

Watershed **Alum Creek - Walnut Creek**  
name(s)

Tributary(ies) **Little Alum Creek**

HUC# **12090301** Stream miles (est.) **TBD**

Drainage area: square miles, est. **1.88** or acreage, est. **1,201**

Social vulnerability index **0.61**

*(SVI score 0.0 indicates least vulnerable; 1.0 indicates most vulnerable.)*

Other **Roadway/Crossing Improvements & Channel Improvements**



### Flood Risk Description

The existing crossing is undersized and overtops. The existing crossing is a bridge. The proposed improvements include construction of a 200 foot bridge and 2,200 feet of channel modifications. The existing main stem road is a 2-lane road with an average daily traffic count of 9,088. The existing risk indicators are based on available data and will be better defined as part of the study. Study results will include detailed assessments of existing flood risk and potential flood risk reduction to be used in evaluating projects for future funding cycles.

Population at risk **75** Structures at risk **25** Critical facilities at risk **0**

Farm/Ranch land impacted (acres) **60** Roadway(s) impacted (miles) **0.31**

### Scope of Study

Conduct a study to evaluate upsizing the existing low water crossings and channel modifications. Study will include hydrologic and hydraulic modeling (with Atlas 14 rainfall), preliminary design of improvements, risk reduction analysis, verification of no adverse impacts, preparation of cost estimates and a benefit-cost-analysis, and an evaluation of potential constraints (environmental, utility conflicts, right-of-way needs, and constructability).

### Related Goal(s)

6.1 Reduce the number of structures and critical facilities that are at high risk of repetitive loss through the implementation of structural flood mitigation projects. 6.2 Increase the number of entities that mitigate flood risk at vulnerable roadways or waterways (e.g., low-water crossings, irrigation canals).

### Estimated Study Cost

Cost **\$100,000** Potential funding source(s) **TBD**

# Scope and Budget to Perform FMEs

FME ID	Title	County	Sponsor	Source
101000027	FM 812 at Little Alum Creek	Bastrop	Bastrop County	Walnut Creek Flood Protection Planning Study

## Study Objective

Bastrop County identified FM 812 at Little Alum Creek of high importance to increase the level of service and provide safe access to residential areas to use as their primary ingress and egress. The 1% ACE USGS rainfall analysis indicates the existing road crossing overtops by approximately 3 feet. The proposed crossing improvements are a 200-foot bridge span with 2,200 LF of channel improvements that would increase the level of service to safely pass the 1% ACE. Additional work is needed to meet TWDB requirements as a FMP which includes updating H&H analysis to use NOAA Atlas 14 rainfall data, a no adverse impact evaluation, updated cost estimates, and a cost-benefit analysis. With completion of the study a determination will be made as to whether this FME meets criteria for reclassification as a Flood Mitigation Project.



# Scope and Budget to Perform FMEs

## Required Information for FMP

The Lower Colorado Cummings Phase 2 FEMA Preliminary Models and Mapping will be leveraged with new LiDAR terrain and NOAA Atlas 14 rainfall data. Leveraged models will need to be re-analyzed for the flood mitigation solution to estimate reduction of flood risk. Results from the H&H analysis will assist in conducting an adverse impact evaluation, updating costs and BCA.

## Sponsor Outreach

Ms. Carolyn Dill, County Engineer, was contacted via email to confirm the County’s interest in having this FME included in the Regional Flood Plan. In email correspondence and a phone discussion on August 30-31, 2022, Ms. Dill indicated the County’s support to have the RFPG perform this FME, as described herein, as part of the Task 12 effort. Precinct 3 Commissioner Mark Meuth is also in support of the Little Alum Creek at FM 812 flood mitigation evaluation in this growing area of Bastrop County.

## Scope and Budget

Task	Description	Estimated Cost	Estimated Time to Complete (weeks)
1	Data collection / site visits	\$10,000.00	2
2	Update H&H modeling	\$15,000.00	4
3	Update alternatives analysis and/or preliminary design	\$15,000.00	4
4	Analyze flood risk reduction benefits	\$5,000.00	1
5	Verify no adverse impact	\$5,000.00	1
6	Develop/update cost estimate	\$7,000.00	1
7	Conduct cost-benefit analysis	\$7,000.00	1
8	Evaluate potential constraints (e.g., environmental, utility conflicts, right-of-way needs, permitting, and constructability)	\$7,000.00	3
9	Document study results in a sealed technical memorandum	\$15,000.00	3
Totals		\$86,000.00	20

Note: If task cost is blank, this task is not needed for this study.

## Recommendations

Proceed     Do not Proceed     Technical Committee Concurrence     RFPG Approval

**Prepared by:** Halff

**Date:** 8/25/22



# Flood Management Evaluation (FME) STUDY

## Lower Colorado-Lavaca REGIONAL FLOOD PLANNING GROUP

Title  ID#   
Sponsor (name of entity)  Commitment  Yes  No  
Technical committee recommend  Yes  No RFPG recommend  Yes  No

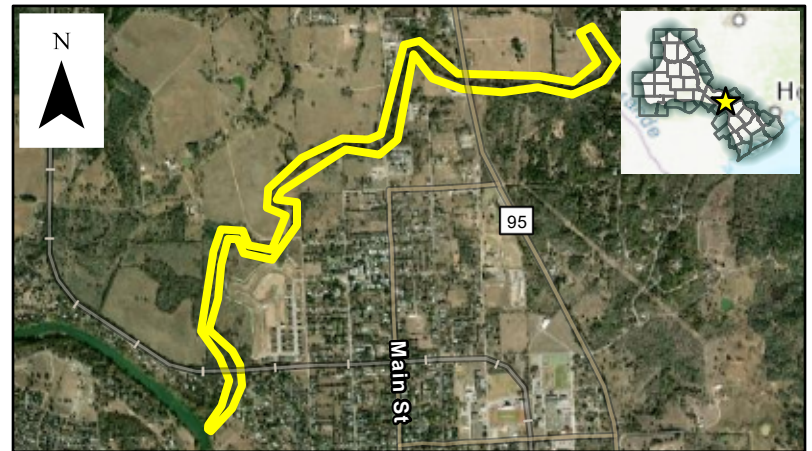
REGION 10

### Study Type

Emergency preparedness  Floodplain modeling, mapping and risk assessment  Feasibility study  Preliminary project engineering  
 Other

### Problem Area

City  County   
Watershed   
name(s)   
Tributary(ies)   
HUC#  Stream miles (est.)   
Drainage area: square miles, est.  or acreage, est.   
Social vulnerability index   
*(SVI score 0.0 indicates least vulnerable; 1.0 indicates most vulnerable.)*  
Other



### Flood Risk Description

The existing channel from upstream of HWY 95 to the Colorado River is undersized threatening multiple road crossings as well as houses on Magnolia Street, Mesquite street, and in the Bastrop Estates Mobile Home Park. The city has identified channel benching (approx. 4,430 feet) to increase conveyance as a potential solution. The existing risk indicators are based on available data and will be better defined as part of the study. Study results will include detailed assessments of existing flood risk and potential flood-risk reduction to be used in evaluating projects for future funding cycles.

Population at risk  Structures at risk  Critical facilities at risk   
Farm/Ranch land impacted (acres)  Roadway(s) impacted (miles)

### Scope of Study

Study will include hydrologic and hydraulic modeling (with Atlas 14 rainfall), preliminary design of improvements, risk reduction analysis, verification of no adverse impacts, preparation of cost estimates and a benefit-cost-analysis, and an evaluation of potential constraints (environmental, utility conflicts, right-of-way needs, and constructability).

### Related Goal(s)

5.1 Reduce the number of structures and critical infrastructure that are at high risk of repetitive loss through property/easement acquisitions, relocations, floodproofing and/or elevation. 6.1 Reduce the number of structures and critical facilities that are at high risk of repetitive loss through the implementation of structural flood mitigation projects. 6.2 Increase the number of entities that mitigate flood risk at vulnerable roadways or waterways (e.g., low-water crossings, irrigation canals).

### Estimated Study Cost

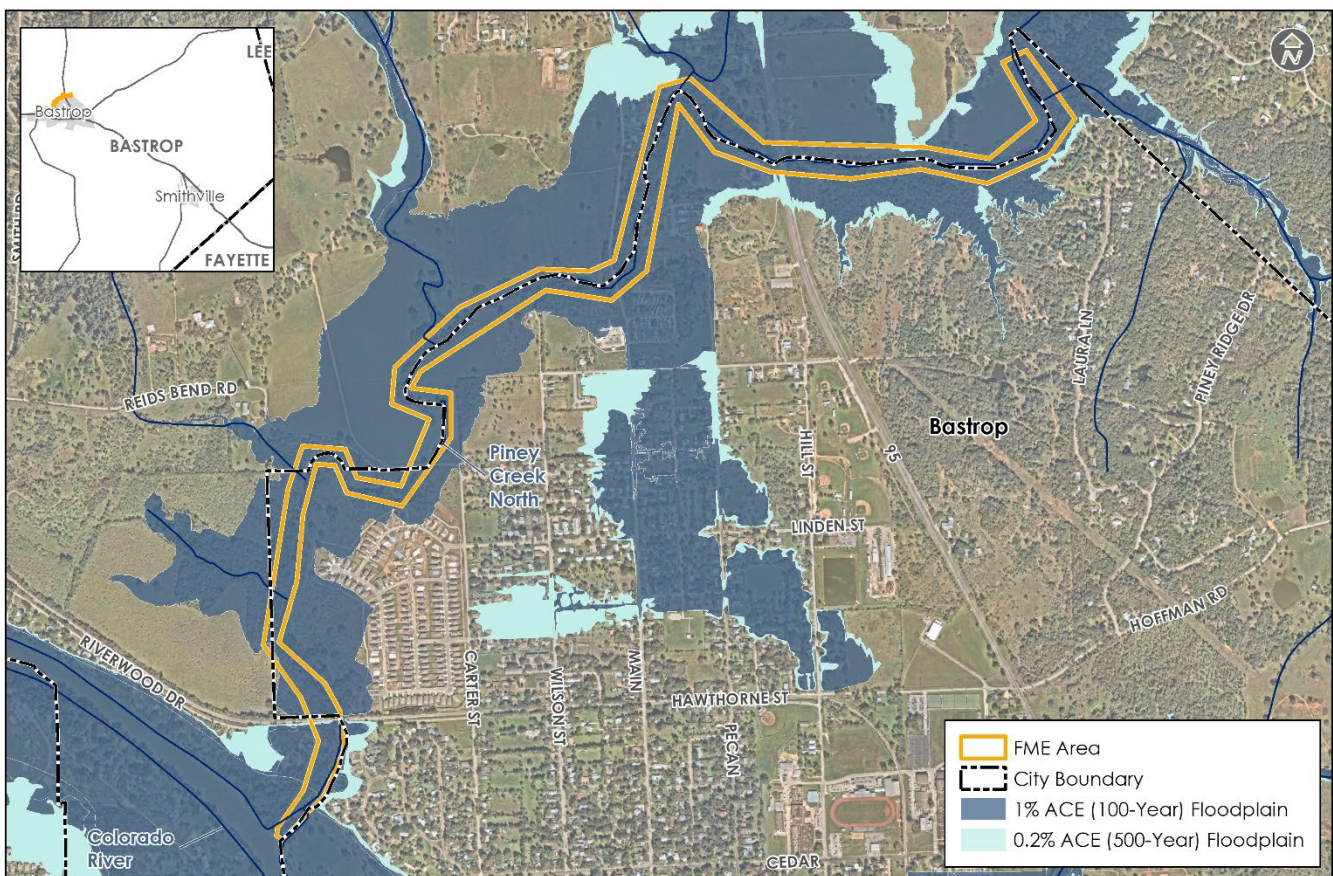
Cost  Potential funding source(s)

# Scope and Budget to Perform FMEs

FME ID	Title	County	Sponsor	Source
101000102	Piney Creek Benching	Bastrop	City of Bastrop	Piney Creek Flood Protection Planning Study / City of Bastrop Drainage Master Plan

## Study Objective

The City of Bastrop identified Piney Creek channel benching as a potential flood mitigation solution to reduce the 1% ACE using USGS rainfall data. These improvements would reduce the potential overtopping of SH 95 and would reduce the overtopping depth at Main Street. The roads that cross Piney Creek floodplain are at grade and not elevated. The City is currently working on a Drainage Master Plan and is interested in making road crossing improvements for safety ingress/egress during significant storm events from the downtown core area of the City. Additional work is needed to meet TWDB requirements as a FMP which includes updating H&H analysis to use NOAA Atlas 14 rainfall data, a no adverse impact evaluation, updated cost estimates, a cost-benefit analysis (BCA), and identification of potential constraints (e.g., environmental impacts, permitting, land acquisition, utility conflicts, and constructability).



# Scope and Budget to Perform FMEs

## Required Information for FMP

The Lower Colorado Cummings Phase 2 FEMA Preliminary Models and Mapping will be leveraged with new LiDAR terrain and NOAA Atlas 14 rainfall data. Leveraged models will need to be updated with channel benching limits and creek crossing improvements to estimate reduction of flood risk. Results from the H&H analysis will assist in conducting an adverse impact analysis, update of costs estimates, the benefit cost analysis, and identification of potential constraints.

## Sponsor Outreach

Mr. Trey Job, Assistant City Manager for Community Development, and Fabiola De Carvalho, Director of Engineering and Capital Project Management, were contacted via email to confirm the City’s interest in having this FME included in the Regional Flood Plan. In email correspondence and a phone discussion on August 30-31, 2022, Mr. Job indicated the City’s support to have the RFPG perform this FME, as described herein, as part of the Task 12 effort.

## Scope and Budget

Task	Description	Estimated Cost	Estimated Time to Complete (weeks)
1	Data collection / site visits	\$5,000.00	2
2	Update H&H modeling	\$7,000.00	2
3	Update alternatives analysis and/or preliminary design	\$15,000.00	4
4	Analyze flood risk reduction benefits	\$7,000.00	1
5	Verify no adverse impact	\$5,000.00	1
6	Develop/update cost estimate	\$7,000.00	1
7	Conduct cost-benefit analysis	\$7,000.00	1
8	Evaluate potential constraints (e.g., environmental, utility conflicts, right-of-way needs, permitting, and constructability)	\$20,000.00	4
9	Document study results in a sealed technical memorandum	\$15,000.00	3
<b>Totals</b>		<b>\$88,000.00</b>	<b>19</b>

Note: If task cost is blank, this task is not needed for this study.

## Recommendations

Proceed     Do not Proceed     Technical Committee Concurrence     RFPG Approval

**Prepared by:** Halff

**Date:** 8/25/22

# Flood Management Evaluation (FME) STUDY

## Lower Colorado-Lavaca REGIONAL FLOOD PLANNING GROUP

Title  ID#   
Sponsor (name of entity)  Commitment  Yes  No  
Technical committee recommend  Yes  No RFPG recommend  Yes  No

REGION 10

### Study Type

Emergency preparedness  Floodplain modeling, mapping and risk assessment  Feasibility study  Preliminary project engineering  
 Other

### Problem Area

City  County   
Watershed   
name(s)   
Tributary(ies)   
HUC#  Stream miles (est.)   
Drainage area: square miles, est.  or acreage, est.   
Social vulnerability index   
*(SVI score 0.0 indicates least vulnerable; 1.0 indicates most vulnerable.)*  
Other



### Flood Risk Description

The plant is located within, and may be impacted by, the 100-year floodplain of Post Oak Branch. The area has existing local drainage problems and has experienced excessive flow depth and velocity. The existing risk indicators are based on available data and will be better defined as part of the study. Study results will provide a more detailed assessment of existing flood and potential flood risk reduction that will be used to evaluate projects for future planning cycles.

Population at risk  Structures at risk  Critical facilities at risk   
Farm/Ranch land impacted (acres)  Roadway(s) impacted (miles)

### Scope of Study

The flood study will include hydrologic and hydraulic modeling (with Atlas 14 rainfall) to identify priority flood risk areas, preliminary design of improvements, risk reduction analysis, verification of no adverse impacts, preparation of cost estimates and a benefit-cost-analysis, and an evaluation of potential constraints (environmental, utility conflicts, right-of-way needs, and constructability).

### Related Goal(s)

3.2 Increase the number of entities that have evaluated priority flood risk areas and flood risk reduction measures (e.g., alternatives analysis and preliminary engineering). 6.1 Reduce the number of structures and critical facilities that are at high risk of repetitive loss through the implementation of structural flood mitigation projects.

### Estimated Study Cost

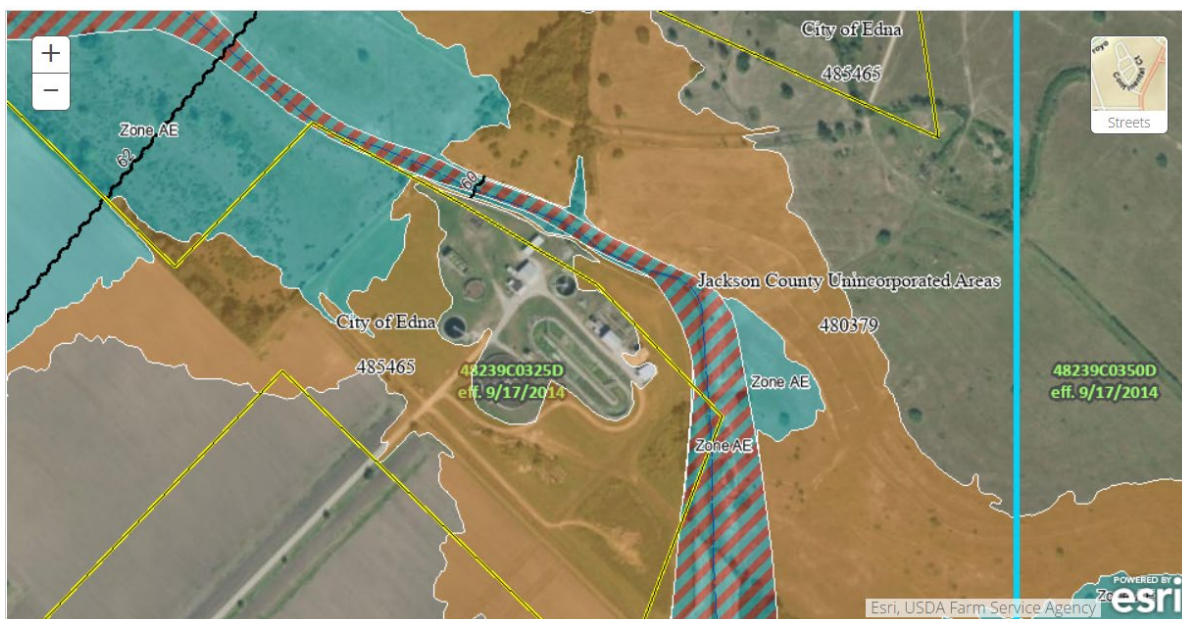
Cost  Potential funding source(s)

# Scope and Budget to Perform FMEs

FME ID	Title	County	Sponsor	Source
101000189	Wastewater Treatment Plant Floodproofing	Jackson	City of Edna	Jackson County Hazard Mitigation Plan

## Study Objective

Perform a flood mitigation alternatives analysis and select a preferred solution for final design to protect the City of Edna wastewater treatment plant (WWTP) from floodwaters from Post Oak Branch. The WWTP is located directly adjacent to Post Oak Branch as shown on the figure below. Post Oak Branch has existing flood hazard data mapped for the area of the WWTP by FEMA effective in 2014 which includes shallow flooding less than 1 foot deep and a floodway. This FME (Flood Management Study) will include updating the FEMA flood hazard analysis and mapping with Atlas 14 rainfall data, more current LiDAR terrain data, more advanced modeling, and evaluation of flood mitigation alternatives. Alternatives will likely include levees or flood walls and/or elevating and/or floodproofing individual plant components. This FME will also include development of preliminary capital cost estimates, quantification of flood risk reduction benefits, benefit-cost analyses, evaluation of potential adverse impacts to flooding of adjacent properties, and a high-level evaluation of potential constraints including environmental impacts, permitting, utility relocations, land acquisition, and constructability issues per adopted FMP screening criteria. With completion of the Hazard study a final determination will be made as to whether this FME meets criteria to be reclassified as a Flood Mitigation Project.



<p><b>PIN</b></p> <ul style="list-style-type: none"> <li>Approximate location based on user input and does not represent an authoritative property location</li> </ul>	<p><b>SPECIAL FLOOD HAZARD AREAS</b></p> <ul style="list-style-type: none"> <li>Without Base Flood Elevation (BFE) Zone A, V, A99</li> <li>With BFE or Depth Regulatory Floodway Zone AE, AO, AH, VE, AR</li> </ul>	<p><b>OTHER AREAS OF FLOOD HAZARD</b></p> <ul style="list-style-type: none"> <li>0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X</li> <li>Future Conditions 1% Annual Chance Flood Hazard Zone X</li> <li>Area with Reduced Flood Risk due to Levee. See Notes, Zone X</li> <li>Area with Flood Risk due to Levee Zone D</li> </ul>	<p><b>OTHER FEATURES</b></p> <ul style="list-style-type: none"> <li>20.2 Cross Sections with 1% Annual Chance Water Surface Elevation</li> <li>17.6 Coastal Transect Base Flood Elevation Line (BFE)</li> <li>Limit of Study</li> <li>Jurisdiction Boundary</li> <li>Coastal Transect Baseline</li> <li>Profile Baseline</li> <li>Hydrographic Feature</li> </ul>
<p><b>MAP PANELS</b></p> <ul style="list-style-type: none"> <li>Selected FloodMap Boundary</li> <li>Digital Data Available</li> <li>No Digital Data Available</li> <li>Unmapped</li> </ul>	<p><b>OTHER AREAS</b></p> <ul style="list-style-type: none"> <li>NO SCREEN Area of Minimal Flood Hazard Zone X</li> <li>Effective LOMRs</li> <li>Area of Undetermined Flood Hazard Zone D</li> <li>Otherwise Protected Area</li> <li>Coastal Barrier Resource System Area</li> </ul>	<p><b>GENERAL STRUCTURES</b></p> <ul style="list-style-type: none"> <li>Channel, Culvert, or Storm Sewer</li> <li>Levee, Dike, or Floodwall</li> </ul>	

# Scope and Budget to Perform FMEs

## Required Information for FMP

A new HEC-RAS version 6.2 model will be developed using rain-on-grid hydrologic methodology and 2-dimensional (2D) hydraulic analysis to model the shallow bifurcated flood characteristics of the site. These methods are more efficient and accurate compared to the rainfall-runoff model and 1D hydraulics used in the effective FEMA Flood Insurance Study. The new model will use 2005 FEMA Coastal LiDAR terrain data for the watershed and stream channel available from TNRIS, and Atlas 14 rainfall data.

## Sponsor Outreach

Mr. Brad Ryan, Public Works Director, was initially contacted via email on March 1, 2022, to confirm the City’s interest in having this FME included in the Regional Flood Plan. Mr. Gary Broz, City Manager, was subsequently contacted via email on July 15, 2022, and via phone call on August 23, 2022, to confirm the City’s interest in having the RFPG perform this FME, as described herein, as part of the Task 12 effort. Mr. Broz confirmed the general nature of the flood problem and is fully supportive of the study and will assist as needed with local information, access to the site, and review of deliverables.

## Scope and Budget

Task	Description	Estimated Cost	Estimated Time to Complete (weeks)
1	Data collection / site visits	\$5,000	2
2	Update H&H modeling	\$12,000	4
3	Update alternatives analysis and/or preliminary design	\$12,000	4
4	Analyze flood risk reduction benefits	\$4,000	1
5	Verify no adverse impact	\$4,000	1
6	Develop/update cost estimate	\$5,000	1
7	Conduct cost-benefit analysis	\$6,000	1
8	Evaluate potential constraints (e.g., environmental, utility conflicts, right-of-way needs, permitting, and constructability)	\$6,000	2
9	Document study results in a sealed technical memorandum	\$12,000	2
<b>Totals</b>		<b>\$66,000</b>	<b>18</b>

Note: If task cost is blank, this task is not needed for this study.

## Recommendations

- Proceed  
  Do not Proceed  
  Technical Committee Concurrence  
  RFPG Approval

**Prepared by:** HDR

**Date:** 8/25/22