

*Fort Bend County, Texas  
Request for Qualifications*



*Engineering Services for the Brazos River Project  
for Fort Bend County  
RFQ 22-089*

**SUBMIT RFQs TO:**

Fort Bend County  
Purchasing Department  
Travis Annex  
301 Jackson, Suite 201  
Richmond, TX 77469

**Note:** All correspondence must include the term  
“Purchasing Department” in address to assist in  
proper delivery

**SUBMIT NO LATER THAN:**

Tuesday, July 12, 2022  
2:00 PM (Central)

**MARK ENVELOPE:**

RFQ 22-089  
Engineering Services for Brazos River

***ALL RFQs MUST BE RECEIVED IN AND TIME/DATE STAMPED BY THE PURCHASING OFFICE  
OF FORT BEND COUNTY ON OR BEFORE THE SPECIFIED TIME/DATE STATED ABOVE.***

***RFQs RECEIVED AS REQUIRED WILL THEN BE OPENED AND NAMES PUBLICLY READ.***

***RFQs RECEIVED AFTER THE SPECIFIED TIME, WILL BE RETURNED UNOPENED.***

Results will not be given by phone.  
Results will be provided after final agreement  
is approved by Commissioners

Requests for information must be in  
writing and directed to:  
Jaime Kovar  
County Purchasing Agent  
[Jaime.Kovar@fortbendcountytexas.gov](mailto:Jaime.Kovar@fortbendcountytexas.gov)

**Vendor Responsibilities:**

- Download and complete any addendums. (Addendums will be posted on the Fort Bend County website no later than 48 hours prior to bid opening)
- Submit response in accordance with requirements stated on the cover of this document.
- DO NOT submit responses via email or fax.



## COUNTY PURCHASING AGENT

Fort Bend County, Texas

### Vendor Information

Jaime Kovar  
Purchasing Agent

Office (281-341-8640)

Legal Company Name <small>(top line of W9)</small>				
Business Name <small>(if different from legal name)</small>				
Federal ID # or S.S. #		DUNS #		
Type of Business	<input type="checkbox"/> Corporation/LLC <input type="checkbox"/> Partnership <input type="checkbox"/> Sole Proprietor/Individual <input type="checkbox"/> Tax Exempt Organization	Age in Business?		
Publicly Traded Business	<input type="checkbox"/> No <input type="checkbox"/> Yes      Ticker Symbol _____			
Remittance Address				
City/State/Zip				
Physical Address				
City/State/Zip				
Phone/Fax Number	Phone: _____      Fax: _____			
Contact Person				
E-mail				
Check all that apply to the company listed above and provide certification number.	DBE-Disadvantaged Business Enterprise <input type="checkbox"/>	<b>Certification #</b> _____ <b>Certification #</b> _____ <b>Certification #</b> _____ <b>Certification #</b> _____	<u>Cert Date</u>	<u>Exp Date</u>
	SBE-Small Business Enterprise <input type="checkbox"/>		_____	_____
	HUB-Texas Historically Underutilized Business <input type="checkbox"/>		_____	_____
	WBE-Women's Business Enterprise <input type="checkbox"/>		_____	_____
			_____	_____
Company's gross annual receipts	<\$500,000 _____	\$500,000-\$4,999,999 _____		
	\$5,000,000-\$16,999,999 _____	\$17,000,000-\$22,399,999 _____		
	>\$22,400,000 _____			
NAICs codes (Please enter all that apply)				
Signature of Authorized Representative				
Printed Name				
Title				
Date				

**THIS FORM MUST BE SUBMITTED WITH THE SOLICITATION RESPONSE**

## 1.0 Scope of Work:

Fort Bend County, Texas (hereafter referred to as the (“County”)) seeks Requests for Qualifications (“RFQ”) for selection of one (1) qualified Contractor (“Respondent”) for Engineering Services for the Brazos River Project. Project will address drainage and river erosion at the most significant portions of the Brazos River and its tributaries threatening infrastructure, levees and bridges. The services will include preliminary design and design and bidding phase activities. Other services may include, but not be limited to, hydrology and hydraulic modeling, environmental services, geotechnical services and construction phase services. This project is being funded totally or partially with federal funds from the U.S. Department of Housing and Urban Development Community Development Block Grant – Disaster Recover (CDBG-MIT) Regional method of distribution funds, administered by the Texas General Land Office (GLO). Respondent is responsible for complying with any and all Federal and State rules and regulations.

### 1.1 Engineer/Architectural/Surveying Services:

Project will address drainage improvements and bank erosion at key locations on the river and its tributaries which threaten infrastructure, levees and bridges. Locations for the work shall include two (2) sites on the river near Simonton, Texas to address a potential cutoff from forming and two (2) sites on the river both upstream and downstream of the IH-69 bridge. The services will include Pre-Funding services and Post-Funding services.

#### 1.1.1 Pre-Funding Services

Engineering/architectural/surveying firm will develop project scope, budget, project map(s), as well as define proposed project service/impact areas. The respondent will work with the County and Administrator, if applicable, to provide concise information needed for the submission of one or more complete disaster mitigation funding applications and related documents. The required information shall be submitted in a format to be described by the GLO.

#### 1.1.2 Post-Funding Services

Engineering/architectural/surveying will manage and implement complete infrastructure, utilities, and eligible projects approved for disaster mitigation funding. The awarded engineering/architectural/surveying firm must follow all requirement of the HUD CDBG-MIT program as administered by GLO to include: Other services may include, but not be limited to:

- Initial Engineering and Design Support
- Engineering and Final Design Support
- Contract Procurement (Bid and Award) Support
- Contract Management and Construction Oversight
- Specialized Services, including but not limited to:
  - Hydrology and Hydraulic Modeling;
  - Environmental Services to include wetland delineation, identification of the Ordinary High Water Mark, threatened and endangered species survey, cultural resource survey, agency coordination

and permitting;

- Geotechnical investigation and report and construction materials testing.

Provide a complete list of actual tasks to be performed under each of these categories in your response, including, if necessary, a **brief** description of each task under Section 8.5, Tab 1.

A sample scope of services, provided by GLO is enclosed as Exhibit I.

## **2.0 General:**

- 2.1 The selected party will be requested to submit a proposal for an engineering contract under the provisions of the §2254 of the Texas Government Code.
- 2.2 Respondents should carefully read the information contained herein and submit a complete response to all requirements and questions as directed.
- 2.3 Submittals and any other Respondent information in response to this RFQ shall become the property of Fort Bend County.
- 2.4 Fort Bend County will not provide compensation to Respondents for any expenses incurred by the Respondent(s) for submittal preparation or for any demonstrations that may be made, unless otherwise expressly stated or required by law. Respondents submit qualifications at their own risk.
- 2.5 Each submittal should be prepared simply and economically, providing a straightforward, concise description of your firm's ability to meet the requirements, and an understanding of the County's needs.
- 2.6 Fort Bend County makes no guarantee that an award will be made as a result of this RFQ. Fort Bend County reserves the right to accept or reject any or all submittals, with or without cause, waive any formalities or minor technical inconsistencies, or delete any item/requirement from this RFQ or contract when deemed to be in the County's best interest. Representations made within the qualifications submittal and any subsequent proposal will be binding on responding firms. Fort Bend County will not be bound to act by any previous communication or submittal by the firms other than those responding to this RFQ.

## **3.0 Insurance:**

- 3.1 All respondents shall submit, with RFQ, a current certificate of insurance indicating coverage in the amounts stated below. In lieu of submitting a certificate of insurance, respondents may submit, with submission, a notarized statement from an Insurance company, authorized to conduct business in the State of Texas, and acceptable to Fort Bend County, guaranteeing the issuance of an

insurance policy, with the coverage stated below, to the firm named therein, if successful, upon award of this Contract.

- 3.2 At contract execution, contractor shall furnish County with properly executed certificates of insurance which shall evidence all insurance required and provide that such insurance shall not be canceled, except on 30 days prior written notice to County. Contractor shall provide certified copies of insurance endorsements and/or policies if requested by County. Contractor shall maintain such insurance coverage from the time Services commence until Services are completed and provide replacement certificates, policies and/or endorsements for any such insurance expiring prior to completion of Services. Contractor shall obtain such insurance written on an Occurrence form (or a Claims Made form for Professional Liability insurance) from such companies having Best's rating of A/VII or better, licensed or approved to transact business in the State of Texas, and shall obtain such insurance of the following types and minimum limits:
  - 3.2.1 Workers' Compensation insurance. Substitutes to genuine Workers' Compensation Insurance will not be allowed.
  - 3.2.2 Employers' Liability insurance with limits of not less than \$1,000,000 per injury by accident, \$1,000,000 per injury by disease, and \$1,000,000 per bodily injury by disease.
  - 3.2.3 Commercial general liability insurance with a limit of not less than \$1,000,000 each occurrence and \$2,000,000 in the annual aggregate. Policy shall cover liability for bodily injury, personal injury, and property damage and products/completed operations arising out of the business operations of the policyholder.
  - 3.2.4 Business Automobile Liability coverage with a combined Bodily Injury/Property Damage limit of not less than \$1,000,000 each accident. The policy shall cover liability arising from the operation of licensed vehicles by policyholder.
  - 3.2.5 Professional Liability insurance may be made on a Claims Made form with limits not less than \$1,000,000.
- 3.3 County and the members of Commissioners Court shall be named as additional insured to all required coverage except for Workers' Compensation and Professional Liability (if required). All Liability policies including Workers' Compensation written on behalf of contractor, excluding Professional Liability, shall contain a waiver of subrogation in favor of County and members of Commissioners Court.
- 3.4 If required coverage is written on a claims-made basis, contractor warrants that any retroactive date applicable to coverage under the policy precedes the effective

date of the contract; and that continuous coverage will be maintained or an extended discovery period will be exercised for a period of two (2) years beginning from the time that work under the agreement is completed.

#### **4.0 Indemnification:**

Respondent shall indemnify and hold harmless County against all liability for damages arising from activities of Respondent, its agents, servants or employees, performed under this agreement to the extent that the damage is caused by or results from an act of negligence, intentional tort, intellectual property infringement, or failure to pay a subcontractor or supplier committed by the Respondent, its agents, servants, employees, consultants under contract, or another entity over which the Respondent exercises control. Respondent agrees to reimburse County for reasonable attorney's fees in proportion to Respondent's liability.

- 4.1 Respondent shall timely report all such matters to Fort Bend County and shall, upon the receipt of any such claim, demand, suit, action, proceeding, lien or judgment, not later than the fifteenth day of each month; provide Fort Bend County with a written report on each such matter, setting forth the status of each matter, the schedule or planned proceedings with respect to each matter and the cooperation or assistance, if any, of Fort Bend County required by Respondent in the defense of each matter.
- 4.2 Respondent's duty to defend, indemnify and hold Fort Bend County harmless shall not abate or end by reason of the expiration or termination of any contract unless otherwise agreed by Fort Bend County in writing. The provisions of this section shall survive the termination of the contract and shall remain in full force and effect with respect to all such matters no matter when they arise.
- 4.3 In the event of any dispute between the parties as to whether a claim, demand, suit, action, proceeding, lien or judgment appears to have been caused by or appears to have arisen out of or in connection with acts or omissions of Respondent, Respondent shall never-the-less fully defend such claim, demand, suit, action, proceeding, lien or judgment until and unless there is a determination by a court of competent jurisdiction that the acts and omissions of Respondent are not at issue in the matter.
- 4.4 The provision by Respondent of insurance shall not limit the liability of Respondent under an agreement.
- 4.5 Respondent shall cause all trade contractors and any other contractor who may have a contract to perform construction or installation work in the area where work will be performed under this request, to agree to indemnify Fort Bend County and to hold it harmless from all claims for bodily injury and property damage that may arise from said Respondent's operations. Such provisions shall be in form satisfactory to Fort Bend County.

- 4.6 Loss Deduction Clause - Fort Bend County shall be exempt from, and in no way liable for, any sums of money which may represent a deductible in any insurance policy. The payment of deductibles shall be the sole responsibility of Respondent and/or trade contractor providing such insurance.

**5.0 Texas Ethics Commission Form 1295:**

- 5.1 Effective January 1, 2016 all contracts executed by Commissioners Court, regardless of the dollar amount, will require completion of Form 1295 "Certificate of Interested Parties", per the new Government Code Statute §2252.908. All vendors submitting a response to a formal Bid, RFP, SOQ or any contracts, contract amendments, renewals or change orders are required to complete the Form 1295 online through the State of Texas Ethics Commission website. Please visit: [https://www.ethics.state.tx.us/whatsnew/elf\\_info\\_form1295.htm](https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm).
- 5.2 On-line instructions:
  - 5.2.1 Name of governmental entity is to read: Fort Bend County.
  - 5.2.2 Identification number used by the governmental entity is: Q22-089.
  - 5.2.3 Description is the title of the solicitation: Engineering Services for Brazos River Project.
- 5.3 Highest evaluated firm will be required to provide the Form 1295 within three (3) calendar days from notification; however, if your company is publicly traded you are not required to complete this form.

**6.0 State Law Requirements for Contracts:**

The contents of this section are required by Texas Law and are included by County regardless of content.

- 6.1 Agreement to Not Boycott Israel Chapter 2271 Texas Government Code: Contractor verifies that if Contractor employs ten (10) or more full-time employees and this Agreement has a value of \$100,000 or more, Contractor does not boycott Israel and will not boycott Israel during the term of this Contract.
- 6.2 Texas Government Code Section 2251.152 Acknowledgment: By signature on vendor form, Contractor represents pursuant to Section 2252.152 of the Texas Government Code, that Contractor is not listed on the website of the Comptroller of the State of Texas concerning the listing of companies that are identified under Section 806.051, Section 807.051 or Section 2253.153.

**7.0 Federal Clauses:**

Refer to Exhibit III.

**8.0 Format of Response, Qualifications, and Evaluation Factors:**

8.1 To facilitate evaluation of submittals, one (1) original, five (5) paper copies and one (1) electronic response on flash drive is required. CD or flash drive must contain only one (1) file in PDF format and must match written response identically. Failure to provide proper flash drive will result in disqualification.

8.2 Request for Qualifications must take the form of a bound 8-1/2-inch by 11-inch report with a Table of Contents and all pages numbered in sequence (**maximum 25 pages**). Binding must allow reports to lay flat when open and may be either wire or GBC. Format of the report may be either “portrait” or “landscape” format with binding on either long or short side. The title page, letter of transmittal, table of contents, tabs, executive summary, or resumes are not included in the 25 page maximum page count.

8.3 Respondents are required to follow the outline below when preparing their submission:

Tab	Title
	Title Page
	Letter of Transmittal
	Table of Contents
	Executive Summary
1	Understand Scope of Work
2	Firm’s Experience
3	Staff Experience
4	Financial Stability
5	Required forms (insurance, vendor forms, W9, debt form)

8.4 Executive Summary - This part of the response to the RFQ should be limited to a brief narrative highlighting the Respondent’s submission. Note that the executive summary should identify the primary contacts for the Respondent.

8.5 Respondents will be evaluated utilizing the factors, as weighted below:

Tab 1	Understanding Scope of Work (weight factor = 40%)
-------	---

- Understanding of Scope of Work: Respondents must express, in detail, their understanding of this specific project. In addition, describe how the project requested will be provided and managed. Describe the approach your firm will take to the required



collaboration, scheduling and coordination required for this project.

Tab 2

Firm's Experience (weight factor = 25%)

- Firm Experience with Similar Projects: Such experience must be in the form of providing engineering services, as described above, for municipal/county government. List a minimum of three (3) similar projects completed within the last ten (10) years; provide the name and location of each project, description of services provided, completion date, the client's name, and contact person with phone number and email address.
- A description of work performance and experience with CDBG, CDBG Disaster Recovery, FEMA Hazard Mitigation or similar projects, including a list of at least three references from past local government clients, with information describing the relevancy of the previous performance.

Tab 3

Staff Experience (weight factor = 20%)

- List the proposed project team, showing all staff and their roles in the contract.
- Include an organizational chart of the proposed team, showing the names and roles of all key personnel and the contractor they are associated with (if applicable).
- Provide resumes of staff members assigned to specific areas of experience and relevant staff experience.

Tab 4

Financial Stability (weight factor = 10%)

- Complete and accurate responses to the following questions:
  - a. Has your Company ever failed to complete any work awarded to it?
  - b. Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your Company or its officers?
  - c. Has your Company filed any lawsuits or requested arbitration with regard to construction contracts within the last five years? If yes, please provide details.

Tab 5

Overall Completeness of Proposal (weight factor = 5%)

- Required proof of insurance and completed forms

**9.0 Questions:**

Questions about this Request for Qualification Package should be directed in writing to Jaime Kovar, County Purchasing Agent at [Jaime.Kovar@fortbendcountytx.gov](mailto:Jaime.Kovar@fortbendcountytx.gov). **Questions will be accepted until 9:00AM, Friday, July 1, 2022.** Requests received after the deadline will not be responded to due to the time constraints of this RFQ process.

**10.0 Required Forms:**

All vendors submitting are required to complete the attached and return with submission:

- 10.1 Vendor Form
- 10.2 W9 Form
- 10.3 Tax Form/Debt/Residence Certification
- 10.4 Proof of Certificate of Insurance, as stated in Section 3.0

**11.0 Exhibits:**

- 11.1 Exhibit I – Sample Scope of Services
- 11.2 Exhibit II – USACE Brazos River Flood Risk Management Study Main Report
- 11.3 Exhibit III – Federal Clauses
- 11.4 Exhibit IV – Regional Method Sheet



**Note.** If you are a U.S. person and a requester gives you a form other than Form W-9 to request your TIN, you must use the requester's form if it is substantially similar to this Form W-9.

**Definition of a U.S. person.** For federal tax purposes, you are considered a U.S. person if you are:

- An individual who is a U.S. citizen or U.S. resident alien;
- A partnership, corporation, company, or association created or organized in the United States or under the laws of the United States;
- An estate (other than a foreign estate); or
- A domestic trust (as defined in Regulations section 301.7701-7).

**Special rules for partnerships.** Partnerships that conduct a trade or business in the United States are generally required to pay a withholding tax under section 1446 on any foreign partners' share of effectively connected taxable income from such business. Further, in certain cases where a Form W-9 has not been received, the rules under section 1446 require a partnership to presume that a partner is a foreign person, and pay the section 1446 withholding tax. Therefore, if you are a U.S. person that is a partner in a partnership conducting a trade or business in the United States, provide Form W-9 to the partnership to establish your U.S. status and avoid section 1446 withholding on your share of partnership income.

In the cases below, the following person must give Form W-9 to the partnership for purposes of establishing its U.S. status and avoiding withholding on its allocable share of net income from the partnership conducting a trade or business in the United States:

- In the case of a disregarded entity with a U.S. owner, the U.S. owner of the disregarded entity and not the entity;
- In the case of a grantor trust with a U.S. grantor or other U.S. owner, generally, the U.S. grantor or other U.S. owner of the grantor trust and not the trust; and
- In the case of a U.S. trust (other than a grantor trust), the U.S. trust (other than a grantor trust) and not the beneficiaries of the trust.

**Foreign person.** If you are a foreign person or the U.S. branch of a foreign bank that has elected to be treated as a U.S. person, do not use Form W-9. Instead, use the appropriate Form W-8 or Form 8233 (see Publication 515, Withholding of Tax on Nonresident Aliens and Foreign Entities).

**Nonresident alien who becomes a resident alien.** Generally, only a nonresident alien individual may use the terms of a tax treaty to reduce or eliminate U.S. tax on certain types of income. However, most tax treaties contain a provision known as a "saving clause." Exceptions specified in the saving clause may permit an exemption from tax to continue for certain types of income even after the payee has otherwise become a U.S. resident alien for tax purposes.

If you are a U.S. resident alien who is relying on an exception contained in the saving clause of a tax treaty to claim an exemption from U.S. tax on certain types of income, you must attach a statement to Form W-9 that specifies the following five items:

1. The treaty country. Generally, this must be the same treaty under which you claimed exemption from tax as a nonresident alien.
2. The treaty article addressing the income.
3. The article number (or location) in the tax treaty that contains the saving clause and its exceptions.
4. The type and amount of income that qualifies for the exemption from tax.
5. Sufficient facts to justify the exemption from tax under the terms of the treaty article.

**Example.** Article 20 of the U.S.-China income tax treaty allows an exemption from tax for scholarship income received by a Chinese student temporarily present in the United States. Under U.S. law, this student will become a resident alien for tax purposes if his or her stay in the United States exceeds 5 calendar years. However, paragraph 2 of the first Protocol to the U.S.-China treaty (dated April 30, 1984) allows the provisions of Article 20 to continue to apply even after the Chinese student becomes a resident alien of the United States. A Chinese student who qualifies for this exception (under paragraph 2 of the first protocol) and is relying on this exception to claim an exemption from tax on his or her scholarship or fellowship income would attach to Form W-9 a statement that includes the information described above to support that exemption.

If you are a nonresident alien or a foreign entity, give the requester the appropriate completed Form W-8 or Form 8233.

## Backup Withholding

**What is backup withholding?** Persons making certain payments to you must under certain conditions withhold and pay to the IRS 28% of such payments. This is called "backup withholding." Payments that may be subject to backup withholding include interest, tax-exempt interest, dividends, broker and barter exchange transactions, rents, royalties, nonemployee pay, payments made in settlement of payment card and third party network transactions, and certain payments from fishing boat operators. Real estate transactions are not subject to backup withholding.

You will not be subject to backup withholding on payments you receive if you give the requester your correct TIN, make the proper certifications, and report all your taxable interest and dividends on your tax return.

**Payments you receive will be subject to backup withholding if:**

1. You do not furnish your TIN to the requester,
2. You do not certify your TIN when required (see the Part II instructions on page 3 for details),

3. The IRS tells the requester that you furnished an incorrect TIN,

4. The IRS tells you that you are subject to backup withholding because you did not report all your interest and dividends on your tax return (for reportable interest and dividends only), or

5. You do not certify to the requester that you are not subject to backup withholding under 4 above (for reportable interest and dividend accounts opened after 1983 only).

Certain payees and payments are exempt from backup withholding. See *Exempt payee code* on page 3 and the separate Instructions for the Requester of Form W-9 for more information.

Also see *Special rules for partnerships* above.

## What is FATCA reporting?

The Foreign Account Tax Compliance Act (FATCA) requires a participating foreign financial institution to report all United States account holders that are specified United States persons. Certain payees are exempt from FATCA reporting. See *Exemption from FATCA reporting code* on page 3 and the Instructions for the Requester of Form W-9 for more information.

## Updating Your Information

You must provide updated information to any person to whom you claimed to be an exempt payee if you are no longer an exempt payee and anticipate receiving reportable payments in the future from this person. For example, you may need to provide updated information if you are a C corporation that elects to be an S corporation, or if you no longer are tax exempt. In addition, you must furnish a new Form W-9 if the name or TIN changes for the account; for example, if the grantor of a grantor trust dies.

## Penalties

**Failure to furnish TIN.** If you fail to furnish your correct TIN to a requester, you are subject to a penalty of \$50 for each such failure unless your failure is due to reasonable cause and not to willful neglect.

**Civil penalty for false information with respect to withholding.** If you make a false statement with no reasonable basis that results in no backup withholding, you are subject to a \$500 penalty.

**Criminal penalty for falsifying information.** Willfully falsifying certifications or affirmations may subject you to criminal penalties including fines and/or imprisonment.

**Misuse of TINs.** If the requester discloses or uses TINs in violation of federal law, the requester may be subject to civil and criminal penalties.

## Specific Instructions

### Line 1

You must enter one of the following on this line; **do not** leave this line blank. The name should match the name on your tax return.

If this Form W-9 is for a joint account, list first, and then circle, the name of the person or entity whose number you entered in Part I of Form W-9.

a. **Individual.** Generally, enter the name shown on your tax return. If you have changed your last name without informing the Social Security Administration (SSA) of the name change, enter your first name, the last name as shown on your social security card, and your new last name.

**Note. ITIN applicant:** Enter your individual name as it was entered on your Form W-7 application, line 1a. This should also be the same as the name you entered on the Form 1040/1040A/1040EZ you filed with your application.

b. **Sole proprietor or single-member LLC.** Enter your individual name as shown on your 1040/1040A/1040EZ on line 1. You may enter your business, trade, or "doing business as" (DBA) name on line 2.

c. **Partnership, LLC that is not a single-member LLC, C Corporation, or S Corporation.** Enter the entity's name as shown on the entity's tax return on line 1 and any business, trade, or DBA name on line 2.

d. **Other entities.** Enter your name as shown on required U.S. federal tax documents on line 1. This name should match the name shown on the charter or other legal document creating the entity. You may enter any business, trade, or DBA name on line 2.

e. **Disregarded entity.** For U.S. federal tax purposes, an entity that is disregarded as an entity separate from its owner is treated as a "disregarded entity." See Regulations section 301.7701-2(c)(2)(iii). Enter the owner's name on line 1. The name of the entity entered on line 1 should never be a disregarded entity. The name on line 1 should be the name shown on the income tax return on which the income should be reported. For example, if a foreign LLC that is treated as a disregarded entity for U.S. federal tax purposes has a single owner that is a U.S. person, the U.S. owner's name is required to be provided on line 1. If the direct owner of the entity is also a disregarded entity, enter the first owner that is not disregarded for federal tax purposes. Enter the disregarded entity's name on line 2, "Business name/disregarded entity name." If the owner of the disregarded entity is a foreign person, the owner must complete an appropriate Form W-8 instead of a Form W-9. This is the case even if the foreign person has a U.S. TIN.

**Line 2**

If you have a business name, trade name, DBA name, or disregarded entity name, you may enter it on line 2.

**Line 3**

Check the appropriate box in line 3 for the U.S. federal tax classification of the person whose name is entered on line 1. Check only one box in line 3.

**Limited Liability Company (LLC).** If the name on line 1 is an LLC treated as a partnership for U.S. federal tax purposes, check the "Limited Liability Company" box and enter "P" in the space provided. If the LLC has filed Form 8832 or 2553 to be taxed as a corporation, check the "Limited Liability Company" box and in the space provided enter "C" for C corporation or "S" for S corporation. If it is a single-member LLC that is a disregarded entity, do not check the "Limited Liability Company" box; instead check the first box in line 3 "Individual/sole proprietor or single-member LLC."

**Line 4, Exemptions**

If you are exempt from backup withholding and/or FATCA reporting, enter in the appropriate space in line 4 any code(s) that may apply to you.

**Exempt payee code.**

- Generally, individuals (including sole proprietors) are not exempt from backup withholding.
- Except as provided below, corporations are exempt from backup withholding for certain payments, including interest and dividends.
- Corporations are not exempt from backup withholding for payments made in settlement of payment card or third party network transactions.
- Corporations are not exempt from backup withholding with respect to attorneys' fees or gross proceeds paid to attorneys, and corporations that provide medical or health care services are not exempt with respect to payments reportable on Form 1099-MISC.

The following codes identify payees that are exempt from backup withholding. Enter the appropriate code in the space in line 4.

- 1—An organization exempt from tax under section 501(a), any IRA, or a custodial account under section 403(b)(7) if the account satisfies the requirements of section 401(f)(2)
- 2—The United States or any of its agencies or instrumentalities
- 3—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities
- 4—A foreign government or any of its political subdivisions, agencies, or instrumentalities
- 5—A corporation
- 6—A dealer in securities or commodities required to register in the United States, the District of Columbia, or a U.S. commonwealth or possession
- 7—A futures commission merchant registered with the Commodity Futures Trading Commission
- 8—A real estate investment trust
- 9—An entity registered at all times during the tax year under the Investment Company Act of 1940
- 10—A common trust fund operated by a bank under section 584(a)
- 11—A financial institution
- 12—A middleman known in the investment community as a nominee or custodian
- 13—A trust exempt from tax under section 664 or described in section 4947

The following chart shows types of payments that may be exempt from backup withholding. The chart applies to the exempt payees listed above, 1 through 13.

IF the payment is for . . .	THEN the payment is exempt for . . .
Interest and dividend payments	All exempt payees except for 7
Broker transactions	Exempt payees 1 through 4 and 6 through 11 and all C corporations. S corporations must not enter an exempt payee code because they are exempt only for sales of noncovered securities acquired prior to 2012.
Barter exchange transactions and patronage dividends	Exempt payees 1 through 4
Payments over \$600 required to be reported and direct sales over \$5,000 <sup>1</sup>	Generally, exempt payees 1 through 5 <sup>2</sup>
Payments made in settlement of payment card or third party network transactions	Exempt payees 1 through 4

<sup>1</sup> See Form 1099-MISC, Miscellaneous Income, and its instructions.

<sup>2</sup> However, the following payments made to a corporation and reportable on Form 1099-MISC are not exempt from backup withholding: medical and health care payments, attorneys' fees, gross proceeds paid to an attorney reportable under section 6045(f), and payments for services paid by a federal executive agency.

**Exemption from FATCA reporting code.** The following codes identify payees that are exempt from reporting under FATCA. These codes apply to persons submitting this form for accounts maintained outside of the United States by certain foreign financial institutions. Therefore, if you are only submitting this form for an account you hold in the United States, you may leave this field blank. Consult with the person requesting this form if you are uncertain if the financial institution is subject to these requirements. A requester may indicate that a code is not required by providing you with a Form W-9 with "Not Applicable" (or any similar indication) written or printed on the line for a FATCA exemption code.

A—An organization exempt from tax under section 501(a) or any individual retirement plan as defined in section 7701(a)(37)

B—The United States or any of its agencies or instrumentalities

C—A state, the District of Columbia, a U.S. commonwealth or possession, or any of their political subdivisions or instrumentalities

D—A corporation the stock of which is regularly traded on one or more established securities markets, as described in Regulations section 1.1472-1(c)(1)(i)

E—A corporation that is a member of the same expanded affiliated group as a corporation described in Regulations section 1.1472-1(c)(1)(i)

F—A dealer in securities, commodities, or derivative financial instruments (including notional principal contracts, futures, forwards, and options) that is registered as such under the laws of the United States or any state

G—A real estate investment trust

H—A regulated investment company as defined in section 851 or an entity registered at all times during the tax year under the Investment Company Act of 1940

I—A common trust fund as defined in section 584(a)

J—A bank as defined in section 581

K—A broker

L—A trust exempt from tax under section 664 or described in section 4947(a)(1)

M—A tax exempt trust under a section 403(b) plan or section 457(g) plan

**Note.** You may wish to consult with the financial institution requesting this form to determine whether the FATCA code and/or exempt payee code should be completed.

**Line 5**

Enter your address (number, street, and apartment or suite number). This is where the requester of this Form W-9 will mail your information returns.

**Line 6**

Enter your city, state, and ZIP code.

**Part I. Taxpayer Identification Number (TIN)**

**Enter your TIN in the appropriate box.** If you are a resident alien and you do not have and are not eligible to get an SSN, your TIN is your IRS individual taxpayer identification number (ITIN). Enter it in the social security number box. If you do not have an ITIN, see *How to get a TIN* below.

If you are a sole proprietor and you have an EIN, you may enter either your SSN or EIN. However, the IRS prefers that you use your SSN.

If you are a single-member LLC that is disregarded as an entity separate from its owner (see *Limited Liability Company (LLC)* on this page), enter the owner's SSN (or EIN, if the owner has one). Do not enter the disregarded entity's EIN. If the LLC is classified as a corporation or partnership, enter the entity's EIN.

**Note.** See the chart on page 4 for further clarification of name and TIN combinations.

**How to get a TIN.** If you do not have a TIN, apply for one immediately. To apply for an SSN, get Form SS-5, Application for a Social Security Card, from your local SSA office or get this form online at [www.ssa.gov](http://www.ssa.gov). You may also get this form by calling 1-800-772-1213. Use Form W-7, Application for IRS Individual Taxpayer Identification Number, to apply for an ITIN, or Form SS-4, Application for Employer Identification Number, to apply for an EIN. You can apply for an EIN online by accessing the IRS website at [www.irs.gov/businesses](http://www.irs.gov/businesses) and clicking on Employer Identification Number (EIN) under Starting a Business. You can get Forms W-7 and SS-4 from the IRS by visiting [IRS.gov](http://IRS.gov) or by calling 1-800-TAX-FORM (1-800-829-3676).

If you are asked to complete Form W-9 but do not have a TIN, apply for a TIN and write "Applied For" in the space for the TIN, sign and date the form, and give it to the requester. For interest and dividend payments, and certain payments made with respect to readily tradable instruments, generally you will have 60 days to get a TIN and give it to the requester before you are subject to backup withholding on payments. The 60-day rule does not apply to other types of payments. You will be subject to backup withholding on all such payments until you provide your TIN to the requester.

**Note.** Entering "Applied For" means that you have already applied for a TIN or that you intend to apply for one soon.

**Caution:** A disregarded U.S. entity that has a foreign owner must use the appropriate Form W-8.

## Part II. Certification

To establish to the withholding agent that you are a U.S. person, or resident alien, sign Form W-9. You may be requested to sign by the withholding agent even if items 1, 4, or 5 below indicate otherwise.

For a joint account, only the person whose TIN is shown in Part I should sign (when required). In the case of a disregarded entity, the person identified on line 1 must sign. Exempt payees, see *Exempt payee code* earlier.

**Signature requirements.** Complete the certification as indicated in items 1 through 5 below.

**1. Interest, dividend, and barter exchange accounts opened before 1984 and broker accounts considered active during 1983.** You must give your correct TIN, but you do not have to sign the certification.

**2. Interest, dividend, broker, and barter exchange accounts opened after 1983 and broker accounts considered inactive during 1983.** You must sign the certification or backup withholding will apply. If you are subject to backup withholding and you are merely providing your correct TIN to the requester, you must cross out item 2 in the certification before signing the form.

**3. Real estate transactions.** You must sign the certification. You may cross out item 2 of the certification.

**4. Other payments.** You must give your correct TIN, but you do not have to sign the certification unless you have been notified that you have previously given an incorrect TIN. "Other payments" include payments made in the course of the requester's trade or business for rents, royalties, goods (other than bills for merchandise), medical and health care services (including payments to corporations), payments to a nonemployee for services, payments made in settlement of payment card and third party network transactions, payments to certain fishing boat crew members and fishermen, and gross proceeds paid to attorneys (including payments to corporations).

**5. Mortgage interest paid by you, acquisition or abandonment of secured property, cancellation of debt, qualified tuition program payments (under section 529), IRA, Coverdell ESA, Archer MSA or HSA contributions or distributions, and pension distributions.** You must give your correct TIN, but you do not have to sign the certification.

## What Name and Number To Give the Requester

For this type of account:	Give name and SSN of:
1. Individual	The individual
2. Two or more individuals (joint account)	The actual owner of the account or, if combined funds, the first individual on the account <sup>1</sup>
3. Custodian account of a minor (Uniform Gift to Minors Act)	The minor <sup>2</sup>
4. a. The usual revocable savings trust (grantor is also trustee) b. So-called trust account that is not a legal or valid trust under state law	The grantor-trustee <sup>1</sup>  The actual owner <sup>1</sup>
5. Sole proprietorship or disregarded entity owned by an individual	The owner <sup>3</sup>
6. Grantor trust filing under Optional Form 1099 Filing Method 1 (see Regulations section 1.671-4(b)(2)(i)(A))	The grantor*
For this type of account:	Give name and EIN of:
7. Disregarded entity not owned by an individual	The owner
8. A valid trust, estate, or pension trust	Legal entity <sup>4</sup>
9. Corporation or LLC electing corporate status on Form 8832 or Form 2553	The corporation
10. Association, club, religious, charitable, educational, or other tax-exempt organization	The organization
11. Partnership or multi-member LLC	The partnership
12. A broker or registered nominee	The broker or nominee
13. Account with the Department of Agriculture in the name of a public entity (such as a state or local government, school district, or prison) that receives agricultural program payments	The public entity
14. Grantor trust filing under the Form 1041 Filing Method or the Optional Form 1099 Filing Method 2 (see Regulations section 1.671-4(b)(2)(i)(B))	The trust

<sup>1</sup> List first and circle the name of the person whose number you furnish. If only one person on a joint account has an SSN, that person's number must be furnished.

<sup>2</sup> Circle the minor's name and furnish the minor's SSN.

<sup>3</sup> You must show your individual name and you may also enter your business or DBA name on the "Business name/disregarded entity" name line. You may use either your SSN or EIN (if you have one), but the IRS encourages you to use your SSN.

<sup>4</sup> List first and circle the name of the trust, estate, or pension trust. (Do not furnish the TIN of the personal representative or trustee unless the legal entity itself is not designated in the account title.) Also see *Special rules for partnerships* on page 2.

\*Note. Grantor also must provide a Form W-9 to trustee of trust.

**Note.** If no name is circled when more than one name is listed, the number will be considered to be that of the first name listed.

## Secure Your Tax Records from Identity Theft

Identity theft occurs when someone uses your personal information such as your name, SSN, or other identifying information, without your permission, to commit fraud or other crimes. An identity thief may use your SSN to get a job or may file a tax return using your SSN to receive a refund.

To reduce your risk:

- Protect your SSN,
- Ensure your employer is protecting your SSN, and
- Be careful when choosing a tax preparer.

If your tax records are affected by identity theft and you receive a notice from the IRS, respond right away to the name and phone number printed on the IRS notice or letter.

If your tax records are not currently affected by identity theft but you think you are at risk due to a lost or stolen purse or wallet, questionable credit card activity or credit report, contact the IRS Identity Theft Hotline at 1-800-908-4490 or submit Form 14039.

For more information, see Publication 4535, Identity Theft Prevention and Victim Assistance.

Victims of identity theft who are experiencing economic harm or a system problem, or are seeking help in resolving tax problems that have not been resolved through normal channels, may be eligible for Taxpayer Advocate Service (TAS) assistance. You can reach TAS by calling the TAS toll-free case intake line at 1-877-777-4778 or TTY/TDD 1-800-829-4059.

**Protect yourself from suspicious emails or phishing schemes.** Phishing is the creation and use of email and websites designed to mimic legitimate business emails and websites. The most common act is sending an email to a user falsely claiming to be an established legitimate enterprise in an attempt to scam the user into surrendering private information that will be used for identity theft.

The IRS does not initiate contacts with taxpayers via emails. Also, the IRS does not request personal detailed information through email or ask taxpayers for the PIN numbers, passwords, or similar secret access information for their credit card, bank, or other financial accounts.

If you receive an unsolicited email claiming to be from the IRS, forward this message to [phishing@irs.gov](mailto:phishing@irs.gov). You may also report misuse of the IRS name, logo, or other IRS property to the Treasury Inspector General for Tax Administration (TIGTA) at 1-800-366-4484. You can forward suspicious emails to the Federal Trade Commission at: [spam@uce.gov](mailto:spam@uce.gov) or contact them at [www.ftc.gov/idtheft](http://www.ftc.gov/idtheft) or 1-877-IDTHEFT (1-877-438-4338).

Visit [IRS.gov](http://IRS.gov) to learn more about identity theft and how to reduce your risk.

## Privacy Act Notice

Section 6109 of the Internal Revenue Code requires you to provide your correct TIN to persons (including federal agencies) who are required to file information returns with the IRS to report interest, dividends, or certain other income paid to you; mortgage interest you paid; the acquisition or abandonment of secured property; the cancellation of debt; or contributions you made to an IRA, Archer MSA, or HSA. The person collecting this form uses the information on the form to file information returns with the IRS, reporting the above information. Routine uses of this information include giving it to the Department of Justice for civil and criminal litigation and to cities, states, the District of Columbia, and U.S. commonwealths and possessions for use in administering their laws. The information also may be disclosed to other countries under a treaty, to federal and state agencies to enforce civil and criminal laws, or to federal law enforcement and intelligence agencies to combat terrorism. You must provide your TIN whether or not you are required to file a tax return. Under section 3406, payers must generally withhold a percentage of taxable interest, dividend, and certain other payments to a payee who does not give a TIN to the payer. Certain penalties may also apply for providing false or fraudulent information.



## **EXHIBIT I. Scope of Services**

### **SCOPE OF SERVICES**

#### **Engineering/Architectural/Surveying Services**

The Contractor shall provide the following scope of services:

#### **DESCRIPTION OF SERVICES AND SPECIAL CONDITIONS**

Respondents will be required to show the ability to provide all the Engineering services described below. Respondent shall then provide a detailed description of how they meet the requirement, describing their knowledge and experience, as well as providing discrete examples of previous work where applicable.

#### **General Requirements**

- a) Coordinate, as necessary, between subrecipient and its service providers (i.e., Engineer, Environmental, Contracted Construction Company, Grant Administrator, etc.) and GLO. regarding project design services.
- b) Provide monthly project status updates.
- c) Funding release will be based on deliverables identified in the contract.

#### **Initial Engineering and Design Support**

Respondents will be required to show the ability to provide all the Engineering services described below:

- a) Assist with the development of grant applications, as necessary.
- b) Provide all project information necessary to ensure timely execution of the environmental review.
- c) Provide preliminary engineering, investigations, and drawings sufficient to achieve the preliminary design milestone, including at a minimum:
  - i. Cross sections/elevations
  - ii. Project layout/staging areas
  - iii. General notes
  - iv. Special notes
  - v. Design details
  - vi. Specifications
  - vii. Utility relocation designs
  - viii. Construction limits, including environmentally sensitive areas that should be avoided during construction
  - ix. Required permits
  - x. Quantities
  - xi. Estimate of construction costs to within +/- 25%
  - xii. Schedules for design, permitting, acquisition and construction
- d) Design surveying, topographic and utility mapping.
- e) Perform subsurface explorations for project sites, as necessary.
- f) Prepare horizontal alignments/layouts for all proposed project alternatives necessary to fully describe the project scope, anticipated limitations, and potential project impacts.
- g) Recommend value engineering options (alternative design, construction methods, procurement, etc.) that may improve efficiency, expedite the schedule, or reduce project costs for the subrecipient.
- h) Identify, acquire and submit all necessary permits and approvals required for design approval and construction.
- i) Submit all necessary deliverables to the appropriate entity for review and comment. Adjust project and/or design to satisfactorily address any comments, as necessary.
- j) Prepare plans and profiles, including vertical design information for the selected alternative.
- k) Identify and address potential obstacles to project implementation (i.e., pipelines, easements, permitting, environmental, etc.) prior to moving forward with the final design.



- l) Support subrecipient with acquisition or property/servitudes/right-of-way documentation as required by the City to facilitate the project, preparing right of way surveys and/or property boundary maps and legal descriptions of parcels to be acquired.
- m) Provide project schedules from cradle to grave in MS Project format or equal as approved by the subrecipient based on GLO guidance.

### **Engineering and Final Design Support**

Respondents will be required to show the ability to provide all the Engineering services described below as they relate to final design support:

- a) Prepare plans and profiles, including necessary design information for the selected alternative sufficient to achieve all detailed design milestones. Examples include, but are not limited to:
  - i. Cross sections/elevations
  - ii. Project layout/staging areas
  - iii. General notes
  - iv. Special notes
  - v. Design details
  - vi. Specifications
  - vii. Utility relocation designs
  - viii. Construction limits, including environmentally sensitive areas that should be avoided during construction
  - ix. Required permits
  - x. Quantities
  - xi. Estimate of construction costs to within +/- 20%
  - xii. Schedules for design, permitting, acquisition and construction
- b) Provide information to appropriate individuals for the development of environmental fund release reports and floodplain maps.
- c) Identify, acquire and submit all necessary permits and approvals required for design approval and construction.
- d) Provide hard copy, if necessary, reproducible plan drawings and bid documents, in addition to electronic copies to the subrecipient, upon design completion, and as requested during design. Electronic copies should be in the native format (AutoCAD DWG) along with PDF packages and should contain all corresponding references, databases, or files associated with the completed design documents.
- e) Assist the subrecipient and any service provider related to the project with all necessary documentation to ensure compliance with all Program requirements and regulations.

### **Bid and Award Support**

Respondents will be required to show the ability to provide all the Engineering services described below as they relate to bid and award support.

- a) Submit appropriate items and support subrecipient in the development of complete bid package.
- b) Prepare and assist subrecipient in the advertisements for bid solicitation.
- c) Support development and issuance of bid-related documents necessary to complete bid process (e.g., bid proposal form, bid addenda and supporting documentation).
- d) Attend and support subrecipient at pre-bid conference and bid opening.
- e) Support subrecipient with ongoing communication during bid process.
- f) Support subrecipient to complete bid tabulation and evaluation of responses and provide recommendation for award.
- g) Support subrecipient to negotiate and finalize contract documents, including issuance of the Notice to Proceed, in accordance with program and subrecipient requirements.
- h) Support subrecipient in the conducting of a preconstruction conference.

### **Contract Management and Construction Oversight**

Respondents will be required to show the ability to provide all the Engineering services described below as they relate to contract management and construction oversight.

- a) Ensure delivery of subrecipient project in accordance with contract.
- b) Provide ongoing Construction Oversight Reports detailing the status of construction for subrecipient project.
- c) Review all service provider submittals to ensure compliance with construction contract documents and provide recommendations to subrecipient.
- d) Provide periodic and final inspections and tests reports, as required for the project.
- e) Provide on-site supervision and oversight of construction activities at a minimum on a bi-weekly basis or as directed by the GLO or subrecipient.
- f) Review Construction Change Orders and provide recommendation to subrecipient as to appropriate action.
- g) Review invoice/draw requests and provide recommendation to subrecipient as to appropriate action, in compliance with the construction contract documents.
- h) Obtain independent cost estimates for validation purposes, as required.
- i) Review and respond to requests for information/clarification.
- j) Support subrecipient with issue identification and claims resolutions.
- k) Enter all requisite information into the GLO system of record in accordance with established policies and procedures.
- l) Develop a final "as built" report of quantities, drawings, and specifications.
- m) Issue to the subrecipient, for execution, a Certificate of Construction Completion within 30 days of final inspection approval.
- n) Deliver "as-built" drawings to the subrecipient within 30 days of project completion.
- o) Host and/or attend project coordination meetings in person, by phone, or by video conference, which may or may not fall during normal business hours.
- p) Perform other contract management and construction oversight duties as required to ensure success of the subrecipient project.
- q) Provide necessary certifications to regulatory agencies of project completion and compliance (ex. TCEQ).
- r) Submit all final invoices within 60 days after contract or work order expiration.

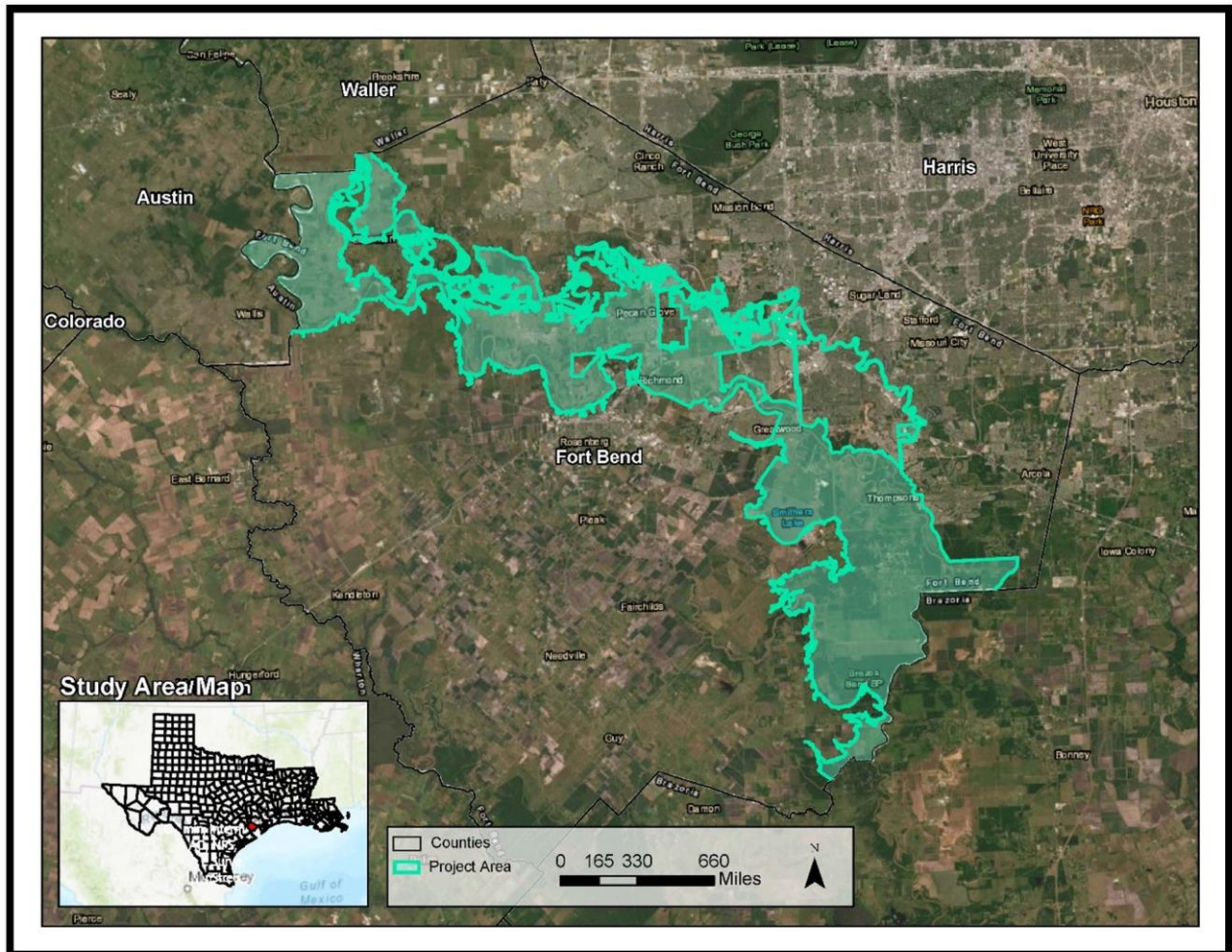
### **Specialized Services**

Respondents will be required to show the ability to provide all the Engineering services described below as they relate to specialized services.

- a) Provide Geotechnical Investigations as may be required for a project.
- b) Provide Detailed Surveying as may be required for a project.
- c) Provide Site Specific Testing as may be required for a project.
- d) Provide Archeological Studies as may be required for a project.
- e) Provide Planning Studies as may be required for a project.
- f) Provide Feasibility Studies as may be required for a project.
- g) Provide Legal documentation for property and/or easements to be acquired (i.e., field notes, etc.).
- h) Provide Phase I and Phase II environmental site assessments as requested.

Brazos River Flood Risk Management Study  
Final Integrated Termination Report, March 2020  
Fort Bend County, Texas

# BRAZOS RIVER FLOOD RISK MANAGEMENT STUDY FINAL INTEGRATED TERMINATION REPORT FORT BEND COUNTY, TEXAS



**MARCH 2020**

## Table of Contents

1	Introduction .....	1
1.1	Project and Study Authorization .....	1
1.1.1	Additional Study Guidelines .....	1
1.2	Purpose and Need .....	1
1.2.1	Flooding History .....	1
1.1.1	Federal Interest .....	2
1.3	Study Area .....	2
1.3.1	Non-Federal Sponsor .....	2
1.4	Related Documents\.....	5
1.4.1	Draft Brazos River Erosion Management (BREM) Planning Assistance to States (PAS) Report, USACE and Fort Bend County, January 2018. ....	5
1.4.2	Lower Brazos Flood Protection Planning Study, Brazos River Authority (BRA), March 2019.....	6
1.4.3	Brazos River Erosion Study, City of Sugar Land, August 2018.....	6
1.4.4	Brazos River Erosion Study, City of Richmond, January 2019.....	7
1.4.5	Brazos River Erosion Study, Fort Bend County, April 2019. ....	8
1.5	Other Projects in Study Area .....	8
2	Affected Environment (Existing Condition) and No Action Alternative (Future Without Project Condition).....	9
2.1	Climate .....	9
2.1.1	Climate Change .....	10
2.2	Air Quality.....	12
2.3	Topography, Geology, and Soils .....	13
2.3.1	Topography.....	13
2.3.2	Geology .....	13
2.3.3	Soils.....	13
2.3.4	Erosion .....	15
2.4	Land Use.....	15
2.5	Water Resources.....	15
2.5.1	Hydrology and Hydraulics .....	15
2.5.2	Surface Water.....	16
2.5.3	Groundwater.....	18

2.5.4	Water Quality .....	18
2.6	Biological Resources .....	19
2.6.1	Vegetation.....	19
2.6.2	Wetlands.....	20
2.6.3	Special Status Species .....	20
2.7	Cultural Resources .....	26
2.7.1	Flood Damages .....	27
2.7.2	Socio-Economics .....	27
2.7.3	Life Safety.....	28
2.7.4	Recreation .....	28
2.7.5	Hazardous, Toxic, and Radioactive Waste (HTRW).....	28
2.8	Future without Project Conditions/Consequences .....	29
3	Plan Formulation .....	29
3.1	Problems, Opportunities, Objectives, and Constraints .....	29
3.1.1	Problems .....	29
3.1.2	Opportunities.....	29
3.1.3	Objectives.....	30
3.1.4	Constraints .....	30
3.2	Management Measures.....	30
3.2.1	Structural Measures.....	30
3.2.2	Non-Structural Measures .....	31
3.2.3	Erosion Risk Reduction Measures.....	32
3.2.4	Screening of General Measures .....	32
3.3	Initial Action Alternatives Array .....	33
3.3.1	Flood Risk Management Infrastructure Protection (Alternative 2) .....	<b>Error! Bookmark not defined.</b>
3.3.2	Improve Existing Levees (Alternative 3) .....	<b>Error! Bookmark not defined.</b>
3.3.3	Floodplain Management Changes (Alternative 4).....	<b>Error! Bookmark not defined.</b>
3.3.4	Buyouts and Structure Raises (Alternative 5) .....	<b>Error! Bookmark not defined.</b>
3.3.5	Pecan Grove Levee Extension (Alternative 6a) .....	<b>Error! Bookmark not defined.</b>
3.3.6	Weston Lakes Levee at Bessie’s (Alternative 6b).....	<b>Error! Bookmark not defined.</b>

3.3.7	Weston Lakes Levee at Brazos (Alternative 6c) .....	<b>Error! Bookmark not defined.</b>
3.3.8	Multi-Levee (Alternative 7).....	<b>Error! Bookmark not defined.</b>
3.3.9	Regional Detention (Alternative 8).....	<b>Error! Bookmark not defined.</b>
3.3.10	Evaluation and Screening of Initial Alternative Array .....	47
3.4	Final Array of Alternatives .....	49
3.5	Evaluation and Comparison of Final Alternative Array.....	50
3.5.1	Completeness.....	50
3.5.2	Acceptability.....	50
3.5.3	Effectiveness .....	50
3.5.4	Efficiency .....	51
3.6	Plan Selection .....	52
3.7	Risk and Uncertainty .....	52
4	Preparers .....	53
5	Recommendation .....	53
5.1	Federal Plan .....	53
5.2	Other Recommendations for Local Action .....	53
5.2.1	Assistance .....	54
5.2.2	Required Coordination .....	54
6	References.....	55

### List of Tables

Table 1:	NOAA Flood Stages at Richmond Gauge.....	2
Table 2:	Flood History .....	3
Table 3:	Study Area Soil Types .....	14
Table 4:	Rare, Threatened, and Endangered Species for Fort Bend County .....	20
Table 5:	Previously-recorded archeological sites, historic districts, and NRHP-listed properties. ....	26
Table 6:	Population Data for Fort Bend County, Texas.....	27
Table 7:	Structural Measures Considered .....	31
Table 8:	Non-structural Measures Considered .....	31
Table 9:	Erosion Risk Reduction Measures .....	32
Table 10:	Levee Overtopping Assessment Summary .....	47
Table 11:	Buyout Rough Cost Benefit Analysis .....	48
Table 12:	Average Annual Flood Damage Reduction (\$1,000, Oct 2018). ....	50
Table 13:	Infrastructure Protection 1% Annual Event Damages .....	51
Table 14:	Flood Risk Management Cost Benefit Analysis .....	51
Table 15:	Erosion Cost Benefit Analysis.....	51
Table 16:	Uncertainty in Benefit-Cost Analysis .....	52

## List of Figures

Figure 1: Study Area Map.....	4
Figure 2: Richmond Erosion Study AOIs .....	8
Figure 3: Levee Districts along Brazos River .....	9
Figure 4: Monthly Average Temperatures .....	10
Figure 5: Monthly Average Precipitation .....	10
Figure 6: Summary Matrix of Observed and Projected Climate Trends .....	12
Figure 7: Floodplain Map .....	16
Figure 8: Map of Streams within Study Area.....	17
Figure 9: Action Alternatives .....	36
Figure 10: Flood Risk Management Erosion Protection Alternative .....	37
Figure 11: Levee Improvement Alternative .....	38
Figure 12: Meander Corridor near Simonton .....	39
Figure 13: Meander Corridor near Richmond .....	40
Figure 14: Meander Corridor near Sienna Plantation .....	41
Figure 15: Meander Corridor near Brazoria County .....	42
Figure 16: Buyout Areas.....	43
Figure 17: Pecan Grove Levee Extension Alternative.....	44
Figure 18: Weston Lakes Levee Alternatives .....	45
Figure 19: Regional Detention Alternative .....	46

## Appendices

Appendix A.....	Engineering
Appendix B.....	Environmental
Appendix C.....	Economics

### Acronym List

AAHUs	Average Annual Habitat Units
APHIS	Animal and Plant Health Inspection Services
AEP	Annual Exceedance Probability
AOU	American Ornithologists' Union
ASTM	American Society for Testing & Materials
BCR	Benefit Cost Ratio
BMPs	Best Management Practices
BP	Before Present
BRA Study	Lower Brazos River Floodplain Protection Study
BREM-PAS	Brazos River Erosion Management – Planning Assistance to States
CAA	Clean Air Act
CAP	Continuing Authorities Program
CDC	Corridor Development Certification
CFR	Code of Federal Regulation
cfs	Cubic Feet Per Second
DSHS	Department of State Health Services
DNL	Day-Night Average Sound Level
EAA	Edwards Aquifer Authority
EAD	Expected Annual Damages
E.O.	Executive Order
ER	Engineering Regulation
EIS	Environmental Impact Statement
EPA	US Environmental Protection Agency
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Association
FEPP	Flood Emergency Preparedness Plans
FFPA	Farmland Protection Policy Act
FRM	Flood Risk Management
FONSI	Finding of No Significant Impact
FWCA	Fish and Wildlife Coordination Act
GCWA	Golden-cheeked Warbler
GBRA	Guadalupe – Blanco River Authority
GIS	Geographical Information System
GRP	Gross Regional Product
HEC-FDA	Hydrologic Engineering Center – Flood Damage Reduction Analysis
HTRW	Hazardous, Toxic & Radioactive Waste
HUD	Housing and Urban Development
IPaC	Information for Planning and Consultation
LERRDs	Lands, Easements, Rights-of-way, Relocations, and Disposal Areas
LID	Levee improvement districts
MAMP	Monitoring and Adaptive Management Plan
MOA	Memorandum of Agreement
mph	Miles per Hour
MUD	Municipal utility districts



Brazos River Flood Risk Management Study  
Final Integrated Termination Report, March 2020  
Fort Bend County, Texas

NAA	No Action Alternative
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection & Repatriation Act
NED	National Economic Development
NEPA	National Environmental Policy Act
NER	National Ecosystem Restoration
NFS	Non-Federal Sponsor
NOAA	National Oceanographic Atmospheric Administration
NPDES	National Pollutant Discharge Elimination
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
OSE	Other Social Effects
OSUM	Ohio State University at Marion
PA	Programmatic Agreement PED
Planning, Engineering, and Design	
PL	Public Law
RED	Regional Economic Development
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
T&E	Threatened and Endangered
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historic Commission
THPO	Tribal Historic Preservation Officers
TPWD	Texas Parks and Wildlife Department
TSWQS	Texas Surface Water Quality Standards
TWDB	Texas Water Development Board
TXNDD	Texas Natural Diversity Database
USACE	US Army Corps of Engineers
USC	United States Code
USFWS	US Fish and Wildlife Service
USGCRP	US Global Change Research Program
USGS	US Geological Service
VOC	Volatile Organic Compounds
WRDA	Water Resource Development Act

# 1 Introduction

## 1.1 Project and Study Authorization

The Brazos Flood Risk Management (FRM) Study, Fort Bend County was authorized in the Water Infrastructure Improvements for the Nation Act or “WIIN Act” 2016, Water Resource Development Act (WRDA) 2016, dated 16 December 2016.

*The Secretary is authorized to conduct a feasibility study for the following projects for water resources development and conservation and other purposes, as identified in the reports titled “Report to Congress on Future Water Resources Development” submitted to Congress on January 29, 2015, and January 29, 2016, respectively, pursuant to section 7001 of the Water Resources Reform and Development Act of 2014 (33 U.S.C. 2282d) or otherwise reviewed by Congress:*

*(21) BRAZOS RIVER, FORT BEND COUNTY, TEXAS. – Project for flood damage reduction in the vicinity of the Brazos River, Fort Bend County, Texas.”*

The authorization stated “flood damage reduction”; however, the authorization also referenced the section 7001 proposal. That 7001 proposal referenced erosion and bank stabilization; therefore, erosion has been evaluated as part of this study effort. The erosion effort focused on protecting existing flood risk infrastructure and critical infrastructure from anticipated erosion.

### 1.1.1 Additional Study Guidelines

Funding for this study was received as part of the Bipartisan Budget Act, also known as PL 115-123, passed on February 8, 2018, which provided study funding at full federal expense. In accordance with United States Army Corps of Engineers (USACE) policy, both structural and non-structural measures were considered. Studies may also address long-range measures to reduce exposure to risks from floods and coastal storms.

## 1.2 Purpose and Need

The purpose of the study is to investigate flood damage reduction and measures to reduce continued severe riverbank erosion, which undermines public infrastructure, including flood risk management infrastructure, adjacent to the Brazos River in Fort Bend County, Texas.

### 1.2.1 Flooding History

The U.S. Geologic Service (USGS) has a river gauge (08114000) in the City of Richmond, Texas. The National Oceanographic and Atmospheric Administration (NOAA) classifications for river stages are shown in the Table 1. Each of the gauge heights can be associated with an Annual Exceedance Probability (AEP).

**Table 1: NOAA Flood Stages at Richmond Gauge**

Stage	Gauge Height	NAVD 88 Elevation	Approximate AEP Event	Number of Events
<b>Action</b>	20	47	20%	23
<b>Flood</b>	45	72	Less Than 0.2%	11
<b>Moderate Flood</b>	48	75	Less Than 0.2%	2
<b>Major Flood</b>	50	77	Less Than 0.2%	6

Flooding of roadways and other nuisance flooding occurs between the action and flood stages. The history at the Richmond USGS gauge site goes back approximately 80 years. Each of the events are shown in Table 2. The study area was affected by the flooding caused by Hurricane Harvey in 2017, which affected the Houston area.

### 1.1.1 Federal Interest

There are approximately 75,000 structures within the current Lower Brazos River effective Federal Emergency Management Association (FEMA) 0.2 percent AEP floodplain, valued at more than \$3.2 billion. There are 15,000 structures that are unprotected from future flood risks. Erosion of the banks of the Brazos River further jeopardizes existing local levees that reduce the flood risk for an additional 60,000 structures

## 1.3 Study Area

The study area (shown in **Error! Reference source not found.**) consists of the Brazos River watershed within Fort Bend County, Texas. The river is 82 miles long and the watershed encompasses 492 square miles in Fort Bend County. Local entities have constructed levees to alleviate the flood impacts along the Brazos River. The municipality utility districts (MUDs) within the study area include: Rosenberg, Richmond, Sugar Land, Missouri City, and Simonton.

### 1.3.1 Non-Federal Sponsor

The Non-Federal Sponsor (NFS) for the Brazos FRM study is Fort Bend County. The NFS has been represented by the Fort Bend County Drainage District.

**Table 2: Flood History**

<b>Date</b>	<b>Gauge Height</b>	<b>NOAA Stage</b>
<b>11/28/1940</b>	51.4	Major Flood
<b>5/1/1942</b>	45.42	Flood
<b>5/8/1944</b>	47.7	Flood
<b>4/27/1945</b>	45.6	Flood
<b>5/20/1946</b>	43.1	Action
<b>5/19/1953</b>	42.86	Action
<b>5/5/1957</b>	50.13	Major Flood
<b>10/20/1957</b>	44.9	Action
<b>10/9/1959</b>	38	Action
<b>1/16/1961</b>	42.66	Action
<b>5/25/1965</b>	47.72	Flood
<b>4/30/1966</b>	41.6	Action
<b>5/14/1968</b>	45.43	Flood
<b>6/15/1973</b>	44.62	Action
<b>5/29/1975</b>	39.51	Action
<b>4/22/1977</b>	44.05	Action
<b>6/8/1979</b>	45.29	Flood
<b>6/14/1981</b>	39.67	Action
<b>11/2/1981</b>	38.08	Action
<b>6/17/1987</b>	42.18	Action
<b>11/10/1988</b>	21.53	Action
<b>5/22/1989</b>	34.07	Action
<b>5/8/1990</b>	38.75	Action
<b>1/20/1991</b>	37.53	Action
<b>1/1/1992</b>	49.68	Moderate Flood
<b>6/23/1993</b>	40.15	Action
<b>5/17/1994</b>	30.15	Action
<b>10/21/1994</b>	50.3	Major Flood
<b>9/23/1996</b>	26.85	Action
<b>3/14/1997</b>	40.93	Action
<b>1/11/1998</b>	38.1	Action
<b>10/22/1998</b>	47.08	Flood
<b>11/7/2002</b>	45.22	Flood
<b>7/2/2004</b>	43.1	Action
<b>11/29/2004</b>	45.84	Flood
<b>7/20/2007</b>	45.04	Flood
<b>6/3/2015</b>	50.01	Major Flood
<b>3/17/2016</b>	44.46	Action
<b>4/21/2016</b>	49.67	Moderate Flood
<b>6/2/2016</b>	54.74	Major Flood
<b>9/1/2017</b>	55.19	Major Flood
<b>1/10/2019</b>	46.59	Flood



## **1.4 Related Documents**

### **1.4.1 Draft Brazos River Erosion Management (BREM) Planning Assistance to States (PAS) Report, USACE and Fort Bend County, January 2018.**

This study effort, hereinafter referred to as the “BREM-PAS Study,” was completed on a 2.5 mile reach of the Brazos River near downtown Richmond, Texas in 2017. Seventeen sites were visited as a part of this study, and all exhibited mass rotational failure induced by toe erosion, which is common with rivers in a degradational regime. The final recommendation of the BREM-PAS study was to implement a watershed level geomorphic/hydraulic analysis of the Brazos River throughout Fort Bend County. This effort is underway through the Regional Sediment Management (RSM) Program. Also highlighted was the need to “restrain” the river and its tributaries in order to protect critical infrastructure throughout the developed areas. Hydraulic modeling, a preliminary geomorphic assessment, and streambank erosion protection concepts were presented and evaluated. Existing 1D models were determined to not accurately capture water surface elevations because existing bathymetry was sparse in coverage and outdated. Due to this data gap, unrealistic roughness values had to be assigned to match recorded stages. While this practice will often allow a model to accurately capture lower stages, it becomes unreliable for prediction at flood stages.

The geomorphic assessment for the BREM-PAS Study produced a specific gage analysis of the Richmond gage, which provided insight into one of the underlying causes of Brazos River bank failure. Based on the specific gage analysis, the vertical trend of the river can be verified as degradational. Degradational, in the riverine sense, implies that the bottom of the river is going down in the vertical direction over time. Such a process induces bank failure that can be seen throughout the Brazos River watershed. Seventeen sites were visited as a part of this study, and all exhibited mass rotational failure induced by toe erosion, which is common with rivers in a degradational regime.

The final recommendation of the BREM-PAS Study was to implement a watershed level geomorphic/hydraulic analysis of the Brazos River throughout Fort Bend County. This effort is underway through the Regional Sediment Management (RSM) Program. Also highlighted was the need to “restrain” the river and its tributaries in order to protect critical infrastructure throughout the developed areas. Critical to the current effort is the BREM-PAS Study report reference to the Strom and Rouhina (2013) report, in which effective discharge at several locations on the Brazos River was determined. Effective discharge can be defined as the streamflow responsible for moving the most sediment in a river. For the Brazos at Richmond, this value is recorded as approximately 45,000 cfs. Updated effective discharge calculations will be pursued through this study.

#### **1.4.2 Lower Brazos Flood Protection Planning Study, Brazos River Authority (BRA), March 2019.**

This study was completed in March of 2019 for the BRA and several partners under a grant provided for by the Texas Water Development Board (TWDB) (hereinafter referred to as “BRA Study”). Some of the alternatives analyzed in the BRA Study were further analyzed as part of this study. These alternatives include the improvement of existing levees, the Pecan Grove levee extension, and the Weston Lakes levees.

Within Fort Bend County, several flood mitigation alternatives were assessed using the BRA Study model. These alternatives included structural buyouts, analysis of existing levee elevations in comparison to the Federal Emergency Management Agency (FEMA) freeboard requirements, a new Simonton Ring Levee, a new Weston Lakes Levee, a new Pecan Grove Levee, large scale detention, channelization, and the construction of bypass channel. Large scale detention, channelization, and the proposed bypass channel were all determined by the BRA Study to not be feasible or provide enough benefit to warrant further consideration. The BRA Study concluded that large scale detention, channelization, and a bypass channel were not at all feasible or beneficial from an FRM perspective. Furthermore, channelization on a river that exhibits degradational characteristics and excessive meander migration, like the Brazos River, would induce far worse erosion long term than it is experiencing now. Overall, the BRA Study and report provided a technical and modeling platform that this FRM study can built upon, with new data, to accomplish the hydraulic analysis goals within Fort Bend County. Just as importantly, the BRA Study has provided the alternatives, analysis, and detail necessary to initially pre-screen the large scale measures for this FRM study.

#### **1.4.3 Brazos River Erosion Study, City of Sugar Land, August 2018.**

In May 2017, the City of Sugar Land contracted with Huitt-Zollars to study bank erosion along the Brazos River. The study evaluated thirteen sites prior to Hurricane Harvey. Further analysis was completed post-Harvey. The methodology employed in this study is based off of soil erodibility and historic river meander migration through aerial imagery. The report estimates the current erosion rates at approximately 25 feet per year.

Following significant erosion due to the Hurricane Harvey event, the scope of the study expanded to include:

- 1) An aerial survey of the river to benchmark the extent of erosion since Hurricane Harvey in August 2017 for comparison after future high water events.

- 2) A geotechnical soil sample within Memorial Park near the river bank for testing at Texas A&M University to determine the erodibility rate for the various soil types.
- 3) A Deterministic and Probabilistic Analyses, performed by Texas A&M University, to project future meander migration of the river.
- 4) A Risk and Consequence analysis based on projected future migration.
- 5) Possible sources of funding for potential improvements.

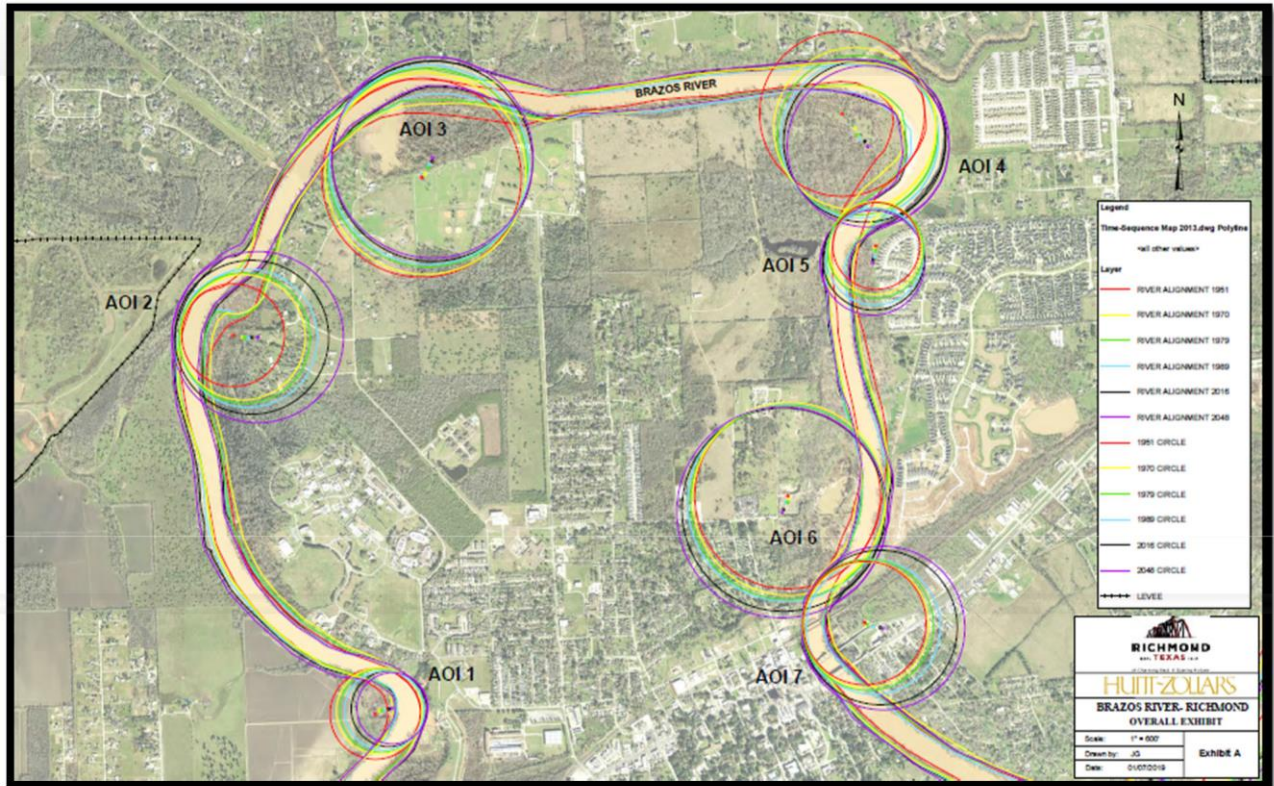
The study, hereinafter referred to as the “Sugar Land Erosion Study,” was completed on August 7, 2018 and provided erosion rates for use in this study.

#### **1.4.4 Brazos River Erosion Study, City of Richmond, January 2019.**

Within this study, Huitt-Zollars performed a geomorphologic analysis to project meander migration utilizing the same methods as the above summarized erosion study. This study, hereinafter referred to as the “Richmond Erosion Study,” focused on roughly eight miles of the Brazos River near the City of Richmond. Within this reach were two bridges essential for the transportation of good and inhabitants of Fort Bend County. Seven areas of interest were analyzed, and the majority of these areas were found to have significant consequences should the current erosion be left unchecked.

The 2019 study investigated 7 erosion sites in and around the City of Richmond using the same methodology of the Sugar Land study. Based upon the report sites AOI 1, 4, 6, and 7 (Figure 2) should be considered as erosion threatening FRM infrastructure.





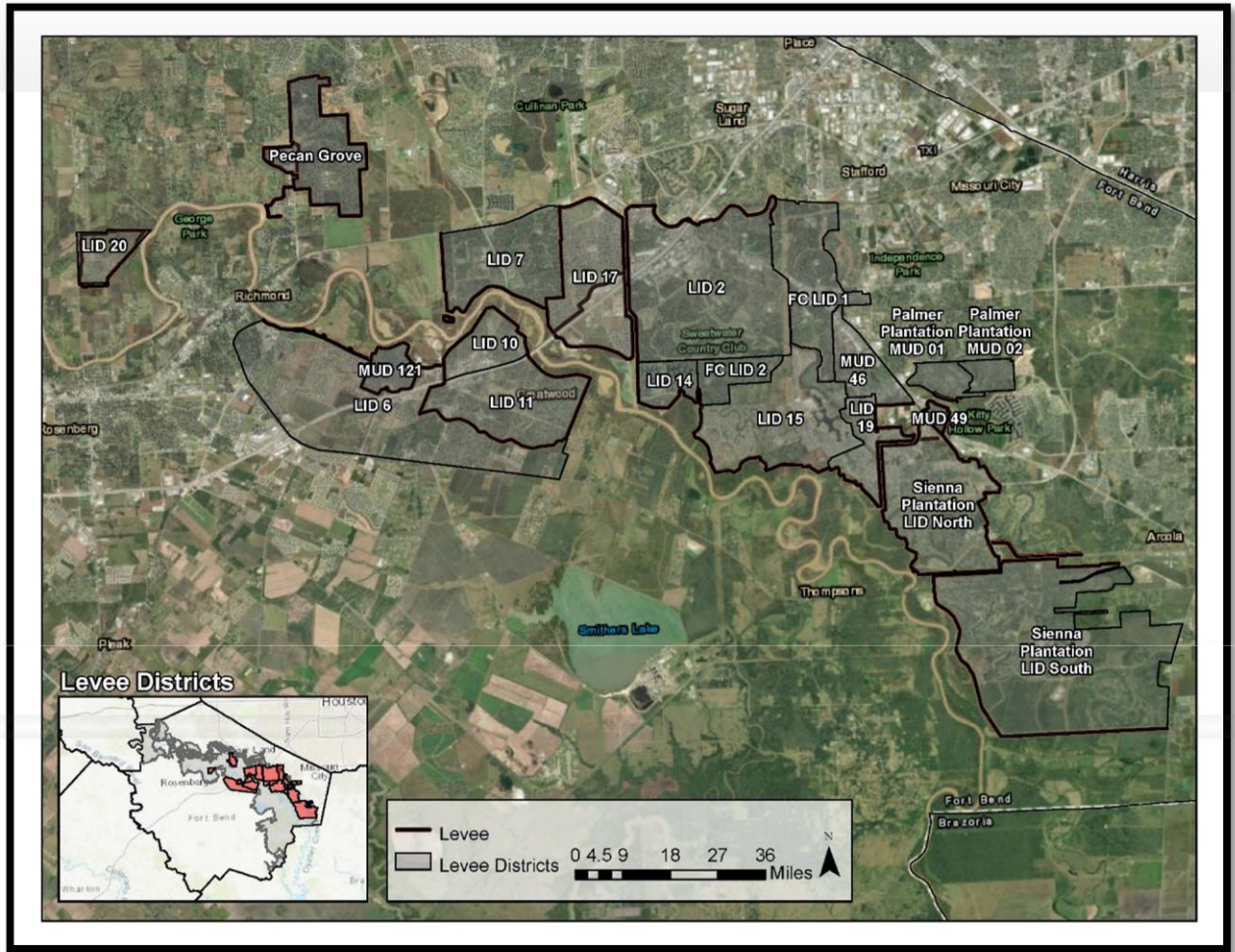
**Figure 2: Richmond Erosion Study AOIs**

#### **1.4.5 Brazos River Erosion Study, Fort Bend County, April 2019.**

This effort was similar in nature and methodology to the two previous erosion studies. The scope of this study, hereinafter referred to as the “Fort Bend County Erosion Study,” was larger and focused on local government infrastructure and historic sites. Twenty-three locations were assessed for future potential meander migration within a thirty year time span. All locations exhibited potential meander migration. Consequences of allowing the current projected erosion to continue unimpeded were quantified based off of the value of the threatened properties and infrastructure.

#### **1.5 Other Projects in Study Area**

There are currently 20 levee improvement districts (LIDs) and municipal utility districts (MUDs) within the study area. LIDs have built and maintained 18 levee systems (Figure 3) along the Brazos River to provide flood mitigation.



**Figure 3: Levee Districts along Brazos River**

## **2 Affected Environment (Existing Condition) and No Action Alternative (Future Without Project Condition)**

The affected environment (existing condition) is the condition at the time of the study. The No Action Alternative (NAA), which is also known as the Future Without Project Condition, is the condition that is considered the most likely future condition if no federal action is taken. The NAA includes actions that can be reasonably anticipated to be taken by local entities. Unless otherwise stated the affected environment is not anticipated to change for the NAA.

### **2.1 Climate**

Fort Bend County is in Texas's Coastal Plain which has a temperate warm, subtropical, and humid climate. According to the National Oceanic Atmospheric Association (NOAA) (Figure 4 and Figure 5) the average high temperature varies from 64° to 94° Fahrenheit, and a monthly rainfall from 2.7 to 6.1 inches. Severe precipitation events occur periodically in the form of thunderstorms, tropical storms and hurricanes. Thunderstorms occur on about 67 days each year, and most occur in July and August.

Typically, the study area will see three tropical storms and/or hurricanes over a four year period. During these events, flooding is the most serious threat. In general, the weaker the system, the more efficient it is at producing heavy rains and catastrophic flooding.

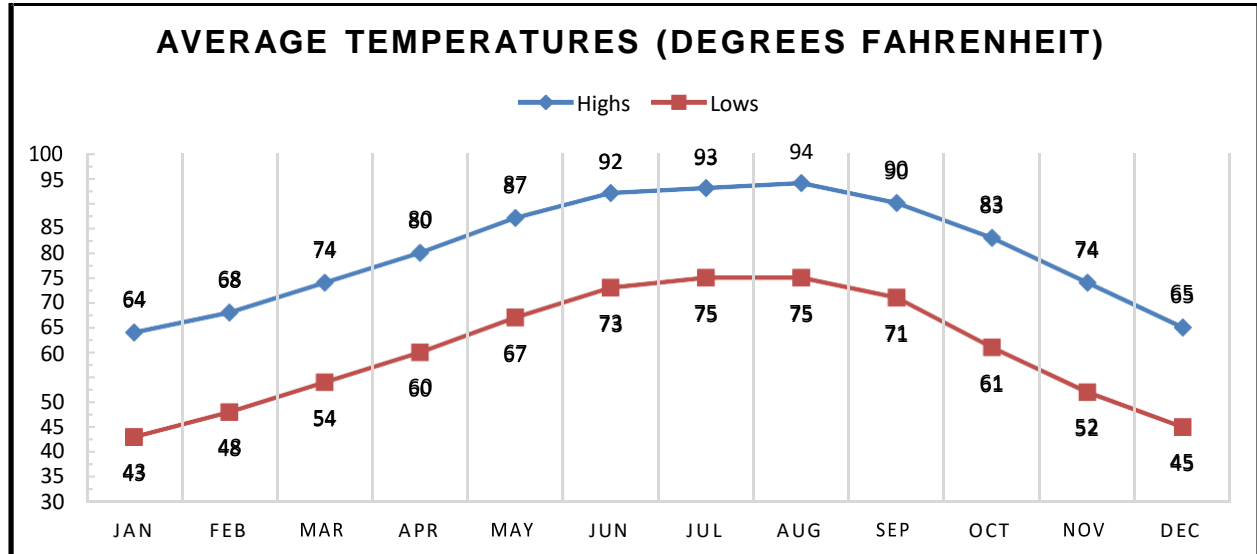


Figure 4: Monthly Average Temperatures

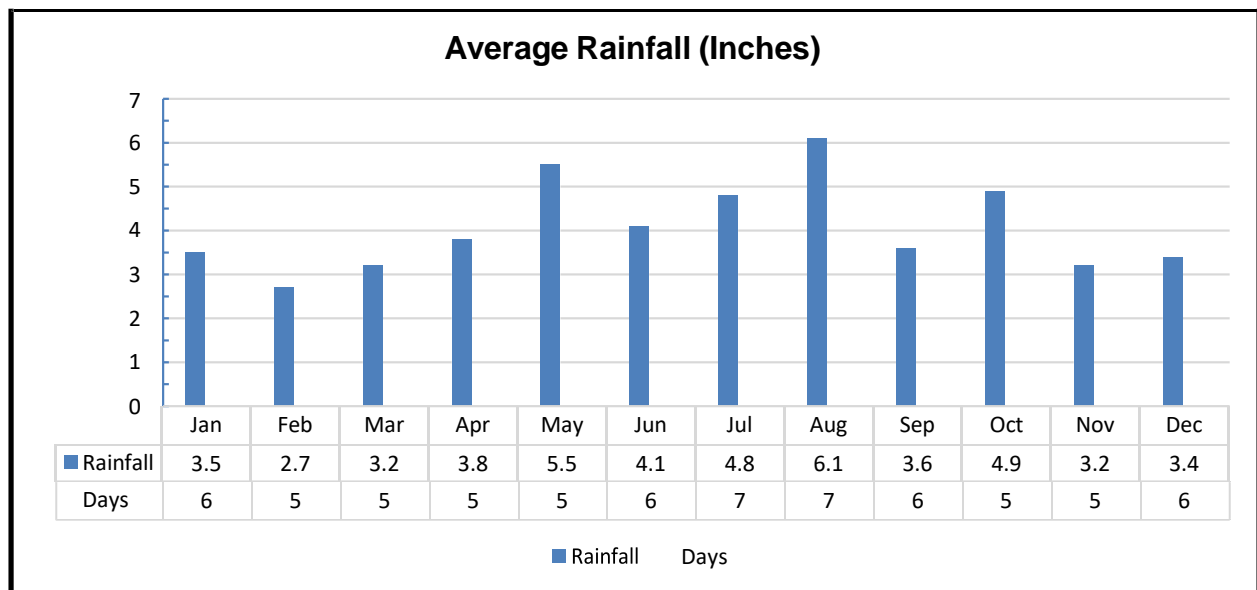


Figure 5: Monthly Average Precipitation

### 2.1.1 Climate Change

There is strong consensus in the literature that air temperatures will increase in the study region, and throughout the country, over the next century. Current studies generally agree on an increase in mean annual air temperature of approximately 3 to 5

°C by the latter half of the 21st century for the Texas-Gulf Region. The largest increases are projected for the summer months. Reasonable consensus is also seen in the literature with respect to projected increases in extreme temperature events, including more frequent, longer, and more intense summer heat waves in the long-term future compared to the recent past. (USACE 2015)

Projections of precipitation in the study region are less certain than those associated with air temperature. On the whole, the region appears to sit on a divide between a generally projected wetter east and a projected dryer west. There is reasonable consensus in the literature, however, that the frequency and intensity of large storm events in the region will increase in the future.

Multiple studies reviewed here also indicate increasing frequency and severity of future droughts in the region. Despite the lack of clarity in precipitation projections, the majority of studies reviewed here generally predict a small to moderate decrease in future streamflows and water availability. These projections were generated by coupling GCMs with macro scale hydrologic models, which introduce additional uncertainty. However, for the Texas-Gulf Region, the number of relevant studies on the subject is limited. Based on the temperature and precipitation projections described above, it appears that future water availability will be limited more so by changes in temperature and ET than by precipitation changes.

The trends and literary consensus of observed and projected primary variables noted above have been summarized for reference and comparison in the Figure 6. More detail on the climate change analysis is found in Section 3 of Appendix A.

PRIMARY VARIABLE	OBSERVED		PROJECTED	
	Trend	Literature Consensus (n)	Trend	Literature Consensus (n)
Temperature	↓	(5)	↑↑	(7)
Temperature MINIMUMS	↑	(1)	↑	(3)
Temperature MAXIMUMS	↑	(1)	↑↑	(3)
Precipitation	↑	(4)	—	(3)
Precipitation EXTREMES	↕	(4)	↑	(3)
Hydrology/ Streamflow	↑	(4)	↓	(4)

*NOTE: Spatial variability was observed in the literature review for Observed Precipitation Extremes. The inland portion of HUC 12 generally showed decreasing trends while the coastal portion of the HUC generally showed increasing trends for observed precipitation extremes.*

**TREND SCALE**

= Large Increase   
 = Small Increase   
 = No Change   
 = Variable  
 = Large Decrease   
 = Small Decrease   
 = No Literature

**LITERATURE CONSENSUS SCALE**

= All literature report similar trend   
 = Low consensus  
 = Majority report similar trends   
 = No peer-reviewed literature available for review  
**(n)** = number of relevant literature studies reviewed

**Figure 6: Summary Matrix of Observed and Projected Climate Trends**

## 2.2 Air Quality

The U.S. Environmental Protection Agency (EPA) has the primary responsibility for regulating air quality nationwide. The Clean Air Act (42 U.S.C. 7401 et seq.), as amended, requires the EPA to set National Ambient Air Quality Standards (NAAQS) for wide-spread pollutants from numerous and diverse sources considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards classified as either “primary” or “secondary.” Primary standards set

limits to protect public health, including the health of at-risk populations such as people with pre-existing heart or lung diseases (such as asthma), children, and older adults. Secondary standards set limits to protect public welfare, including protection against visibility impairment, damage to animals, crops, vegetation, and buildings.

EPA has set NAAQS for six principal pollutants, which are called “criteria” pollutants. These criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO<sub>2</sub>), ozone (O<sub>3</sub>), particulate matter less than 10 microns (PM<sub>10</sub>), particulate matter less than 2.5 microns (PM<sub>2.5</sub>), sulfur dioxide (SO<sub>2</sub>) and lead (Pb). If the concentration of one or more criteria pollutant in a geographic area is found to exceed the regulated “threshold” level for one or more of the NAAQS, the area may be classified as a non-attainment area. Areas with concentrations of criteria pollutants that are below the levels established by the NAAQS are considered either attainment or unclassifiable areas.

Fort Bend County is located in the Houston-Galveston-Brazoria (HGB) Air Quality Control Region (AQRC). Fort Bend County is currently designated as an area of marginal nonattainment for the 2015 8-hour ozone standard effective 3 August 2018 and in serious nonattainment for the 2008 8-hour ozone standard effective 20 July 2012.

Air pollutants within the study area are measured by numerous air monitoring stations. Most of the stations in the region measure the concentrations of criteria air pollutants, as well as temperature, wind, velocity, wind direction, and other meteorological parameters. The monitors operate continuously and are routinely calibrated and maintained to assure quality data.

## **2.3 Topography, Geology, and Soils**

### **2.3.1 Topography**

### **2.3.2 Geology**

There are two geologic formations within the study area. The first makes up the floodplain and consists of Holocene alluvial deposits (clay, silt, sand, and organic matter). These deposits include point bars, natural levees, stream channels, and backswamps. The second forms the upland areas bordering the floodplain and is called the Beaumont Formation of the Pleistocene, and consists of mostly of ancient stream channels (clay, silt, and sand), point bars, natural levees, backswamps, and to a lesser extent coastal marsh and mud-flat deposits.

### **2.3.3 Soils**

The Natural Resources Conservation Service (NRCS) is responsible for designating soils as prime farmland soils, in accordance with the Farmland Protection Policy Act. In addition, the Texas Department of Agriculture has designated soils that are of local importance for the production of food, feed, fiber, forage, or oilseed crops as soils of Statewide Importance. In order to narrow down the list of soils present in Fort Bend County, a study area was delineated for areas in the immediate vicinity of the Brazos

River. The resulting prime farmland soils, soils of state importance, and hydric soils are presented in Table 3 (NRCS, 2019).

**Table 3: Study Area Soil Types**

Soil Unit Symbol	Soil Unit Name	Percent of Brazos River Soil Study Area
<b>Aa<sup>1</sup></b>	Asa silt loam, 0 to 1% slopes, rarely flooded	0.1
<b>Ab<sup>1</sup></b>	Asa silty clay loam, 0 to 1% slopes, rarely flooded	1.6
<b>Ac<sup>1</sup></b>	Asa-Pledger complex, 0 to 1% slopes, rarely flooded	2.1
<b>Bb<sup>1</sup></b>	Bernard clay loam, 0 to 1% slopes	0.4
<b>Bc<sup>1</sup></b>	Bernard-Edna clay loams, 1 to 4% slopes	0.3
<b>Bd</b>	Bernard-Edna clay loams, 4 to 8% slopes	0.6
<b>Be<sup>1</sup></b>	Bernard-Edna complex, 0 to 1% slopes	0.6
<b>BP</b>	Borrow Pits	0.5
<b>Ea<sup>2</sup></b>	Edna fine sandy loam, 0 to 1% slopes	2.5
<b>Eb<sup>2</sup></b>	Edna fine sandy loam, 1 to 3% slopes	1.2
<b>Fa<sup>1</sup></b>	Fulshear fine sandy loam, 1 to 4% slopes	0.3
<b>Ha</b>	Fordtran loamy fine sand, 0 to 5% slopes	0.1
<b>Ke</b>	Kenney loamy fine sand, 0 to 2% slopes	1.2
<b>Kg</b>	Kenney loamy fine sand, 2 to 8% slopes	0.2
<b>Kh</b>	Kenney-Fulshear complex, 4 to 8% slopes	0.1
<b>KraA<sup>1</sup></b>	Krasna fine sandy loam, 0 to 2% slopes	1.4
<b>La<sup>1</sup></b>	Lake Charles clay, 0 to 1% slopes	4.9
<b>Lb<sup>1</sup></b>	Lake Charles clay, 2 to 5% slopes	1.9
<b>Lc</b>	Lake Charles clay, 3 to 8% slopes	0.8
<b>Ma<sup>1</sup></b>	Brazoria clay, 0 to 1% slopes, rarely flooded	31.2
<b>Mb<sup>1</sup></b>	Clemville fine sandy loam, rarely flooded	1.3
<b>Mc<sup>1</sup></b>	Clemville fine sandy loam, 0 to 1% slopes	3.3
<b>Md</b>	Clemville fine sandy loam, 0 to 1% slopes, occasionally flooded	2.4
<b>Me<sup>1,3</sup></b>	Brazoria rarely flooded-Sumpf frequently flooded, occasionally ponded clay	0.5
<b>Nb<sup>1</sup></b>	Belk clay, rarely flooded	0.9
<b>Nc<sup>1</sup></b>	Norwood loam, 0 to 1 percent slopes, rarely flooded	3.3
<b>Nd<sup>1</sup></b>	Norwood silty clay loam, 0 to 1% slopes, rarely flooded	1.4
<b>Pa<sup>1</sup></b>	Pledger clay, 0 to 1%, rarely flooded	3.9
<b>Ra<sup>3</sup></b>	Churnabog clay, 0 to 1% slopes, frequently flooded, occasionally ponded	1.2
<b>Sa</b>	Sandy alluvial land, occasionally flooded	12.4
<b>Sb</b>	Sloping alluvial land, rarely flooded	1.2
<b>TncA<sup>2,3</sup></b>	Texana-Cieno frequently flooded ponded complex, 0 to 1% slopes	0.1
<b>W</b>	Water	5.8

<b>Wa</b>	Gessner loam, 0 to 1% slopes, frequently ponded	0.1
<b>Ya<sup>1</sup></b>	Mohat loam, 0 to 1% slopes, rarely flooded	1.7
<b><sup>1</sup>Prime Farmland Soils</b>		
<b><sup>2</sup>Farmland Soils of State Importance</b>		
<b><sup>3</sup>Hydric Soils</b>		

### 2.3.4 Erosion

Based on the BREM-PAS, Brazos River FRM Feasibility Study, and City of Sugar Land Brazos River Erosion Studies it has been documented that the continued erosion on the Brazos River threatens non-Federal levees in the area. After a risk characterization performed by the USACE it was determined that several of the levees most likely failure mode is an erosion caused breach. The erosion threats are shown in Figure 7, and discussed more in Section 3.1 of Appendix A.

### 2.4 Land Use

The major land uses in the study area are residential, commercial, industrial, and agricultural. As the City of Houston’s urban sprawl increases more of the study area is urbanizing.

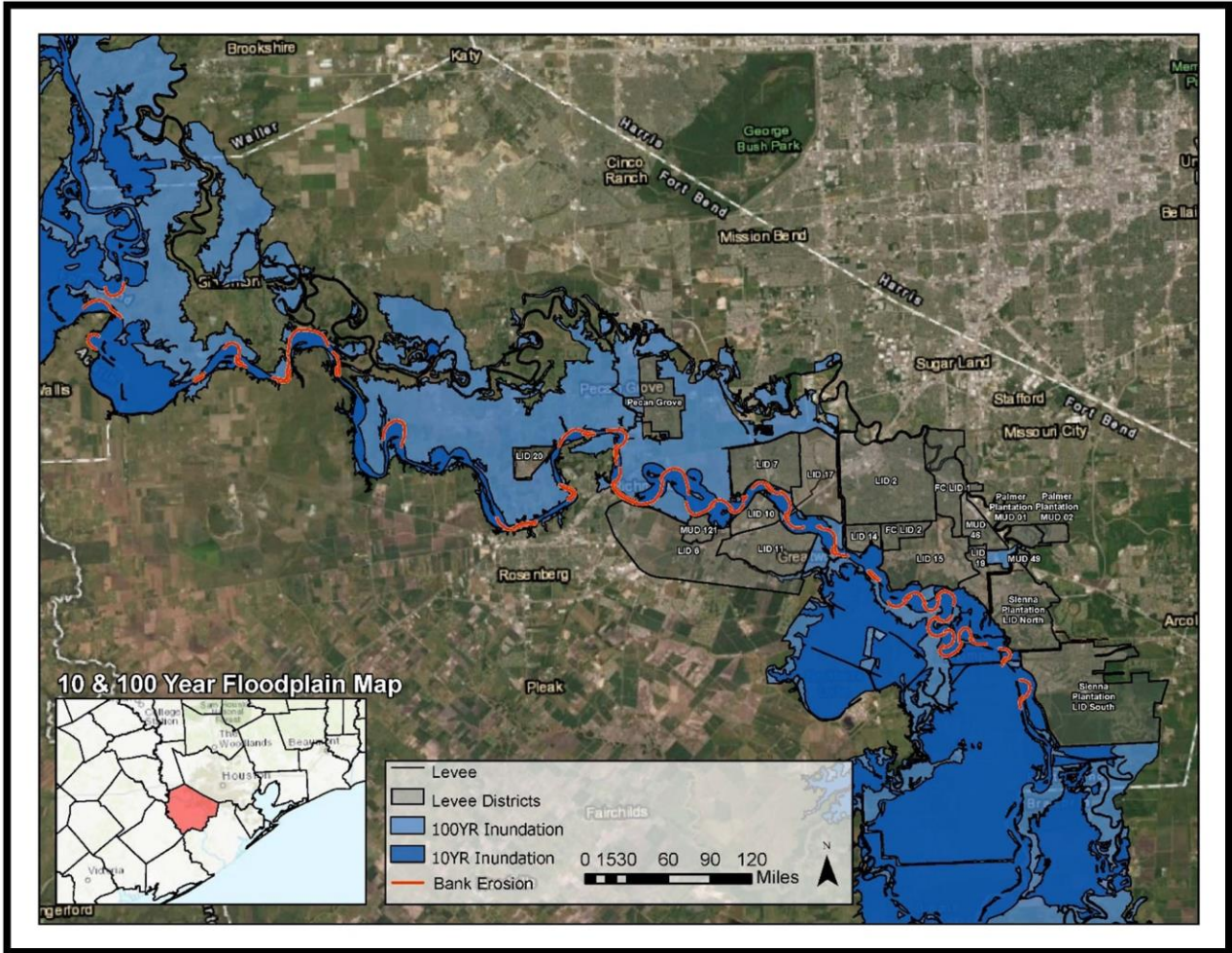
### 2.5 Water Resources

Water resources include both surface water and groundwater resources; associated water quality; and floodplains. Surface water includes all lakes, ponds, rivers, streams, impoundments, and wetlands; while groundwater is typically found in areas known as aquifers. Water quality describes the chemical and physical composition of water as affected by natural conditions and human activities.

#### 2.5.1 Hydrology and Hydraulics

The Brazos River is the second largest river basin (42,620 mi<sup>2</sup>) by area and the second longest river (820 miles) within Texas. Communities along the Lower Brazos River are threatened by frequent flooding with 24 major flooding events (discharges greater the 70,000 cubic feet per second (cfs)) at the Richmond USGS gauge (Halff, 2019). Record major floods have occurred as recently as 2016 and 2017. The flows in the upstream end of the lower basin are controlled by upstream detention structures, so the nature of the flooding is not prone to rapid water surface elevation increases or rapid drawdown. The 10% and 1 % AEP floodplains are shown in Figure 7.

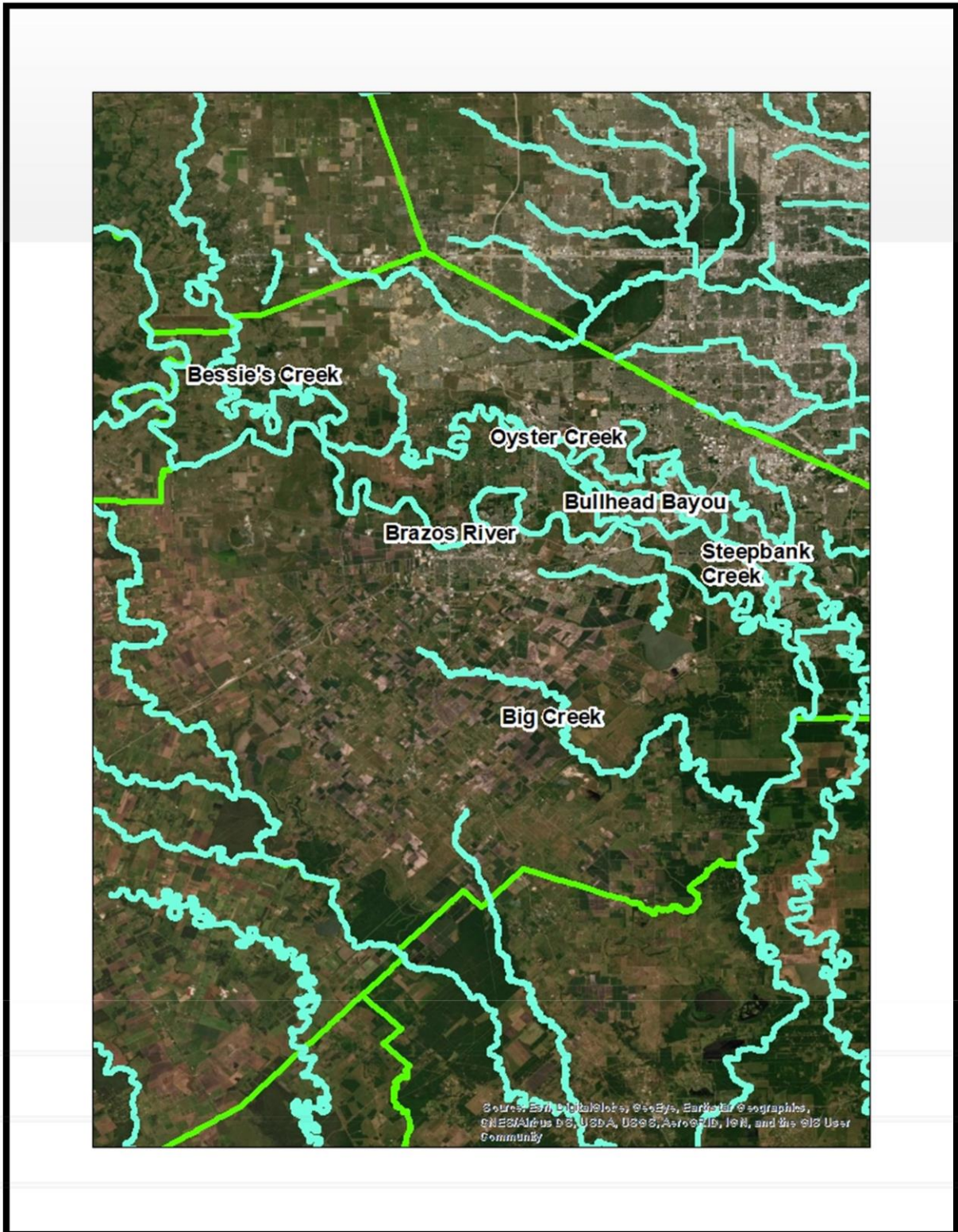




**Figure 7: Floodplain Map**

**2.5.2 Surface Water**

The Brazos River is the main river drainage system in Fort Bend County. The major streams in the study area that feed into the Brazos River include Bessie’s Creek, Oyster Creek, Bullhead Bayou, Alcorn Bayou, Steepbank Creek, Big Creek, Rabbs Bayou, and Jones Creek (Figure 8). These creeks flow into the Brazos River which terminates at the Gulf of Mexico. The streams are intermittent with a network of emergent wetlands and forested wetlands following the channel during low/intermittent flows. The Brazos River also supports a network of oxbows and ponded areas adjacent to the river channel throughout the length of the river in Fort Bend County. These oxbows and ponds also support associated emergent and forested wetlands.



**Figure 8: Map of Streams within Study Area**

### **2.5.3 Groundwater**

The study area overlies the Gulf Coast Aquifer major aquifer. In Texas, the aquifer parallels the Gulf of Mexico coastline from the Louisiana border to the border of Mexico. The Gulf Coast Aquifer contains various interconnected layers, some of which are aquicludes (impervious clay or rock layers). From bottom to top, the four main water-producing layers are the Catahoula, Jasper, Evangeline, and Chicot layers, with the Evangeline and Chicot being the main sources of groundwater in the region. The maximum total sand thickness of the Gulf Coast Aquifer ranges from 700 feet in the south to 1,300 feet in the north. Freshwater saturated thickness averages about 1,000 feet.

Fresh groundwater in the study area is supplied by the Chicot and Evangeline Aquifers. The deeper Jasper Aquifer is slightly saline and is only located at the northwestern part of Fort Bend County. The principal source of fresh groundwater in Fort Bend County is precipitation. Most precipitation runs off and becomes streamflow or evaporates immediately. Only a small fraction of rainfall infiltrates to the zone of saturation. A large percentage of the water that reaches the zone of saturation in the aquifers is rapidly returned to the surface as spring flow, which supports the base flow of the streams of the area.

### **2.5.4 Water Quality**

The Texas Commission of Environmental Quality (TCEQ) is the agency in Texas responsible for enforcing the water quality standards and has prepared a 2016 Texas Integrated Report and 303(d) List of impaired waters to the EPA. A Draft 2020 report has been submitted to the EPA, but has not been approved.

#### **2.5.4.1.1 Surface Water**

Surface water quality in the study area is influenced by the agricultural, residential, and commercial land uses in the area. These increased nutrient loads lead to water quality impacts by decreasing dissolved oxygen concentrations in the water bodies which impact aquatic life in the streams. Increased concentrations of coliform bacteria impact the contact recreation use in the streams.

The TCEQ has designated water quality impairments in six water bodies in the study area in their 2016 Texas 303(d) list. These impairments have also been documented in TCEQ's Draft 2020 report as well:

- Oyster Creek above Tidal (Segment 1110) – Exceedance of bacteria and depressed oxygen level water quality parameters for the section of the creek 330 feet upstream of FM 2004 in Brazoria County to 2.7 miles upstream of Scanlon Road in Fort Bend County.
- Upper Oyster Creek (Segment 1245) - Exceedance of bacteria and depressed oxygen level water quality parameters for the section of the creek from the confluence with Steep Bank Creek/Brazos River to the pumping station on Jones

Creek. This segment includes portions of Steepbank Creek, Flat Bank Creek, and Jones Creek.

- Bullhead Bayou (Segment 1245C) - Exceedance of bacteria water quality parameters for the section of the creek from the confluence with Steep Bank Creek upstream to its headwaters.
- Unnamed Tributary of Bullhead Bayou (Segment 1245D) – Exceedance of bacteria water quality parameters for the section of the creek from the confluence with Bullhead Bayou upstream to its headwaters.
- Alcorn Bayou (Segment 1245F) - Exceedance of bacteria water quality parameters for the section of the creek from the confluence with Steep Bank Creek upstream to its headwaters.
- Steep Bank Creek (Segment 1245I) - Exceedance of bacteria water quality parameters for the section of the creek from the confluence with Flat Bank Creek upstream to the end of the water body.

#### **2.5.4.1.2 Groundwater**

The Chicot and Evangeline aquifers are pierced or displaced by eight salt domes and associated faults. At some locations over the domes, there is very little or no fresh ground water. In areas not affected by the domes, the quality of the fresh water is generally suitable for irrigation, public water supply, and most industrial uses. However, in the vicinity of the salt domes, the concentration of dissolved solids and chlorides may exceed the standards for drinking water. In general, the ground water is very hard.

## **2.6 Biological Resources**

### **2.6.1 Vegetation**

The study area is within the Floodplains and Low Terraces ecological subunit of the Western Gulf Coastal Plain Ecoregion (Griffith et.al, 2007). The Western Gulf Coastal Plain is a relatively flat strip of land, generally 50 to 90 miles wide, adjacent to the Gulf of Mexico. The principal distinguishing characteristics of this ecoregion are its relatively flat topography and mainly grassland potential natural vegetation. Inland from this region the plains are older, more irregular, and have mostly forest or savanna-type vegetation potentials. Largely because of these characteristics, a higher percentage of the land is in cropland than in bordering ecological regions. Rice, grain sorghum, cotton, and soybeans are the principal crops. Urban and industrial land uses have expanded greatly in recent decades, and oil and gas production is common.

Covering primarily the Holocene floodplain and low terrace deposits, the Floodplains and Low Terraces ecoregion has a different and less diverse bottomland forest than the floodplains of the adjacent Columbia Bottomland and Wetlands. Bottomland forests of pecan (*Carya illinoensis*), water oak (*Quercus nigra*), southern live oak (*Q. virginiana*), and elm (*Ulmus* spp.), are typical, with some bald cypress (*Taxodium distichum*) on larger streams. On some terraces, black hickory (*Carya texana*), post oak

(*Q. stellata*), and winged elm (*Ulmus alata*) are found. The Brazos River floodplains exhibit a broader expanse of alluvial sediments than the adjacent Navidad, Lavaca, Guadalupe, San Antonio, and Nueces River systems. However, large portions of floodplains forest have been removed and land cover is now a mix of forest, cropland, pasture, and urbanized landscapes.

## 2.6.2 Wetlands

The U.S. Fish & Wildlife Service (USFWS) (2019) has mapped wetlands within the study area as part of the National Wetlands Inventory (NWI). Based on the USFWS data, there are five major wetland types in the study area including: riverine (Brazos River), freshwater pond and lakes (including oxbows), freshwater emergent wetlands, and freshwater forested wetlands.

The wetland complex associated with the Brazos River in the study area is part of the larger Columbia Bottomlands Forest and Wetlands. The Columbia Bottomlands are associated with the low lying areas surrounding the Colorado, Brazos, and San Bernard Rivers. The system is generally level interlaced with a series of swales, depressions, and natural levees. Due to the extent of the bottomlands, much of the flooding experienced by this system results from seasonal precipitation and tropical storms, not from over-bank flooding. However, the system adjacent to the rivers and streams are influenced by over-bank flooding.

## 2.6.3 Special Status Species

### 2.6.3.1 Threatened and Endangered Species

The Texas Natural Diversity Database (TXNDD) is a Geographical Information System (GIS) based inventory of known locations of state-listed threatened, endangered, and species of greatest conservation need (SGCN) species. The TXNDD is limited to elements of occurrence that are located on public lands and private lands where the landowner has given written consent to include in the database. Therefore, the TXNDD data is not a comprehensive representation of the range of the species, but a tool to identify potential listed species in a specific area. A search of the TXNDD for the study area resulted in the identification of listed mussels inhabiting the Brazos River, numerous bald eagle nests, and the identification of the two rare plant communities described above (TPWD, 2019).

**Table 4: Rare, Threatened, and Endangered Species for Fort Bend County**

Common Name	Scientific Name	Federal Listing	State Listing
<b>Amphibians</b>			
<b>Houston Toad</b>	<i>Anaxyrus houstonensis</i>	_1	E <sup>3</sup>
<b>Woodhouse’s Toad</b>	<i>Anaxyrus woodhousei</i>	-- <sup>2</sup>	SGCN <sup>6</sup>
<b>Strcker’s Chorus Frog</b>	<i>Pseudacris streckeri</i>	--	SGCN
<b>Cajun Chorus Frog</b>	<i>Pseudacris fouquettei</i>	--	SGCN
<b>Southern Crawfish Frog</b>	<i>Lithobates aureolatus aereolatus</i>	--	SGCN
<b>Birds</b>			
<b>Reddish Egret</b>	<i>Egretta rufescens</i>	--	T <sup>4</sup>

White-faced Ibis	<i>Plegadis chihi</i>	--	T
Wood Stork	<i>Mycteria americana</i>	--	T
Swallow-tailed Kite	<i>Elanoides forficatus</i>	--	T
Bald Eagle	<i>Haliaeetus leucocephalus</i>	--	T
White-tailed Hawk	<i>Buteo albicaudatus</i>	--	T
Attwater's Greater Prairie-chicken	<i>Tympanuchus cupido attwateri</i>	-	E SGCN
Black Rail	<i>Laterallus jamaicensis</i>	-	E T
Whooping Crane	<i>Grus americana</i>	E	T SGCN
Piping Plover	<i>Charadrius melodus</i>	T	SGCN
Red Knot	<i>Calidris cantus rufa</i>	T	SGCN
Franklin's Gull	<i>Leucophaeus pipixcan</i>	--	E SGCN
Interior Least Tern	<i>Sternula antillarum athalassos</i>	E	SGCN
Western Burrowing Owl	<i>Athene cunicularia hypugaea</i>	--	SGCN
Tropical Kingbird	<i>Tyrannus melancholicus</i>	--	
<b>Fishes</b>			
Sharpnose Shiner	<i>Notropis oxyrhynchus</i>	-	SGCN
Silverband Shiner	<i>Notropis shumardi</i>	--	SGCN
Silver Chub	<i>Macrhybopsis storeriana</i>	--	SGCN
<b>Mammals</b>			
Southern Short-tailed Shrew	<i>Blarina carolinensis</i>	--	SGCN
Tricolored Bat	<i>Perimyotis subflavus</i>	--	SGCN
Big Brown Bat	<i>Eptesicus fuscus</i>	--	SGCN
Eastern Red Bat	<i>Lasiurus borealis</i>	--	SGCN
Hoary Bat	<i>Lasiurus cinereus</i>	--	SGCN
Rafinesque's Big-eared Bat	<i>Coryrhinus rafinesqii</i>	--	T
Mexican Free-tailed Bat	<i>Tadarida brasiliensis</i>	--	SGCN
Big Free-tailed Bat	<i>Nyctinomops macrotis</i>	--	SGCN
Swamp Rabbit	<i>Sylvilagus aquaticus</i>	--	SGCN
Thirteen-lined Ground Squirrel	<i>Ictidomys tridecemlineatus</i>	--	SGCN
Long-tailed Weasel	<i>Mustela frenata</i>	--	SGCN
Mink	<i>Neovison vison</i>	--	SGCN
American Badger	<i>Taxidea taxus</i>	--	SGCN
Eastern Spotted Skunk	<i>Spilogale putorius</i>	--	SGCN
Plains Spotted Skunk	<i>Spilogale putorius interrupta</i>	--	SGCN
Western Hog-nosed Skunk	<i>Conepatus leuconotus</i>	--	SGCN
Mountain Lion	<i>Puma concolor</i>	--	
<b>Reptiles</b>			
Eastern Box Turtle	<i>Terrapene carolina</i>	--	SGCN
Western Box Turtle	<i>Terrepene ornata</i>	--	SGCN
Smooth Softshell	<i>Apalone mutica</i>	--	SGCN
American Alligator	<i>Alligator mississippiensis</i>	--	SGCN
Slender Glass Lizard	<i>Ophiosaurus attenuatus</i>	--	SGCN
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	--	T
Common Garter Snake	<i>Thamnophis sirtalis</i>	--	SGCN
Timber Rattlesnake	<i>Crotalus horridus</i>	--	T
<b>Insects</b>			
American Bumblebee	<i>Bombus pensylvanicus</i>	--	SGCN
<b>Mollusks</b>			
Smooth Pimpleback	<i>Quadrula houstonensis</i>	-	T
Texas Fawnsfoot	<i>Truncilla macrodon</i>	C <sup>5</sup>	T

Plants			
Texas Tauschia	Tauschia texana	--	SGCN
Texas Prairie Dawn	Hymenoxys texana	E	E
Threeflower Broomweed	Thurovia triflora	--	SGCN
Corkwood	Leitneria pillosa ssp. pilosa	--	SGCN
Florida Pinkroot	Spigelia texana	--	SGCN
Awnless Bluestem	Bothriochloa exaristata	--	SGCN
<sup>1</sup> Federally listed species; however, USFWS does not list the species for Fort Bend County			
<sup>2</sup> Species not listed by the USFWS			
<sup>3</sup> Listed as an endangered species by USFWS and/or TPWD			
<sup>4</sup> Listed as a threatened species by USFWS and/or TPWD			
<sup>5</sup> Listed as a candidate species by USFWS			
<sup>6</sup> Listed as a species of greatest conservation need by TPWD			

### 2.6.3.1.1 Federally Listed Species

#### 2.6.3.1.1.1 Houston Toad

The Houston toad's primary habitat entails sandy soil which supports populations of loblolly pine, water in pools, ephemeral pools, and stock tanks. The toads breed in the spring, especially after it rains, from February to June. The Houston toad is now limited to habitats around Bastrop County and is unlikely to occur in the study area. In addition, the USFWS does not list the species for Fort Bend County.

#### 2.6.3.1.1.2 Attwater's Prairie-chicken

The Attwater's Prairie-chicken's habitat includes open prairies of mostly thick grass one to three feet tall. Preferred habitat historically consisted of sandhill country with bunch grass, sage, and shinnery oak located near sea level to 200 feet along coastal plain on the upper two-thirds of Texas coast. The species has since been relegated to the Attwater's Prairie-chicken National Wildlife Refuge in Colorado County, Texas. The latest record of an Attwater's Prairie-chicken in the study area was in 1985 (TPWD, 2019b). The USFWS does not list the prairie-chicken as occurring in Fort Bend County. It is extremely unlikely that the Attwater's Prairie-chicken would occur in the study area.

#### 2.6.3.1.1.3 Whooping Crane

The Whooping Crane winters on the Aransas Refuge's 22,350 acres of salt flats and marshes where they also utilize the area's coastal prairie, swales, and ponds. The whooping cranes leave the refuge around April/May and return in September/October. The study area is on the edge of the migratory range of the cranes. Although it is unlikely to be found in the study area, there is a potential that a migrating crane could utilize habitats in the study area.

#### 2.6.3.1.1.4 Piping Plover

The Piping Plover habitat consists of beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands, while algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low to very low tides and are often completely unavailable during extreme high tides or strong north winds.

Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Due to the lack of beaches, sandflats, and dunes in the study area, it is unlikely that the Piping Plover would utilize habitats within the study area.

#### **2.6.3.1.1.5 Red Knot**

Red Knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Due to the distance from the Gulf Coast and the lack of suitable habitat, the Red Knot is unlikely to occur within the study area.

#### **2.6.3.1.1.6 Interior Least Tern**

The Least Tern can be found on sand beaches, bays, inlets, lagoons, and islands along the Gulf Coast. The Interior Least Tern subspecies is listed only when it is more than 50 miles from the coastline where it nests on sand and gravel bars within braided streams and rivers. Although the Brazos River is not a braided system in the Fort Bend County river reach, the exposed sand bars on the inner meanders of the river could provide marginal habitat for the interior least tern. Therefore, there is a chance that the tern could utilize habitats in the study area.

#### **2.6.3.1.1.7 Sharpnose Shiner**

The range of the sharpnose shiner is now restricted to upper Brazos River upstream of Possum Kingdom Lake. The last record of a sharpnose shiner in the study area was from 1951 (TPWD, 2019b). Although the species is listed as endangered by the USFWS, the agency does not list the shiner as occurring in the Brazos River in Fort Bend County. Because of the range restriction, it is extremely unlikely that the sharpnose shiner would occur within the study area.

#### **2.6.3.1.1.8 Smooth Pimpleback**

The smooth pimpleback occupies small to moderate streams and rivers as well as moderate size reservoirs. The mussels settle in the mixed mud, sand, and fine gravel substrates of the streams and rivers where they tolerate very slow to moderate river flows rates. Although the USFWS does not list the candidate listed mussel as occurring in Fort Bend County, TPWD records show that the smooth pimpleback is found in the Brazos River within the study area.

#### **2.6.3.1.1.9 Texas Fawnsfoot**

Little known is known about the habitat for the Texas fawnsfoot. It potentially occurs in rivers and larger streams and seems to be intolerant of impoundments. The mussel may use sand, gravel, and perhaps sandy-mud substrates in rivers/streams with moderate flows. TPWD (2019b) records The habitats along the Brazos River and some of the larger tributaries may provide habitat for the Texas fawnsfoot; therefore, the mussel is likely to occur within the study area.



#### **2.6.3.1.1.10 Texas Prairie Dawn**

The Texas prairie dawn grows in poorly drained, sparsely vegetated areas at the base of mima mounds in open coastal grasslands or almost barren areas on slightly saline soils. Although most known populations of Texas prairie dawn are located in Harris County, there is the possibility that the prairie dawn could occur in the study area.

#### **2.6.3.1.2 State Listed Species**

##### **2.6.3.1.2.1 Reddish Egret**

The Reddish Egret is a resident of the Texas Gulf Coast utilizing brackish marsh, shallow salt pond, and tidal flat habitats. The egrets nest on the ground, in trees, or bushes on dry coastal islands with brushy thickets of yucca and prickly pear. The study area only contains 38 acres (0.05% of the study area) of marsh habitat and 6 acres (0.01% of the study area) of tidal flats. Therefore, the Reddish Egret is unlikely to occur in the study area.

##### **2.6.3.1.2.2 White-faced Ibis**

The White-faced Ibis prefers freshwater marshes, sloughs, and irrigated rice fields, but will also utilize brackish and saltwater habitats. The ibis nest in the low trees of marshes, on the ground in bulrushes or reeds, or on floating mats. Habitat for the White-faced Ibis occurs within the study area.

##### **2.6.3.1.2.3 Wood Stork**

The Wood Stork prefers to nest in large tracts of baldcypress or red mangrove (*Rhizophora mangle*) habitats. The stork forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water. They usually roost communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); however, there have been no breeding records of the stork in Texas since 1960. Foraging and resting habitat occurs for Wood Storks migrating through the study area.

##### **2.6.3.1.2.4 Swallow-tailed Kite**

The Swallow-tailed Kite can be found in lowland forested regions, swamps, marshes, and along rivers, lakes, and ponds. The kite nests in tall trees (pine, bald cypress, or other deciduous trees) in clearings or along the forest woodland edge. Habitat for the Swallow-tailed Kite occurs within the study area.

##### **2.6.3.1.2.5 Bald Eagle**

The Bald Eagle is found near rivers and large lakes where it nests in tall trees or on cliffs near the water.

##### **2.6.3.1.2.6 White-tailed Hawk**

The white-tailed hawk can be found near the Gulf Coast in prairies, cordgrass flats, and scrub-live oak habitats. Further inland, the hawks prefer prairies, mesquite and oak savannas, and mixed savanna-chaparral. Habitat for the white-tailed hawk is available within the study area.

#### **2.6.3.1.2.7 Rafinesque's Big-eared Bat**

The Rafinesque's big-eared bat utilizes lowland pine and hardwood forests. The bats roosts in large cavities in the trees of bottomland hardwoods, as well as in concrete culverts and abandoned man-made structures. Habitat for the Rafinesque's big-eared bat exists within the study area.

#### **2.6.3.1.2.8 Texas Horned Lizard**

The Texas horned lizard occupies open, arid and semi-arid habitats with sparse vegetation, including grass, cactus, scattered brush or scrubby trees. There has been a significant decline in the lizards due primarily to the expansion of red-imported fire ants throughout its historical range. This includes Fort Bend County. Although habitat may exist in Fort Bend County, it is unlikely that the Texas horned lizard would occur within the study area.

#### **2.6.3.1.2.9 Timber Rattlesnake**

The timber rattlesnake habitat includes swamps, floodplains, upland pine and deciduous woodlands, riparian zones, and abandoned farmland. The snakes prefer ground cover such as palmetto or other dense vegetation as well as tree stumps, logs and branches. Habitat for the timber rattlesnake occurs within the study area.

#### **2.6.3.2 Bald and Golden Eagles Protection Act**

The Bald and Golden Eagle Protection Act protects two eagle species. USFWS has outlined sites on McFaddin NWR and nearby Anahuac Lake that serve as concentration areas for Bald Eagles (*Haliaeetus leucocephalus*). Breeding has been documented in nearby wooded areas, including areas near the restoration units, but is not likely immediately within the restoration units due to the lack of sufficiently large enough old-growth trees or snags. Because of the species relatively large home range and the abundance of suitable foraging habitat within the focused study area and within the restoration units, it is reasonably expected that they will continue to use the area.

#### **2.6.3.3 Migratory Bird Treaty Act**

The Migratory Bird Treaty Act (MBTA)(16 U.S.C. 703-712) prohibits the take, possession, importation, exportation, transportation, selling, purchasing, bartering, or offer to sell, purchase, or barter any migratory bird, or parts, nests, or eggs of such a bird except under terms of a valid Federal permit. The MBTA applies to native birds migrating or residing within the U.S., Mexico, Russia, and Japan. Additional protections for eagles are provided under the Bald and Golden Eagle Protection Act.

The past several decades have seen a decline in Neotropical migratory bird numbers. Recently, it has been recognized that the loss, fragmentation, and degradation of migratory stop-over habitat is potentially the greatest threat to the survival and conservation of Neotropical birds. The Columbia Bottomlands provides migratory habitat 240 bird species and supports over 29 million birds each year. These include species of concern such as Swainson's Warbler, Hooded Warblers, Prothonotory Warblers, Worm-eating Warblers, Bell's Vireos, Olive-sided Flycatchers, Swallow-tailed Kites, and Bald Eagles.

## 2.7 Cultural Resources

Federal agencies are required under Section 106 of the National Historic Preservation Act to “take into account the effects of their undertakings on historic properties” and consider alternatives “to avoid, minimize or mitigate the undertaking’s adverse effects on historic properties” [(36 CFR 800.1(a-c)] in consultation with the State Historic Preservation Officer (SHPO) and appropriate federally recognized Indian Tribes (Tribal Historic Preservation Officers - THPO) [(36 CFR 800.2(c)]. In accordance with this and other applicable regulations, including the National Environmental Policy Act of 1969 (NEPA), the Native American Graves Protection and Repatriation Act (NAGPRA), the Antiquities Code of Texas, and Engineer Regulation (ER) 1105-2-100, USACE has reviewed of the Texas Historical Commission (THC) ATLAS Database to better determine the existing conditions and potential risks of encountering cultural resources. A review of the Texas Historical Commission’s (THC) (Atlas) database revealed several prior terrestrial cultural resource investigations within the study area. However, it is important to note that the majority of the study area has not been culturally surveyed to current THC standards. There are 13 previously recorded terrestrial archeological sites and one possible unmarked cemetery, within the study area (Table 5). Eleven of these terrestrial archeological sites were evaluated to determine their eligibility to the National Register of Historic Places (NRHP); four are Eligible and five are Not Eligible. The four remaining terrestrial archaeological sites are considered unevaluated for NRHP eligibility. Four of the identified historic structures were recommended as Eligible, while two were recommended as Not Eligible.

**Table 5: Previously-recorded archeological sites, historic districts, and NRHP-listed properties.**

Site Number	National Register of Historic Places Eligibility	Cultural Affiliation
41BO137	Undetermined	Prehistoric
41BO212	Undetermined	Historic
41FB168	Not Eligible	Historic
41FB188	Not Eligible	Historic
41FB24	Eligible	Historic
41FB241	Not Eligible	Historic
41FB25	Eligible	Historic
41FB250	Undetermined	Prehistoric
41FB26	Eligible	Historic
41FB268	Eligible	Historic
41FB290	Undetermined	Prehistoric
41FB298	Not Eligible	Prehistoric
41FB345	Not Eligible	Historic

### 2.7.1 Flood Damages

There are 75,130 structures within the .2% AEP floodplain. Most of these, 60,413, are already protected by levees, generally with a 1% AEP level of protection or greater. There were 14,717 structures, mostly residential, in the study area that were outside the leveed areas. The total valuation of the inventory is approximately \$32 billion. Along with the structure inventory, water surface elevations were developed for each of the eight standard frequencies (50%, 20%, 10%, 4%, 2%, 1%, .4% and .2% AEPs) and imported in the Hydrologic Engineering Center-Flood Damage Analysis (HEC-FDA) version 1.42 in order to estimate damages. Depth damage curves for residential structures were taken from EGM 04-01, Generic Depth Damage for Residential Structures. Curves for commercial and public structures were adopted from those use in previous FRM studies in the Fort Worth and Galveston Districts.

### 2.7.2 Socio-Economics

Socioeconomics is defined as the basic attributes and resources associated with the human environment, particularly population, demographics, and economic development. Demographics entail population characteristics and include data pertaining to race, gender, income, housing, poverty status, and educational attainment. Economic development or activity typically includes employment, wages, business patterns, an area’s industrial base, and its economic growth.

Table 6 provides the total population, the race and ethnicity composition, the age structure, education, and income levels for Fort Bend County.

**Table 6: Population Data for Fort Bend County, Texas**

Population Metric	Fort Bend County	Texas
<b>Population</b>		
Total Population	711,421	27,419,612
Total Households	222,331	9,430,419
<b>Race and Ethnicity</b>		
White	34.4%	42.9%
Black or African-American	20.2%	11.7%
Native American or Alaska Native	0.2%	0.2%
Asian	19.2%	4.5%
Native Hawaiian or Other Pacific Islander	0.0%	0.1%
Other Race	0.2%	0.1%
Two or More Races	1.7%	1.6%
Hispanic	24.2%	38.9%
<b>Age</b>		
Under 10 years	14.9%	14.6%
10 to 19 years	15.6%	14.5%
20 to 69 years	63.3%	63.7%
Over 69 years	7.6%	5.8%
<b>Education</b>		
High School Diploma	89.7%	82.8%

Population Metric	Fort Bend County	Texas
Bachelor's Degree or Higher	45.7%	28.7%
<b>Household Income</b>		
Median Household Income	\$93,645	\$57,051
Less than \$14,999	6.0%	13.4%
\$15,000 to \$24,999	5.9%	11.4%
\$25,000 to \$49,999	18.2%	25.5%
\$50,000 to \$74,999	17.1%	18.1%
Greater than \$75,000	52.8%	31.6%
USCB, 2019		

### 2.7.3 Life Safety

The Brazos River experiences controlled flows into the study area. There are no documented cases of life loss from flooding in the study area, which a flood risk management project could address.

#### 2.7.3.1 Critical Infrastructure

Critical infrastructure is the infrastructure that are vital to health and safety during a flood event, and includes bridge crossings, roads, hospitals, emergency management services, etc. Most of this infrastructure is outside of the area of flood impact, and bridge crossings appear to be of sufficient height, to not be affected by flooding up to the 1% AEP. The bridges are not only at risk of flooding, but also erosion caused failure before and during a flood event.

### 2.7.4 Recreation

Fort Bend County provides numerous recreation opportunities with county and municipal park facilities, and Brazos Bend State Park. These facilities, as well as private lands in the Columbia Bottomlands, provide hunting, fishing, hiking, biking, horseback riding, birdwatching, and other outdoor recreation opportunities. TPWD have developed the Great Coastal Texas Birding Trail to identify points around Fort Bend County that the public could access high quality wildlife and bird viewing area. Fort Bend County operates ten county parks, leases three parks, and operates four community centers.

### 2.7.5 Hazardous, Toxic, and Radioactive Waste (HTRW)

In order to complete a feasibility level HTRW evaluation for the Brazos River Erosion Feasibility Study, a records search was conducted following the rules and guidance of ER 1165-2-132: HTRW Guidance for Civil Works Projects, and in general accordance with portions of American Society for Testing and Materials (ASTM) E1527-13: Standard Practice for Environmental Site Assessment: Phase 1 Environmental Site Assessment Process. The proposed project involves structural flood control measures in the Pecan Grove area along the Brazos River, as well as non-structural measures to include buyouts in multiple communities downstream of Rosenberg, Texas. For the purposes of this records search, the proposed Pecan Grove Levee and the #7, #8, #9, and #10 buyouts areas are considered the footprints of the project. These are all shown in Figure 9 on page 36, with the buyout areas shaded blue.

Due to the residential nature of the propose project areas, HTRW is extremely limited in these areas. However, according to TCEQ databases, the approximate Buyout #9 area is located adjacent to a former State Superfund Site, the Hagerson Road Drums site. Records also indicate that the footprints of Buyout Areas #8, 9, and 10 all include significant oil and gas infrastructure. No other HTRW can be found in the proposed project areas. See Appendix B for the complete HTRW assessment.

## **2.8 Future without Project Conditions/Consequences**

Under the Future without Project (FWOP) conditions, no changes to the resources identified in this chapter would be impacted by the project. Land use would continue to transition to residential and ranchette communities as the urban sprawl of the Houston Metroplex encroaches on the study area. The environmental resources in the area would continue to be affected by this urbanization. The resource impacts of the No Action plan would result in the same impact as the Future without Project conditions.

## **3 Plan Formulation**

### **3.1 Problems, Opportunities, Objectives, and Constraints**

Based on the existing conditions and anticipated future without project condition, known as the NAA, an initial set of problems, opportunities, objectives and constraints were developed. These have been revised based on additional information that developed during the study effort.

#### **3.1.1 Problems**

The problems identified in the study area are:

1. Repeat damages to structures and property caused by repeat flooding
2. Continued erosion increasing the risk of flood risk management infrastructure failure including levees, evacuation routes, and emergency management infrastructure

#### **3.1.2 Opportunities**

The study specific opportunities are:

1. Improve floodplain management
2. Reduce sediment loading to water supply
3. Protect existing FRM infrastructure from future failure
4. Protect existing critical infrastructure to ensure availability during flood events

### **3.1.3 Objectives**

For this study planning objectives are analyzed over a 50-year period that begins with complete implementation of the project. The objectives for the 50-year period of analysis is from 2025 to 2075, within the Brazos River Basin inside Fort Bend County are:

1. Reduce flood damage to structures in the floodplains
2. Reduce transportation interruptions from flooding
3. Reduce risk of existing FRM infrastructure failure
4. Reduce risk to other public infrastructure

The second objective is a study objective, but is outside of the USACE authority to implement. The study recognized the significant need to address the erosion that puts much of the existing FRM infrastructure in jeopardy of failure, so it was included as an objective.

### **3.1.4 Constraints**

The study constraints are:

1. Avoid impacts to special status species
2. Avoid increased downstream erosion
3. Avoid induced flooding

The study constraints are will be avoided where possible and minimized where not possible and mitigated when minimization still resulted in a significant negative impact.

## **3.2 Management Measures**

Management measures are actions that can be taken that would address one or more planning objectives.

### **3.2.1 Structural Measures**

Structural measures are actions that when undertaken will significantly change the floodplains either in flooding depth, extent, or both.

**Table 7: Structural Measures Considered**

Measure	Description	Notes	Carried Forward
<b>Channel Modification</b>	Increasing channel dimensions to increase in bank conveyance	Because of the current channel dimensions and continued erosion rate, implementation may not be possible, and if possible would be extremely costly to maintain	No
<b>Levees/Floodwalls</b>	Structure to keep flood waters away from structures, with pumps to remove rainfall from within protected area		Yes
<b>Detention</b>	In channel or channel adjacent area, with not structures, for storage of floodwaters	The area has no natural hydrologic constrictions so in and channel adjacent detention would both require a large area outside of the developed areas.	Yes

### 3.2.2 Non-Structural Measures

Non-structural measures are actions when undertaken that will not significantly change the floodplains in either flooding depth or extent.

**Table 8: Non-structural Measures Considered**

Measure	Description	Notes	Carried Forward
<b>Buyouts</b>	Purchase and demolition of structures		Yes
<b>Elevating Structures</b>	Elevating the first floor of a structure in place so that damages occur at a higher water surface elevation		Yes
<b>Relocations</b>	Moving a structure from a location in the floodplain to a location outside of the floodplain	Many of the structures appear to be slab on grade which are likely to be lost during relocation.	No
<b>Floodproofing</b>	Modification of a structure to reduce flood impacts to		Yes



	the structure and its contents		
<b>Flood Warning System</b>	System to warn the public of an impending flood in order to increase evacuation time	These systems provide benefit to flashy hydraulic systems. This portion of the Brazos is does not have flashy hydrology allowing for the required evacuations.	No

**3.2.3 Erosion Risk Reduction Measures**

Erosion poses a risk to FRM infrastructure, critical infrastructure, public structures, and private structures. This study focused on erosion effecting FRM and critical infrastructure; however, the measures evaluated would be equally applicable to other all erosion areas.

**Table 9: Erosion Risk Reduction Measures**

Measure	Description	Notes	Carried Forward
<b>Riverbank Stabilization</b>	Armoring portions of the river to reduce, or eliminate, erosion in the area		Yes
<b>Designate Maeander Corridor</b>	Designated area with no future development to allow limited meandering of the Brazos River	This would protect future development from erosion and would be beneficial. However, it would not address the current structures at risk.	Yes

**3.2.4 Screening of General Measures**

The majority of structures in the study are residential structures on slab foundations, which may not be reinforced. The type of structures eliminated dry floodproofing from further consideration based on wet floodproofing being a more appropriate solution. Flood warning systems increase life safety in flashy hydrology, since the flows are controlled life safety is not a concern and flood warning systems was screened from further consideration. Relocations were eliminated because they have a high risk of the structure having irreparable damage, because they are slab foundation, and buyouts would serve achieve the objective in a similar fashion.

The erosion makes it so that channel modifications implementation may not be possible, and if possible would be extremely costly to maintain, so it was screened from further consideration. The area has no natural hydrologic constrictions so in and channel

adjacent detention would both require a large area outside of the developed areas; therefore, large scale detention was screened from further consideration.

### **3.3 Initial Action Alternatives Array**

The initial alternatives were comprised of: 1) No Action; 2) Flood Risk Management Infrastructure; 3) Improve Existing Levees; 4) Floodplain Management Changes; 5) Buyouts and Structure Raises; 6a) Proposed Pecan Grove Levee Extension; 6b) Proposed Weston Lakes Levee (Bessie's); 6c) Proposed Weston Lakes Levee (Brazos); 7) Multi-Levee; and 8) Regional Detention.

The action alternatives are briefly described below. Alternative 1 is the No Action Alternative (NAA).

#### **3.3.1 Flood Risk Management Infrastructure Protection (Alternative 2)**

Protecting flood risk management infrastructure would consist of protecting existing levees and evacuation routes from failure during flood events. The most likely failure mode for these is from erosion undermining the foundations of the infrastructure. For more information on the risk characterization for the levees see Attachment 2 to Appendix A.

#### **3.3.2 Improve Existing Levees (Alternative 3)**

Improving the existing levees consisted of raising the levee height to reduce flood risk from overtopping the levee. The BRA study identified 8 levee systems potentially not meet the minimum FEMA freeboard requirements included LID 6, LID 10, LID 11, LID 14, LID 20, Pecan Grove, and Sienna Plantation, identified in Figure 11. Since, overtopping was identified as one of the most likely flood risk raising the levees was investigated further. Details on the overtopping analysis are found in Section 7 of Appendix A. Based upon the conclusions for Alternative 3 and the need to further refine the model, a cost estimate was not developed.

#### **3.3.3 Floodplain Management Changes (Alternative 4)**

Floodplain management changes consist of determining a meander corridor that would restrict development, which would the Brazos River to meander without putting infrastructure, structures, and safety at risk. It also, includes developing floodplain management recommendations for future development to reduce its future flood risk. Findings of previous studies enacted along the Brazos River, regarding erosion and meander migration, indicate the system exhibits rapid meander migration in the form of bank erosion and subsequent failures. When averaging the progression of bank erosion over the period of record it can be asserted that the average bank erosion rate of the Brazos River in the project study area is roughly nine feet per year. Given the 50 year project horizon a suitable meander corridor would need to be extrapolated out over this time span. In doing so, the meander corridor would extend five hundred feet from the top of bank of both the east and west banks of the river. The meander corridor (Figure 12 through Figure 15) would serve to not only prevent future development from being threatened by foreseeable river erosion but also increase the floodplain hydraulic

conveyance area throughout the county. Cost estimates were not developed for non-structural measures, which include Alternatives 4 and 5.

### **3.3.4 Buyouts and Structure Raises (Alternative 5)**

Buyouts consist of the acquisition and demolition of designated structures that meet given criteria. The areas (Figure 16) are based on the floodplains developed for this study, with a focus on the 4% and greater AEP floodplains. 10 potential buyouts areas were identified based on a community being significantly affected by the 4% or greater AEP flood. Buyouts would be done in conjunction with recreation as this has a higher likelihood of being economically justified than buyouts alone.

Structure raising in the elevating of the first floor of a structure, high enough to not be affected by the 1% AEP. This is usually done by placing the structure on a pier foundation. These areas would be identified in the same manner as buyouts.

### **3.3.5 Pecan Grove Levee Extension (Alternative 6a)**

The ring levee, shown in Figure 17, would engage when waters leave the banks of the Brazos River or Jones Creek and would overtop at approximately the 1% AEP flood. The proposed levee would be placed along the left overbank of the Brazos River and along Pitts Road. The estimated height is seven feet with a maximum height of 18 feet and a length of approximately 26,000 feet (5 miles). An internal drainage system would be required to address the 1,000 acres of runoff within the leveed area.

### **3.3.6 Weston Lakes Levee at Bessie's (Alternative 6b)**

The levee, shown in Figure 18, would engage when waters leave the banks of the Brazos River and would overtop at approximately the 1% AEP flood. The levee would begin approximately 450 feet west of Waterford Crest Lane at FM 1039, runs along FM 1033 to Bessie's Creek, and follow Bessie's Creek for approximately 1,400 feet. The estimated average height of the levee is five feet with a maximum height of 11 feet. The levee would have a length of approximately 5,100 feet (1 mile).

### **3.3.7 Weston Lakes Levee at Brazos (Alternative 6c)**

The levee, shown in Figure 18, would engage when waters leave the banks of the Brazos River and would overtop at approximately 1% AEP flood. The levee would have begun approximately 600 feet west of the intersection of Woodbine Drive and Wellspring Lake Drive, continued south to the Brazos River, and extended downstream along the Brazos River to a point approximately 1,000 feet northeast of Waterhouse Court. The estimated average height of the levee was seven feet with a maximum height of 15 feet. The levee was proposed at a length of 11,000 feet (2 miles).

### **3.3.8 Multi-Levee (Alternative 7)**

There is the potential to combine the individual levees into a single alternative. This would only be done with levees that achieve one or more objectives that also are economically justified.

### **3.3.9 Regional Detention (Alternative 8)**

The regional detention was proposed along Bessie's Creek near the confluence of Flewellen Creek, which is downstream of the Weston Lakes community. In order to reduce flood risk on Jones Creek, approximately 696 acres would be needed with the ability to store water to a depth of 16 feet. This would be accomplished with berms that are 10 feet above ground elevation and excavating inside the berms 6 feet.

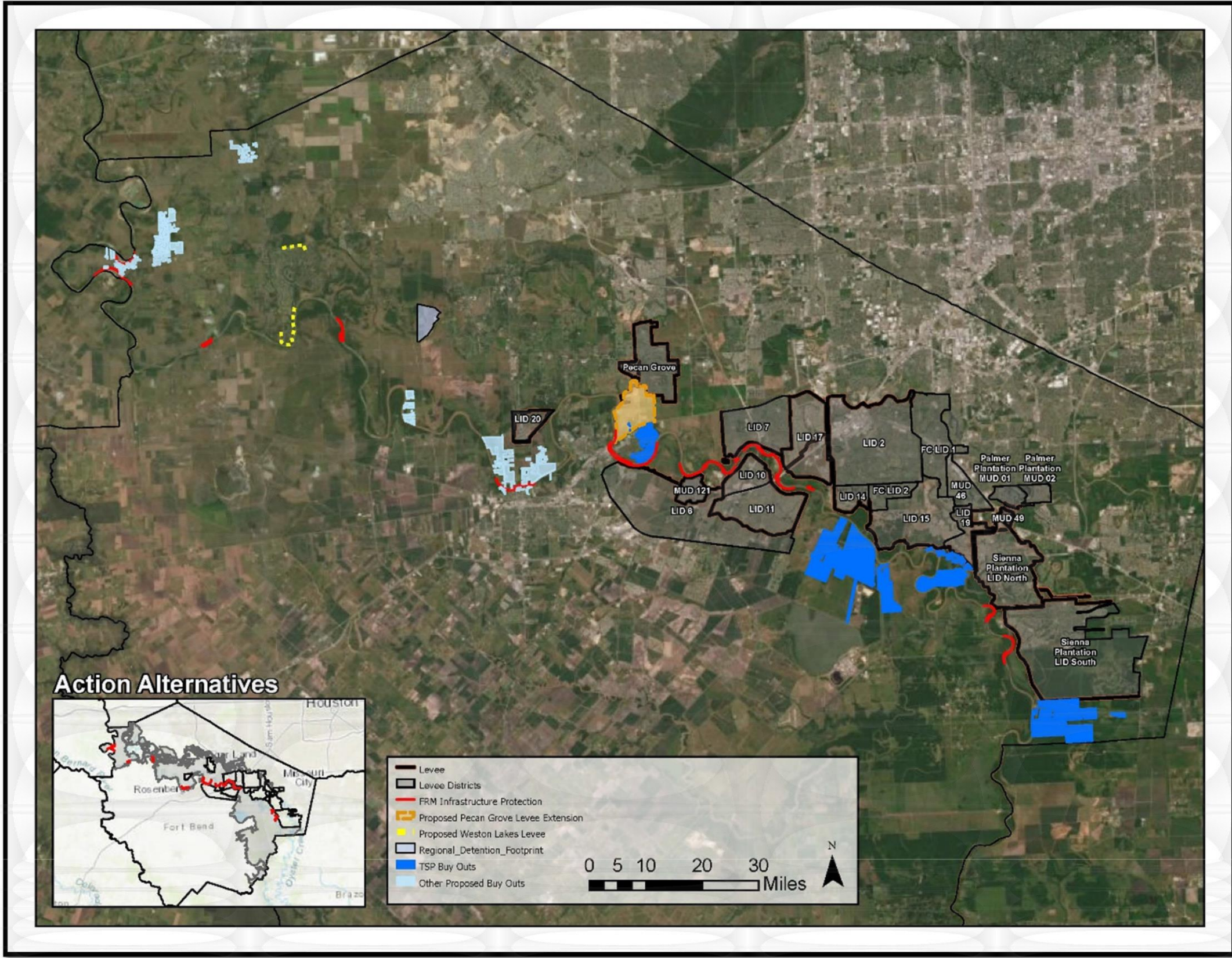
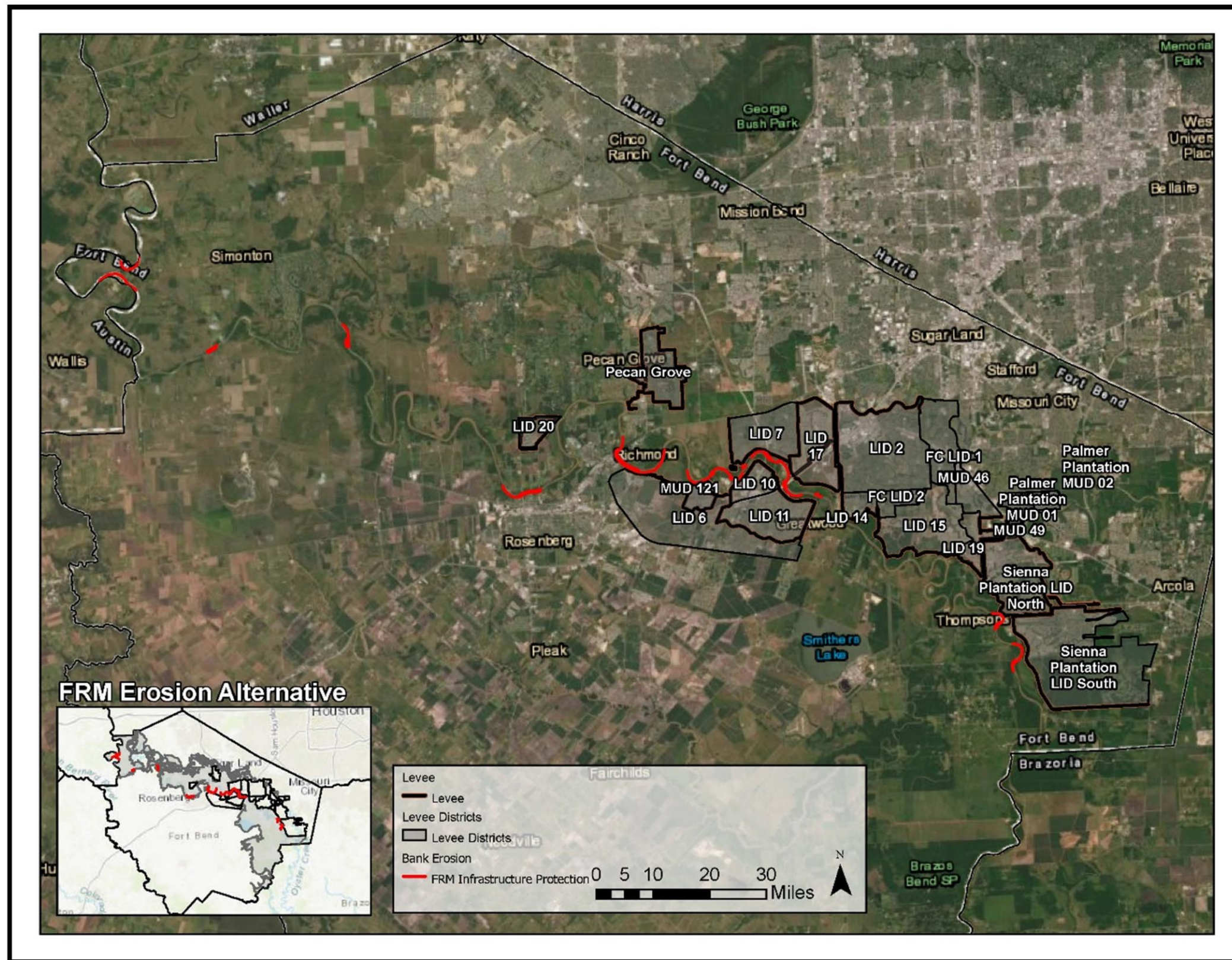


Figure 9: Action Alternatives



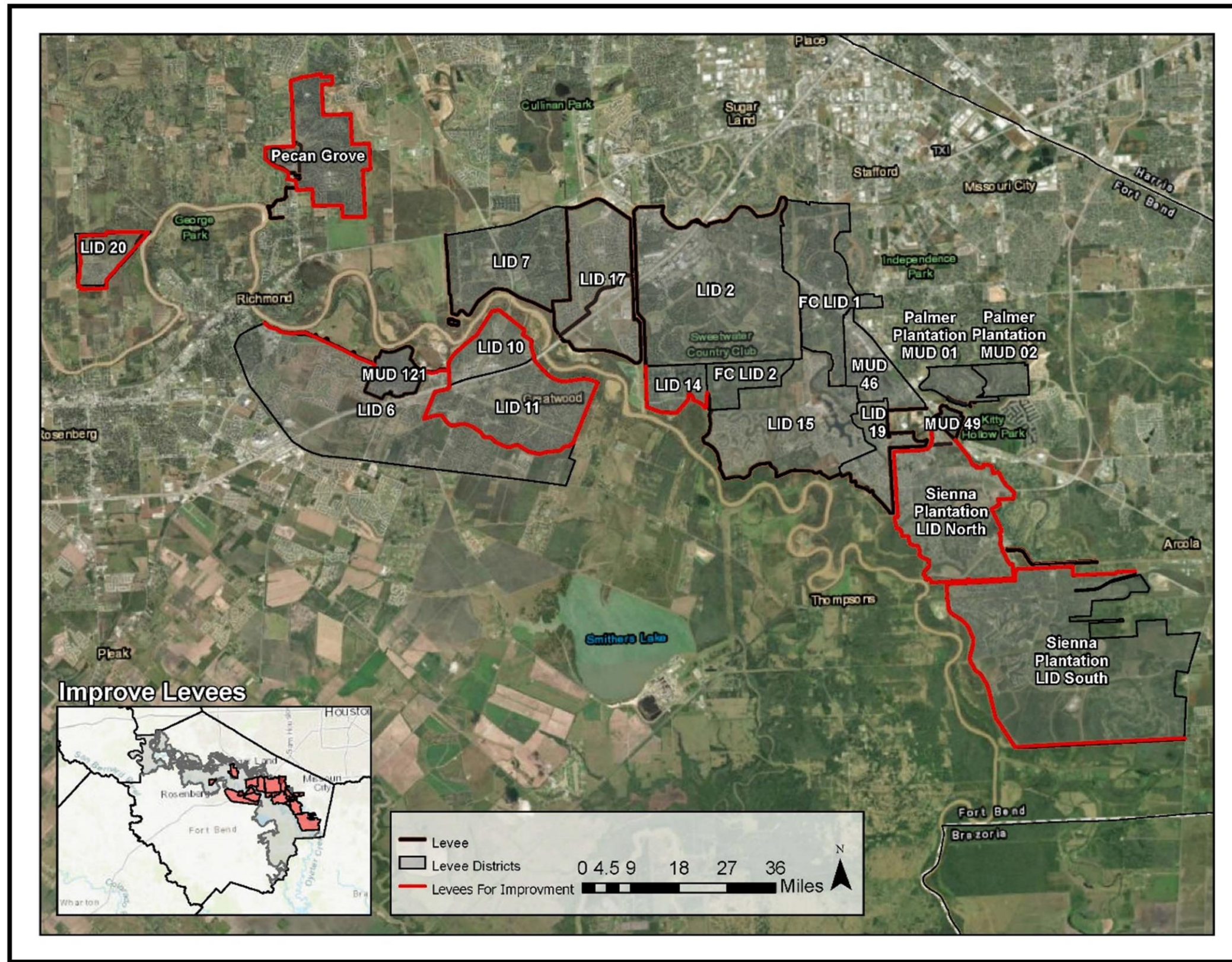


Figure 11: Levee Improvement Alternative

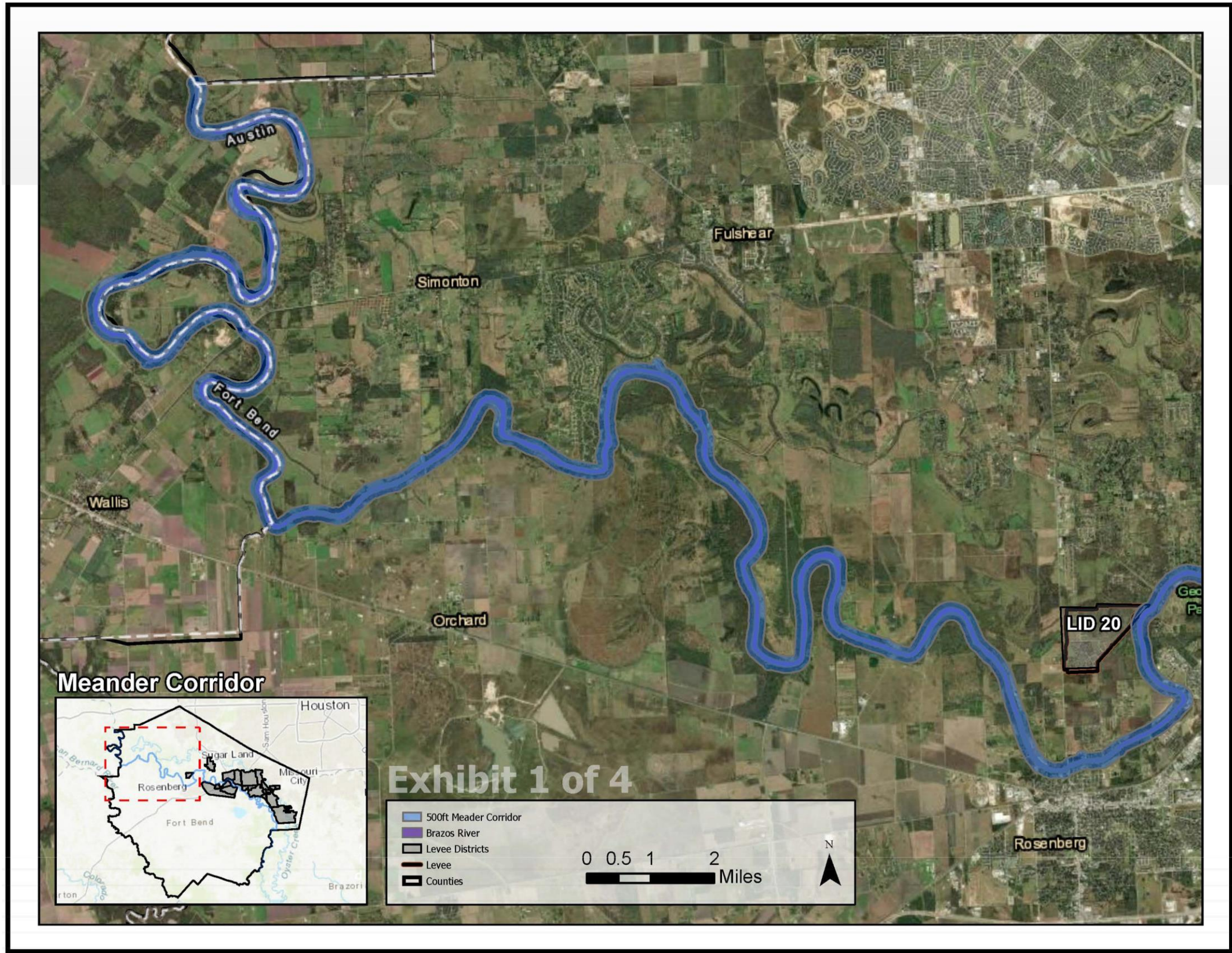


Figure 12: Meander Corridor near Simonton



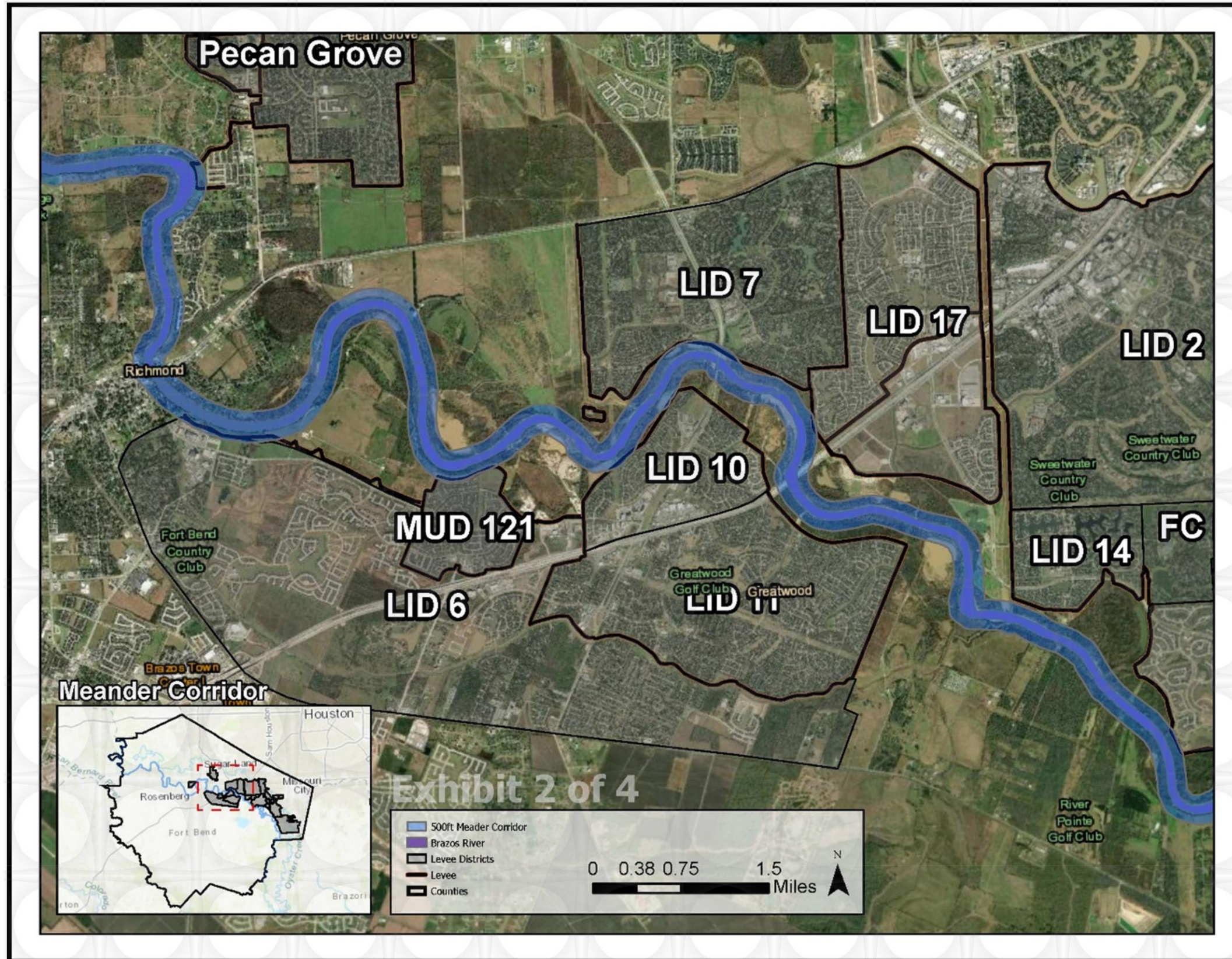


Figure 13: Meander Corridor near Richmond

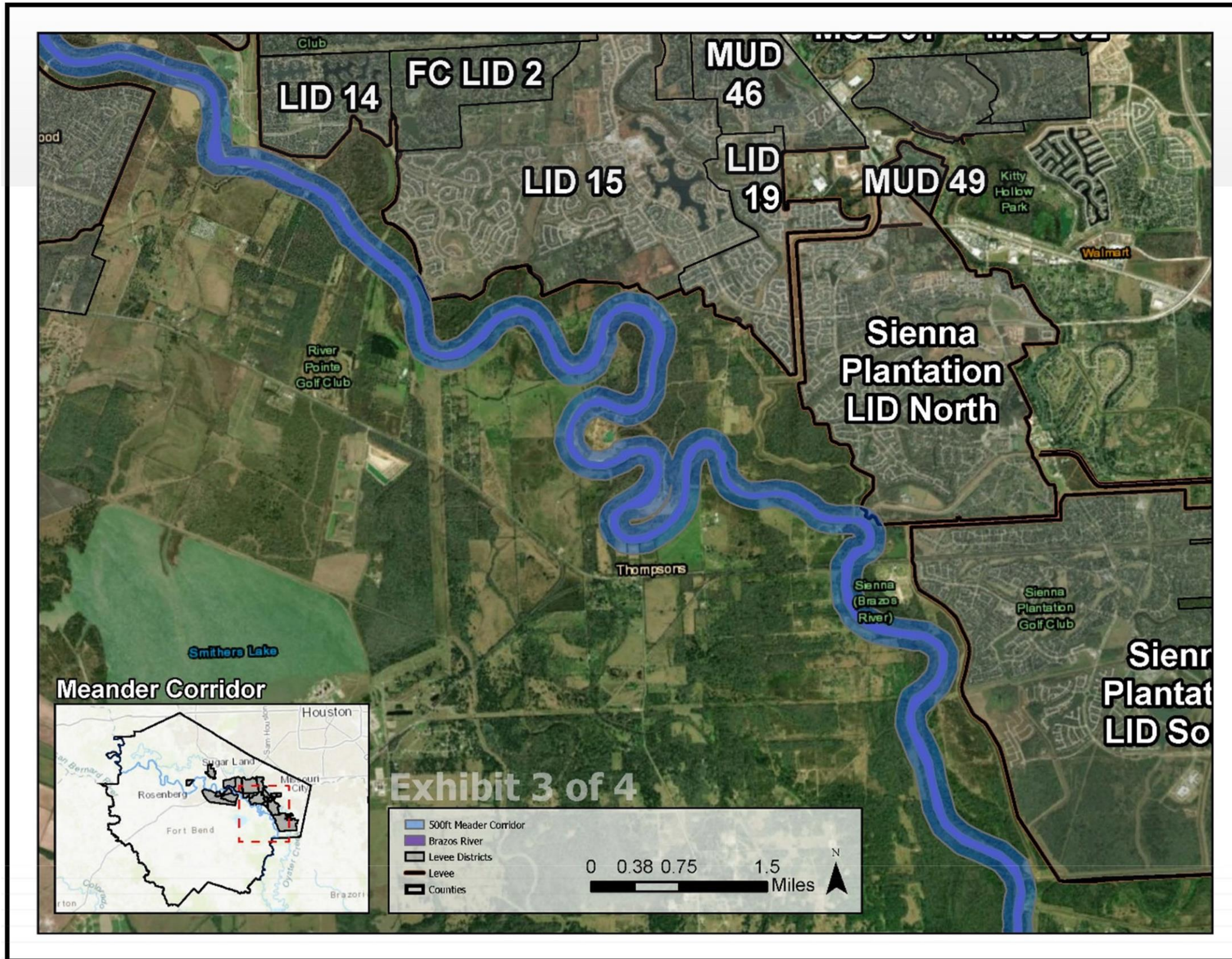


Figure 14: Meander Corridor near Sienna Plantation

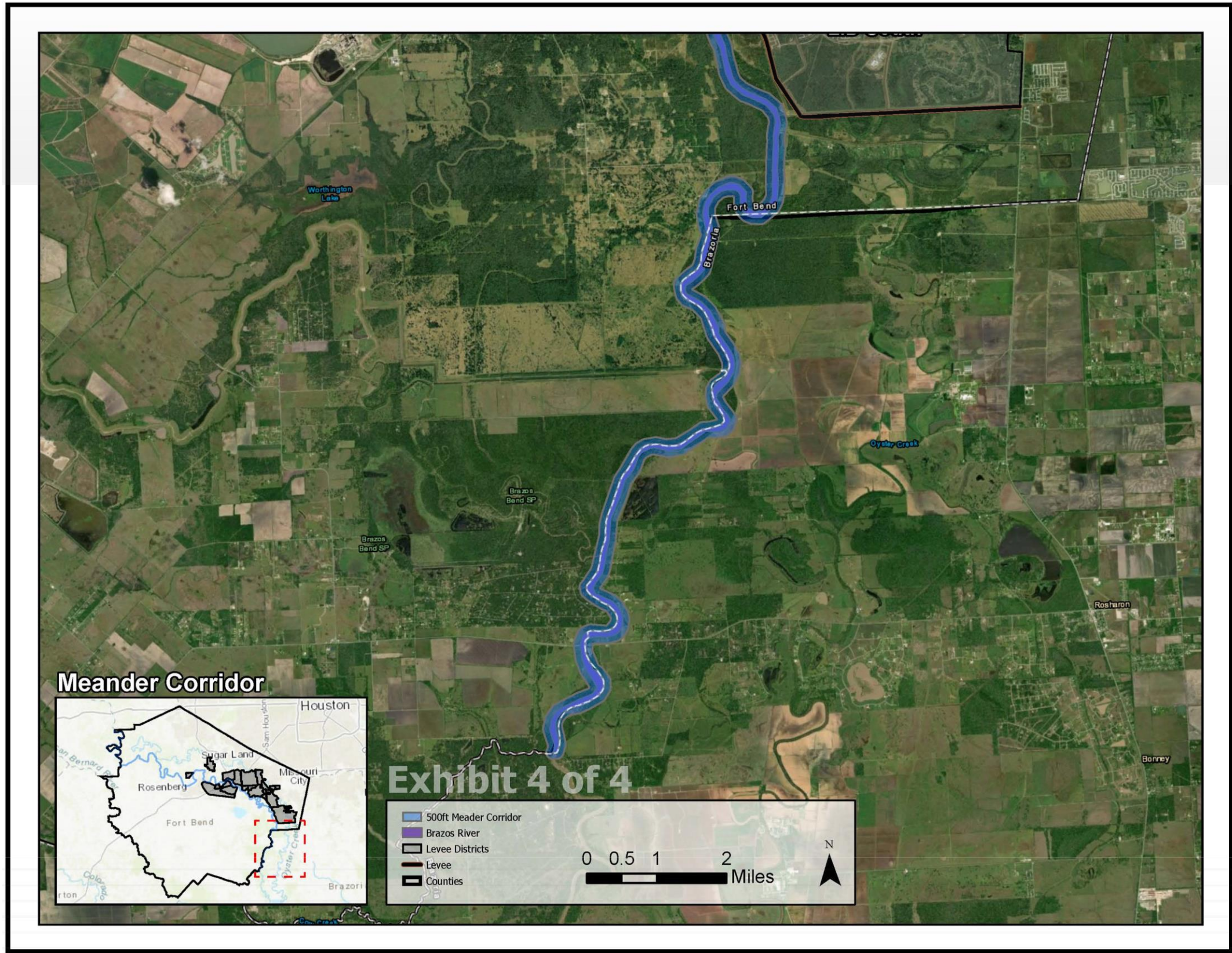


Figure 15: Meander Corridor near Brazoria County

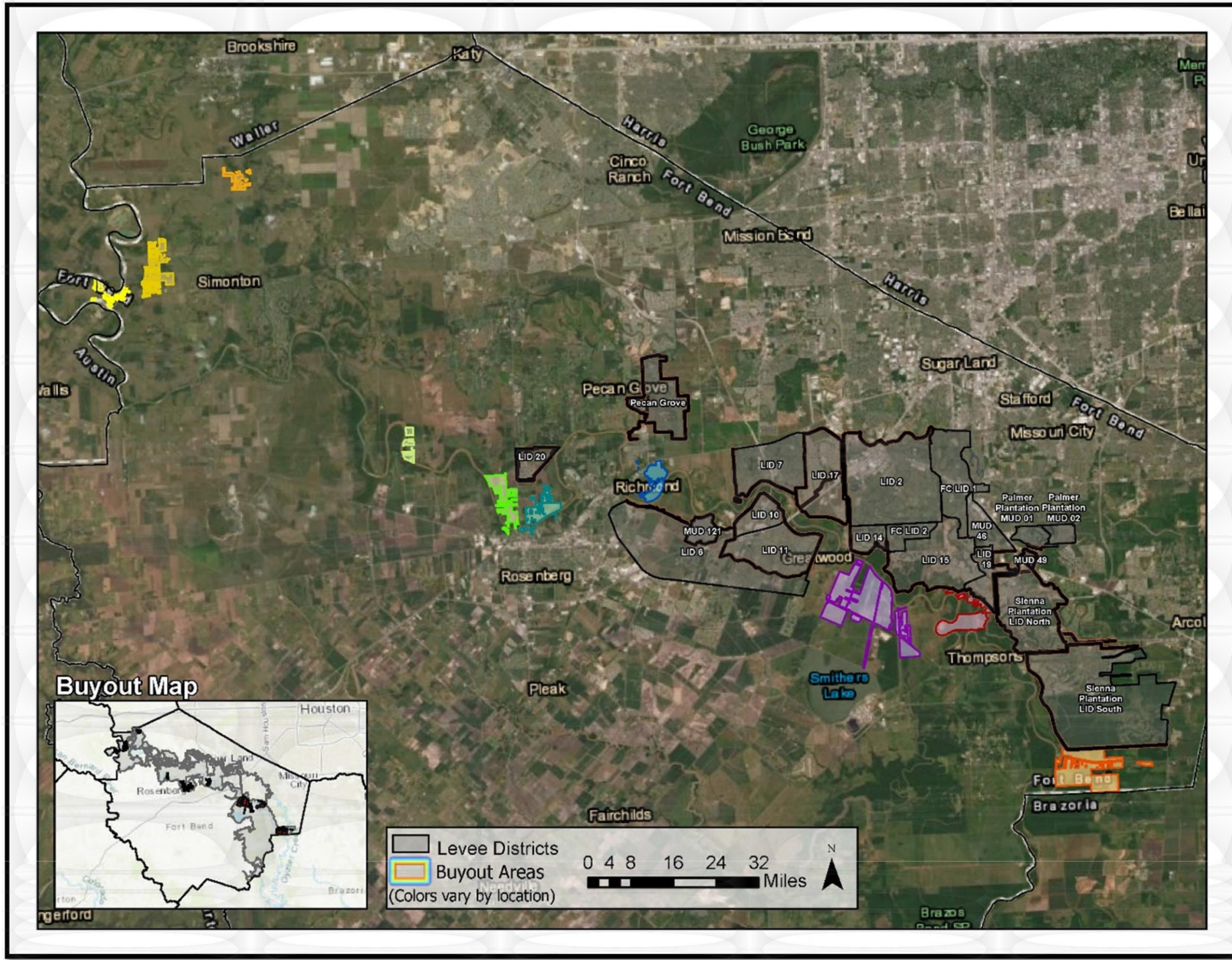


Figure 16: Buyout Areas

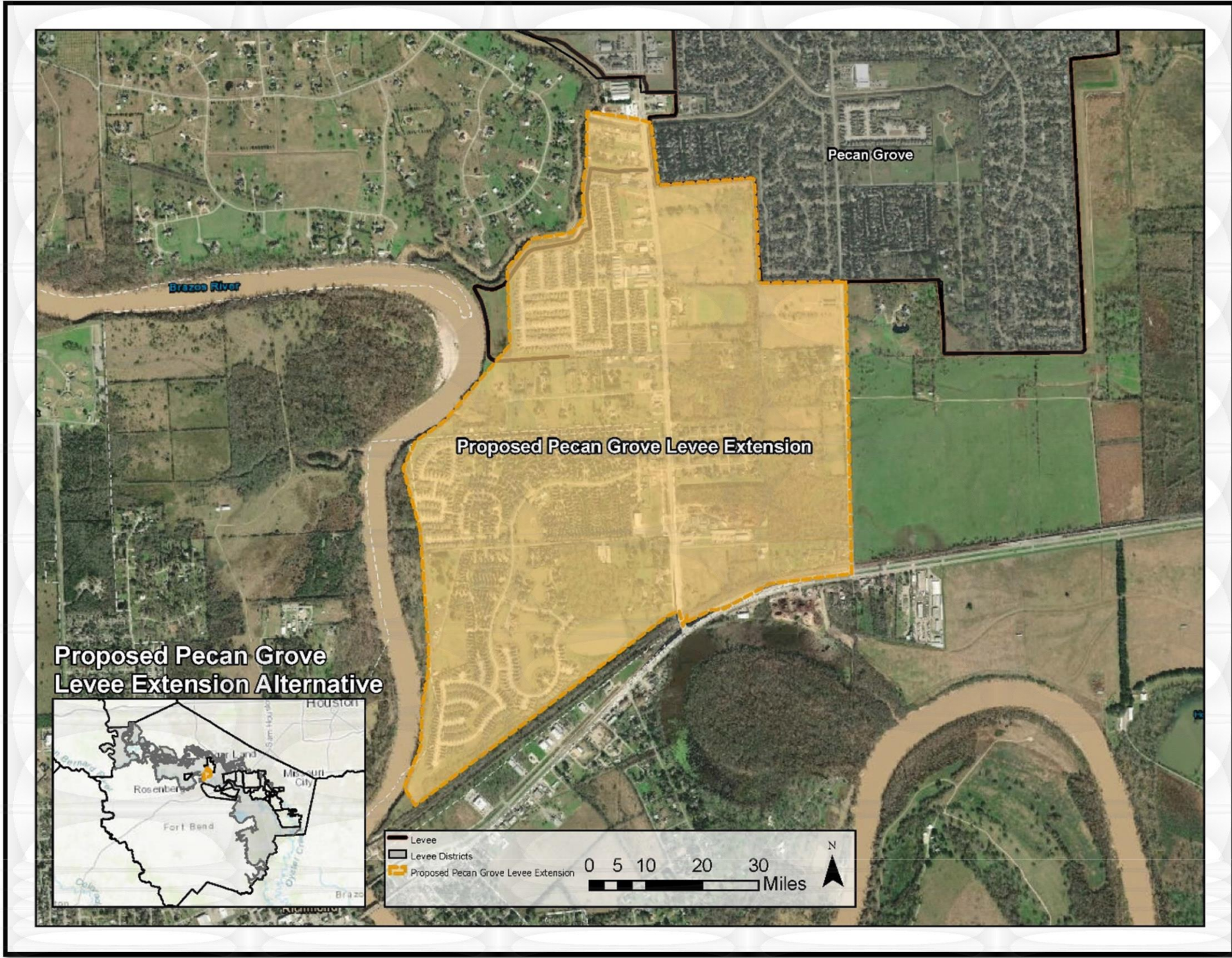


Figure 17: Pecan Grove Levee Extension Alternative

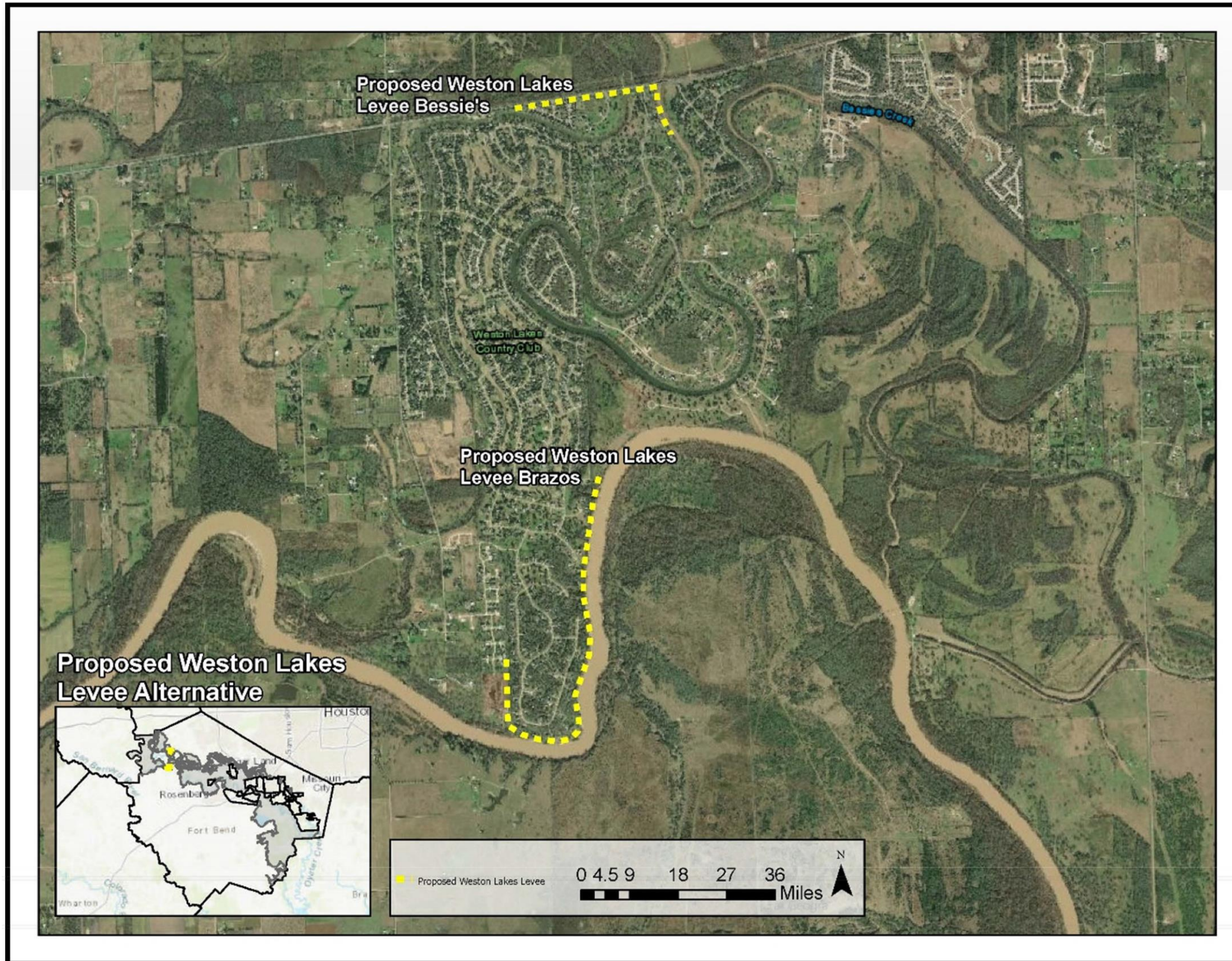


Figure 18: Weston Lakes Levee Alternatives

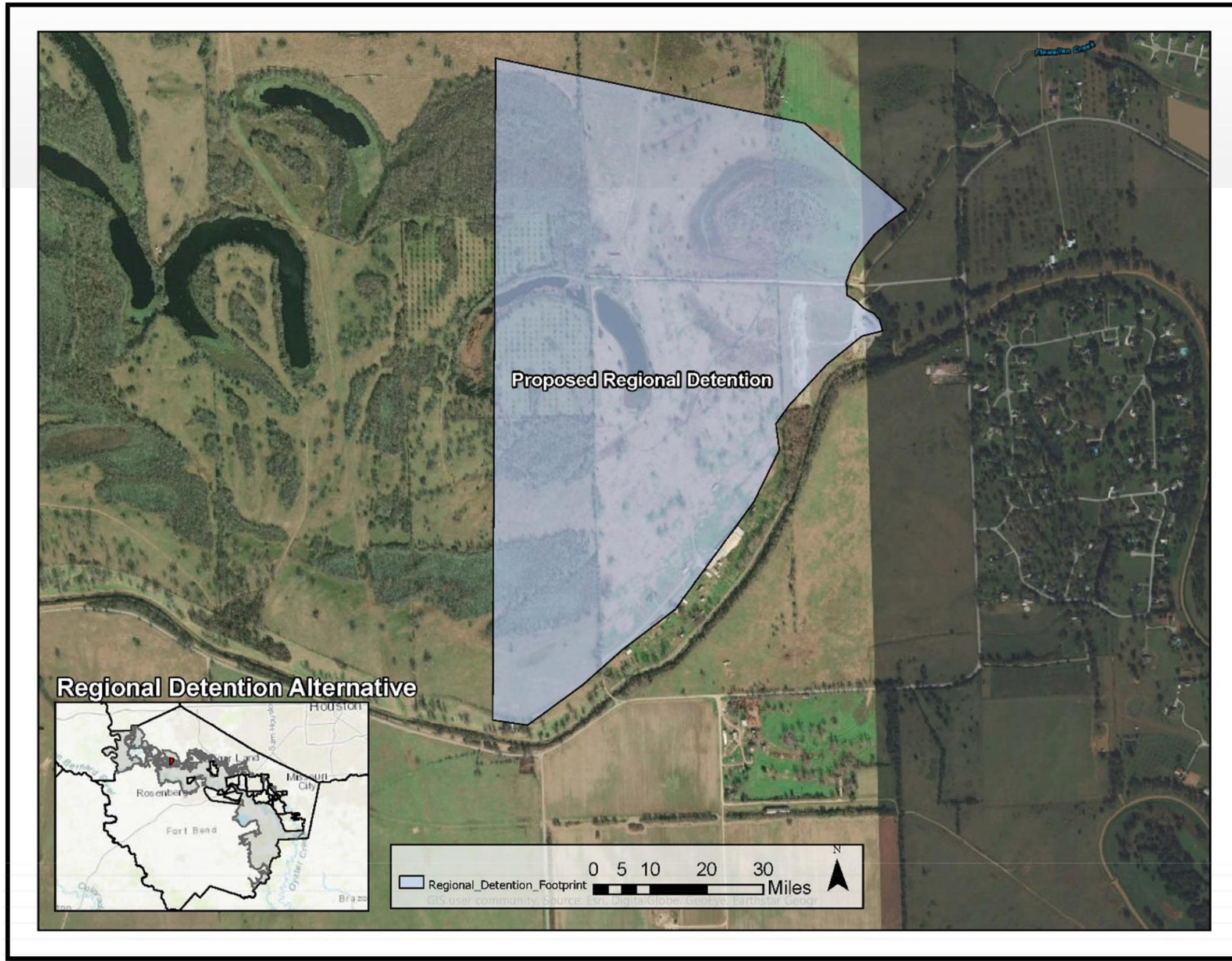


Figure 19: Regional Detention Alternative

### 3.3.10 Evaluation and Screening of Initial Alternative Array

The initial alternatives were evaluated with qualitative and quantitative analysis. The quantitative analysis included anticipated structures impacted, change in water surface elevation, and rough order of magnitude costs based on previous studies. Qualitative analysis included potential impacts to the natural environment, impacts to cultural resources, anticipated net benefits, and implementation risks. Based on this evaluation alternatives were screened, and the screening is discussed with the evaluation of each alternative.

#### 3.3.10.1 Flood Risk Management Infrastructure Protection (Alternative 2)

Protection of the existing levees will reduce the likelihood of damages to structures, due to levee failure. This protection does have potential environmental impacts to muscle species. However, these impacts may be avoided through further investigation and coordination with environmental agencies.

#### 3.3.10.2 Improve Existing Levees (Alternative 3)

Improving the existing levees was evaluated by determining the flood event that would likely overtop a levee. The levees were evaluated by comparing the levee heights to various AEP storms. A summary of the annual exceedance probability analysis is show in Table 10 and the full details are included in Appendix A.

**Table 10: Levee Overtopping Assessment Summary**

Levee Assessed	Expected AEP	Improvement Needed
LID #6	0.0006	No
LID #10	0.0006	No
LID #11	0.0006	No
LID #14	0.0006	No
LID #20	0.0006	No
Pecan Grove	0.0413	No
Sienna North	0.0006	No
Sienna South	0.0029	No

Based on the evaluation only one levee, the existing Pecan Grove Levee, could potentially need any improvements. However, during Hurricane Harvey, Pecan Grove and Sienna South LID engineers indicated more than 5 feet of freeboard was present during the peak of the Brazos River as measured by the Richmond gage. Based upon visual observations of levee performance during significant events, this model does not appear to indicate the areas of most concern. The model would have to be refined and analyzed further to provide meaningful results for this system. With the modeling and past experience informing professional judgment it was determined that improving the existing levees would not generate more economic benefits than costs, as so was screened from further consideration.



### 3.3.10.3 Floodplain Management Changes (Alternative 4)

Reducing development affected by the 1% AEP would keep the risk of future flood damages at their current levels. It would also reduce the need for future levees and bank stabilization to protect levees near the Brazos River. This would need to be implemented by the sponsor, and was not evaluated for federal implementation. However, based on the analysis of other alternatives recommendations were reached.

### 3.3.10.4 Buyouts and Structure Raises (Alternative 5)

For the ten buyout areas that were developed a rough cost and benefit analysis was completed. The costs included acquisition (based on tax appraisal), demolition, and would only likely increase with further analysis. The benefits were derived from the reduced flood damages because of the reduced structures in the floodplain.

**Table 11: Buyout Rough Cost Benefit Analysis**

Measure #	First Costs (\$1,000)	Average Annual Costs (\$1,000)	Average Annual Benefits (\$1,000)	Net Benefits (\$1,000)
1	54,712	2136	852	-1284
2	15,186	593	146	-447
3	14,050	549	214	-335
4	3,135	122	39	-83
5	17,410	680	359	-321
6	31,508	1230	516	-714
<b>7</b>	<b>17,504</b>	<b>683</b>	<b>542</b>	<b>-141</b>
8	52,471	2047	1215	-832
<b>9</b>	<b>15,237</b>	<b>595</b>	<b>380</b>	<b>-215</b>
<b>10</b>	<b>15,504</b>	<b>605</b>	<b>405</b>	<b>-200</b>

Costs for elevating structures and engineering viability are based on the type of foundation and construction. Most of the structures that are affected by the 1% AEP flood are slab on grade. Slab on grade foundations can be elevated at a high cost, but usually those structures are irreparably damaged or destroyed. Therefore, structure elevation was removed as a measure for this alternative. Areas 7, 9, and 10 are the

blue area near Richmond, purple area near Smither's Lake, and orange area near the Brazoria County line respectively on Figure 16.

#### **3.3.10.5 Pecan Grove Levee Extension (Alternative 6a)**

Based on the BRA Study, the Pecan Grove Levee had a Benefit-Cost Ratio (BCR) of 1.4 with approximately \$1,300,000 more in average annual benefits than costs. The levee was modeled with a 2D hydraulic model, which showed that it would function as designed. Based on that information, this alternative was not screened at this stage and became part of the final array of alternatives.

#### **3.3.10.6 Weston Lakes Levee at Bessie's (Alternative 6b)**

The BRA Study identified the Weston Lakes Levee along Bessie's Creek as having a BCR of 0.9 with approximately \$50,000 less in average annual benefits than costs. The proposed levee was modeled with a 2D hydraulic model, which showed that it would not function as proposed. Instead, the levee would function as a retention structure. In order for the levee to reduce flood risk, it would need to be a ring levee around the Weston Lakes community, which would increase the costs without increasing benefits. Therefore; this alternative was screened and not included in the final array of alternatives.

#### **3.3.10.7 Weston Lakes Levee at Brazos (Alternative 6c)**

Based on the BRA Study, the Weston Lakes Levees as a single alternative had a BCR of 0.9 with approximately \$50,000 less in average annual benefits than costs. The levee was modeled with a 2D hydraulic model, which showed that it would not function as a levee, but as a retention structure. In order to make the levee function in reducing flood risk, it would need to be extended into a ring levee around the Weston Lakes community, which would increase the costs without increasing benefits. Therefore; this alternative was screened and not included in the final array of alternatives.

#### **3.3.10.8 Multi-Levee (Alternative 7)**

Since the only levee would be economically justified was the Pecan Grove Levee Extension, this alternative was eliminated.

#### **3.3.10.9 Regional Detention (Alternative 8)**

The regional detention would be located where oxbows, which are now functioning as wetlands, were once located. This would require significant mitigation for impacts to the high quality wetlands. The proposed detention would only provide 1% AEP flood reduction benefits for a short distance downstream. More details on the H&H analysis are found in Appendix A. Rough costs were not developed but the anticipated costs for real estate, construction, and mitigation would exceed the anticipated benefits. Therefore, this alternative was screened and not included in the final array of alternatives.

### **3.4 Final Array of Alternatives**

After evaluating the initial array of alternatives the remaining alternatives were:

Alternative 1, NAA  
 Alternative 2, Flood Risk Management Infrastructure Protection,  
 Alternative 5, Buyouts Non-structural, and Alternative 6a, Pecan Grove Levee  
 Extension.

### 3.5 Evaluation and Comparison of Final Alternative Array

The evaluation and comparison of the final alternative array was completed across four criteria:

1. Completeness, or the extent to which the alternative plans provide and account for all necessary investments or other actions to ensure the realization of the planning objectives
2. Acceptability, or the extent to which the alternative plans are acceptable in terms of applicable laws, regulations and public policies.
3. Effectiveness, or the extent to which the alternative plans contribute to achieve the planning objectives.
4. Efficiency, or the extent to which an alternative plan is the most cost effective means of achieving the objectives

#### 3.5.1 Completeness

All of the action alternatives provide and account for the needed investments and actions to realize the planning objectives and the described benefits.

#### 3.5.2 Acceptability

All of the alternatives comply with applicable laws, regulations, and public policies. However, the FRM infrastructure protection alternative is outside of the authority of the USACE to implement.

#### 3.5.3 Effectiveness

##### 3.5.3.1 Flood Damage Reduction

Flood damages are calculated based on water surface elevations, first floor elevations, and depth damage curves. Detailed discussion on the calculation of flood damages is in Appendix C.

**Table 12: Average Annual Flood Damage Reduction (\$1,000, Oct 2018)**

Alt #	Alternative	Damages Reduced
1	NAA	\$0
5	Non-Structural	\$2,542
6a	Pecan Grove Levee Extension	\$3,064

##### 3.5.3.2 FRM Infrastructure Protection

The FRM infrastructure protection alternative was evaluated, but as it cannot be implemented by the USACE it was evaluated differently than the other alternatives.

This was done by assessing the damages that would occur if the levees were to fail during a 1% AEP flood.

**Table 13: Infrastructure Protection 1% Annual Event Damages**

Alt #	Alternative	Without Levees 1% AEP Damages
2	FRM Infrastructure Protection	\$2,067,376

### 3.5.3.3 Critical Infrastructure Protection

There is no identified critical infrastructure at risk from flooding. However, erosion does put at risk flood evacuation routes, as well as the levees that protect 1,000s of homes. The effectiveness of the solutions for protecting critical infrastructure is the same as FRM infrastructure protection.

### 3.5.4 Efficiency

Efficiency is measured by comparing the costs to the benefits an alternative can provide.

#### 3.5.4.1 Cost Benefit Analysis

The costs were developed using Micro-Computer Aided Cost Estimating System (MCACES) and are detailed in Section 10 of Appendix A. The costs included real estate, construction, design, and environmental requirements. Those costs were then annualized over the 50 year study horizon, to develop the average annual cost, which was then compared to the average annual benefits. The results of the analysis are shown in Table 14 and Table 15. The erosion benefits are based on a single failure during a 1% AEP.

**Table 14: Flood Risk Management Cost Benefit Analysis**

Alt #	Description	Structures Affected	First Costs	Average Annual Costs	Average Annual Benefits	BCR
1	No Action (NAA)	0	\$0	\$0	\$0	0
5	Buyouts	252	\$100,716,000	\$3,930,000	\$2,542,000	0.65
6a	Pecan Grove Levee	1,360	\$380,057,000	16,748,000	\$3,064,000	0.18

**Table 15: Erosion Cost Benefit Analysis**

Alt #	Description	Structures Affected	First Costs	Average Annual Costs	Without Levees 1% AEP Damages
2	FRM Infrastructure Protection	5,823	\$190,051,000	\$8,722,000	\$509,225,000

### 3.6 Plan Selection

Based on the evaluation, no plan had positive net benefits or any other benefit to allow for USACE implementation; therefore, the No Action Alternative is the selected plan. Section 5 details recommended actions that should be implemented by local entities to address the studied problems.

### 3.7 Risk and Uncertainty

All the plans will leave the some portion of the basin with no change in flood risk. The one that provides the protection to the structures most at risk is the non-structural alternative. It also provides the risk reduction to the most portions of the basin, and would allow a slightly larger area for the Brazos River to meander.

Further, the results of a limited scope risk assessment indicate that without structural mitigation measures that life safety risks may increase for the levee systems evaluated as part of this study in regards to the erosion failure mode. The results of a limited scope risk assessment indicate that new levee systems considered in the area should carefully consider the potential for long-term erosion of the Brazos River. Consideration should be given to keeping construction of new levees far enough away from the Brazos River as to reduce the potential for erosion to impact levees in the future.

Reference Attachment 2 of Appendix A for the full Limited Scope Risk Assessment report.

#### 3.7.1.1 Benefit and Cost Uncertainty

HEC-FDA accounts for the uncertainty for some aspects of the analysis. These include structure value, water surface elevation, flood events occurring over 50 years, and structure occupancy. However, benefits were calculated based on the assumption of a first floor elevation of 1 foot above ground surface elevation. First floors vary from structure to structure and the benefits are affected by this assumption. Table 16 shows the uncertainty in benefit cost analysis for the Pecan Grove Levee (Alternative 6a), which would be similar to the non-structural alternative.

**Table 16: Uncertainty in Benefit-Cost Analysis**

Foundation Height (Feet)	Without Project	With Project	Damages Reduced	Annual Cost	Benefit-to-Cost Ratio
0	\$5,784	\$1,174	\$4,610	\$16,748	0.28
1	4,116	1,052	3,064	16,748	0.18
2	2,823	913	1,910	16,748	0.11

## 4 Preparers

Preparer	Discipline
Dee Gonzales	Project Manager
David May	Hydrologic and Hydraulic – Civil Engineer
Kalli Clark-Egan	Civil Engineer
Danny Allen	Biologist
Chris Davies	Archeologist
Norm Lewis	Economist
Tom Jester	Plan Formulator

## 5 Recommendation

### 5.1 Federal Plan

There is no recommendation for USACE action.

Fort Bend County has worked with the USACE through to address the erosion concerns on the Brazos River. These past studies have included planning assistance to states and Continuing Authorities Program (CAP) Section 14. Section 14 is for addressing erosion, but has a total project cost spending limit of approximately \$7.5 million. It is possible to use this authority in order stabilize river banks, but is limited to sites that protect public infrastructure and do not induce downstream erosion.

### 5.2 Other Recommendations for Local Action

The continued erosion in the study area puts many pieces of infrastructure at risk. The protection of the levees and evacuation routes, even though it is outside of the USACE authority to implement, are vital to the continued safety of the region. Alternative 2 (FRM Infrastructure Protection) described in this report, and in Appendix A, would address the erosion and should be implemented quickly in order to avoid the risk of future levee and bridge failures.

A meander corridor would further reduce the risk that erosion creates in the basin. This corridor would need to be designated and regulated, such that further development inside the corridor is curtailed, in order for it to reduce future erosion risks. The proposed meander corridor is based on erosion rates determined during the feasibility study. The average erosion rate of the Brazos River within Fort Bend County is approximately nine feet per year. In accordance with 50 year design and study horizon, it is recommended that this erosion rate be extrapolated out. As a result, a meander

corridor should be implemented approximately 500 feet from the existing east and west top of bank of the Brazos River.

To reduce flood risk within the basin, it is recommended that development should be outside of the 1% AEP floodplain. This would be accomplished either through the development occurring outside the extents, or the requiring the first floor elevations be a minimum of 1 foot above the anticipated 1% AEP water surface elevation, used for zoning and planning. Purchases of structures not meeting these criteria, would likely be those nearest the Brazos River and would help develop the meander corridor.

The development of common regional criteria and procedures for development within the Lower Brazos River watershed is strongly recommended to mitigate the impacts of significant development, subsequent encroachment, and other changes to the floodplain within Fort Bend County. Along with the implementation of a meander corridor, local governments, within and beyond Fort Bend County, should evaluate what processes should be put in place to mitigate flood and sedimentation transport risks of floodplain development. Without a process that considers the impacts of future development to the floodplain, the risks of erosion and flooding will likely increase. Also reference the conclusions of the Brazos River Authority Lower Brazos Flood Protection Planning Study where a Brazos River Coalition was recommended. An example of such process is the Corridor Development Certificate (CDC) process that has been implemented for development within the Trinity River corridor.

### **5.2.1 Assistance**

If needed, ERDC Technical Assistance can be obtained through the Water Operations Technical Support Program (WOTS; [wots.el.erdcdren.mil](http://wots.el.erdcdren.mil)) or the Dredging Operations Technical Support Program (DOTS; <https://dots.el.erdcdren.mil/>). These programs, requested by the local USACE District, cover one week of time and travel for an ERDC employee (WOTS) or two weeks of time and travel for an ERDC employee (DOTS).

Any site within Fort Bend County is applicable for both programs. Furthermore, with SWD/SWG permission, Fort Bend County can directly access ERDC resources and technical assistance through a service agreement. Such an agreement would require a scope of work (SOW) between ERDC and the sponsor that would outline the tasks and deliverables agreed upon. District H&H support and participation is highly recommended with a service agreement. There are many options for partnering mechanisms that can be explored at the following link:

<https://www.erdcdren.usace.army.mil/Business-With-Us/Partnering-Mechanisms/>.

### **5.2.2 Required Coordination**

As part of implementing the recommendations above the following coordination will be required.

1. Section 401 Clean Water Act Permit: Need to conduct a wetland delineation for the project areas and coordinate with USACE for a Section 401 permit for any actions involving waters of the U.S.

2. Section 404(b)(1): Need to obtain a water quality certification from TCEQ for any action that would involve disturbance of the stream/river beds or adjacent areas.
3. Endangered Species Act: Need to coordinate with the Houston USFWS Ecological Services Office for regarding to potential impacts to endangered species. Of specific concern are listed mussels associated with the bank erosion solutions on the Brazos River.
4. Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act: Need to coordinate with Houston USFWS Ecological Services Office and the Regional HQ in Albuquerque regarding impacts to migratory birds and bald eagles for any action that would require the removal/grubbing of vegetation.
5. Cultural Resources: Need to coordinate with the Texas State Historic Preservation Office (SHPO) and conduct a cultural resources survey in compliance with the Antiquities Code of Texas.
6. Clean Air Act: The study area is in a non-attainment area and actions should be coordinated with the TCEQ.
7. If the non-federal sponsor would move forward with the action alternatives, a Section 404 permit for wetland impacts would be required. The minor extent of impacted wetlands would qualify for the use of a Nationwide Permit.

## **6 References**

- U.S. Army Corps of Engineers. (2000, April 22). Engineer Regulation 1105-2-100. *Planning Guidance Notebook*. Washington, District of Columbia, United States of America: Department of the Army.
- U.S. Army Corps of Engineers. (2015). *Recent US Climate Change and Hydrology Literature Applicable to the US Army Corps of Engineers Missions - Texas-Gluf Region 12*. Washington, DC: USACE.



## Exhibit III - Federal Clauses

Contractor understands and acknowledges that this Agreement is being funded totally or partially with federal funds from the U.S. Department of Housing and Urban Development Community Development Block Grant – Disaster Recovery (“CDBG-MIT) funds, administered by the Texas General Land Office (“GLO”). As a condition of receiving these funds, Contractor represents that it is and will remain in compliance with all federal terms as stated below. All expenditures under this Contract must be made in accordance with the rules and regulations promulgated under the CDBG-MIT Program, and any other applicable laws. Further, Contractor acknowledges that all funds are subject to recapture and repayment for non-compliance. These terms flow down to all third party contractors and their subcontracts at every tier that exceed the simplified acquisition threshold set at \$50,000 by the County, unless a particular award term or condition specifically indicates otherwise. **The Contractor shall require that these clauses shall be included in each covered transaction at any tier.**

The following Exhibits (available at <https://www.glo.texas.gov/recovery/index.html>) are included as a condition to any proposal, bid or contract:

- Exhibit I: Federal Assurances for Construction Programs (Standard Form 424D) (Only required for construction projects) *“Construction work” is defined as the construction, rehabilitation, alteration, conversion, extension, demolition or repair of buildings, highways, or other changes or improvements to real property, including facilities providing utility services. The term also includes the supervision, inspection, and other onsite functions incidental to the actual construction. (41 C.F.R. § 60-1.3)*
- Exhibit II: General Affirmations
- Exhibit III: Nonexclusive List of Applicable Laws, Rules, and Regulations

In addition, Contractor is deemed to have read and understood, and shall abide by, all guidance documents applicable to the CDBG-MIT program, including, without limitation 2 C.F.R. Part 200 Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards; the State of Texas Action Plan for Disaster Recovery at <http://texasrebuilds.org>; and other guidance documents posted at: <http://texasrebuilds.org>.

### **1. Federal Assurances.**

To the extent that they are applicable, Contractor further certifies that the Federal Assurances in the attached Exhibits have been reviewed and that Contractor is in compliance with each of the requirements reflected therein. Contractor must execute the forms included in the attached Exhibits.

### **2. Federal Certifications.**

To the extent that they are applicable, Contractor further certifies that the Federal Certifications in the attached Exhibits have been reviewed, and that Contractor is in compliance with each of the requirements reflected therein. Contractor must execute the forms and return to County prior to start of performance.

### **3. General Affirmations.**

To the extent that they are applicable, Contractor further certifies that the General Affirmations in the attached Exhibits have been reviewed, and that Contractor is in compliance with each of the requirements reflected therein.

**4. Nonexclusive List of Applicable Laws, Rules, and Regulations.**

To the extent that they are applicable, Contractor further certifies that the Nonexclusive List of Applicable Laws, Rules, and Regulations in the attached Exhibits have been reviewed, and that Contractor is in compliance with each of the requirements reflected therein.

**5. State Required Clauses**

This Contract shall not be construed as creating any debt on behalf of the State of Texas and/or the GLO in violation of Article III, Section 49, of the Texas Constitution. In compliance with Article VIII, Section 6 of the Texas Constitution, all obligations of the GLO hereunder are subject to the availability of state funds. If such funds are not appropriated or become unavailable, the County may terminate this Contract.

**6. Abandonment or Default.**

If the Contractor defaults on the Contract, the County reserves the right to cancel the Contract without notice and either re-solicit or re-award the Contract to the next best responsive and responsible vendor qualified under the Solicitation. The defaulting contractor will not be considered in the re-solicitation and may not be considered in future solicitations for the same type of work, unless the specification or scope of work significantly changed. The period of suspension will be determined by the County based on the seriousness of the default.

**7. Intellectual Property- Ownership and Use.**

- (a) The County and GLO shall jointly own all right, title, and interest in and to all reports, drafts of reports, or other material, data, drawings, computer programs, and codes associated with this Contract, and/or any copyright or other intellectual property rights, and any material or information developed and/or required to be delivered under this Contract, with each having the right to use, reproduce, or publish any or all of such information and other materials without obtaining permission from the Contractor and without expense or charge.
- (b) Contractor grants the GLO and HUD a royalty free, non-exclusive, and irrevocable license to reproduce, publish, or otherwise use, and to authorize others to use, for U.S. Government purposes, all reports, drafts of reports, or other material, data, drawings, computer programs, and codes associated with this Contract, and/or any copyright or other intellectual property rights, and any material or information developed and/or required to be delivered under this Contract.

**8. Non-Endorsement by State and the United States**

Contractor shall not publicize or otherwise circulate promotional material (such as advertisements, sales brochures, press releases, speeches, still or motion pictures, articles, manuscripts, or other publications) that states or implies the GLO, State of Texas, U.S. Government, or any government employee endorses a product, service, or position the Contractor

represents. Contractor may not release information relating to this Contract or state or imply that the GLO, the State of Texas, or the U.S. Government approves of Contractor's work products or considers Contractor's work product to be superior to other products or services.

#### **9. Books and Records.**

County shall keep and maintain full, true, and complete records sufficient to allow the GLO, the Texas State Auditor's Office, the United States Government, and/or their authorized representatives to determine County's compliance with this Contract and all applicable laws, rules, and regulations, including the applicable laws and regulations provided in all Exhibits.

#### **10. Inspection and Audit.**

All records related to this Contract, including records of County and its Subcontractors, shall be subject to the Administrative and Audit Regulations. Accordingly, such records and work product shall be subject, at any time, to inspection, examination, audit, and copying at the County's primary location or any location where such records and work product may be found, with or without notice from the GLO or other government entity with necessary legal authority. Contractor shall cooperate fully with any federal or state entity in the conduct of inspection, examination, audit, and copying, including providing all information requested. County will ensure that this clause concerning federal and state entities' authority to inspect, examine, audit, and copy records and work product, and the requirement to fully cooperate with the federal and state entities, is included in any subcontract it awards.

The state auditor may conduct an audit or investigation of any entity receiving funds from the state directly under the Contract or indirectly through a subcontract under the Contract. Acceptance of funds directly under the Contract or indirectly through a subcontract under the Contract acts as acceptance of the authority of the state auditor, under the direction of the legislative audit committee, to conduct an audit or investigation in connection with those funds. Under the direction of the legislative audit committee, an entity that is the subject of an audit or investigation by the state auditor must provide the state auditor with access to any information the state auditor considers relevant to the investigation or audit. **The Office of the Comptroller General of the United States, the Government Accountability Office, the Office of Inspector General, or any authorized representative of the U.S. Government shall also have this right of inspection.** County shall ensure that this clause concerning the authority to audit funds received indirectly by subcontractors through County and the requirement to cooperate is included in any subcontract it awards.

#### **11. Period of Retention.**

All records relevant to this Contract shall be retained for a period subsequent to the final closeout of the State of Texas **CDBG-DR** grant program, in accordance with federal regulations. **The County will notify all Program participants of the date upon which local records may be destroyed.**

#### **12. Equal Opportunity Clause.**

During the performance of this contract, the contractor agrees as follows: (1) The contractor will not discriminate against any employee or applicant for employment because of race, color,

religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information. (4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment. (5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor. (6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders. (7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law. (8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

*Provided*, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency,

the contractor may request the United States to enter into such litigation to protect the interests of the United States.

**13. Bonding Requirements.**

Contractor shall be required to obtain any performance and payment bonds to the extent they are required under Chapter 2253 of the Texas Government Code.

**14. Energy Policy and Conservation Act (42 U.S.C. 6201).**

Contractor shall comply with all mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (42 U.S.C. 6201).

**15. Clean Air Act and the Federal Water Pollution Control Act.**

Contractor must comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401–7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251–1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

**16. Procurement.**

Contractor must confirm that it is not debarred from receiving state or federal funds at each of the following web addresses: Texas Comptroller’s Vendor Performance Program at <https://comptroller.texas.gov/purchasing/>; and the Federal General Services Administration’s Excluded Parties List System at <https://www.epls.gov/>.

**17. Purchases and Equipment.**

Any purchase of equipment or computer software shall be made in accordance with all applicable laws, regulations, and rules including those listed in the attached Exhibits.

**18. Communication with Third Parties.**

The GLO and any other authorized federal agency or authority may initiate communications with Contractor and any subcontractor, and may request access to any books, documents, personnel, papers, and records of a subcontractor which are pertinent to this Contract. Such communications may be required to conduct audits, examinations, Davis-Bacon Labor Standards interviews, and gather additional information as necessary.

**19. Dispute Resolution**

Contractor understands that for all subcontracts for \$50,000 (the simplified acquisition threshold currently set by the County) or more, the Contractor must include terms to address dispute resolution between the parties who shall attempt in good faith to resolve promptly any dispute arising out of or relating to the Agreement by negotiation between the parties.

**20. Procurement of Recovered Materials.**

To the extent applicable, the Contractor shall make maximum use of products containing recovered materials that are EPA-designated items unless the product cannot be acquired (1) competitively

within a timeframe providing for compliance with the contract performance schedule; (2) meeting contract performance requirements; or (3) at a reasonable price.

Information about this requirement, to ensure maximum use of recovered/recycled materials per to 2 CFR 200.322, along with the list of EPA-designated items, is available at EPA's Comprehensive Procurement Guidelines web site, <https://www.epa.gov/smm/comprehensiveprocurement-guideline-cpg-program>.

## **21. False Statements or Claims.**

Except as otherwise provided under federal law, any person who knowingly and willfully falsifies, conceals, or covers up a material fact by any trick, scheme or device or who makes any materially false, fictitious, or fraudulent statement or representation or who makes or uses any false writing or document knowing the writing or document to contain any materially false, fictitious, or fraudulent statement or entry shall be prosecuted under Title 18, United States Code, § 1001. Under penalties of 18 U.S.C. § 1001, the undersigned Contractor hereby declares that he/she has examined this Contract and Exhibits, including without limitation, the Solicitation and Solicitation Response, and to the best of his/her knowledge and belief any statements, entries, or claims made by Contractor are, correct, accurate and complete.

## **22. Economic Opportunities for Section 3 Residents and Section 3 Business Concerns.**

Contractor understands that:

- (a) The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (Section 3). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- (b) The parties to this Agreement agree to comply with HUD's regulations in 24 CFR part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this Agreement certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.
- (c) The Contractor agrees to send to each labor organization or representative of workers with which the Contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the Contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
- (d) The Contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause,

upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The Contractor will not subcontract with any subcontractor where the Contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.

- (e) The Contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the Contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the Contractor's obligations under 24 CFR part 135.
- (f) Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this Agreement for default, and debarment or suspension from future HUD assisted contracts.

### **23. Termination for Cause and Termination for Convenience**

Contractor understands that all contracts in excess of \$10,000, including subcontracts, must address termination for cause and for convenience by the non-Federal entity including the manner by which it will be effected and the basis for settlement.

### **24. Assignment and Subcontracts**

Contractor shall not assign, transfer, or delegate any rights, obligations, or duties under this Contract without the prior written consent of the County. Consent may be required from both the County and any federal or state agency associated with the funding for this agreement. In any approved subcontracts, Contractor shall legally bind such subcontractor to perform and make such subcontractor subject to all the duties, requirements, and obligations of Contractor as specified in this Contract. Nothing in this Contract shall be construed to relieve Contractor of the responsibility for ensuring that the goods delivered and/or the services rendered by Contractor and/or any of its subcontractors comply with all the terms and provisions of this Contract. Contractor will provide written notification to the County of any such subcontractor including the name and taxpayer identification number of subcontractor, the task(s) being performed, and the number of subcontractor employees expected to work on the task.

### **25. Lobbying.**

*This clause applies to all contracts and subcontracts of \$100,000 or more.*

Contractors who apply or bid for an award of \$100,000 or more shall file the certification required by 49 C.F.R. Part 20, "New Restrictions on Lobbying." Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose the name of any registrant under the Lobbying Disclosure Act of 1995 who has made lobbying contacts on its behalf with non-Federal funds with respect to that Federal contract, grant or award covered by 31 U.S.C. 1352. Such disclosures are forwarded from tier to tier up to the County.

### **26. Procurement of Recovered Materials.**

*This Requirement applies to procurements of \$10,000 or more per year for items designated by EPA.*

Contractor must comply with Section 6002 of the Solid Waste Disposal Act, Pub. L. No. 89-272 (1965) (codified as amended by the Resource Conservation and Recovery Act, 42 U.S.C. section 6962). The requirements of Section 6002 include procuring only items designated in guidelines of the Environmental Protection Agency (EPA) at 40 C.F.R. Part 247 that contain the highest percentage of recovered materials practicable, consistent with maintaining a satisfactory level of competition.

## **27. Prohibited Telecommunications and Video Surveillance Services and Equipment.**

*For contracts that include the purchase of equipment, system, or service that uses covered **telecommunications equipment or services** as a substantial or essential component of any system, or as critical technology of any system.*

Contractor understands and acknowledges that under 2 CFR 200.216, the County is prohibited from using federal funds to procure, obtain, extend or renew a contract to procure or obtain covered telecommunications equipment or services, including telecom equipment produced by Huawei Technologies Company or ZTE Corp. (or subsidiaries or affiliates of such entities).

Contractor, therefore, certifies that they are in compliance with the [John S. McCain National Defense Authorization Act for Fiscal Year 2019 \(FY 2019 NDAA\)](#), Pub. L. No. 115-232 (2018), and that in the performance of this agreement, it will not provide equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system. As described in [Public Law 115-232](#), section 889, covered telecommunications equipment is telecommunications equipment produced by Huawei Technologies Company or ZTE Corporation (or any [subsidiary](#) or affiliate of such entities).

- (i) For the purpose of public safety, security of government facilities, physical security surveillance of critical infrastructure, and other national security purposes, video surveillance and telecommunications equipment produced by Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any [subsidiary](#) or affiliate of such entities).
- (ii) Telecommunications or video surveillance services provided by such entities or using such equipment.
- (iii) Telecommunications or video surveillance equipment or services produced or provided by an entity that the Secretary of Defense, in consultation with the Director of the National Intelligence or the Director of the Federal Bureau of Investigation, reasonably believes to be an entity owned or controlled by, or otherwise connected to, the government of a covered foreign country.

## **28. Domestic Preferences for Procurements.**



As appropriate and to the extent consistent with law, Contractor shall to the greatest extent practicable, provide a preference for the purchase, acquisition, or use of goods, products, or materials produced in the United States (including but not limited to iron, aluminum, steel, cement, and other manufactured products). The requirements of this section must be included in all subawards including all contracts and purchase orders for work or products procured with federal funds. For purposes of this clause, (1) "Produced in the United States" means, for iron and steel products, that all manufacturing processes, from the initial melting stage through the application of coatings, occurred in the United States. (2) "Manufactured products" means items and construction materials composed in whole or in part of non-ferrous metals such as aluminum; plastics and polymer-based products such as polyvinyl chloride pipe; aggregates such as concrete; glass, including optical fiber; and lumber.

## ASSURANCES - CONSTRUCTION PROGRAMS

OMB Number: 4040-0009  
Expiration Date: 01/31/2019

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0042), Washington, DC 20503.





**PLEASE DO NOT RETURN YOUR COMPLETED FORM TO THE OFFICE OF MANAGEMENT AND BUDGET. SEND IT TO THE ADDRESS PROVIDED BY THE SPONSORING AGENCY.**

**NOTE:** Certain of these assurances may not be applicable to your project or program. If you have questions, please contact the Awarding Agency. Further, certain Federal assistance awarding agencies may require applicants to certify to additional assurances. If such is the case, you will be notified.

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for Federal assistance, and the institutional, managerial and financial capability (including funds sufficient to pay the non-Federal share of project costs) to ensure proper planning, management and completion of project described in this application.
2. Will give the awarding agency, the Comptroller General of the United States and, if appropriate, the State, the right to examine all records, books, papers, or documents related to the assistance; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.
3. Will not dispose of, modify the use of, or change the terms of the real property title or other interest in the site and facilities without permission and instructions from the awarding agency. Will record the Federal awarding agency directives and will include a covenant in the title of real property acquired in whole or in part with Federal assistance funds to assure non-discrimination during the useful life of the project.
4. Will comply with the requirements of the assistance awarding agency with regard to the drafting, review and approval of construction plans and specifications.
5. Will provide and maintain competent and adequate engineering supervision at the construction site to ensure that the complete work conforms with the approved plans and specifications and will furnish progressive reports and such other information as may be required by the assistance awarding agency or State.
6. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.
7. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.
8. Will comply with the Intergovernmental Personnel Act of 1970 (42 U.S.C. §§4728-4763) relating to prescribed standards of merit systems for programs funded under one of the 19 statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 C.F.R. 900, Subpart F).
9. Will comply with the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. §§4801 et seq.) which prohibits the use of lead-based paint in construction or rehabilitation of residence structures.
10. Will comply with all Federal statutes relating to non-discrimination. These include but are not limited to: (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color or national origin; (b) Title IX of the Education Amendments of 1972, as amended (20 U.S.C. §§1681 1683, and 1685-1686), which prohibits discrimination on the basis of sex; (c) Section 504 of the Rehabilitation Act of 1973, as amended (29 U.S.C. §794), which prohibits discrimination on the basis of handicaps; (d) the Age Discrimination Act of 1975, as amended (42 U.S.C. §§6101-6107), which prohibits discrimination on the basis of age; (e) the Drug Abuse Office and Treatment Act of 1972 (P.L. 92-255), as amended relating to nondiscrimination on the basis of drug abuse; (f) the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to nondiscrimination on the basis of alcohol abuse or alcoholism; (g) §§523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. §§290 dd-3 and 290 ee 3), as amended, relating to confidentiality of alcohol and drug abuse patient records; (h) Title VIII of the Civil Rights Act of 1968 (42 U.S.C. §§3601 et seq.), as amended, relating to nondiscrimination in the sale, rental or financing of housing; (i) any other nondiscrimination provisions in the specific statute(s) under which application for Federal assistance is being made; and (j) the requirements of any other nondiscrimination statute(s) which may apply to the application.

11. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provide for fair and equitable treatment of persons displaced or whose property is acquired as a result of Federal and federally-assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of Federal participation in purchases.
12. Will comply with the provisions of the Hatch Act (5 U.S.C. §§1501-1508 and 7324-7328) which limit the political activities of employees whose principal employment activities are funded in whole or in part with Federal funds.
13. Will comply, as applicable, with the provisions of the Davis-Bacon Act (40 U.S.C. §§276a to 276a-7), the Copeland Act (40 U.S.C. §276c and 18 U.S.C. §874), and the Contract Work Hours and Safety Standards Act (40 U.S.C. §§327-333) regarding labor standards for federally-assisted construction subagreements.
14. Will comply with flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is \$10,000 or more.
15. Will comply with environmental standards which may be prescribed pursuant to the following: (a) institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514; (b) notification of violating facilities pursuant to EO 11738; (c) protection of wetlands pursuant to EO 11990; (d) evaluation of flood hazards in floodplains in accordance with EO 11988; (e) assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 (16 U.S.C. §§1451 et seq.); (f) conformity of Federal actions to State (Clean Air) implementation Plans under Section 176(c) of the Clean Air Act of 1955, as amended (42 U.S.C. §§7401 et seq.); (g) protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended (P.L. 93-523); and, (h) protection of endangered species under the Endangered Species Act of 1973, as amended (P.L. 93-205).
16. Will comply with the Wild and Scenic Rivers Act of 1968 (16 U.S.C. §§1271 et seq.) related to protecting components or potential components of the national wild and scenic rivers system.
17. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. §470), EO 11593 (identification and protection of historic properties), and the Archaeological and Historic Preservation Act of 1974 (16 U.S.C. §§469a-1 et seq).
18. Will cause to be performed the required financial and compliance audits in accordance with the Single Audit Act Amendments of 1996 and OMB Circular No. A-133, "Audits of States, Local Governments, and Non-Profit Organizations."
19. Will comply with all applicable requirements of all other Federal laws, executive orders, regulations, and policies governing this program.
20. Will comply with the requirements of Section 106(g) of the Trafficking Victims Protection Act (TVPA) of 2000, as amended (22 U.S.C. 7104) which prohibits grant award recipients or a sub-recipient from (1) Engaging in severe forms of trafficking in persons during the period of time that the award is in effect (2) Procuring a commercial sex act during the period of time that the award is in effect or (3) Using forced labor in the performance of the award or subawards under the award.

SIGNATURE OF AUTHORIZED CERTIFYING OFFICIAL  	TITLE  
APPLICANT ORGANIZATION  	DATE SUBMITTED  

SF-424D (Rev. 7-97) Back

## GENERAL AFFIRMATIONS

Provider agrees without exception to the following affirmations:

1. Provider certifies that he/she/it has not given, offered to give, nor intends to give at anytime hereafter, any economic opportunity, future employment, gift, loan gratuity, special discount, trip, favor, or service to a public servant in connection with the Contract.
2. Provider certifies that neither Provider nor any firm, corporation, partnership, or institution represented by Provider or anyone acting for such firm, corporation, partnership, or institution has (1) violated the antitrust laws of the State of Texas under Texas Business & Commerce Code, Chapter 15, or federal antitrust laws; or (2) communicated the contents of the Contract or proposal either directly or indirectly to any competitor or any other person engaged in the same line of business during the procurement process for the Contract or proposal.
3. Provider certifies that if its business address shown on the Contract is a Texas address, that address is the legal business address of Provider and Provider qualifies as a Texas Resident Bidder under Texas Administrative Code, Title 34, Part 1, Chapter 20.
4. Section 2155.004 of the Texas Government Code prohibits the award of a contract that includes proposed financial participation by a person who received compensation from the Subrecipient to participate in preparing the specifications or request for proposals on which the Contract is based. Under Section 2155.004, Government Code, the vendor [Provider] certifies that the individual or business entity named in this bid or Contract is not ineligible to receive the specified Contract and acknowledges that the Contract may be terminated and payment withheld if this certification is inaccurate.
5. Under Texas Family Code section 231.006, a child support obligor who is more than 30 days delinquent in paying child support and a business entity in which the obligor is a sole proprietor, partner, shareholder, or owner with an ownership interest of at least 25 percent is not eligible to receive payments from state funds under a contract to provide property, materials, or services. Under Section 231.006, Texas Family Code, the vendor or applicant [Provider] certifies that the individual or business entity named in this Contract, bid, or application is not ineligible to receive the specified grant, loan, or payment and acknowledges that this Contract may be terminated and payment may be withheld if this certification is inaccurate.
6. Provider agrees that any payments due under the Contract will be applied towards any debt, including but not limited to delinquent taxes and child support, Provider owes to the State of Texas.
7. The Subrecipient is federally mandated to adhere to the directions provided in the President's Executive Order (EO) 13224, blocking property and prohibiting transactions with persons who commit, threaten to commit, or support terrorism and any subsequent changes made to it. The Subrecipient will cross-reference Providers/vendors with the federal System for Award Management (<https://www.sam.gov/>), which includes the United States Treasury's Office of Foreign Assets Control (OFAC) Specially Designated National (SDN) list.
8. Provider certifies: 1) that the responding entity and its principals are eligible to participate in this transaction and have not been subjected to suspension, debarment, or similar ineligibility determined by any federal, state, or local governmental entity; 2) that Provider is in compliance with the State of Texas statutes and rules relating to procurement; and 3) that Provider is not listed on the federal government's terrorism watch list as described in Executive Order 13224. Entities ineligible for federal procurement are listed at <https://www.sam.gov/>.

9. Under Section 2155.006(b) of the Texas Government Code, the Subrecipient may not enter into a contract that includes proposed financial participation by a person who, during the five year period preceding the date of the bid or award, has been: (1) convicted of violating a federal law in connection with a contract awarded by the federal government for relief, recovery, or reconstruction efforts as a result of Hurricane Rita, as defined by Section 39.459, Utilities Code, Hurricane Katrina, or any other disaster occurring after September 24, 2005; or (2) assessed a penalty in a federal civil or administrative enforcement action in connection with a contract awarded by the federal government for relief, recovery, or reconstruction efforts as a result of Hurricane Rita, as defined by Section 39.459, Utilities Code, Hurricane Katrina, or any other disaster occurring after September 24, 2005. Under Section 2155.006 of the Texas Government Code, Provider certifies that the individual or business entity named in the Contract is not ineligible to receive the specified Contract and acknowledges that the Contract may be terminated and payment withheld if this certification is inaccurate.
10. The state auditor may conduct an audit or investigation of any entity receiving state funds directly under the Contract or indirectly through a subcontract under the Contract. Acceptance of funds directly under the Contract or indirectly through a subcontract under the Contract acts as acceptance of the authority of the state auditor, under the direction of the legislative audit committee, to conduct an audit or investigation in connection with those funds. Under the direction of the legislative audit committee, an entity that is the subject of an audit or investigation by the state auditor must provide the state auditor with access to any information the state auditor considers relevant to the investigation or audit. Provider shall ensure that this clause concerning the authority to audit funds received indirectly by subcontractors through Provider and the requirement to cooperate is included in any subcontract it awards.
11. Provider understands that the neither the Subrecipient nor the GLO tolerate any type of fraud. The Subrecipient's policy is to promote consistent, legal, and ethical organizational behavior by assigning responsibilities and providing guidelines to enforce controls. Any violations of law, agency policies, or standards of ethical conduct will be investigated, and appropriate actions will be taken. Providers are expected to report any possible fraudulent or dishonest acts, waste, or abuse affecting any transaction with the GLO to the GLO's Internal Audit Director at 512.463.5338 or to [tracey.hall@glo.texas.gov](mailto:tracey.hall@glo.texas.gov).

**NOTE: Information, documentation, and other material related to this Contract may be subject to public disclosure pursuant to the "Public Information Act," Chapter 552 of the Texas Government Code.**

**REMAINDER OF PAGE INTENTIONALLY LEFT BLANK**

### NONEXCLUSIVE LIST OF APPLICABLE LAWS, RULES, AND REGULATIONS

If applicable to the Project, Provider must be in compliance with the following laws, rules, and regulations; and any other state, federal, or local laws, rules, and regulations as may become applicable throughout the term of the Contract, and Provider acknowledges that this list may not include all such applicable laws, rules, and regulations.

**Provider and is deemed to have read and understands the requirements of each of the following, if applicable to the Project under this Contract:**

#### GENERALLY

The Acts and Regulations specified in this Contract;

Continuing Appropriations Act, 2018 and Supplemental Appropriations for Disaster Relief Requirements Act, 2017 (Public Law 115-56);

The Housing and Community Development Act of 1974 (12 U.S.C. § 5301 *et seq.*);

The United States Housing Act of 1937, as amended, 42 U.S.C. § 1437f(o)(13) (2016) and related provisions governing Public Housing Authority project-based assistance, and implementing regulations at 24 C.F.R. Part 983 (2016);

Cash Management Improvement Act regulations (31 C.F.R. Part 205);

Community Development Block Grants (24 C.F.R. Part 570);

Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (2 C.F.R. Part 200);

Disaster Recovery Implementation Manual; and

State of Texas Plan for Disaster Recovery: Hurricane Harvey – Round 1, dated April 6, 2018, as amended.

#### CIVIL RIGHTS

Title VI of the Civil Rights Act of 1964, (42 U.S.C. § 2000d *et seq.*); 24 C.F.R. Part 1, "Nondiscrimination in Federally Assisted Programs of the Department of Housing and Urban Development - Effectuation of Title VI of the Civil Rights Act of 1964";

Title VII of the Civil Rights Act of 1964, as amended by the Equal Employment Opportunity Act of 1972 (42 U.S.C. § 2000e, *et seq.*);

Title VIII of the Civil Rights Act of 1968, "The Fair Housing Act of 1968" (42 U.S.C. § 3601, *et seq.*), as amended;

Executive Order 11063, as amended by Executive Order 12259, and 24 C.F.R. Part 107, "Nondiscrimination and Equal Opportunity in Housing under Executive Order 11063"; The failure or refusal of Provider to comply with the requirements of Executive Order 11063 or 24 C.F.R. Part 107 shall be a proper basis for the imposition of sanctions specified in 24 C.F.R. 107.60;

The Age Discrimination Act of 1975 (42 U.S.C. § 6101, *et seq.*); and

Section 504 of the Rehabilitation Act of 1973 (29 U.S.C. § 794.) and "Nondiscrimination Based on Handicap in Federally-Assisted Programs and Activities of the Department of Housing and Urban Development", 24 C.F.R. Part 8. By signing this Contract, Provider understands and agrees that the activities funded shall be performed in accordance with

24 C.F.R. Part 8; and the Architectural Barriers Act of 1968 (42 U.S.C. § 4151, *et seq.*), including the use of a telecommunications device for deaf persons (TDDs) or equally effective communication system.

### **LABOR STANDARDS**

The Davis-Bacon Act, as amended (originally, 40 U.S.C. §§ 276a-276a-5 and re-codified at 40 U.S.C. §§ 3141-3148); 29 C.F.R. Part 5;

The Copeland "Anti-Kickback" Act (originally, 18 U.S.C. § 874 and re-codified at 40 U.S.C. § 3145); 29 C.F.R. Part 3;

Sections 103 and 107 of the Contract Work Hours and Safety Standards Act (originally, 40 U.S.C. §§ 327A and 330 and re-codified at 40 U.S.C. §§ 3701-3708);

Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction (Also Labor Standards Provisions Applicable to Non-construction Contracts Subject to the Contract Work Hours and Safety Standards Act) (29 C.F.R. Part 5); and

Federal Executive Order 11246, as amended.

### **EMPLOYMENT OPPORTUNITIES**

Section 3 of the Housing and Urban Development Act of 1968 (12 U.S.C. § 1701u); 24 C.F.R. §§ 135.3(a)(2) and (a)(3);

The Vietnam Era Veterans' Readjustment Assistance Act of 1974 (38 U.S.C. § 4212);

Title IX of the Education Amendments of 1972 (20 U.S.C. §§ 1681-1688); and

Federal Executive Order 11246, as amended.

### **GRANT AND AUDIT STANDARDS**

Single Audit Act Amendments of 1996, 31 U.S.C. § 7501;

Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards (2 C.F.R. Part 200);

Uniform Grant and Contract Management Act (Texas Government Code Chapter 783) and the Uniform Grant Management Standards, issued by Governor's Office of Budget and Planning; and

Title 1 Texas Administrative Code § 5.167(c).

### **LEAD-BASED PAINT**

Section 302 of the Lead-Based Paint Poisoning Prevention Act (42 U.S.C. § 4831(b)).

### **HISTORIC PROPERTIES**

The National Historic Preservation Act of 1966 as amended (16 U.S.C. § 470, *et seq.*), particularly sections 106 and 110 (16 U.S.C. §§ 470 and 470h-2), except as provided in §58.17 for Section 17 projects;

Executive Order 11593, Protection and Enhancement of the Cultural Environment, May 13, 1971 (36 FR 8921), 3 C.F.R., 1971-1975 Comp., p. 559, particularly section 2(c);

Federal historic preservation regulations as follows: 36 C.F.R. Part 800 with respect to

HUD programs; and

The Reservoir Salvage Act of 1960, as amended by the Archeological and Historic Preservation Act of 1974 (16 U.S.C. § 469, *et seq.*), particularly section 3 (16 U.S.C. § 469a-1).

#### **ENVIRONMENTAL LAW AND AUTHORITIES**

Environmental Review Procedures for Recipients assuming HUD Environmental Responsibilities (24 C.F.R. Part 58, as amended);

National Environmental Policy Act of 1969, as amended (42 U.S.C. §§ 4321-4347); and  
Council for Environmental Quality Regulations for Implementing NEPA (40 C.F.R. Parts 1500-1508).

#### **FLOODPLAIN MANAGEMENT AND WETLAND PROTECTION**

Executive Order 11988, Floodplain Management, May 24, 1977 (42 FR 26951), 3 C.F.R., 1977 Comp., p. 117, as interpreted in HUD regulations at 24 C.F.R. Part 55, particularly Section 2(a) of the Order (For an explanation of the relationship between the decision-making process in 24 C.F.R. Part 55 and this part, see § 55.10.); and

Executive Order 11990, Protection of Wetlands, May 24, 1977 (42 FR 26961), 3 C.F.R., 1977 Comp., p. 121 particularly Sections 2 and 5.

#### **COASTAL ZONE MANAGEMENT**

The Coastal Zone Management Act of 1972 (16 U.S.C. § 1451, *et seq.*), as amended, particularly sections 307(c) and (d) (16 U.S.C. § 1456(c) and (d)).

#### **SOLE SOURCE AQUIFERS**

The Safe Drinking Water Act of 1974 (42 U.S.C. §§ 201, 300(f), *et seq.*, and 21 U.S.C. § 349) as amended; particularly section 1424(e)(42 U.S.C. § 300h-3(e)); and

Sole Source Aquifers (Environmental Protection Agency-40 C.F.R. part 149.).

#### **ENDANGERED SPECIES**

The Endangered Species Act of 1973 (16 U.S.C. § 1531, *et seq.*) as amended, particularly section 7 (16 U.S.C. § 1536).

#### **WILD AND SCENIC RIVERS**

The Wild and Scenic Rivers Act of 1968 (16 U.S.C. § 1271, *et seq.*) as amended, particularly sections 7(b) and (c) (16 U.S.C. § 1278(b) and (c)).

#### **AIR QUALITY**

The Clean Air Act (42 U.S.C. § 7401, *et seq.*) as amended, particularly sections 176(c) and (d) (42 U.S.C. § 7506(c) and (d)).

Determining Conformity of Federal Actions to State or Federal Implementation Plans (Environmental Protection Agency-40 C.F.R. Parts 6, 51, and 93).

#### **FARMLAND PROTECTION**

Farmland Protection Policy Act of 1981 (7 U.S.C. § 4201, *et seq.*) particularly sections 1540(b) and 1541 (7 U.S.C. §§ 4201(b) and 4202); and



Farmland Protection Policy (Department of Agriculture-7 C.F.R. part 658).

**HUD ENVIRONMENTAL STANDARDS**

Applicable criteria and standards specified in HUD environmental regulations (24 C.F.R. Part 51)(other than the runway clear zone and clear zone notification requirement in 24 C.F.R. § 51.303(a)(3); and

HUD Notice 79-33, Policy Guidance to Address the Problems Posed by Toxic Chemicals and Radioactive Materials, September 10, 1979.

**ENVIRONMENTAL JUSTICE**

Executive Order 12898 of February 11, 1994—Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, (59 FR 7629), 3 C.F.R., 1994 Comp. p. 859.

**SUSPENSION AND DEBARMENT**

Use of debarred, suspended, or ineligible contractors or subrecipients (24 C.F.R. § 570.609);

General HUD Program Requirements; Waivers (24 C.F.R. Part 5); and

Nonprocurement Suspension and Debarment (2 C.F.R. Part 2424).

**OTHER REQUIREMENTS**

Environmental Review Procedures for Entities Assuming HUD Environmental Responsibilities (24 C.F.R. Part 58).

**ACQUISITION / RELOCATION**

The Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 U.S.C. § 4601, *et seq.*), 24 C.F.R. Part 42, and 24 C.F.R. § 570.606.

**FAITH-BASED ACTIVITIES**

Executive Order 13279 of December 12, 2002 - Equal Protection of the Laws for Faith-Based and Community Organizations, (67 FR 77141).

**REMAINDER OF PAGE INTENTIONALLY LEFT BLANK**

**Texas General Land Office  
Community Development Block Grant Disaster Recovery - Mitigation (CDBG – MIT)**

**Engineering/Architectural/Surveying Services  
Description of Programs**

Below is a description of proposed Community Development Block Grant-Mitigation (CDBG-MIT) construction/acquisition programs through the Texas General Land Office (GLO). The County anticipates applying for the following programs (please check the appropriate programs below):

Applicant: Fort Bend County

**Programs:**

***(Local Government will check boxes for Programs included in this RFP)***

- Hurricane Harvey Mitigation (for declared counties)
- 2015 Floods Mitigation (for declared counties)
- 2016 Floods Mitigation (for declared counties)
- Hazard Mitigation: Supplemental (for declared counties)
- Regional Mitigation (for declared counties)**
- Coastal Resiliency (Coastal Counties Only)

**CDBG-MIT Program Descriptions:**

**Hurricane Harvey State Mitigation:** Funds mitigation projects for Hurricane Harvey HUD MID and State MID areas. The State Competition is open to cities, counties, council of governments, state entities, special and service districts. Examples of projects include flood control and drainage improvements, infrastructure improvements, green infrastructure, public facilities, and buyouts.

**2015 Floods State Mitigation:** Provide funds to cities, counties, Indian Tribes, and councils of governments to address risks in the 2015 Floods HUD MID and State MID areas. Examples of projects include flood control and drainage improvements, infrastructure improvements, green infrastructure, public facilities, and buyouts.

**2016 Floods State Mitigation:** Provide funds to cities, counties, Indian Tribes, and councils of governments to address risks in the 2016 Floods HUD MID and State MID areas. Examples of projects include flood control and drainage improvements, infrastructure improvements, green infrastructure, public facilities, and buyouts.

**Hazard Mitigation Grant Program (HMGP): Supplemental:** The Texas Division of Emergency Management has called for, selected, and prioritized a variety of local mitigation projects through FEMA's HMGP. This supplemental helps fund HMGP CDBG-MIT eligible projects that were selected but unable to receive funding in Hurricane Harvey impacted areas.

**Regional Mitigation (COG MODs):** Each Council of Government (COG) impacted by Hurricane Harvey will be allocated funds. Each COG will develop a method of distribution (MOD) to allocate funds to local units of governments and Indian Tribes. The GLO encourages the prioritization of regional investments with regional impacts in risk reduction to develop disaster-resistant infrastructure including upgrading of water, Sewer, solid waste, communications, energy, transportation, health and medical infrastructure, and natural mitigation infrastructure.

**Coastal Resiliency:** Provides Funds for a combination of green/ grey infrastructure, or non-structural CDBG-MIT eligible projects identified in the Texas Coastal Master Plan in the Hurricane Harvey HUD MID and State MID areas that enact long-term coastal resiliency. Counties, cities, navigation districts, port authorities, non-government organizations and state agencies are eligible to apply. Examples of projects include wetland protection, beach nourishment, and dune restoration, regional infrastructure improvements, and oyster reef enhancements.

See the GLO's CDBG-MIT Action Plan for more information on the requirements and scopes of these activities:  
<https://recovery.texas.gov/files/programs/mitigation/cdbg-mit-submitted-plan.pdf>

*This form will be inserted into the RFQ Packet for engineering purposes.*