

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 2



LIBERTY COUNTY, TEXAS AND INCORPORATED AREAS

COMMUNITY NAME	NUMBER
CITY OF AMES*	480044
CITY OF CLEVELAND	480439
CITY OF DAISSETTA	481101
CITY OF DAYTON	480440
CITY OF DAYTON LAKES	481593
CITY OF DEVERS	481514
CITY OF HARDIN	481270
TOWN OF KENEFICK	481523
CITY OF LIBERTY	480441
LIBERTY COUNTY UNINCORPORATED AREAS	480438
CITY OF MONT BELVIEU	480122
CITY OF NORTH CLEVELAND	481083
CITY OF PLUM GROVE	481269

*No Special Flood Hazard Areas Identified

PRELIMINARY
SEPTEMBER 30, 2015
REVISED

FLOOD INSURANCE STUDY NUMBER
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FEMA

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FLOOD INSURANCE STUDY REPORT LIBERTY COUNTY, TX

SECTION 1.0 – INTRODUCTION

1.1 The National Flood Insurance Program

The National Flood Insurance Program (NFIP) is a voluntary Federal program that enables property owners in participating communities to purchase insurance protection against losses from flooding. This insurance is designed to provide an insurance alternative to disaster assistance to meet the escalating costs of repairing damage to buildings and their contents caused by floods.

For decades, the national response to flood disasters was generally limited to constructing flood-control works such as dams, levees, sea-walls, and the like, and providing disaster relief to flood victims. This approach did not reduce losses nor did it discourage unwise development. In some instances, it may have actually encouraged additional development. To compound the problem, the public generally could not buy flood coverage from insurance companies, and building techniques to reduce flood damage were often overlooked.

In the face of mounting flood losses and escalating costs of disaster relief to the general taxpayers, the U.S. Congress created the NFIP. The intent was to reduce future flood damage through community floodplain management ordinances, and provide protection for property owners against potential losses through an insurance mechanism that requires a premium to be paid for the protection.

The U.S. Congress established the NFIP on August 1, 1968, with the passage of the National Flood Insurance Act of 1968. The NFIP was broadened and modified with the passage of the Flood Disaster Protection Act of 1973 and other legislative measures. It was further modified by the National Flood Insurance Reform Act of 1994 and the Flood Insurance Reform Act of 2004. The NFIP is administered by the Federal Emergency Management Agency (FEMA), which is a component of the Department of Homeland Security (DHS).

Participation in the NFIP is based on an agreement between local communities and the Federal Government. If a community adopts and enforces floodplain management regulations to reduce future flood risks to new construction and substantially improved structures in Special Flood Hazard Areas (SFHAs), the Federal Government will make flood insurance available within the community as a financial protection against flood losses. The community's floodplain management regulations must meet or exceed criteria established in accordance with Title 44 Code of Federal Regulations (CFR) Part 60.3, *Criteria for Land Management and Use*.

SFHAs are delineated on the community's Flood Insurance Rate Maps (FIRMs). Under the NFIP, buildings that were built before the flood hazard was identified on the community's FIRMs are generally referred to as "Pre-FIRM" buildings. When the NFIP was created, the U.S. Congress recognized that insurance for Pre-FIRM buildings would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these floodprone buildings were built by individuals who did not have sufficient knowledge of the flood hazard to make informed decisions. The NFIP requires that full actuarial rates reflecting the complete flood risk be charged on all buildings constructed or substantially improved on or after

the effective date of the initial FIRM for the community or after December 31, 1974, whichever is later. These buildings are generally referred to as “Post-FIRM” buildings.

1.2 Purpose of this Flood Insurance Study Report

This Flood Insurance Study (FIS) report revises and updates information on the existence and severity of flood hazards for the study area. The studies described in this report developed flood hazard data that will be used to establish actuarial flood insurance rates and to assist communities in efforts to implement sound floodplain management.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive than the minimum Federal requirements. Contact your State NFIP Coordinator to ensure that any higher State standards are included in the community’s regulations.

1.3 Jurisdictions Included in the Flood Insurance Study Report

This FIS Report covers the entire geographic area of Liberty County, Texas.

The jurisdictions that are included in this project area, along with the Community Identification Number (CID) for each community and the 8-digit Hydrologic Unit Codes (HUC-8) sub-basins affecting each, are shown in Table 1. The Flood Insurance Rate Map (FIRM) panel numbers that affect each community are listed. If the flood hazard data for the community is not included in this FIS Report, the location of that data is identified.

The location of flood hazard data for participating communities in multiple jurisdictions is also indicated in the table.

Jurisdictions that have no identified SFHAs as of the effective date of this study are indicated in the table. Changed conditions in these communities (such as urbanization or annexation) or the availability of new scientific or technical data about flood hazards could make it necessary to determine SFHAs in these jurisdictions in the future.

Table 1: Listing of NFIP Jurisdictions

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
City of Ames ¹	480044	12030203	48291C0445D, 48291C0475D	
City of Cleveland	480439	12040103	48291C0025C, 48291C0130C, 48291C0150C	
City of Daisetta	481101	12020007	48291C0475D	
City of Dayton	480440	12030203, 12040203	48291C0300D, 48291C0400C, 48291C0410D, 48291C0420D, 48291C0425D, 48291C0450D, 48291C0575D, 48291C0600D	
City of Dayton Lakes	481593	12030203	48291C0325D	
City of Devers	481514	12020007, 12030203	48291C0500D	
City of Hardin	481270	12020007, 12030203	48291C0325D, 48291C0350D, 48291C0475D	
Town of Kenefick	481523	12030203	48291C0300D, 48291C0325D, 48291C0450D	
City of Liberty	480441	12030203	48291C0435D, 48291C0445D, 48291C0450D, 48291C0475D, 48291C0600D	
Liberty County, Unincorporated Areas	480438	12020007, 12030202, 12030203, 12040103, 12040201, 12040202, 12040203	48291C0025C, 48291C0050D, 48291C0075D, 48291C0100C, 48291C0125C, 48291C0130C, 48291C0150C, 48291C0175D,	

Community	CID	HUC-8 Sub-Basin(s)	Located on FIRM Panel(s)	If Not Included, Location of Flood Hazard Data
			48291C0200D, 48291C0225C, 48291C0250C, 48291C0275C, 48291C0300D, 48291C0325D, 48291C0350D, 48291C0375C, 48291C0400C, 48291C0410D, 48291C0420D, 48291C0425D, 48291C0435D, 48291C0445D, 48291C0450D, 48291C0475D, 48291C0500D, 48291C0525C, 48291C0550C, 48291C0575D, 48291C0600D, 48291C0625D, 48291C0650D, 48291C0675C	
City of Mont Belvieu	480122	12030203	48291C0600D	
City of North Cleveland	484083	12040103	48291C0130C	
City of Plum Grove	481269	12040103	48291C0275C	

¹No Special Flood Hazard Areas Identified

1.4 Considerations for using this Flood Insurance Study Report

The NFIP encourages State and local governments to implement sound floodplain management programs. To assist in this endeavor, each FIS Report provides floodplain data, which may include a combination of the following: 10-, 4-, 2-, 1-, and 0.2-percent annual chance flood elevations (the 1% annual chance flood elevation is also referred to as the Base Flood Elevation (BFE)); delineations of the 1% annual chance and 0.2% annual chance floodplains; and 1% annual chance floodway. This information is presented on the FIRM and/or in many components of the FIS Report, including Flood Profiles, Floodway Data tables, Summary of Non-Coastal Stillwater Elevations tables, and Coastal Transect Parameters tables (not all components may be provided for a specific FIS).

This section presents important considerations for using the information contained in this FIS Report and the FIRM, including changes in format and content. Figures 1, 2, and 3 present information that applies to using the FIRM with the FIS Report.

- Part or all of this FIS Report may be revised and republished at any time. In addition, part of this FIS Report may be revised by a Letter of Map Revision (LOMR), which does not involve republication or redistribution of the FIS Report. Refer to Section 6.5 of this FIS Report for information about the process to revise the FIS Report and/or FIRM.

It is, therefore, the responsibility of the user to consult with community officials by contacting the community repository to obtain the most current FIS Report components. Communities participating in the NFIP have established repositories of flood hazard data for floodplain management and flood insurance purposes. Community map repository addresses are provided in Table 31, “Map Repositories,” within this FIS Report.

- New FIS Reports are frequently developed for multiple communities, such as entire counties. A countywide FIS Report incorporates previous FIS Reports for individual communities and the unincorporated area of the county (if not jurisdictional) into a single document and supersedes those documents for the purposes of the NFIP.

The initial Countywide FIS Report for Liberty County became effective on May 2, 2008. Refer to Table 28 for information about subsequent revisions to the FIRMs.

- FEMA does not impose floodplain management requirements or special insurance ratings based on Limit of Moderate Wave Action (LiMWA) delineations at this time. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. If the LiMWA is shown on the FIRM, it is being provided by FEMA as information only. For communities that do adopt Zone VE building standards in the area defined by the LiMWA, additional Community Rating System (CRS) credits are available. Refer to Section 2.5.4 for additional information about the LiMWA.

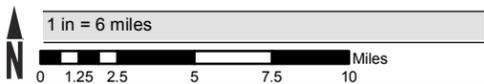
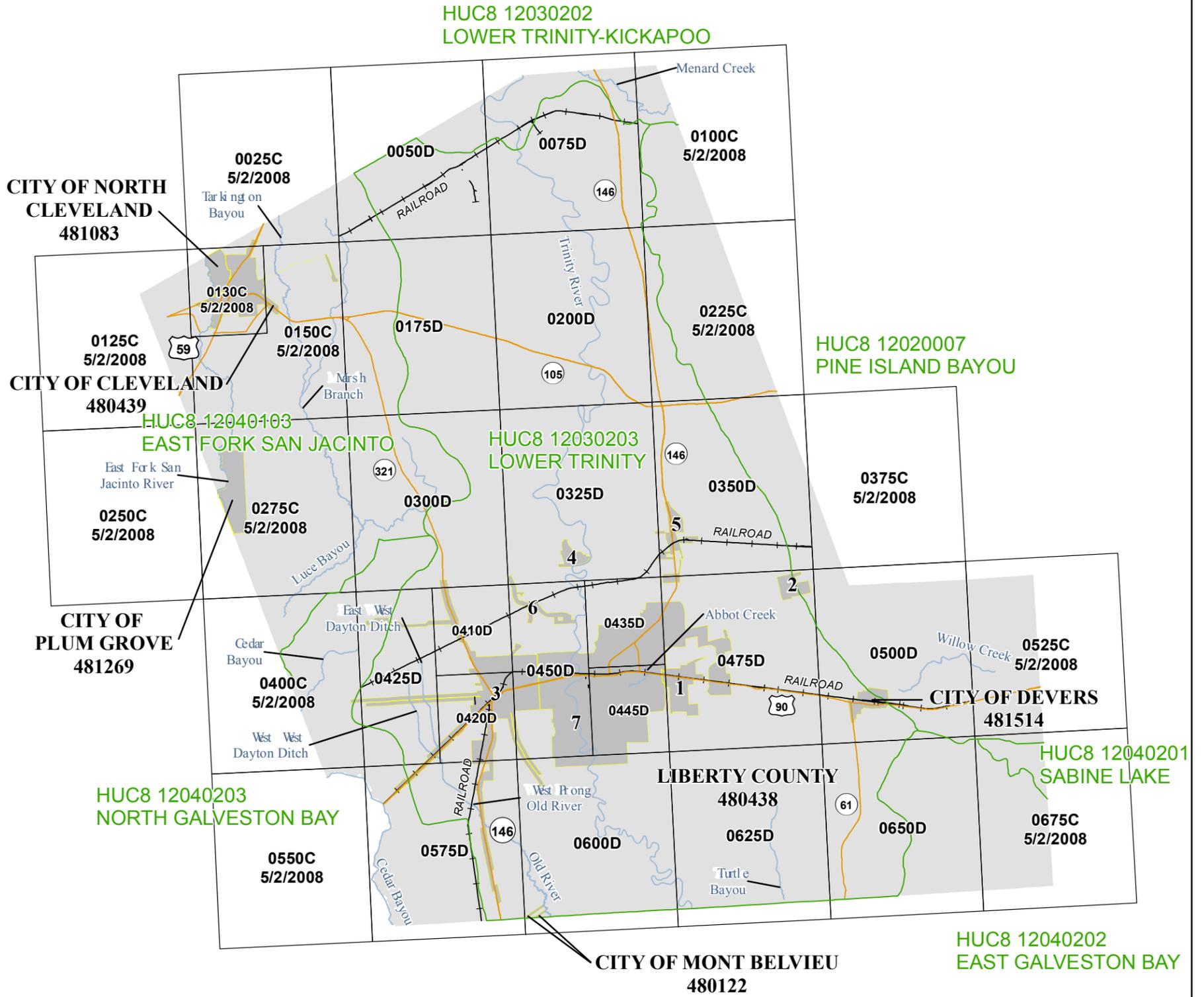
The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. Visit the FEMA Web site at <http://www.fema.gov> or contact your appropriate FEMA Regional Office for more information about this program.

- Previous FIS Reports and FIRMs may have included levees that were accredited as reducing the risk associated with the 1% annual chance flood based on the information available and the mapping standards of the NFIP at that time. For FEMA to continue to accredit the identified levees, the levees must meet the criteria of the Code of Federal Regulations, Title 44, Section 65.10 (44 CFR 65.10), titled “Mapping of Areas Protected by Levee Systems.”

Since the status of levees is subject to change at any time, the user should contact the appropriate agency for the latest information regarding levees presented in Table 9 of this FIS Report. For levees owned or operated by the U.S. Army Corps of Engineers (USACE), information may be obtained from the USACE National Levee Database. For all other levees, the user is encouraged to contact the appropriate local community.

- FEMA has developed a *Guide to Flood Maps* (FEMA 258) and online tutorials to assist users in accessing the information contained on the FIRM. These include how to read panels and step-by-step instructions to obtain specific information. To obtain this guide and other assistance in using the FIRM, visit the FEMA Web site at <http://www.fema.gov>.

KEY NUMBER	COMMUNITY	CID
1	City of Ames	480044
2	City of Daisetta	481101
3	City of Dayton	480440
4	City of Dayton Lakes	481593
5	City of Hardin	481270
6	Town of Kenefick	481523
7	City of Liberty	480441



Map Projection:
Texas State Plane Central Zone (FIPS Zone 4203);
North American Datum 1983

THE INFORMATION DEPICTED ON THIS MAP AND SUPPORTING DOCUMENTATION ARE ALSO AVAILABLE IN DIGITAL FORMAT AT

[HTTP://MSC.FEMA.GOV](http://MSC.FEMA.GOV)

SEE FLOOD INSURANCE STUDY FOR ADDITIONAL INFORMATION

COUNTY LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

FLOOD INSURANCE RATE MAP INDEX

LIBERTY COUNTY, TX and Incorporated Areas

PANELS PRINTED:
0025, 0050, 0075, 0100, 0125, 0130, 0150, 0175, 0200, 0225, 0250,
0275, 0300, 0325, 0350, 0375, 0400, 0410, 0420, 0425, 0435, 0445,
0450, 0475, 0500, 0525, 0550, 0575, 0600, 0625, 0650, 0675



FEMA

MAP NUMBER
48291CIND0B
MAP REVISED

Figure 2: FIRM Notes to Users

NOTES TO USERS

For information and questions about this map, available products associated with this FIRM including historic versions of this FIRM, how to order products, or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange at 1-877-FEMA-MAP (1-877-336-2627) or visit the FEMA Map Service Center website at <http://msc.fema.gov>. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the website. Users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center website or by calling the FEMA Map Information eXchange.

Communities annexing land on adjacent FIRM panels must obtain a current copy of the adjacent panel as well as the current FIRM Index. These may be ordered directly from the Map Service Center at the number listed above.

For community and countywide map dates, refer to Table 28 in this FIS Report.

To determine if flood insurance is available in the community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

PRELIMINARY FIS REPORT: FEMA maintains information about map features, such as street locations and names, in or near designated flood hazard areas. Requests to revise information in or near designated flood hazard areas may be provided to FEMA during the community review period, at the final Consultation Coordination Officer's meeting or during the statutory 90-day appeal period. Approved requests for changes will be shown on the final printed FIRM.

The map is for use in administering the NFIP. It may not identify all areas subject to flooding, particularly from local drainage sources of small size. Consult the community map repository to find updated or additional flood hazard information.

BASE FLOOD ELEVATIONS: For more detailed information in areas where Base Flood Elevations (BFEs) and/or floodways have been determined, consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables within this FIS Report. Use the flood elevation data within the FIS Report in conjunction with the FIRM for construction and/or floodplain management.

FLOODWAY INFORMATION: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the FIS Report for this jurisdiction.

FLOOD CONTROL STRUCTURE INFORMATION: Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 4.3 "Non-Levee Flood Protection Measures" of this FIS Report for information on flood control structures for this jurisdiction.

Figure 2. FIRM Notes to Users

PROJECTION INFORMATION: The projection used in the preparation of the map was Texas State Plane Central Zone (FIPS Zone 4203). The horizontal datum was NAD 83 GRS 1980 Spheroid. Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

ELEVATION DATUM: Flood elevations on the FIRM are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988 (NAVD 88), visit the National Geodetic Survey website at <http://www.ngs.noaa.gov/> or contact the National Geodetic Survey at the following address:

*NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242*

Local vertical monuments may have been used to create the map. To obtain current monument information, please contact the appropriate local community listed in Table 31 of this FIS Report.

BASE MAP INFORMATION: Base map information shown on the FIRM was provided in digital format by U.S. Census Bureau TIGER files, U.S. Department of the Interior, U.S. Department of Agriculture, State of Texas, Taylor Engineering, Inc., U.S. Geological Survey, 2012 National Agriculture Imagery Program Imagery, and FEMA. For information about base maps, refer to Section 6.2 "Base Map" in this FIS Report.

Corporate limits shown on the map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after the map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Figure 2. FIRM Notes to Users

NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Liberty County, Texas, corresponding revisions to the FIRM Index will be incorporated within the FIS Report to reflect the effective dates of those panels. Please refer to Table 28 of this FIS Report to determine the most recent FIRM revision date for each community. The most recent FIRM panel effective date will correspond to the most recent index date.

SPECIAL NOTES FOR SPECIFIC FIRM PANELS

This Notes to Users section was created specifically for Liberty County, Texas, effective May 2, 2008.

FLOOD RISK REPORT: A Flood Risk Report (FRR) may be available for many of the flooding sources and communities referenced in this FIS Report. The FRR is provided to increase public awareness of flood risk by helping communities identify the areas within their jurisdictions that have the greatest risks. Although non-regulatory, the information provided within the FRR can assist communities in assessing and evaluating mitigation opportunities to reduce these risks. It can also be used by communities developing or updating flood risk mitigation plans. These plans allow communities to identify and evaluate opportunities to reduce potential loss of life and property. However, the FRR is not intended to be the final authoritative source of all flood risk data for a project area; rather, it should be used with other data sources to paint a comprehensive picture of flood risk.

Figure 3: Map Legend for FIRM

SPECIAL FLOOD HAZARD AREAS: *The 1% annual chance flood, also known as the base flood or 100-year flood, has a 1% chance of happening or being exceeded each year. Special Flood Hazard Areas are subject to flooding by the 1% annual chance flood. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood. The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights. See note for specific types. If the floodway is too narrow to be shown, a note is shown.*



Special Flood Hazard Areas subject to inundation by the 1% annual chance flood (Zones A, AE, AH, AO, AR, A99, V and VE)

- Zone A The flood insurance rate zone that corresponds to the 1% annual chance floodplains. No base (1% annual chance) flood elevations (BFEs) or depths are shown within this zone.
- Zone AE The flood insurance rate zone that corresponds to the 1% annual chance floodplains. Base flood elevations derived from the hydraulic analyses are shown within this zone, either at cross section locations or as static whole-foot elevations that apply throughout the zone.
- Zone AH The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the hydraulic analyses are shown at selected intervals within this zone.
- Zone AO The flood insurance rate zone that corresponds to the areas of 1% annual chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the hydraulic analyses are shown within this zone.
- Zone AR The flood insurance rate zone that corresponds to areas that were formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- Zone A99 The flood insurance rate zone that corresponds to areas of the 1% annual chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or flood depths are shown within this zone.
- Zone V The flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations are not shown within this zone.
- Zone VE Zone VE is the flood insurance rate zone that corresponds to the 1% annual chance coastal floodplains that have additional hazards associated with storm waves. Base flood elevations derived from the coastal analyses are shown within this zone as static whole-foot elevations that apply throughout the zone.



Regulatory Floodway determined in Zone AE.

Figure 3: Map Legend for FIRM

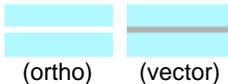
OTHER AREAS OF FLOOD HAZARD	
	Shaded Zone X: Areas of 0.2% annual chance flood hazards and areas of 1% annual chance flood hazards with average depths of less than 1 foot or with drainage areas less than 1 square mile.
	Future Conditions 1% Annual Chance Flood Hazard – Zone X: The flood insurance rate zone that corresponds to the 1% annual chance floodplains that are determined based on future-conditions hydrology. No base flood elevations or flood depths are shown within this zone.
	Area with Reduced Flood Risk due to Levee: Areas where an accredited levee, dike, or other flood control structure has reduced the flood risk from the 1% annual chance flood. See Notes to Users for important information.
OTHER AREAS	
	Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible
	Unshaded Zone X: Areas determined to be outside the 0.2% annual chance flood hazard
FLOOD HAZARD AND OTHER BOUNDARY LINES	
	Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)
	Limit of Study
	Jurisdiction Boundary
	Limit of Moderate Wave Action (LiMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet
GENERAL STRUCTURES	
 <i>Aqueduct Channel Culvert Storm Sewer</i>	Channel, Culvert, Aqueduct, or Storm Sewer
 <i>Dam Jetty Weir</i>	Dam, Jetty, Weir
	Levee, Dike, or Floodwall accredited or provisionally accredited to reduce the flood risk from the 1% annual chance flood.
	Levee, Dike or Floodwall not accredited to reduce the flood risk from the 1% annual chance flood.
 <i>Bridge</i>	Bridge

Figure 3: Map Legend for FIRM

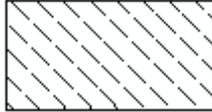
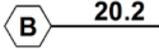
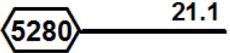
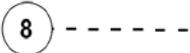
COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA): <i>CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas. See Notes to Users for important information.</i>	
 CBRS AREA 09/30/2009	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
 OTHERWISE PROTECTED AREA 09/30/2009	Otherwise Protected Area
REFERENCE MARKERS	
 22.0	River mile Markers
CROSS SECTION & TRANSECT INFORMATION	
 20.2	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
 21.1	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
 17.5	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
 8	Coastal Transect
 	<p>Profile Baseline: Indicates the modeled flow path of a stream and is shown on FIRM panels for all valid studies with profiles or otherwise established base flood elevation.</p> <p>Coastal Transect Baseline: Used in the coastal flood hazard model to represent the 0.0-foot elevation contour and the starting point for the transect and the measuring point for the coastal mapping.</p>
 ZONE AE (EL 16) ZONE AO (DEPTH 2) ZONE AO (DEPTH 2) (VEL 15 FPS)	<p>Base Flood Elevation Line (shown for flooding sources for which no cross sections or profile are available)</p> <p>Static Base Flood Elevation value (shown under zone label)</p> <p>Zone designation with Depth</p> <p>Zone designation with Depth and Velocity</p>

Figure 3: Map Legend for FIRM

BASE MAP FEATURES	
<i>Missouri Creek</i> 	River, Stream or Other Hydrographic Feature
	Interstate Highway
	U.S. Highway
	State Highway
	County Highway
<u>MAPLE LANE</u>	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
	Railroad
	Horizontal Reference Grid Line
	Horizontal Reference Grid Ticks
	Secondary Grid Crosshairs
Land Grant	Name of Land Grant
7	Section Number
R. 43 W. T. 22 N.	Range, Township Number
4276^{000m}E	Horizontal Reference Grid Coordinates (UTM)
365000 FT	Horizontal Reference Grid Coordinates (State Plane)
80° 16' 52.5"	Corner Coordinates (Latitude, Longitude)

SECTION 2.0 – FLOODPLAIN MANAGEMENT APPLICATIONS

2.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1% annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2% annual chance (500-year) flood is employed to indicate additional areas of flood hazard in the community.

Each flooding source included in the project scope has been studied and mapped using professional engineering and mapping methodologies that were agreed upon by FEMA and Liberty County as appropriate to the risk level. Flood risk is evaluated based on factors such as known flood hazards and projected impact on the built environment. Engineering analyses were performed for each studied flooding source to calculate its 1% annual chance flood elevations; elevations corresponding to other floods (e.g. 10-, 4-, 2-, 0.2-percent annual chance, etc.) may have also been computed for certain flooding sources. Engineering models and methods are described in detail in Section 5.0 of this FIS Report. The modeled elevations at cross sections were used to delineate the floodplain boundaries on the FIRM; between cross sections, the boundaries were interpolated using elevation data from various sources. More information on specific mapping methods is provided in Section 6.0 of this FIS Report.

Depending on the accuracy of available topographic data (Table 23), study methodologies employed (Section 5.0), and flood risk, certain flooding sources may be mapped to show both the 1% and 0.2% annual chance floodplain boundaries, regulatory water surface elevations (BFEs), and/or a regulatory floodway. Similarly, other flooding sources may be mapped to show only the 1% annual chance floodplain boundary on the FIRM, without published water surface elevations. In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary is shown on the FIRM. Figure 3, “Map Legend for FIRM”, describes the flood zones that are used on the FIRMs to account for the varying levels of flood risk that exist along flooding sources within the project area. Table 2 and Table 3 indicate the flood zone designations for each flooding source and each community within Liberty County, Texas, respectively.

Table 2, “Flooding Sources Included in this FIS Report,” lists each flooding source, including its study limits, affected communities, mapped zone on the FIRM, and the completion date of its engineering analysis from which the flood elevations on the FIRM and in the FIS Report were derived. Descriptions and dates for the latest hydrologic and hydraulic analyses of the flooding sources are shown in Table 13. Floodplain boundaries for these flooding sources are shown on the FIRM (published separately) using the symbology described in Figure 3. On the map, the 1% annual chance floodplain corresponds to the SFHAs. The 0.2% annual chance floodplain shows areas that, although out of the regulatory floodplain, are still subject to flood hazards.

Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data. The procedures to remove these areas from the SFHA are described in Section 6.5 of this FIS Report.

2.2 Floodways

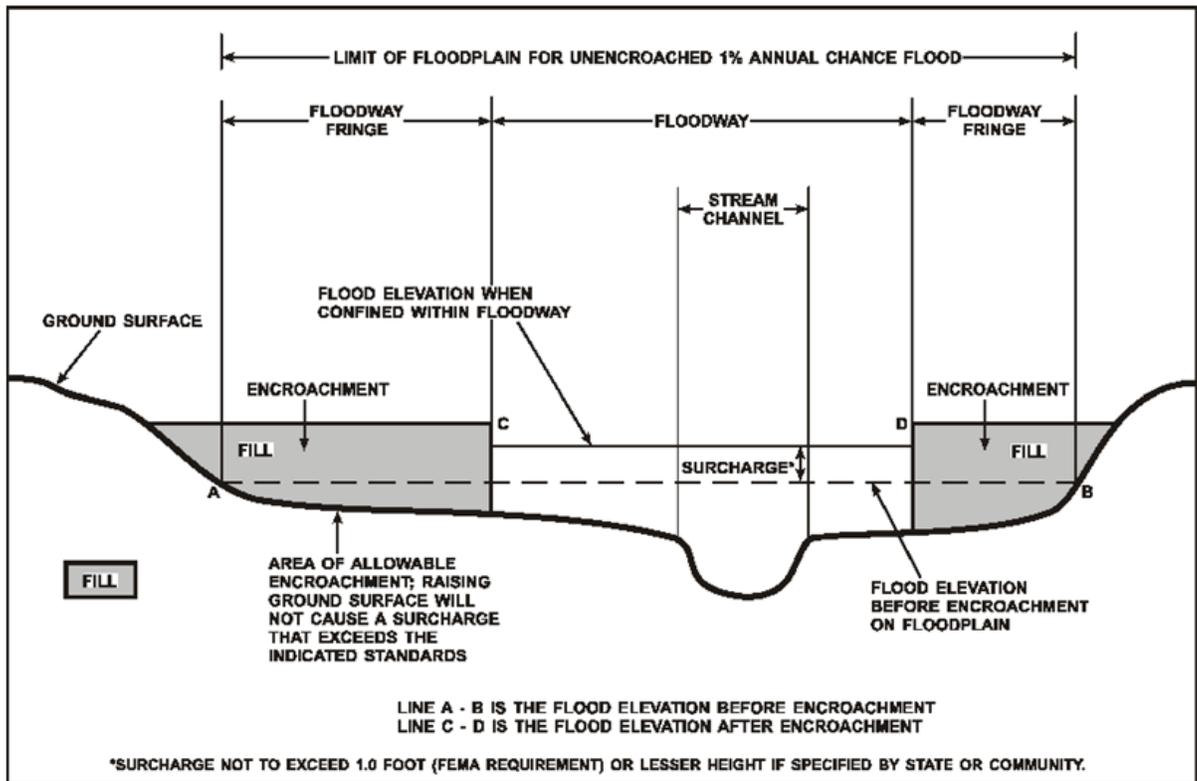
Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the

encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard.

For purposes of the NFIP, a floodway is used as a tool to assist local communities in balancing floodplain development against increasing flood hazard. With this approach, the area of the 1% annual chance floodplain on a river is divided into a floodway and a floodway fringe based on hydraulic modeling. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment in order to carry the 1% annual chance flood. The floodway fringe is the area between the floodway and the 1% annual chance floodplain boundaries where encroachment is permitted. The floodway must be wide enough so that the floodway fringe could be completely obstructed without increasing the water surface elevation of the 1% annual chance flood more than 1 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

To participate in the NFIP, Federal regulations require communities to limit increases caused by encroachment to 1.0 foot, provided that hazardous velocities are not produced. Regulations for Texas try to limit increases caused by encroachment to 0.5 foot where possible. The floodways in this project are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway projects.

Figure 4: Floodway Schematic



Floodway widths presented in this FIS Report and on the FIRM were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. For certain stream segments,

floodways were adjusted so that the amount of floodwaters conveyed on each side of the floodplain would be reduced equally. The results of the floodway computations have been tabulated for selected cross sections and are shown in Table 24, "Floodway Data."

Table 2: Flooding Sources Included in this FIS Report

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Abbot Creek	City of Liberty	Approximately 430 feet downstream of FM 563	Approximately 540 feet upstream of Beaumont Road	12030203	1.8		Y	AE	2014
Barrett Bayou	Liberty County	Approximately 65 feet upstream of the Railroad	Just downstream of FM 1011	12030203	1.9		N	A	2014
Barrett Bayou Tributary 1	City of Hardin, Liberty County	Confluence with Barrett Bayou	Approximately 1,915 feet upstream of County Road 2006	12030203	1.2		N	A	2014
Barrett Bayou Tributary 2	City of Hardin, Liberty County	Confluence with Barrett Bayou	Approximately 45 feet downstream of West Hardin Road	12030203	1.7		N	A	2014
Batiste Creek	Liberty County	Confluence with Willow Creek	Approximately 1.8 miles upstream of the confluence with Willow Creek	12020007	3.0		Y	AE	1986
Big Caney Creek	Liberty County	Approximately 30 feet upstream of FM 1409	Approximately 22,830 feet upstream of FM 1409	12030203	4.4		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Big Ditch	Liberty County	Confluence with Old River Drain	Approximately 1,755 feet upstream of FM 1409	12030203	2.7		N	A	2014
Bowie Creek	Liberty County	Approximately 1,570 feet downstream of FM 1008	Approximately 100 feet upstream of Douglas Street	12030203	3.2		N	A	2014
Bowie Creek Tributary 1	Liberty County	Confluence with Bowie Creek	Approximately 320 feet upstream of Parker Loop	12030203	0.6		N	A	2014
Brooks Creek	Liberty County	Confluence with Sprinks Creek	Approximately 5,550 feet upstream of confluence with Spinks Creek	12030203	1.1		N	A	2014
Brooks Creek Tributary 1	Liberty County	Confluence with Brooks Creek	Approximately 2,356 feet upstream of confluence with Brooks Creek	12030203	0.4		N	A	2014
Brooks Creek Tributary 2	Liberty County	Confluence with Brooks Creek	Approximately 3,420 feet upstream of confluence with Brooks Creek	12030203	0.6		N	A	2014
Bull Tongue Creek	Liberty County	Confluence with Willow Creek	Approximately 0.9 miles upstream of its confluence with Willow Creek	12020007	1.0		Y	AE	1986

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
C100	Liberty County	Approximately 725 feet downstream of FM 2276	Approximately 1,276 feet upstream of FM 163	12030203	2.1		N	A	2014
C102	Liberty County	Confluence with C103	Approximately 2,735 feet upstream of FM 163	12030203	2.3		N	A	2014
C103	Liberty County	Confluence with C102	Approximately 2,216 feet upstream of FM 163	12030203	0.9		N	A	2014
C104	Liberty County	Confluence with C100	Approximately 3,395 feet upstream of the confluence with C100	12030203	0.6		N	A	2014
C105	Liberty County	Confluence with C100	Approximately 1,680 feet upstream of Davis Hill Road	12030203	2.2		N	A	2014
Cedar Bayou	Liberty County	From its upstream county boundary	Approximately 0.8 miles upstream of an access road that is approximately 4.4 miles upstream of the county boundary	12040203	5.2		Y	AE	1986

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Cedar Bayou	Liberty County	From its upstream county boundary with Harris County	The downstream County boundary with Chambers	12040203	10.6		Y	AE	2004
Cherry Creek	Liberty County	Confluence with Gaylor Creek	Approximately 65 feet downstream of Davis Hill Road	12030203	7.1		N	A	2014
Cherry Creek 2	Liberty County	Approximately 1,175 feet downstream of Railroad	Approximately 825 feet upstream of County Road 2179	12030203	0.9		N	A	2014
Cherry Creek 3	Liberty County	Approximately 2,760 feet downstream of County Road 2132	Approximately 5,805 feet upstream of Railroad	12030203	5.7		N	A	2014
Cow Branch	Liberty County	Confluence with East Fork San Jacinto River	Approximately 2.3 miles upstream of the confluence with East Fork San Jacinto River	12040103	2.2		Y	AE	1985
Cow Island Bayou	Liberty County	Confluence with Turtle Bayou	Approximately 19,515 feet upstream of the confluence with Cow Island Bayou Tributary 4	12030203	9.7		N	A	2014
Cow Island Bayou Tributary 1	Liberty County	Confluence with Cow Island Bayou	Approximately 4,030 feet upstream of the confluence with Cow Island Bayou	12030203	0.8		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Cow Island Bayou Tributary 1A	Liberty County	Confluence with Cow Island Bayou Tributary 1	Approximately 16,210 feet upstream of the confluence with Cow Island Bayou Tributary 1	12030203	3.1		N	A	2014
Cow Island Bayou Tributary 2	Liberty County	Confluence with Cow Island Bayou	Approximately 6,645 feet upstream of the confluence with Cow Island Bayou	12030203	1.3		N	A	2014
Cow Island Bayou Tributary 3	Liberty County	Confluence with Cow Island Bayou	Approximately 6,350 feet upstream of the confluence with Cow Island Bayou	12030203	1.2		N	A	2014
Cow Island Bayou Tributary 4	Liberty County	Confluence with Cow Island Bayou	Approximately 3,090 feet upstream of confluence with Cow Island Bayou	12030203	0.6		N	A	2014
Cow Island Bayou Tributary 5	Liberty County	Confluence with Cow Island Bayou	Approximately 2,445 feet upstream of the confluence with Cow Island Bayou	12030203	0.5		N	A	2014
Crooked Bayou	Liberty County	Confluence with Whites Bayou	Approximately 9,530 feet upstream of Crooked Bayou Tributary 1	12030203	3.9		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Crooked Bayou Tributary 1	Liberty County	Confluence with Crooked Bayou	Approximately 14,740 feet upstream of Crooked Bayou	12030203	2.8		N	A	2014
Crooked Marsh	Liberty County	Confluence with Crooked Bayou	Approximately 16,915 feet upstream of the confluence with Crooked Bayou	12030203	2.1		N	A	2014
Dry Cherry Creek	Liberty County	Confluence with Cherry Creek	Approximately 920 feet upstream of County Line Road	12030203	0.3		N	A	2014
East Fork San Jacinto River	City of Cleveland, City of North Cleveland, City of Plum Grove, Liberty County	County boundary with San Jacinto County	County boundary with Montgomery	12040103	17.3		Y	AE	1985
East Prong Old River	City of Dayton, Liberty County	Confluence with West Prong Old River	Approximately 515 feet upstream of County Road 496	12030203	6.3		N	A	2014
East Prong Old River Tributary 1	Liberty County	Confluence with East Prong Old River	Approximately 210 feet downstream of U.S. Highway 90	12030203	2.1		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
East Prong Old River Tributary 2	Liberty County	Confluence with East Prong Old River	Approximately 2,630 feet upstream of the confluence with East Prong Old River	12030203	0.5		N	A	2014
East West Dayton Ditch	City of Dayton, Liberty County	Confluence with West Prong Old River	Approximately 10,350 feet upstream of FM 1960	12030203	5.1		Y	AE	2014
French Bayou	Liberty County, Town of Kenefick	Approximately 3.8 miles upstream of U.S. Highway 90	Approximately 5.3 miles upstream of U.S. Highway 90	12030203	2.4		N	A	2014
French Bayou Tributary 1	Liberty County	Confluence with French Bayou	Approximately 150 feet upstream of County Road 6350	12030203	1.2		N	A	2014
French Creek	City of Dayton, Liberty County	Confluence with Linney Creek	Approximately 16,990 feet upstream of East Clayton Avenue	12030203	4.0		N	A	2014
Gaylor Creek	Liberty County	Approximately 7,390 feet downstream of County Road 2305 South	Approximately 3,865 feet upstream of the confluence with Cherry Creek	12030203	15.4		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Gaylor Creek Tributary 1	Liberty County	Confluence with Gaylor Creek	Approximately 11,310 feet upstream of the confluence with Gaylor Creek	12030203	2.2		N	A	2014
Gaylor Creek Tributary 2	Liberty County	Confluence with Gaylor Creek	Approximately 3,770 feet upstream of County Road 2305 South	12030203	0.8		N	A	2014
Gaylor Creek Tributary 3	Liberty County	Confluence with Gaylor Creek	Approximately 130 feet downstream of State Highway 105	12030203	4.3		N	A	2014
Gaylor Creek Tributary 4	Liberty County	Confluence with Gaylor Creek	Approximately 18,350 feet upstream of the confluence with Gaylor Creek	12030203	3.5		N	A	2014
Gaylor Creek Tributary 4A	Liberty County	Confluence with Gaylor Creek Tributary 4	Approximately 75 feet upstream of Pine Meadow Road	12030203	0.7		N	A	2014
Gaylor Creek Tributary 5	Liberty County	Confluence with Gaylor Creek	Approximately 55 feet downstream of Upper Macedonia Road	12030203	0.8		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Gaylor Creek Tributary 6	Liberty County	Confluence with Gaylor Creek	Approximately 4,075 feet upstream of County Road 2286	12030203	1.5		N	A	2014
Hickory Island Gully	Liberty County	Approximately 3,456 feet downstream of Hatcherville Road	Approximately 4.2 miles upstream of Hatcherville Road	12040203	4.8		Y	AE	1986
Josie Bayou	City of Hardin, City of Liberty, Liberty County	Approximately 1,540 feet downstream of FM 1011	Approximately 9,690 feet upstream of State Highway 146	12030203	4.9		N	A	2014
Josie Bayou Tributary 1	Liberty County	Confluence with Josie Bayou	Approximately 4,265 feet upstream of State Highway 146	12030203	1.6		N	A	2014
Josie Bayou Tributary 2	Liberty County	Confluence with Josie Bayou	Approximately 645 feet upstream of Berryhill Road	12030203	0.6		N	A	2014
Josie Bayou Tributary 3	City of Hardin, Liberty County	Confluence with Josie Bayou	Approximately 40 feet upstream of Berry Hill Road	12030203	0.6		N	A	2014
Josie Bayou Tributary 4	City of Hardin	Confluence with Josie Bayou	Approximately 3,780 feet upstream of County Road 2003	12030203	1.0		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Labbit Creek	Liberty County	Chambers/Liberty county boundary	Approximately 2,090 feet upstream of County Road 4011	12030203	1.1		Y	AE	2014
Labbit Creek Tributary 1	Liberty County	Confluence with Labbit Creek	Approximately 765 feet upstream of Lillard Lane	12030203	0.6		N	A	2014
Lake Liberty Creek	City of Liberty	Confluence with Wood Spring Creek	Approximately 150 feet upstream of Mizell Road	12030203	1.9		N	A	2014
Lee Gully	Liberty County	Approximately 745 feet downstream of Speights Road	Approximately 3,360 feet upstream of County Road 112	12030203	4.1		N	A	2014
Linney Creek	City of Dayton, Liberty County	Approximately 85 feet downstream of Railroad	Approximately 1,810 feet upstream of FM 686	12030203	6.1		N	A	2014
Linney Creek Tributary 1	City of Dayton	Confluence with Linney Creek	Approximately 2,080 feet upstream of N Winfree Street	12030203	1.4		N	A	2014
Linney Creek Tributary 2	City of Dayton, Liberty County	Confluence with Linney Creek	Approximately 1,780 feet upstream of N Cleveland Street	12030203	2.2		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Linney Creek Tributary 3	City of Dayton, Liberty County	Confluence with Linney Creek	Approximately 760 feet downstream of North Cleveland Street	12030203	1.0		N	A	2014
Linney Creek Tributary 4	Liberty County	Confluence with Linney Creek	Approximately 3,795 feet upstream of the confluence with Linney Creek	12030203	0.7		N	A	2014
Linney Creek Tributary 5	City of Dayton, Liberty County	Confluence with Linney Creek	At County Road 6681	12030203	0.8		N	A	2014
Linney Creek Tributary 6	City of Dayton, Liberty County	Confluence with Linney Creek	Approximately 140 feet downstream of State Highway 321	12030203	0.6		N	A	2014
Little Caney Creek	Liberty County	Chambers/Liberty county boundary	Approximately 1,230 feet upstream of County Road 411	12030203	2.2		Y	AE	2014
Little Caney Creek Tributary 1	Liberty County	Confluence with Little Caney Creek	Approximately 230 feet upstream of Forest Brook Street	12030203	0.5		N	A	2014
Long Island Creek	Liberty County	Confluence with Whites Bayou	Approximately 6,130 feet upstream of FM 770N	12030203	3.3		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Long John Creek	Liberty County, Town of Kenefick	Approximately 3,435 feet downstream of FM 1008	Just downstream of State Highway 321	12030203	5.6		N	A	2014
Long John Creek Tributary 1	Liberty County	Confluence with Long John Creek	Approximately 3,120 feet upstream of the confluence with Long John	12030203	0.6		N	A	2014
Luce Bayou	Liberty County	Approximately 9.1 miles downstream of its confluence with Tarkington Bayou.	Approximately 4.9 miles upstream of State Route 321	12040103	17.5		Y	AE	1985
Marsh Branch	Liberty County	Confluence with Tarkington Bayou	Approximately 1.4 miles upstream of the Atchison Topeka & Santa Fe Railway	12040103	11.0		Y	AE	1985
Marsh Branch Tributary Number 1	Liberty County	Confluence with Marsh Branch	Approximately 1.1 miles upstream of the Atchison, Topeka & Santa Fe Railway	12040103	3.0		Y	AE	1985
McMurty Bayou	Liberty County	Approximately 2,440 feet downstream of County Road 2085	Approximately 9,300 feet upstream of County Road 2085	12030203	2.6		N	A	2014
Menard Creek	Liberty County	Confluence with the Trinity River	Approximately 5.6 miles upstream of State Route 146	12030202	7.1		Y	AE	1986

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Old River	City of Dayton, City of Mont Belvieu, Liberty County	Approximately 8,690 feet downstream of FM 1409	Confluence with West Prong Old River	12030203	9.0		Y	AE	2014
Old River Drain	City of Dayton, Liberty County	Confluence with Old River	Approximately 250 feet downstream of FM 1409	12030203	4.4		N	A	2014
Old River Tributary 3	City of Mont Belvieu	Confluence with Old River	Approximately 3,560 feet upstream of the confluence with Old River	12030203	0.004		N	A	2014
Old River Tributary 4	City of Mont Belvieu, Liberty County	Confluence with Old River	Approximately 9,300 feet upstream of the confluence with Old River	12030203	1.7		N	A	2014
Old River Tributary 4	Liberty County	Approximately 3,815 feet downstream of the confluence with Old River Tributary 4C	Approximately 11,370 feet upstream of the confluence with Old River Tributary 4C	12030203	2.9		N	A	2014
Old River Tributary 4A	Liberty County	Confluence with Old River Tributary 4	Approximately 3,195 feet upstream of the confluence with Old River Tributary 4	12030203	0.6		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Old River Tributary 4B	Liberty County	Confluence with Old River Tributary 4	Approximately 5,160 feet upstream of the confluence with Old River Tributary 4	12030203	1.0		N	A	2014
Old River Tributary 4C	Liberty County	Confluence with Old River Tributary 4	Approximately 2,440 feet upstream of the confluence with Old River Tributary 4	12030203	0.5		N	A	2014
Pignut Gully	Liberty County	Confluence with Shiloh Creek	Approximately 7,390 feet upstream of the confluence with Shiloh Creek	12030203	1.4		N	A	2014
Reese Bayou	City of Cleveland, Liberty County	Confluence with Tarkington Bayou	Approximately 1.6 miles upstream of Southbound highway 59	12040103	5.1		Y	AE	1985
Shiloh Creek	Liberty County	Approximately 1,300 feet downstream of FM 563	Approximately 7,630 feet upstream of FM 563	12030203	1.7		N	A	2014
Spinks Creek	Liberty County	Approximately 13,160 feet downstream of FM 563	At confluence with Brooks Creek	12030203	2.9		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Spring Branch	Liberty County	Approximately 6,175 feet downstream of State Highway 61	Approximately 1,015 feet upstream of Hankamer Loop Road	12030203	0.02		N	A	2014
Tarkington Bayou	City of Cleveland, Liberty County	Confluence with Luce Bayou	Approximately 3.3 miles upstream of the Atchison, Topeka & Santa Fe Railway	12040103	21.7		Y	AE	1985
The Cutoff Tributary 1	Liberty County	Approximately 2,745 feet downstream of County Road 401	Just downstream of County Road 401	12030203	0.2		N	A	2014
The Cutoff Tributary 2	Liberty County	Approximately 3,070 feet downstream of County Road 401	Approximately 1,560 feet upstream of County Road 401	12030203	0.4		N	A	2014
Trinity River	Liberty County	Approximately 26.0 miles downstream of U.S. Route 90	Approximately 55,530 feet downstream of U.S. Highway 90	12030203	16.8		Y	AE	1986
Trinity River	City of Dayton Lakes, City of Liberty, Liberty County, Town of Kenefick	Approximately 55,530 feet downstream of US Highway 90	Approximately 69,560 feet upstream of US Highway 90	12030203	20.8		Y	AE	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Trinity River	Liberty County	Approximately 69,560 feet upstream of US Highway 90	Approximately 5.7 miles upstream of the Atchison, Topeka & Santa Fe Railway	12030202, 12030203	41.1		Y	AE	1986
Turkey Creek	Liberty County	Approximately 430 feet upstream of FM 563	Approximately 9,495 feet upstream of FM 563	12030203	1.7		N	A	2014
Turtle Bayou	Liberty County	Just upstream of Interstate 10	Approximately 7,520 feet upstream of the confluence with Cow Island Bayou	12030203	0.2		N	A	2014
Turtle Bayou	Liberty County	Approximately 11,255 feet downstream of County Road 126	Approximately 15,000 feet upstream of County Road 126	12030203	5.0		Y	AE	2014
Turtle Bayou	Liberty County	Approximately 21,536 feet downstream of County Road 118	Approximately 6,855 feet upstream of County Road 118	12030203	5.4		N	A	2014
Turtle Bayou Tributary 1	Liberty County	Confluence with Turtle Bayou	Approximately 3,600 feet upstream of the confluence with Turtle Bayou	12030203	0.7		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Turtle Bayou Tributary 2	Liberty County	Confluence with Turtle Bayou	Approximately 4,330 feet upstream of the confluence with Turtle Bayou	12030203	0.8		N	A	2014
Twin Ditches	Liberty County	Approximately 0.7 mile downstream of Atascocita Road	Approximately 1.2 miles upstream of Atascocita Road	12040203	2.0		Y	AE	1986
Unnamed Stream 1	Liberty County	Approximately 45 feet downstream of the county boundary	At county boundary	12030203	1.3		N	A	2014
Unnamed Stream 1A	Liberty County	Approximately 95 feet upstream of County Road 125	Approximately 370 feet downstream of Liberty Wallisville Road	12030203	0.8		N	A	2014
Unnamed Stream 2	Liberty County	Approximately 695 feet upstream of the county boundary	Approximately 6,620 feet upstream of the county boundary	12030203	0.3		N	A	2014
Unnamed Stream 3	Liberty County	Approximately 7,340 feet upstream of the county boundary	Approximately 12,890 feet upstream of the county boundary	12030203	1.1		N	A	2014
Unnamed Stream 4	Liberty County	Approximately 1,050 feet upstream of FM 770	Approximately 6,600 feet upstream of FM 770	12030203	1.1		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Unnamed Stream 5	Liberty County	Approximately 1,270 feet upstream of FM 770	Approximately 5,160 feet upstream of FM 770	12030203	0.7		N	A	2014
Unnamed Stream 6	Liberty County	Approximately 400 feet upstream of Krahl Road	Approximately 8,815 feet upstream of Krahl Road	12030203	1.6		N	A	2014
Unnamed Stream 7	Liberty County	Approximately 680 feet downstream of County Road 443	Approximately 2,195 feet upstream of County Road 443	12030203	0.6		N	A	2014
Unnamed Stream 7A	Liberty County	Confluence with Unnamed Stream 7	Approximately 1,200 feet upstream of the confluence with Unnamed Stream 7	12030203	0.2		N	A	2014
Unnamed Stream 8	City of Dayton	Approximately 200 feet upstream of the confluence with Linney Creek	Approximately 3,213 feet upstream of the confluence with Linney Creek	12030203	0.6		N	A	2014
Unnamed Stream 9	Liberty County	Approximately 40 feet upstream of County Road 2257	Approximately 730 feet upstream of County Road 2252	12030203	1.7		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Upper-East Twin Ditches	Liberty County	Confluence with Twin Ditches	Approximately 800 feet upstream of an access road that is approximately 8.6 miles upstream of its confluence with Twin Ditches	12040203	2.6		Y	AE	1986
West Prong Old River	Liberty County	Confluence with Old River	FM 1960 and confluence with East-West Dayton Ditch	12030203	3.8		Y	AE, AO	2014
West-West Dayton Ditch	City of Dayton, Liberty County	Confluence with West Prong Old River	Approximately 7,600 feet upstream of FM 1960	12030203	5.0		Y	AE	2014
Whiskey Branch	City Of Cleveland, Liberty County	Confluence with East Fork San Jacinto River	Approximately 3.0 miles upstream of State Route 105	12040103	4.9		Y	AE	1985
Whites Bayou	City Of Devers, Liberty County	Approximately 13,465 feet downstream of Interstate 10	Approximately 14,835 feet upstream of FM 770N	12030203	20.6		N	A	2014
Whites Bayou Tributary 1	Liberty County	Confluence with Whites Bayou	Approximately 2,230 feet upstream of Hankamer Loop Road	12030203	0.2		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Whites Bayou Tributary 2	Liberty County	Confluence with Whites Bayou	Approximately 12,655 feet upstream of the confluence with Whites Bayou	12030203	2.4		N	A	2014
Whites Bayou Tributary 2A	Liberty County	Confluence with Whites Bayou Tributary 2	Approximately 7,040 feet upstream of the confluence with Whites Bayou Tributary 2	12030203	1.3		N	A	2014
Whites Bayou Tributary 2B	Liberty County	Confluence with Whites Bayou Tributary 2	Approximately 3,590 feet upstream of the confluence with Whites Bayou Tributary 2	12030203	0.7		N	A	2014
Whites Bayou Tributary 3	Liberty County	Confluence with Whites Bayou	Approximately 3,840 feet upstream of the confluence with Whites Bayou	12030203	0.7		N	A	2014
Whites Bayou Tributary 4	Liberty County	Confluence with Whites Bayou	Confluence with Whites Bayou Tributary 5	12030203	2.7		N	A	2014
Whites Bayou Tributary 5	City of Devers, Liberty County	Confluence with Whites Bayou	Approximately 1,795 feet upstream of Gates Road	12030203	5.4		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Whites Bayou Tributary 5A	Liberty County	Confluence with Whites Bayou Tributary 5	Approximately 8,100 feet upstream of the confluence with Whites Bayou Tributary 5	12030203	1.5		N	A	2014
Whites Bayou Tributary 5A1	Liberty County	Confluence with Whites Bayou Tributary 5A	Just downstream of County Road 105	12030203	0.9		N	A	2014
Whites Bayou Tributary 5B	Liberty County	Confluence with Whites Bayou Tributary 5	Approximately 745 feet upstream of County Road 105	12030203	1.3		N	A	2014
Whites Bayou Tributary 6	Liberty County	Confluence with Whites Bayou	Approximately 3,015 feet upstream of County Road 117	12030203	1.4		N	A	2014
Whites Bayou Tributary 7	Liberty County	Confluence with Whites Bayou	Approximately 5,080 feet upstream of the confluence with Whites Bayou	12030203	1.0		N	A	2014
Whites Bayou Tributary 8	Liberty County	Confluence with Whites Bayou	Approximately 8,160 feet upstream of the confluence with Whites Bayou	12030203	1.5		N	A	2014

Flooding Source	Community	Downstream Limit	Upstream Limit	HUC-8 Sub-Basin(s)	Length (mi) (streams or coastlines)	Area (mi ²) (estuaries or ponding)	Floodway (Y/N)	Zone shown on FIRM	Date of Analysis
Whites Bayou Tributary 9	Liberty County	Confluence with Whites Bayou	Approximately 6,100 feet upstream of the confluence with Whites Bayou	12030203	1.2		N	A	2014
Whites Bayou Tributary 10	Liberty County	Confluence with Whites Bayou	Approximately 3,170 feet upstream of the confluence with Whites Bayou	12030203	0.6		N	A	2014
Whites Bayou Tributary 11	Liberty County	Confluence with Whites Bayou	Approximately 2,630 feet upstream of County Road 1840	12030203	1.4		N	A	2014
Willow Creek	Liberty County	Approximately 2.4 miles downstream of Hogpen Road.	Approximately 2.3 miles upstream of the confluence of Bull Tongue Creek	12020007	6.5		Y	AE	1986
Wood Spring Creek	City of Liberty, Liberty County	Approximately 530 feet downstream of Sandune Road	Approximately 10,400 feet upstream of McGuire Road	12030203	2.6		N	A	2014

All floodways that were developed for this FIS project are shown on the FIRM using the symbology described in Figure 3. In cases where the floodway and 1% annual chance floodplain boundaries are either close together or collinear, only the floodway boundary has been shown on the FIRM. For information about the delineation of floodways on the FIRM, refer to Section 6.3.

2.3 Base Flood Elevations

The hydraulic characteristics of flooding sources were analyzed to provide estimates of the elevations of floods of the selected recurrence intervals. The Base Flood Elevation (BFE) is the elevation of the 1% annual chance flood. These BFEs are most commonly rounded to the whole foot, as shown on the FIRM, but in certain circumstances or locations they may be rounded to 0.1 foot. Cross section lines shown on the FIRM may also be labeled with the BFE rounded to 0.1 foot. Whole-foot BFEs derived from engineering analyses that apply to coastal areas, areas of ponding, or other static areas with little elevation change may also be shown at selected intervals on the FIRM.

Cross sections with BFEs shown on the FIRM correspond to the cross sections shown in the Floodway Data table and Flood Profiles in this FIS Report. BFEs are primarily intended for flood insurance rating purposes. For construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM.

2.4 Non-Encroachment Zones

Some States and communities use non-encroachment zones to manage floodplain development. While not a FEMA designated floodway, the non-encroachment zone represents that area around the stream that should be reserved to convey the 1% annual chance flood event.

Non-encroachment determinations may be delineated where it is not possible to delineate floodways because specific channel profiles with bridge and culvert geometry were not developed. Any non-encroachment determinations for this FIS project have been tabulated for selected cross sections and are shown in Table 25, "Flood Hazard and Non-Encroachment Data for Selected Streams."

2.5 Coastal Flood Hazard Areas

This section is not applicable to this FIS Project

2.5.1 Water Elevations and the Effects of Waves

This section is not applicable to this FIS Project

Figure 5: Wave Runup Transect Schematic

[Not Applicable to this FIS Project]

2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

This section is not applicable to this FIS Project

2.5.3 Coastal High Hazard Areas

This section is not applicable to this FIS Project

Figure 6: Coastal Transect Schematic

[Not Applicable to this FIS Project]

2.5.4 Limit of Moderate Wave Action

This section is not applicable to this FIS Project

SECTION 3.0 – INSURANCE APPLICATIONS

3.1 National Flood Insurance Program Insurance Zones

For flood insurance applications, the FIRM designates flood insurance rate zones as described in Figure 3, “Map Legend for FIRM.” Flood insurance zone designations are assigned to flooding sources based on the results of the hydraulic or coastal analyses. Insurance agents use the zones shown on the FIRM and depths and base flood elevations in this FIS Report in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

The 1% annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (e.g. Zones A, AE, V, VE, etc.), and the 0.2% annual chance floodplain boundary corresponds to the boundary of areas of additional flood hazards.

Table 3 lists the flood insurance zones in the unincorporated and incorporated areas of Liberty County.

Table 3: Flood Zone Designations by Community

Community	Flood Zone(s)
City of Ames	X
City of Cleveland	AE, X
City of Daisetta	A, X
City of Dayton	A, AE, AO, X
City of Dayton Lakes	AE
City of Devers	A, X
City of Hardin	A, X
Town of Kenefick	A, AE, X
City of Liberty	A, AE, X
Liberty County, Unincorporated Areas	A, AE, AO, X
City of Mont Belvieu	A, AE, X
City of North Cleveland	AE, X
City of Plum Grove	AE, X

3.2 Coastal Barrier Resources System

The Coastal Barrier Resources Act (CBRA) of 1982 was established by Congress to create areas along the Atlantic and Gulf coasts and the Great Lakes, where restrictions for Federal financial assistance including flood insurance are prohibited. In 1990, Congress passed the Coastal Barrier Improvement Act (CBIA), which increased the extent of areas established by the CBRA and added “Otherwise Protected Areas” (OPA) to the system. These areas are collectively referred to as the John. H Chafee Coastal Barrier Resources System (CBRS). The CBRS boundaries that have been identified in the project area are in Table 4, “Coastal Barrier Resource System Information.”

Table 4: Coastal Barrier Resources System Information

[Not Applicable to this FIS Project]

SECTION 4.0 – AREA STUDIED

4.1 Basin Description

Table 5 contains a description of the characteristics of the HUC-8 sub-basins within which each community falls. The table includes the main flooding sources within each basin, a brief description of the basin, and its drainage area.

Table 5: Basin Characteristics

HUC-8 Sub-Basin Name	HUC-8 Sub-Basin Number	Primary Flooding Source	Description of Affected Area	Drainage Area (square miles)
East Fork San Jacinto	12040103	East Fork San Jacinto River	Located in the northwestern corner of Liberty County, encompassing approximately 204 square miles.	995
East Galveston Bay	12040202	East Galveston Bay	Located in the southeastern corner of Liberty County, encompassing approximately 48 square miles.	819
Lower Trinity	12030203	Trinity River	Largest watershed within Liberty County, encompassing 629 square miles in the middle of the county.	767
Lower Trinity-Kickapoo	12030202	Trinity-Kickapoo River	Located in the far northern portion of Liberty County, encompasses 23 square miles.	3,257
North Galveston Bay	12040203	North Galveston Bay	Located in the southwestern corner of Liberty County, encompasses 80 square miles.	357
Pine Island Bayou	12020007	Pine Island Bayou	Located along the eastern portion of Liberty County, encompasses 184 square miles.	709
Sabine Lake	12040201	Sabine Lake	Located in the southeastern region of Liberty County, encompasses 4 square miles.	987

4.2 Principal Flood Problems

Table 6 contains a description of the principal flood problems that have been noted for Liberty County by flooding source.

Table 6: Principal Flood Problems

Flooding Source	Description of Flood Problems
*	<p>Large drainage areas of streams within the county, coupled with flat topography, result in slow runoff and long duration flood concentrations. The terrain in the southern half of Liberty County is typical of the Coastal Plains with gentle slopes and low relief and is especially vulnerable to flooding caused by overland flow or sheet flow. This flooding, although usually shallow, may cover a large portion of the county following high intensity rainstorms. Small culverts and bridges under roads and railroads aggravate the flooding problems in the county. Flooding commonly occurs along portions of the streams studied. Small overflows occur during most years and cause minor damage. Larger floods, with potential for significant damage, occur when the county receives a large amount of rain within a short period, such as 8.4 inches of rainfall in 24 hours. Records indicate that the county has a 10-percent chance of this rainfall occurring in any given year.</p>
Trinity River	<p>Moderate flooding is common along the Trinity River in Liberty County, and the flood of May 1942 was the largest flood to occur since 1903. The peak discharge from the 1942 flood was 114,000 cubic feet per seconds (at an elevation of 27.16 feet) and has an estimated recurrence interval of 60 years.</p>
*	<p>The last significant floods in the county occurred on May 21, 2015, September 13, 2008, September 24, 2005, August 19, 1983, and September 20, 1979. The May 2015 storms caused Trinity River to crest at 30 feet on May 31, 2015 at the gage located at US 90 near the City of Liberty. The September 2008 flood was caused by Hurricane Ike. The September 2005 flood was caused by Hurricane Rita. The August 1983 and September 1979 storms produced 4.99 and 5.31 inches of rainfall at the Cleveland gage, respectively. Serious flooding has occurred in the county in 1940, 1960, and 1973. The 1960 rainfall was produced by Hurricane Carla.</p>

*No specific flooding source provided.

Table 7 contains information about historic flood elevations in the communities within Liberty County.

Table 7: Historic Flooding Elevations

[Not Applicable to this FIS Project]

4.3 Non-Levee Flood Protection Measures

Table 8 contains information about non-levee flood protection measures within Liberty County such as dams, jetties, and or dikes. Levees are addressed in Section 4.4 of this FIS Report.

Table 8: Non-Levee Flood Protection Measures

Flooding Source	Structure Name	Type of Measure	Location	Description of Measure
Trinity River and its major tributaries	N/A	Reservoirs	Along Trinity River and its major tributaries located upstream from Liberty County	There are 26 major reservoirs. The total allocated flood control storage in these projects is over 1.3 million acre-feet.

4.4 Levees

This section is not applicable to this FIS Project

Table 9: Levees

[Not Applicable to this FIS Project]

SECTION 5.0 – ENGINEERING METHODS

For the flooding sources in the community, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude that are expected to be equaled or exceeded at least once on the average during any 10-, 25-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for floodplain management and for flood insurance rates. These events, commonly termed the 10-, 25-, 50-, 100-, and 500-year floods, have a 10-, 4-, 2-, 1-, and 0.2% annual chance, respectively, of being equaled or exceeded during any year.

Although the recurrence interval represents the long-term, average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood that equals or exceeds the 100-year flood (1-percent chance of annual exceedance) during the term of a 30-year mortgage is approximately 26 percent (about 3 in 10); for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

The engineering analyses described here may incorporate the results of previously issued Letters of Map Change (LOMCs) listed in Table 27, “Incorporated Letters of Map Change”, which include Letters of Map Revision (LOMRs). For more information about LOMRs, refer to Section 6.5, “FIRM Revisions.”

5.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak elevation-frequency relationships for floods of the selected recurrence intervals for each flooding source studied. Hydrologic analyses are typically performed at the watershed level. Depending on factors such as watershed size and shape, land use and urbanization, and natural or man-made storage, various models or methodologies may be applied. A summary of the hydrologic methods applied to develop the discharges used in the hydraulic analyses for each stream is provided in Table 13. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

A summary of the discharges is provided in Table 10. Frequency Discharge-Drainage Area Curves used to develop the hydrologic models may also be shown in Figure 7 for selected flooding sources. A summary of stillwater elevations developed for non-coastal flooding sources is provided in Table 11. (Coastal stillwater elevations are discussed in Section 5.3 and shown in Table 17.) Stream gage information is provided in Table 12.

Table 10: Summary of Discharges

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Abbot Creek	Approximately 485 feet downstream of Farm to Market Road 563	10.35	1,145	1,501	1,785	2,100	2,923
Abbot Creek	At Layl Drive	10.05	1,177	1,550	1,849	2,182	3,056
Abbot Creek	Approximately 125 feet upstream of U.S. Highway 90	8.57	985	1,282	1,517	1,777	2,451
Abbot Creek	At the upstream side of Beaumont Road	8.36	965	1,255	1,484	1,738	2,394
Abbot Creek	Approximately 485 feet upstream of Beaumont Road	8.35	926	1,199	1,414	1,650	2,259
Batiste Creek	Approximately 1,600 feet upstream of confluence with Willow Creek	74.20	3,740	*	6,080	7,050	9,100

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Bull Tongue Creek	Approximately 1,100 feet upstream of confluence with Willow Creek	4.70	501	*	690	756	880
Bull Tongue Creek	Approximately 0.9 mile upstream of confluence with Willow Creek	4.30	430	*	572	617	710
Cedar Bayou	Upstream of confluence of Adlong Ditch	77.40	4,400	*	6,700	8,000	11,000
Cedar Bayou	Approximately 100 feet downstream of U.S. Route 90	65.00	3,910	*	6,100	7,220	10,000
Cedar Bayou	At upstream county boundary	26.60	2,140	*	3,280	4,370	6,300
Cedar Bayou	Approximately 1.3 miles upstream of county boundary	25.40	1,990	*	3,200	3,830	5,290
Cedar Bayou	Approximately 1.4 miles upstream of upstream county boundary	23.00	1,970	*	3,180	3,800	5,200
Cedar Bayou	Approximately 2.2 miles upstream of upstream county boundary	22.60	1,900	*	3,070	3,560	4,800
Cedar Bayou	Approximately 0.7 mile upstream of access road, approximately 3.6 miles upstream of upstream county boundary	18.20	1,600	*	2,670	3,080	4,150

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Cedar Bayou	Approximately 0.8 mile upstream of access road, approximately 3.7 miles upstream of upstream county boundary	14.10	1,340	*	2,100	2,410	3,300
Cedar Bayou	Approximately 2,000 feet downstream of access road, approximately 4.0 miles upstream of upstream county boundary	6.60	764	*	1,140	1,290	1,620
Cedar Bayou	Approximately 0.8 mile upstream of access road, approximately 5.2 miles upstream of upstream county boundary	5.20	561	*	788	868	1,090
Cow Branch	Approximately 1.2 miles upstream of confluence with East Fork San Jacinto River	4.16	1,267	*	2,725	3,580	6,051
Cow Branch	Approximately 1.9 miles upstream of confluence with East Fork San Jacinto River	3.92	1,265	*	2,756	3,628	6,145
Cow Branch	Approximately 2.3 miles upstream of confluence with East Fork San Jacinto River	3.64	1,264	*	2,794	3,689	6,264
East Fork San Jacinto River	Approximately 1.4 miles upstream of downstream county boundary	365.78	16,815	*	38,706	52,361	94,818

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
East Fork San Jacinto River	At FM 2090	356.95	16,877	*	38,863	52,541	94,930
East Fork San Jacinto River	Approximately 2.7 miles downstream of U.S. Route 59	340.58	17,531	*	39,974	53,875	96,080
East Fork San Jacinto River	At State Route 105	325.00	17,879	*	40,699	54,689	96,721
East Fork San Jacinto River	At upstream county boundary	314.68	17,817	*	40,626	54,472	95,602
East-West Dayton Ditch	Approximately 1,120 feet downstream of U.S. Highway 90	6.58	800	1,031	1,212	1,411	1,923
East-West Dayton Ditch	Approximately 530 feet upstream of U.S. Highway 90	3.23	463	581	671	769	1,013
East-West Dayton Ditch	Approximately 40 feet upstream of Wolf Island Road	2.88	432	541	624	714	938
East-West Dayton Ditch	Approximately 1,375 feet upstream of Fairfield Loop	1.78	302	372	424	479	616
East-West Dayton Ditch	At the upstream side of Farm to Market Road 1960	1.44	215	257	287	319	394
East-West Dayton Ditch	Approximately 6,720 feet upstream of Farm to Market Road 1960	0.19	60	67	71	76	86

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Hickory Island Gully	Approximately 100 feet upstream of county boundary	7.50	860	*	1,307	1,479	1,810
Hickory Island Gully	Approximately 900 feet downstream of Hatcherville Road	7.00	844	*	1,292	1,465	1,790
Hickory Island Gully	Approximately 2,000 feet upstream of Hatcherville Road	5.60	733	*	1,115	1,262	1,570
Hickory Island Gully	Approximately 4,000 feet upstream of Hatcherville Road	4.80	661	*	1,001	1,131	1,400
Hickory Island Gully	Approximately 1.7 miles upstream of Hatcherville Road	4.10	596	*	896	1,011	1,270
Hickory Island Gully	Approximately 2.1 miles upstream of Hatcherville Road	2.90	466	*	688	771	940
Hickory Island Gully	Approximately 3.1 miles upstream of Hatcherville Road	2.00	358	*	519	578	700
Hickory Island Gully	Approximately 4.2 miles upstream of Hatcherville Road	1.20	249	*	352	388	465
Labbit Creek	Approximately 515 feet downstream of Laura Lane	1.27	400	503	582	669	884
Labbit Creek	Approximately 1,895 feet upstream of Laura Lane	0.34	129	151	166	181	217
Little Caney Creek	Approximately 300 feet upstream of the confluence with Little Caney Creek Tributary 1	1.42	403	506	584	669	879

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Little Caney Creek	Approximately 2,495 feet downstream of County Road 411	1.28	396	498	576	661	872
Little Caney Creek	Approximately 1,085 feet upstream of County Road 411	0.35	131	152	168	183	220
Luce Bayou	At county boundary	202.41	4,651	*	11,532	16,796	43,706
Luce Bayou	At confluence of Tarkington Bayou	168.52	4,686	*	11,680	16,928	44,140
Luce Bayou	Approximately 0.9 mile upstream of confluence of Tarkington Bayou	38.91	2,039	*	4,345	5,673	11,451
Luce Bayou	At State Route 321	27.48	1,886	*	4,148	5,719	13,322
Luce Bayou	Approximately 1.3 miles upstream of State Route 321	15.59	1,126	*	2,616	3,755	9,472
Luce Bayou	Approximately 1.7 miles downstream of FM 1008	12.38	1,229	*	2,806	3,997	9,408
Luce Bayou	At FM 1008	6.97	954	*	2,087	2,857	6,461
Marsh Branch	Approximately 0.8 mile upstream of confluence with Tarkington Bayou	32.31	1,355	*	3,134	4,452	13,084
Marsh Branch	At State Route 321	24.94	1,178	*	2,667	3,809	11,309
Marsh Branch	At Oak Shade Road	15.21	933	*	2,103	3,094	7,659
Marsh Branch	At FM 787	10.52	678	*	1,562	2,239	5,609

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Marsh Branch	Approximately 1,600 feet upstream of Atchison, Topeka & Santa Fe Railway	7.74	588	*	1,335	1,896	4,734
Marsh Branch	Approximately 1.4 miles upstream of Atchison, Topeka & Santa Fe Railway	6.84	598	*	1,423	2,006	4,823
Marsh Branch Tributary No. 1	At FM 787	2.99	212	*	495	807	2,446
Marsh Branch Tributary No. 1	At Atchison, Topeka & Santa Fe Railway	2.19	207	*	521	859	2,295
Marsh Branch Tributary No. 1	At unnamed road approximately 1,600 feet upstream of Atchison, Topeka & Santa Fe Railway	1.64	182	*	445	681	1,754
Marsh Branch Tributary No. 1	Approximately 1.1 miles upstream of Atchison, Topeka & Santa Fe Railway	0.92	127	*	309	437	1,048
Menard Creek	At FM 2610	162.00	12,000	*	22,200	27,200	38,800
Menard Creek	At State Route 146	152.00	11,600	*	21,500	26,300	37,400
Menard Creek	Approximately 1.2 miles upstream of State Route 146	121.00	10,000	*	18,300	22,300	31,600

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Menard Creek	At upstream county boundary	111.00	9,680	*	17,800	21,700	30,400
Old River	Approximately 760 feet upstream of the confluence with Old River Tributary 4	58.38	4,636	6,308	7,691	9,237	13,344
Old River	Approximately 300 feet upstream of the confluence with Old River Tributary 3	17.59	1,138	1,584	1,963	2,392	3,551
Old River	Approximately 950 feet upstream of the confluence with Old River Tributary 3	15.44	1,009	1,406	1,742	2,123	3,152
Old River	Approximately 4,530 feet upstream of the confluence with Old River Tributary 4	13.30	884	1,232	1,527	1,861	2,765
Old River	Approximately 200 feet downstream of the confluence with Old River Tributary 4	12.61	753	1,039	1,280	1,551	2,275
Old River	Approximately 300 feet upstream of the confluence with Old River Tributary 4	8.70	527	728	896	1,086	1,592
Old River	Approximately 485 feet downstream of the confluence with Old River Drain	7.09	389	532	651	783	1,134

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Old River	Approximately 610 feet upstream of the confluence with Old River Drain	3.90	219	298	364	437	628
Reese Bayou	Approximately 0.9 mile upstream of confluence with Tarkington Bayou	13.70	954	*	2,146	3,023	8,031
Reese Bayou	At Atchison, Topeka & Santa Fe Railway	12.29	972	*	2,166	3,025	7,796
Reese Bayou	At U.S. Route 59	10.87	943	*	2,115	2,946	7,364
Reese Bayou	Approximately 0.6 mile downstream of county boundary	8.43	814	*	1,925	2,712	6,398
Reese Bayou	At county boundary	8.11	815	*	1,930	2,714	6,484
Tarkington Bayou	Approximately 0.9 mile upstream of confluence with Luce Bayou	128.78	3,076	*	7,625	11,305	34,861
Tarkington Bayou	At Gulf Road	95.01	119	*	7,737	11,413	32,308
Tarkington Bayou	At State Route 321	56.62	2,303	*	5,758	8,286	21,641
Tarkington Bayou	At FM 787	38.08	1,783	*	4,374	6,243	15,938
Tarkington Bayou	Approximately 0.9 mile downstream of county boundary	33.57	1,924	*	4,695	6,695	16,332
Tarkington Bayou	Approximately 900 feet upstream of county boundary	30.92	2,009	*	4,751	6,687	16,073
Trinity River	At U.S. Route 90	17,468.00	72,000	*	110,000	127,000	235,000

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Turtle Bayou	Approximately 11,450 feet downstream of Frontier Park Road	19.13	1,712	2,513	3,107	3,923	5,758
Turtle Bayou	Approximately 8,000 feet downstream of Frontier Park Road	18.43	1,718	2,533	3,127	3,941	5,756
Turtle Bayou	Approximately 6,300 feet downstream of Frontier Park Road	16.57	1,613	2,357	2,882	3,602	5,200
Turtle Bayou	Approximately 5,415 feet downstream of Frontier Park Road	14.26	1,460	2,098	2,538	3,142	4,481
Turtle Bayou	Approximately 1,255 feet upstream of Frontier Park Road	12.97	1,454	2,047	2,457	3,022	4,268
Turtle Bayou	Approximately 7,425 feet upstream of Frontier Park Road	11.79	1,551	2,090	2,486	3,034	4,234
Turtle Bayou	Approximately 9,480 feet downstream of the confluence with Turtle Bayou Tributary 1	10.38	1,380	1,855	2,203	2,685	3,741
Twin Ditches	Approximately 0.8 mile upstream of county boundary	7.55	864	*	1,310	1,490	1,860
Twin Ditches	At downstream side of Atascocita Road	6.89	809	*	1,220	1,380	1,700

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Twin Ditches	At downstream side of access road, approximately 0.9 mile upstream of Atascocita Road	5.71	740	*	1,130	1,270	1,600
Twin Ditches	Approximately 1.2 miles upstream of Atascocita Road	5.35	692	*	1,040	1,180	1,450
Upper-East Twin Ditch	Approximately 1.2 miles upstream of Atascocita Road	4.32	565	*	826	922	1,150
Upper-East Twin Ditch	Approximately 1.9 miles upstream of Atascocita Road	3.54	530	*	788	885	1,100
West Prong Old River	Approximately 6,300 feet downstream of Highway 146	26.49	2,451	3,256	3,903	4,612	6,455
West Prong Old River	Approximately 300 feet upstream of Highway 146	25.94	2,329	3,080	3,682	4,338	6,033
West Prong Old River	Approximately 900 feet upstream of Highway 146	24.94	2,438	3,248	3,901	4,619	6,491
West Prong Old River	Approximately 1,200 feet upstream of Highway 146	19.51	1,935	2,548	3,035	3,566	4,933
West Prong Old River	Approximately 1,205 feet upstream of Farm to market Road 1413	19.50	2,087	2,769	3,318	3,921	5,488
West Prong Old River	Approximately 3,080 feet upstream of Farm to Market Road 1413	19.17	2,062	2,736	3,277	2,871	5,415

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
West Prong Old River	Approximately 7,270 feet upstream of Farm to Market Road 1413	16.65	1,847	2,440	2,914	3,432	4,775
West Prong Old River	Approximately 1,155 feet downstream of Cox Road	16.50	1,851	2,446	2,922	3,444	4,796
West Prong Old River	Approximately 3,200 feet downstream of U.S. Highway 90	16.10	1,389	1,817	2,158	2,533	3,508
West-West Dayton Ditch	Approximately 795 feet downstream of U.S. Highway 90	9.01	904	1,163	1,365	1,586	2,151
West-West Dayton Ditch	Approximately 410 feet upstream of U.S. Highway 90	8.30	855	1,098	1,288	1,494	2,022
West-West Dayton Ditch	Approximately 210 feet upstream of Wolf Island Road	7.70	738	937	1,089	1,253	1,667
West-West Dayton Ditch	Approximately 735 feet upstream of Wolf Island Road	2.37	307	374	423	474	600
West-West Dayton Ditch	Approximately 1,060 feet downstream of Slew Road	1.98	274	332	374	418	526
West-West Dayton Ditch	At the downstream side of Farm to Market Road 1960	1.87	249	300	336	374	465

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Whiskey Branch	Approximately 0.9 mile upstream of confluence of East Fork San Jacinto River	6.90	566	*	1,284	1,673	2,602
Whiskey Branch	At State Route 105	6.32	563	*	1,281	1,654	2,541
Whiskey Branch	Approximately 0.9 mile upstream of Atchison, Topeka & Santa Fe Railway	5.16	538	*	1,309	1,771	3,110
Whiskey Branch	At county boundary	4.08	473	*	1,169	1,594	2,859
Willow Creek	Approximately 1.5 miles downstream of Hogpen Road	90.40	4,300	*	7,050	8,200	10,700
Willow Creek	Approximately 430 feet upstream of confluence of Batiste Creek	12.90	1,240	*	1,930	2,200	2,900
Willow Creek	Approximately 1,500 feet upstream of confluence of Batiste Creek	5.66	690	*	1,030	1,160	1,400
Willow Creek	Approximately 0.8 mile upstream of confluence of Bull Tongue Creek	4.92	660	*	1,000	1,130	1,360
Willow Creek	Approximately 1.4 miles upstream of confluence of Bull Tongue Creek	3.49	550	*	830	940	1,170
Willow Creek	At access road, approximately 2.0 miles upstream of confluence of Bull Tongue Creek	2.42	470	*	720	820	1,000

Flooding Source	Location	Drainage Area (Square Miles)	Peak Discharge (CFS)				
			10% Annual Chance	4% Annual Chance	2% Annual Chance	1% Annual Chance	0.2% Annual Chance
Willow Creek	Approximately 2.3 miles upstream of confluence of Bull Tongue Creek	1.65	380	*	590	660	820

Figure 7: Frequency Discharge-Drainage Area Curves

[Not Applicable to this FIS Project]

Table 11: Summary of Non-Coastal Stillwater Elevations

[Not Applicable to this FIS Project]

Table 12: Stream Gage Information used to Determine Discharges

Flooding Source	Gage Identifier	Agency that Maintains Gage	Site Name	Drainage Area (Square Miles)	Period of Record	
					From	To
Trinity River	1	USGS	USGS 08066500 Trinity River At Romayor, TX	17,186	6/4/1924	3/13/2012
Trinity River	1	USGS	USGS 08067000 Trinity River At Liberty, TX	17,468	5/1/1922	7/4/2012

5.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Base flood elevations on the FIRM represent the elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static base flood elevations. These whole-foot elevations may not exactly reflect the elevations derived from the hydraulic analyses. Flood elevations shown on the FIRM are primarily intended for flood insurance rating purposes. For

construction and/or floodplain management purposes, users are cautioned to use the flood elevation data presented in this FIS Report in conjunction with the data shown on the FIRM. The hydraulic analyses for this FIS were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

For streams for which hydraulic analyses were based on cross sections, locations of selected cross sections are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 6.3), selected cross sections are also listed on Table 24, "Floodway Data."

A summary of the methods used in hydraulic analyses performed for this project is provided in Table 13. Roughness coefficients are provided in Table 14. Roughness coefficients are values representing the frictional resistance water experiences when passing overland or through a channel. They are used in the calculations to determine water surface elevations. Greater detail (including assumptions, analysis, and results) is available in the archived project documentation.

Table 13: Summary of Hydrologic and Hydraulic Analyses

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Abbot Creek	Approximately 430 feet downstream of FM 563	Approximately 540 feet upstream of Beaumont Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	AE w/ floodway	
Barrett Bayou	Approximately 65 feet upstream of the Railroad	Just downstream of FM 1011	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Barrett Bayou Tributary 1	Confluence with Barrett Bayou	Approximately 1,915 feet upstream of County Road 2006	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Barrett Bayou Tributary 2	Confluence with Barrett Bayou	Approximately 45 feet downstream of West Hardin Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Batiste Creek	Confluence with Willow Creek.	Approximately 1.8 miles upstream of the confluence with Willow Creek	Regression Equations	HEC-2	6/1986	AE w/ floodway	
Big Caney Creek	Approximately 30 feet upstream of FM 1409	Approximately 22,830 feet upstream of FM 1409	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Big Ditch	Confluence with Old River Drain	Approximately 1,755 feet upstream of FM 1409	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Bowie Creek	Approximately 1,570 feet downstream of FM 1008	Approximately 100 feet upstream of Douglas Street	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Bowie Creek Tributary 1	Confluence with Bowie Creek	Approximately 320 feet upstream of Parker Loop	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Brooks Creek	Confluence with Sprinks Creek	Approximately 5,550 feet upstream of confluence with Spinks Creek	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Brooks Creek Tributary 1	Confluence with Brooks Creek	Approximately 2,356 feet upstream of confluence with Brooks Creek	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Brooks Creek Tributary 2	Confluence with Brooks Creek	Approximately 3,420 feet upstream of confluence with Brooks Creek	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Bull Tongue Creek	Confluence with Willow Creek.	Approximately 0.9 miles upstream of its confluence with Willow Creek	Regression Equations	HEC-2	6/1986	AE w/ floodway	
C100	Approximately 725 feet downstream of FM 2276	Approximately 1,276 feet upstream of FM 163	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	Hydrology was taken from the 2011 Macedonia Study.

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
C102	Confluence with C103	Approximately 2,735 feet upstream of FM 163	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	Hydrology was taken from the 2011 Macedonia Study.
C103	Confluence with C102	Approximately 2,216 feet upstream of FM 163	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	Hydrology was taken from the 2011 Macedonia Study.
C104	Confluence with C100	Approximately 3,395 feet upstream of the confluence with C100	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	Hydrology was taken from the 2011 Macedonia Study.
C105	Confluence with C100	Approximately 1,680 feet upstream of Davis Hill Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	Hydrology was taken from the 2011 Macedonia Study.
Cedar Bayou	From its upstream county boundary with Harris County	The downstream County boundary with Chambers	HEC-HMS	HEC-RAS	2004	AE w/ floodway	
Cedar Bayou	From its upstream county boundary	Approximately 0.8 miles upstream of an access road that is approximately 4.4 miles upstream of the county boundary	Regression Equations	HEC-2	6/1986	AE w/ floodway	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Cherry Creek	Confluence with Gaylor Creek	Approximately 65 feet downstream of Davis Hill Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Cherry Creek 2	Approximately 1,175 feet downstream of Railroad	Approximately 825 feet upstream of County Road 2179	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Cherry Creek 3	Approximately 2,760 feet downstream of County Road 2132	Approximately 5,805 feet upstream of Railroad	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Cow Branch	Confluence with East Fork San Jacinto River	Approximately 2.3 miles upstream of the confluence with East Fork San Jacinto River	SCS Synthetic Frequency Methods	SCS WSP-2	4/1985	AE w/ floodway	
Cow Island Bayou	Confluence with Turtle Bayou	Approximately 19,515 feet upstream of the confluence with Cow Island Bayou Tributary 4	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Cow Island Bayou Tributary 1	Confluence with Cow Island Bayou	Approximately 4,030 feet upstream of the confluence with Cow Island Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Cow Island Bayou Tributary 1A	Confluence with Cow Island Bayou Tributary 1	Approximately 16,210 feet upstream of the confluence with Cow Island Bayou Tributary 1	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Cow Island Bayou Tributary 2	Confluence with Cow Island Bayou	Approximately 6,645 feet upstream of the confluence with Cow Island Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Cow Island Bayou Tributary 3	Confluence with Cow Island Bayou	Approximately 6,350 feet upstream of the confluence with Cow Island Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Cow Island Bayou Tributary 4	Confluence with Cow Island Bayou	Approximately 3,090 feet upstream of confluence with Cow Island Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Cow Island Bayou Tributary 5	Confluence with Cow Island Bayou	Approximately 2,445 feet upstream of the confluence with Cow Island Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Crooked Bayou	Confluence with Whites Bayou	Approximately 9,530 feet upstream of Crooked Bayou Tributary 1	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Crooked Bayou Tributary 1	Confluence with Crooked Bayou	Approximately 14,740 feet upstream of Crooked Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Crooked Marsh	Confluence with Crooked Bayou	Approximately 16,915 feet upstream of the confluence with Crooked Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Dry Cherry Creek	Confluence with Cherry Creek	Approximately 920 feet upstream of County Line Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
East Fork San Jacinto River	County boundary with San Jacinto County	County boundary with Montgomery	SCS Synthetic Frequency Methods	SCS WSP-2	4/1985	AE w/ floodway	
East Prong Old River	Confluence with West Prong Old River	Approximately 515 feet upstream of County Road 496	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
East Prong Old River Tributary 1	Confluence with East Prong Old River	Approximately 210 feet downstream of U.S. Highway 90	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
East Prong Old River Tributary 2	Confluence with East Prong Old River	Approximately 2,630 feet upstream of the confluence with East Prong Old River	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
East West Dayton Ditch	Approximately 30 feet downstream of FM 1960	Approximately 10,350 feet upstream of FM 1960	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	AE w/ floodway	
French Bayou	Approximately 3.8 miles upstream of U.S. Highway 90	Approximately 5.3 miles upstream of U.S. Highway 90	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
French Bayou Tributary 1	Confluence with French Bayou	Approximately 150 feet upstream of County Road 6350	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
French Creek	Confluence with Linney Creek	Approximately 16,990 feet upstream of East Clayton Avenue	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Gaylor Creek	Approximately 7,390 feet downstream of County Road 2305 South	Approximately 3,865 feet upstream of the confluence with Cherry Creek	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Gaylor Creek Tributary 1	Confluence with Gaylor Creek	Approximately 11,310 feet upstream of the confluence with Gaylor Creek	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Gaylor Creek Tributary 2	Confluence with Gaylor Creek	Approximately 3,770 feet upstream of County Road 2305 South	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Gaylor Creek Tributary 3	Confluence with Gaylor Creek	Approximately 130 feet downstream of State Highway 105	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Gaylor Creek Tributary 4	Confluence with Gaylor Creek	Approximately 18,350 feet upstream of the confluence with Gaylor Creek	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Gaylor Creek Tributary 4A	Confluence with Gaylor Creek Tributary 4A	Approximately 75 feet upstream of Pine Meadow Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Gaylor Creek Tributary 5	Confluence with Gaylor Creek	Approximately 55 feet downstream of Upper Macedonia Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Gaylor Creek Tributary 6	Confluence with Gaylor Creek	Approximately 4,075 feet upstream of County Road 2286	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Hickory Island Gully	Approximately 3,456 feet downstream of Hatcherville Road.	Approximately 4.2 miles upstream of Hatcherville Road	Regression Equations	HEC-2	6/1986	AE w/ floodway	
Josie Bayou	Approximately 1,540 feet downstream of FM 1011	Approximately 9,690 feet upstream of State Highway 146	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Josie Bayou Tributary 1	Confluence with Josie Bayou	Approximately 4,265 feet upstream of State Highway 146	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Josie Bayou Tributary 2	Confluence with Josie Bayou	Approximately 645 feet upstream of Berryhill Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Josie Bayou Tributary 3	Confluence with Josie Bayou	Approximately 40 feet upstream of Berry Hill Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Josie Bayou Tributary 4	Confluence with Josie Bayou	Approximately 3,780 feet upstream of County Road 2003	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Labbit Creek	Approximately 1,825 feet downstream of County Road 401	Approximately 2,090 feet upstream of County Road 4011	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	AE w/ floodway	
Labbit Creek Tributary 1	Confluence with Labbit Creek	Approximately 765 feet upstream of Lillard Lane	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Lake Liberty Creek	Confluence with Wood Spring Creek	Approximately 150 feet upstream of Mizell Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Lee Gully	Approximately 745 feet downstream of Speights Road	Approximately 3,360 feet upstream of County Road 112	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Linney Creek	Approximately 85 feet downstream of Railroad	Approximately 1,810 feet upstream of FM 686	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Linney Creek Tributary 1	Confluence with Linney Creek	Approximately 2,080 feet upstream of N Winfree Street	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Linney Creek Tributary 2	Confluence with Linney Creek	Approximately 1,7780 feet upstream of N Cleveland Street	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Linney Creek Tributary 3	Confluence with Linney Creek	Approximately 760 feet downstream of North Cleveland Street	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Linney Creek Tributary 4	Confluence with Linney Creek	Approximately 3,795 feet upstream of the confluence with Linney Creek	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Linney Creek Tributary 5	Confluence with Linney Creek	At County Road 6681	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Linney Creek Tributary 6	Confluence with Linney Creek	Approximately 140 feet downstream of State Highway 321	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Little Caney Creek	Approximately 8,120 feet downstream of FM 1409	Approximately 1,230 feet upstream of County Road 411	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	AE w/ floodway	
Little Caney Creek Tributary 1	Confluence with Little Caney Creek	Approximately 230 feet upstream of Forest Brook Street	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Long Island Creek	Confluence with Whites Bayou	Approximately 6,130 feet upstream of FM 770N	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Long John Creek	Approximately 3,435 feet downstream of FM 1008	Just downstream of State Highway 321	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Long John Creek Tributary 1	Confluence with Long John Creek	Approximately 3,120 feet upstream of the confluence with Long John	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Luce Bayou	Approximately 9.1 miles downstream of its confluence with Tarkington Bayou.	Approximately 4.9 miles upstream of State Route 321	SCS Synthetic Frequency Methods	SCS WSP-2	4/1985	AE w/ floodway	
Marsh Branch	Confluence with Tarkington Bayou.	Approximately 1.4 miles upstream of the Atchison Topeka & Santa Fe Railway	SCS Synthetic Frequency Methods	SCS WSP-2	4/1985	AE w/ floodway	
Marsh Branch Tributary No. 1	Confluence with Marsh Branch.	Approximately 1.1 miles upstream of the Atchison, Topeka & Santa Fe Railway	SCS Synthetic Frequency Methods	SCS WSP-2	4/1985	AE w/ floodway	
McMurty Bayou	Approximately 2,440 feet downstream of County Road 2085	Approximately 9,300 feet upstream of County Road 2085	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Menard Creek	Confluence with the Trinity River.	Approximately 5.6 miles upstream of State Route 146	Regression Equations	HEC-2	6/1986	AE w/ floodway	
Old River	Approximately 8,690 feet downstream of FM 1409	Confluence with West Prong Old River	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	AE w/ floodway	
Old River Drain	Confluence with Old River	Approximately 250 feet downstream of FM 1409	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Old River Tributary 3	Confluence with Old River	Approximately 3,560 feet upstream of the confluence with Old River	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Old River Tributary 4	Confluence with Old River	Approximately 9,300 feet upstream of the confluence with Old River	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Old River Tributary 4	Approximately 3,815 feet downstream of the confluence with Old River Tributary 4C	Approximately 11,370 feet upstream of the confluence with Old River Tributary 4C	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Old River Tributary 4A	Confluence with Old River Tributary 4	Approximately 3,195 feet upstream of the confluence with Old River Tributary 4	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Old River Tributary 4B	Confluence with Old River Tributary 4	Approximately 5,160 feet upstream of the confluence with Old River Tributary 4	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Old River Tributary 4C	Confluence with Old River Tributary 4	Approximately 2,440 feet upstream of the confluence with Old River Tributary 4	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Pignut Gully	Confluence with Shiloh Creek	Approximately 7,390 feet upstream of the confluence with Shiloh Creek	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Reese Bayou	Confluence with Tarkington Bayou	Approximately 1.6 miles upstream of Southbound highway 59	SCS Synthetic Frequency Methods	SCS WSP-2	4/1985	AE w/ floodway	
Shiloh Creek	Approximately 1,300 feet downstream of FM 563	Approximately 7,630 feet upstream of FM 563	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Spinks Creek	Approximately 13,160 feet downstream of FM 563	At confluence with Brooks Creek	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Spring Branch	Approximately 6,175 feet downstream of State Highway 61	Approximately 1,015 feet upstream of Hankamer Loop Road	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Tarkington Bayou	Confluence with Luce Bayou	Approximately 3.3 miles upstream of the Atchison, Topeka & Santa Fe Railway	SCS Synthetic Frequency Methods	SCS WSP-2	4/1985	AE w/ floodway	
The Cutoff Tributary 1	Approximately 2,745 feet downstream of County Road 401	Just downstream of County Road 401	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
The Cutoff Tributary 2	Approximately 3,070 feet downstream of County Road 401	Approximately 1,560 feet upstream of County Road 401	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Trinity River	Approximately 55,530 feet downstream of US Highway 90	Approximately 69,560 feet upstream of US Highway 90	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	AE w/ floodway	
Trinity River	Approximately 26.0 miles downstream of U.S. Route 90	Approximately 55,530 feet downstream of U.S. Highway 90	Effective Flows	HEC-2	6/1986	AE w/ floodway	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Trinity River	Approximately 69,560 feet upstream of US Highway 90	Approximately 5.7 miles upstream of the Atchison, Topeka & Santa Fe Railway	Effective Flows	HEC-2	6/1986	AE w/ floodway	
Turkey Creek	Approximately 430 feet upstream of FM 563	Approximately 9,495 feet upstream of FM 563	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Turtle Bayou	Approximately 11,255 feet downstream of County Road 126	Approximately 15,000 feet upstream of County Road 126	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	AE w/ floodway	
Turtle Bayou	Just upstream of Interstate 10	Approximately 7,520 feet upstream of the confluence with Cow Island Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Turtle Bayou	Approximately 21,536 feet downstream of County Road 118	Approximately 6,855 feet upstream of County Road 118	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Turtle Bayou Tributary 1	Confluence with Turtle Bayou	Approximately 3,600 feet upstream of the confluence with Turtle Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Turtle Bayou Tributary 2	Confluence with Turtle Bayou	Approximately 4,330 feet upstream of the confluence with Turtle Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Twin Ditches	Approximately 0.7 mile downstream of Atascocita Road	Approximately 1.2 miles upstream of Atascocita Road	Regression Equations	HEC-2	6/1986	AE w/ floodway	
Unnamed Stream 1	Approximately 45 feet downstream of the county boundary	At county boundary	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Unnamed Stream 1A	Approximately 95 feet upstream of County Road 125	Approximately 370 feet downstream of Liberty Wallisville Road	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Unnamed Stream 2	Approximately 695 feet upstream of the county boundary	Approximately 6,620 feet upstream of the county boundary	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Unnamed Stream 3	Approximately 7,340 feet upstream of the county boundary	Approximately 12,890 feet upstream of the county boundary	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Unnamed Stream 4	Approximately 1,050 feet upstream of FM 770	Approximately 6,600 feet upstream of FM 770	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Unnamed Stream 5	Approximately 1,270 feet upstream of FM 770	Approximately 5,160 feet upstream of FM 770	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Unnamed Stream 6	Approximately 400 feet upstream of Krahl Road	Approximately 8,815 feet upstream of Krahl Road	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Unnamed Stream 7	Approximately 680 feet downstream of County Road 443	Approximately 2,195 feet upstream of County Road 443	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Unnamed Stream 7A	Confluence with Unnamed Stream 7	Approximately 1,200 feet upstream of the confluence with Unnamed Stream 7	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Unnamed Stream 8	Approximately 200 feet upstream of the confluence with Linney Creek	Approximately 3,213 feet upstream of the confluence with Linney Creek	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	
Unnamed Stream 9	Approximately 40 feet upstream of County Road 2257	Approximately 730 feet upstream of County Road 2252	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Upper-East Twin Ditches	Confluence with Twin Ditches	Approximately 800 feet upstream of an access road that is approximately 8.6 miles upstream of its confluence with Twin Ditches	Regression Equations	HEC-2	6/1986	AE w/ floodway	
West Prong Old River	Confluence with Old River	FM 1960 and confluence with East-West Dayton Ditch	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	AO, AE w/ floodway	
West-West Dayton Ditch	Confluence with West Prong Old River	Approximately 7,600 feet upstream of FM 1960	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	AE w/ floodway	
Whiskey Branch	Confluence with East Fork San Jacinto River	Approximately 3.0 miles upstream of State Route 105	SCS Synthetic Frequency Methods	SCS WSP-2	4/1985	AE w/ floodway	
Whites Bayou	Approximately 13,465 feet downstream of Interstate 10	Approximately 14,835 feet upstream of FM 770N	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 1	Confluence with Whites Bayou	Approximately 2,230 feet upstream of Hankamer Loop Road	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Whites Bayou Tributary 2	Confluence with Whites Bayou	Approximately 12,655 feet upstream of the confluence with Whites Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 2A	Confluence with Whites Bayou Tributary 2	Approximately 7,040 feet upstream of the confluence with Whites Bayou Tributary 2	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 2B	Confluence with Whites Bayou Tributary 2	Approximately 3,590 feet upstream of the confluence with Whites Bayou Tributary 2	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 3	Confluence with Whites Bayou	Approximately 3,840 feet upstream of the confluence with Whites Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 4	Confluence with Whites Bayou	Confluence with Whites Bayou Tributary 5	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 5	Confluence with Whites Bayou	Approximately 1,795 feet upstream of Gates Road	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Whites Bayou Tributary 5A	Confluence with Whites Bayou Tributary 5	Approximately 8,100 feet upstream of the confluence with Whites Bayou Tributary 5	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 5A1	Confluence with Whites Bayou Tributary 5A	Just downstream of County Road 105	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 5B	Confluence with Whites Bayou Tributary 5	Approximately 745 feet upstream of County Road 105	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 6	Confluence with Whites Bayou	Approximately 3,015 feet upstream of County Road 117	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 7	Confluence with Whites Bayou	Approximately 5,080 feet upstream of the confluence with Whites Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 8	Confluence with Whites Bayou	Approximately 8,160 feet upstream of the confluence with Whites Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 9	Confluence with Whites Bayou	Approximately 6,100 feet upstream of the confluence with Whites Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	

Flooding Source	Study Limits		Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
	Downstream Limit	Upstream Limit					
Whites Bayou Tributary 10	Confluence with Whites Bayou	Approximately 3,170 feet upstream of the confluence with Whites Bayou	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Whites Bayou Tributary 11	Confluence with Whites Bayou	Approximately 2,630 feet upstream of County Road 1840	XP-SWMM 8.52 and up	XP-SWMM 8.52 and up	6/20/2014	A	
Willow Creek	Approximately 2.4 miles downstream of Hogpen Road	Approximately 2.3 miles upstream of the confluence of Bull Tongue Creek	Regression Equations	HEC-2	6/1986	AE w/ floodway	
Wood Spring Creek	Approximately 530 feet downstream of Sandune Road	Approximately 10,400 feet upstream of McGuire Road	Regression Equations	HEC-RAS 3.1.1 and up	6/20/2014	A	

Table 14: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Abbot Creek	0.05-0.08	0.04-0.12
Barrett Bayou	0.055	0.08-0.12
Barrett Bayou Tributary 1	0.055	0.08-0.12
Barrett Bayou Tributary 2	0.055	0.08-0.12
Batiste Creek	0.065-0.080	0.070-0.095
Big Caney Creek	0.055	0.10-0.16
Big Ditch	0.055	0.10-0.16
Bowie Creek	0.055	0.08-0.12
Bowie Creek Tributary 1	0.055	0.08-0.12
Brooks Creek	0.055	0.10-0.16
Brooks Creek Tributary 1	0.055	0.10-0.16
Brooks Creek Tributary 2	0.055	0.10-0.16
Bull Tongue Creek	0.080-0.090	0.095
Cedar Bayou	0.040-0.065	0.050-0.120
Cherry Creek	0.055	0.10-0.16
Cow Branch	0.060	0.130
Cow Island Bayou	0.055	0.10-0.16
Cow Island Bayou Tributary 1	0.055	0.08-0.12
Cow Island Bayou Tributary 1A	0.055	0.08-0.12
Cow Island Bayou Tributary 2	0.055	0.08-0.12
Cow Island Bayou Tributary 3	0.055	0.10-0.16
Cow Island Bayou Tributary 4	0.055	0.10-0.16
Cow Island Bayou Tributary 5	0.055	0.08-0.12
Crooked Bayou	0.055	0.08-0.12
Crooked Bayou Tributary 1	0.055	0.08-0.12
Crooked Marsh	0.055	0.08-0.12
East Fork San Jacinto River	0.045-0.060	0.075-0.150
East Prong Old River	0.055	0.08-0.12
East Prong Old River Tributary 1	0.055	0.08-0.12
East Prong Old River Tributary 2	0.055	0.10-0.16
East-West Dayton Ditch	0.022-0.033	0.040-0.12
French Bayou	0.055	0.10-0.16

Flooding Source	Channel "n"	Overbank "n"
French Bayou Tributary 1	0.055	0.10-0.16
French Creek	0.055	0.10-0.16
Gaylor Creek	0.055	0.10-0.16
Gaylor Creek Tributary 1	0.055	0.10-0.16
Gaylor Creek Tributary 2	0.055	0.10-0.16
Gaylor Creek Tributary 3	0.055	0.10-0.16
Gaylor Creek Tributary 4	0.055	0.10-0.16
Gaylor Creek Tributary 4A	0.055	0.10-0.16
Gaylor Creek Tributary 5	0.055	0.10-0.16
Gaylor Creek Tributary 6	0.055	0.10-0.16
Hickory Island Gully	0.045-0.050	0.065-0.080
Josie Bayou	0.055	0.08-0.12
Josie Bayou Tributary 1	0.055	0.08-0.12
Josie Bayou Tributary 2	0.055	0.08-0.12
Josie Bayou Tributary 3	0.055	0.08-0.12
Josie Bayou Tributary 4	0.055	0.08-0.12
Labbit Creek	0.05-0.08	0.04-0.12
Labbit Creek Tributary 1	0.055	0.10-0.16
Lake Liberty Creek	0.055	0.08-0.12
Lee Gully	0.055	0.10-0.16
Linney Creek	0.055	0.08-0.12
Linney Creek Tributary 1	0.055	0.08-0.12
Linney Creek Tributary 2	0.055	0.08-0.12
Linney Creek Tributary 3	0.055	0.08-0.12
Linney Creek Tributary 4	0.055	0.08-0.12
Linney Creek Tributary 5	0.055	0.08-0.12
Linney Creek Tributary 6	0.055	0.08-0.12
Little Caney Creek	0.05-0.15	0.04-0.12
Little Caney Creek Tributary 1	0.055	0.08-0.12
Long Island Creek	0.055	0.10-0.16
Long John Creek	0.055	0.08-0.12
Long John Creek Tributary 1	0.055	0.10-0.16
Luce Bayou	0.060-0.085	0.120-0.150
Marsh Bayou	0.065-0.075	0.150

Flooding Source	Channel "n"	Overbank "n"
Marsh Bayou Tributary No. 1	0.065	0.150
McMurty Bayou	0.055	0.08-0.12
Menard Creek	0.040-0.090	0.030-0.100
Old River	0.033-0.045	0.04-0.12
Old River Drain	0.055	0.08-0.12
Old River Tributary 4	0.055	0.10-0.16
Old River Tributary 4A	0.055	0.10-0.16
Old River Tributary 4B	0.055	0.10-0.16
Old River Tributary 4C	0.055	0.08-0.12
Pignut Gully	0.055	0.10-0.16
Shiloh Creek	0.055	0.10-0.16
Spinks Creek	0.055	0.10-0.16
Spring Branch	0.055	0.10-0.16
Tarkington Bayou	0.065-0.075	0.140-0.150
The Cutoff Tributary 1	0.055	0.08-0.12
The Cutoff Tributary 2	0.055	0.08-0.12
Trinity River	0.040-0.060	0.070-0.250
Trinity River	0.033-0.045	0.04-0.12
Trinity River Relief Structures	0.04-0.12	0.04-0.12
Turkey Creek	0.055	0.10-0.16
Turtle Bayou	0.055-0.08	0.04-0.12
Turtle Bayou Tributary 1	0.055	0.08-0.12
Turtle Bayou Tributary 2	0.055	0.08-0.12
Twin Ditches	0.060-0.085	0.060-0.085
Unnamed Stream 1	0.055	0.10-0.16
Unnamed Stream 1A	0.055	0.10-0.16
Unnamed Stream 2	0.055	0.10-0.16
Unnamed Stream 3	0.055	0.10-0.16
Unnamed Stream 4	0.055	0.10-0.16
Unnamed Stream 5	0.055	0.10-0.16
Unnamed Stream 6	0.055	0.08-0.12
Unnamed Stream 7	0.055	0.10-0.16
Unnamed Stream 7A	0.055	0.08-0.12
Unnamed Stream 8	0.055	0.10-0.16

Flooding Source	Channel “n”	Overbank “n”
Unnamed Stream 9	0.055	0.10-0.16
Upper-East Twin Ditch	0.060	0.085
West Prong Old River	0.022-0.08	0.04-0.12
West-West Dayton Ditch	0.022-0.045	0.04-0.12
Whiskey Branch	0.050-0.055	0.130-0.150
Whites Bayou	0.055	0.10-0.16
Whites Bayou Tributary 1	0.055	0.10-0.16
Whites Bayou Tributary 2	0.055	0.08-0.12
Whites Bayou Tributary 2A	0.055	0.08-0.12
Whites Bayou Tributary 2B	0.055	0.08-0.12
Whites Bayou Tributary 3	0.055	0.10-0.16
Whites Bayou Tributary 4	0.055	0.10-0.16
Whites Bayou Tributary 5	0.055	0.10-0.16
Whites Bayou Tributary 5A	0.055	0.08-0.12
Whites Bayou Tributary 5A1	0.055	0.08-0.12
Whites Bayou Tributary 5B	0.055	0.08-0.12
Whites Bayou Tributary 6	0.055	0.08-0.12
Whites Bayou Tributary 7	0.055	0.10-0.16
Whites Bayou Tributary 8	0.055	0.10-0.16
Whites Bayou Tributary 9	0.055	0.10-0.16
Willow Creek	0.065-0.090	0.070-0.095
Wood Spring Creek	0.055	0.08-0.12

5.3 Coastal Analyses

This section is not applicable to this FIS Project

Table 15: Summary of Coastal Analyses

[Not Applicable to this FIS Project]

5.3.1 Total Stillwater Elevations

This section is not applicable to this FIS Project

Figure 8: 1% Annual Chance Total Stillwater Elevations for Coastal Areas

[Not Applicable to this FIS Project]

Table 16: Tide Gage Analysis Specifics

[Not Applicable to this FIS Project]

5.3.2 Waves

This section is not applicable to this FIS Project

5.3.3 Coastal Erosion

This section is not applicable to this FIS Project

5.3.4 Wave Hazard Analyses

This section is not applicable to this FIS Project

Table 17: Coastal Transect Parameters

[Not Applicable to this FIS Project]

Figure 9: Transect Location Map

[Not Applicable to this FIS Project]

5.4 Alluvial Fan Analyses

This section is not applicable to this FIS Project

Table 18: Summary of Alluvial Fan Analyses

[Not Applicable to this FIS Project]

Table 19: Results of Alluvial Fan Analyses

[Not Applicable to this FIS Project]

SECTION 6.0 – MAPPING METHODS

6.1 Vertical and Horizontal Control

All FIS Reports and FIRMs are referenced to a specific vertical datum. The vertical datum provides a starting point against which flood, ground, and structure elevations can be referenced and compared. Until recently, the standard vertical datum used for newly created or revised FIS Reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD29). With the completion of the North American Vertical Datum of 1988 (NAVD88), many FIS Reports and FIRMs are now prepared using NAVD88 as the referenced vertical datum.

Flood elevations shown in this FIS Report and on the FIRMs are referenced to NAVD 88. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between NGVD29 and NAVD88 or other datum conversion, visit the National Geodetic Survey website at www.ngs.noaa.gov, or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

Temporary vertical monuments are often established during the preparation of a flood hazard analysis for the purpose of establishing local vertical control. Although these monuments are not shown on the FIRM, they may be found in the archived project documentation associated with the FIS Report and the FIRM for this community. Interested individuals may contact FEMA to access these data.

To obtain current elevation, description, and/or location information for benchmarks in the area, please contact Information Services Branch of the NGS at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

The datum conversion locations and values that were calculated for Liberty County are provided in Table 20.

Table 20: Countywide Vertical Datum Conversion

Quadrangle Name	Quadrangle Corner	Latitude	Longitude	Conversion from NGVD29 to NAVD88 (feet)
Arizona Creek	SE	-94.62	30.25	-0.01
Bear Creek	SE	-95.12	30.37	-0.01
Capers Ridge	SE	-94.75	30.12	-0.01
Cleveland	SE	-95	30.25	-0.01
Crosby	SE	-95	29.87	0
Daisetta	SE	-94.62	30	-0.01
Davis Hill	SE	-94.75	30.25	-0.01
Dayton	SE	-94.87	30	0

Quadrangle Name	Quadrangle Corner	Latitude	Longitude	Conversion from NGVD29 to NAVD88 (feet)
Devers	SE	-94.5	30	-0.01
Fostoria	SE	-95.12	30.25	-0.01
Goodrich	SE	-94.87	30.5	-0.03
Hardin	SE	-94.62	30.12	-0.01
Huffman	SE	-95	30	0
Liberty	SE	-94.75	30	-0.01
Moss Bluff	SE	-94.75	29.87	-0.01
Plum Grove	SE	-95	30.12	-0.01
Rayburn	SE	-94.87	30.37	-0.02
Romayor	SE	-94.75	30.37	-0.01
Schwab City	SE	-94.75	30.5	-0.01
Sheeks	SE	-94.87	29.87	0
Shiloh	SE	-94.62	29.87	-0.01
Simmons Bottom	SE	-94.87	30.12	-0.01
Tarkington Prairie	SE	-94.87	30.25	-0.01
Thorson Gully	SE	-94.5	30.12	-0.01
Westcott	SE	-95	30.37	-0.01
Whites Bayou	SE	-94.5	29.87	-0.01
Average Conversion from NGVD29 to NAVD88 = -0.01 feet				

Table 21: Stream-by-Stream Vertical Datum Conversion

[Not Applicable to this FIS Project]

6.2 Base Map

The FIRMs and FIS Report for this project have been produced in a digital format. The flood hazard information was converted to a Geographic Information System (GIS) format that meets FEMA’s FIRM database specifications and geographic information standards. This information is provided in a digital format so that it can be incorporated into a local GIS and be accessed more easily by the community. The FIRM Database includes most of the tabular information contained in the FIS Report in such a way that the data can be associated with pertinent spatial features. For example, the information contained in the Floodway Data table and Flood Profiles can be linked to the cross sections that are shown on the FIRMs. Additional information about the FIRM Database and its contents can be found in FEMA’s *FIRM Database Technical Reference*.

Base map information shown on the FIRM was derived from the sources described in Table 22.

Table 22: Base Map Sources

Data Type	Data Provider	Data Date	Data Scale	Data Description
7.5-Minute Series Topographic Maps	U.S. Department of the Interior, Geological Survey	1989	1:24,000	Grid of FIRM panels was derived from USGS quadrangles
Digital Orthophoto	U.S. Department of Agriculture	2012	1:12,000	2012 NAIP Aerial Imagery
High Water Marks	State of Texas	2005	N/A	Surveyed High Water Marks
HUC 8 Subbasins	U.S. Geological Survey	2012	1:24,000	Spatial and attribute information for S_Subbasins
Surface Water for Texas: Peak Streamflow	U.S. Geological Survey	2013	N/A	Spatial and attribute information for S_Gage
Transportation Features	U.S. Department of Commerce, U.S. Census Bureau, Geography Division	2014	1:12,000	Spatial and attribute information for transportation features derived from TIGER data
Water line	Taylor Engineering, Inc.	2006	1:12,000	Spatial and attribute information for S_Wtr_Ln
Water line	U.S. Department of Agriculture	2004	1:12,000	Spatial and attribute information for S_Wtr_Ln

6.3 Floodplain and Floodway Delineation

The FIRM shows tints, screens, and symbols to indicate floodplains and floodways as well as the locations of selected cross sections used in the hydraulic analyses and floodway computations.

For riverine flooding sources, the mapped floodplain boundaries shown on the FIRM have been delineated using the flood elevations determined at each cross section; between cross sections, the boundaries were interpolated using the topographic elevation data described in Table 23.

In cases where the 1% and 0.2% annual chance floodplain boundaries are close together, only the 1% annual chance floodplain boundary has been shown. Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

The floodway widths presented in this FIS Report and on the FIRM were computed for certain stream segments on the basis of equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. Table 2 indicates the flooding sources for which floodways have been determined. The results of the floodway computations for those flooding sources have been tabulated for selected cross sections and are shown in Table 24, "Floodway Data."

Table 23: Summary of Topographic Elevation Data used in Mapping

Community	Flooding Source	Source of Topographic Elevation Data			
		Description	Scale	Contour Interval	Citation
City of Dayton	East Prong Old River, East West Dayton Ditch, French Creek, Linney Creek, Linney Creek Tributary 1, Linney Creek Tributary 2, Linney Creek Tributary 3, Linney Creek Tributary 5, Linney Creek Tributary 6, Old River, Old River Drain, Unnamed Stream 8, West West Dayton Ditch	LiDAR for Lower Trinity Watershed, TX and 3 Meter Digital Elevation Models (DEMs)	1 meter and 3 meter		RAMPP LiDAR and USGS DEMs
City of Dayton Lakes	Trinity River	LiDAR for Lower Trinity Watershed, TX	1 meter		RAMPP LiDAR
City of Devers	Whites Bayou, Whites Bayou Tributary 5	LiDAR for Lower Trinity Watershed, TX and 10 Meter DEMs	1 meter and 10 meter		RAMPP LiDAR and USGS DEMs
City of Hardin	Barrett Bayou Tributary 1, Barrett Bayou Tributary 2, Josie Bayou, Josie Bayou Tributary 3, Josie Bayou Tributary 4	LiDAR for Lower Trinity Watershed, TX and 10 Meter DEMs	1 meter and 10 meter		RAMPP LiDAR and USGS DEMs
City of Liberty	Abbot Creek, Josie Bayou, Lake Liberty Creek, Trinity River, Wood Spring Creek	LiDAR for Lower Trinity Watershed, TX and 10 Meter DEMs	1 meter and 10 meter		RAMPP LiDAR and USGS DEMs
Liberty County,	Barrett Bayou, Barrett Bayou	LiDAR for Lower Trinity	1 meter, 3 meter and		RAMPP LiDAR and

Community	Flooding Source	Source of Topographic Elevation Data			
		Description	Scale	Contour Interval	Citation
Unincorporated Areas	Tributary 1, Barrett Bayou Tributary 2, Big Caney Creek, Big Ditch, Bowie Creek, Bowie Creek Tributary 1, Brooks Creek, Brooks Creek Tributary 1, Brooks Creek Tributary 2, C100, C102, C103, C104, C105, Cherry Creek, Cherry Creek 2, Cherry Creek 3, Cow Island Bayou, Cow Island Bayou Tributary 1, Cow Island Bayou Tributary 1A, Cow Island Bayou Tributary 2, Cow Island Bayou Tributary 3, Cow Island Bayou Tributary 4, Cow Island Bayou Tributary 5, Crooked Bayou, Crooked Bayou Tributary 1, Crooked Marsh, Dry Cherry Creek, East Prong Old River, East Prong Old River Tributary 1, East Prong Old River Tributary 2, East West Dayton Ditch, French Bayou, French	Watershed, TX, 3 Meter and 10 Meter DEMs	10 meter		USGS DEMs

Community	Flooding Source	Source of Topographic Elevation Data			
		Description	Scale	Contour Interval	Citation
	Bayou Tributary 1, French Creek, Gaylor Creek, Gaylor Creek Tributary 1, Gaylor Creek Tributary 2, Gaylor Creek Tributary 3, Gaylor Creek Tributary 4, Gaylor Creek Tributary 4A, Gaylor Creek Tributary 5, Gaylor Creek Tributary 6, Josie Bayou, Josie Bayou Tributary 1, Josie Bayou Tributary 2, Josie Bayou Tributary 3, Labbit Creek, Labbit Creek Tributary 1, Lee Gully, Linney Creek, Linney Creek Tributary 2, Linney Creek Tributary 3, Linney Creek Tributary 4, Linney Creek Tributary 5, Linney Creek Tributary 6, Little Caney Creek, Little Caney Creek Tributary 1, Long Island Creek, Long John Creek, Long John Creek Tributary 1,				

Community	Flooding Source	Source of Topographic Elevation Data			
		Description	Scale	Contour Interval	Citation
	McMurty Bayou, Old River, Old River Drain, Old River Tributary 4, Old River Tributary 4A, Old River Tributary 4B, Old River Tributary 4C, Pignut Gully, Shiloh Creek, Spinks Creek, Spring Branch, The Cutoff Tributary 1, The Cutoff Tributary 2, Trinity River, Turkey Creek, Turtle Bayou, Turtle Bayou Tributary 1, Turtle Bayou Tributary 2, Unnamed Stream 1, Unnamed Stream 1A, Unnamed Stream 2, Unnamed Stream 3, Unnamed Stream 4, Unnamed Stream 5, Unnamed Stream 6, Unnamed Stream 7, Unnamed Stream 7A, Unnamed Stream 9, West Prong Old River, West West Dayton Ditch, Whites Bayou, Whites Bayou Tributary 1, Whites Bayou Tributary 2,				

Community	Flooding Source	Source of Topographic Elevation Data			
		Description	Scale	Contour Interval	Citation
	Whites Bayou Tributary 2A, Whites Bayou Tributary 2B, Whites Bayou Tributary 3, Whites Bayou Tributary 4, Whites Bayou Tributary 5, Whites Bayou Tributary 5A, Whites Bayou Tributary 5A1, Whites Bayou Tributary 5B, Whites Bayou Tributary 6, Whites Bayou Tributary 7, Whites Bayou Tributary 8, Whites Bayou Tributary 9, Whites Bayou Tributary 10, Whites Bayou Tributary 11, Wood Spring Creek				
City of Mont Belvieu	Old River, Old River Tributary 3, Old River Tributary 4	LiDAR for Lower Trinity Watershed, TX	1 meter		RAMPP LiDAR

BFEs shown at cross sections on the FIRM represent the 1% annual chance water surface elevations shown on the Flood Profiles and in the Floodway Data tables in the FIS Report. Rounded whole-foot elevations may be shown on the FIRM in coastal areas, areas of ponding, and other areas with static BFEs.

Table 24: Floodway Data

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	-970	370	1,525	1.4	25.7	21.1 ²	22.0	0.9
B	-465	61	459	4.8	25.7	21.0 ²	22.0	1.0
C	-61	84	473	4.6	25.7	22.3 ²	22.9	0.6
D	73	117	573	3.8	25.7	23.1 ²	23.2	0.1
E	403	244	544	4.0	25.7	23.5 ²	23.7	0.2
F	1,135	86	542	4.0	25.7	25.5 ²	25.6	0.1
G	1,749	86	370	5.9	26.2	26.2	26.2	0.0
H	2,176	53	344	6.3	27.3	27.3	27.8	0.5
I	2,216	56	296	7.4	27.5	27.5	27.8	0.3
J	2,280	119	448	4.9	28.0	28.0	28.6	0.6
K	2,648	286	1,187	1.8	28.6	28.6	29.3	0.7
L	3,003	83	579	3.8	28.9	28.9	29.4	0.5
M	3,089	83	597	3.7	29.3	29.3	29.9	0.6
N	3,346	98	614	3.6	29.6	29.6	30.1	0.5
O	3,779	80	449	4.9	30.0	30.0	30.4	0.4
P	4,343	70	606	3.6	30.8	30.8	31.2	0.4
Q	4,802	58	409	5.3	31.1	31.1	31.4	0.3
R	5,194	70	470	4.6	31.8	31.8	32.1	0.3
S	5,942	81	596	3.0	32.8	32.8	33.0	0.2
T	6,477	55	273	6.5	33.1	33.1	33.3	0.2
U	6,632	57	328	5.4	34.9	34.9	35.0	0.1

¹Feet above Wallisville Road

²Elevation computed without consideration of backwater effects from Trinity River

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: ABBOT CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
ABBOT CREEK (CONTINUED)								
V	6,769 ¹	48	304	5.8	36.3	36.3	36.4	0.1
W	7,447 ¹	54	311	5.7	37.9	37.9	38.0	0.1
X	7,867 ¹	77	480	3.6	39.2	39.2	39.2	0.0
Y	7,987 ¹	89	328	5.3	39.4	39.4	39.4	0.0
Z	8,243 ¹	86	572	2.9	40.1	40.1	40.1	0.0
BATISTE CREEK								
A	1,620 ²	1,356	5,028	1.4	49.9	49.9	50.8	0.9
B	3,770 ²	928	6,264	1.1	51.4	51.4	52.1	0.7
C	6,130 ²	1,100	4,410	1.6	52.6	52.6	53.3	0.7
D	9,420 ²	1,200	8,217	0.9	53.7	53.7	54.6	0.9
BULL TONGUE BAYOU								
A	1,125 ²	266	799	0.9	49.6	46.7 ³	47.6	0.9
B	2,895 ²	200	738	1.0	49.6	48.1 ³	48.9	0.8
C	4,665 ²	100	291	2.1	50.4	50.4	51.2	0.8

¹Feet above Wallisville Road

²Feet above confluence with Willow Creek

³Elevation computed without consideration of backwater effects from Willow Creek

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA FLOODING SOURCE: ABBOT CREEK – BATISTE CREEK – BULL TONGUE BAYOU
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LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH ² (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	128,346	1,913/613	9,501	1.2	35.4	35.4	36.4	1.0
B	129,367	2,436/448	9,391	1.2	35.8	35.8	36.8	1.0
C	130,408	2,442/453	8,714	1.3	36.3	36.3	37.2	0.9
D	131,329	1,980/137	8,259	1.4	36.8	36.8	37.6	0.8
E	132,652	1,335/154	6,314	1.8	37.3	37.3	38.2	0.9
F	133,923	1,496/758	6,593	1.7	38.1	38.1	38.9	0.8
G	135,332	2,113/1,571	5,397	2.1	38.7	38.7	39.4	0.7
H	136,370	2,567/2,035	10,813	1.0	39.2	39.2	39.8	0.6
I	137,537	3,147/2,040	13,177	0.8	39.5	39.5	40.1	0.6
J	138,604	2,823/1,412	9,036	1.2	39.8	39.8	40.3	0.5
K	139,838	2,100/596	6,468	1.7	40.5	40.5	41.0	0.5
L	141,274	2,156/131	5,517	2.0	41.5	41.5	42.1	0.6
M	142,357	2,131/110	6,631	1.6	42.2	42.2	43.0	0.8
N	143,894	3,006/77	9,799	0.8	43.0	43.0	43.8	0.8
O	144,892	2,800/205	7,884	1.0	43.3	43.3	44.1	0.8
P	145,817	2,400/216	6,744	1.2	43.5	43.5	44.4	0.9
Q	147,197	2,500/1,015	7,308	1.1	44.0	44.0	44.9	0.9
R	148,487	3,060/449	10,183	0.8	44.6	44.6	45.5	0.9
S	149,207	3,130/165	9,258	0.9	44.8	44.8	45.7	0.9
T	150,457	3,600/613	7,090	1.2	45.5	45.5	46.3	0.8
U	151,505	3,510/615	4,774	1.7	46.2	46.2	47.0	0.8

¹Feet above confluence with Galveston Bay

²Total floodway width / width within county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: CEDAR BAYOU

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH ² (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CEDAR BAYOU (CONTINUED)								
V	152,575	2,380/558	5,166	1.5	46.8	46.8	47.8	1.0
W	153,553	1,680/804	5,711	1.4	47.3	47.3	48.2	0.9
X	154,795	950/871	4,540	1.7	48.0	48.0	48.8	0.8
Y	155,854	1,100/771	4,269	1.8	48.7	48.7	49.4	0.7
Z	157,631	446/383	3,015	2.6	50.3	50.3	50.7	0.4
AA	159,117	1,208/803	5,921	1.3	51.0	51.0	51.6	0.6
AB	160,314	819/785	4,527	1.7	51.5	51.5	52.0	0.5
AC	161,176	797/554	5,418	1.5	51.9	51.9	52.4	0.5
AD	162,357	439/80	2,373	2.9	52.2	52.2	52.7	0.5
AE	163,197	535/68	2,736	2.5	52.8	52.8	53.4	0.6
AF	164,595	1,165/359	4,355	1.6	53.5	53.5	54.2	0.7
AG	165,591	170/87	1,479	4.6	54.1	54.1	54.8	0.7
AH	167,059	290/131	2,397	2.9	56.5	56.5	56.8	0.3
AI	168,356	953/469	4,650	1.4	56.9	56.9	57.5	0.6
AJ	169,267	772/247	3,999	1.7	57.2	57.2	57.8	0.6
AK	170,369	532/206	3,009	2.2	57.5	57.5	58.1	0.6
AL	171,625	650/609	4,014	1.6	57.9	57.9	58.7	0.8
AM	172,755	498/412	2,960	2.1	58.3	58.3	59.0	0.7
AN	173,986	518/455	1,883	3.3	59.0	59.0	59.6	0.6

¹Feet above confluence with Galveston Bay

²Total floodway width / width within county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: CEDAR BAYOU

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CEDAR BAYOU (CONTINUED)								
AO	174,939	1,351/649 ²	7,015	0.9	59.5	59.5	60.2	0.7
AP	176,299	776/725 ²	2,929	2.0	59.8	59.8	60.5	0.7
AQ	177,321	616/524 ²	1,896	3.1	60.3	60.3	60.9	0.6
AR	178,351	818/737 ²	4,924	1.2	60.7	60.7	61.5	0.8
AS	179,513	1,606/1,191 ²	6,549	0.9	61.0	61.0	61.8	0.8
AT	180,578	2,179/1,487 ²	7,329	0.8	61.2	61.2	62.0	0.8
AU	181,673	3,165/1,924 ²	10,985	0.5	61.4	61.4	62.1	0.7
AV	182,706	3,058/2,278 ²	9,263	0.5	61.5	61.5	62.2	0.7
AW	183,808	2,905/2,407 ²	8,179	0.6	61.6	61.6	62.3	0.7
AX	184,886	2,953/2,710 ²	9,612	0.5	61.7	61.7	62.5	0.8
AY	186,078	3,064/2,352 ²	9,353	0.5	61.8	61.8	62.5	0.7
AZ	210,333	437 ³	1,673	2.6	71.7	71.7	72.7	1.0
BA	212,033	548	2,237	1.9	72.9	72.9	73.9	1.0
BB	214,833	844	3,055	1.3	74.0	74.0	75.0	1.0
BC	216,933	805	2,918	1.3	74.6	74.6	75.6	1.0
BD	217,533	838	2,885	1.3	74.8	74.8	75.8	1.0
BE	219,133	705	2,470	1.5	75.4	75.4	76.4	1.0
BF	221,933	713	2,307	1.5	76.5	76.5	77.5	1.0
BG	224,833	420	1,755	2.0	77.9	77.9	78.9	1.0

¹Feet above confluence with Galveston Bay

²Total floodway width / width within county boundary

³This width extends beyond county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: CEDAR BAYOU

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CEDAR BAYOU (CONTINUED)								
BH	225,333 ¹	682	1,877	1.9	78.2	78.2	79.2	1.0
BI	225,653 ¹	668	2,284	1.6	78.4	78.4	79.4	1.0
BJ	226,133 ¹	957	3,450	1.0	78.6	78.6	79.6	1.0
BK	227,553 ¹	1,235	4,571	0.8	78.8	78.8	79.8	1.0
BL	229,033 ¹	534	2,608	1.2	79.0	79.0	80.0	1.0
BM	229,633 ¹	736	3,051	0.8	79.1	79.1	80.1	1.0
BN	231,533 ¹	400	1,043	1.2	79.5	79.5	80.4	0.9
BO	235,373 ¹	175	829	1.6	81.0	81.0	81.9	0.9
BP	237,473 ¹	85	444	2.0	81.9	81.9	82.9	1.0
COW BRANCH								
A	6,200 ²	143	1,063	3.4	101.3	99.8 ³	100.8	1.0
B	9,800 ²	268	1,647	2.2	106.1	106.1	107.1	1.0
C	12,000 ²	107	817	4.5	111.3	111.3	112.3	1.0

¹Feet above confluence with Galveston Bay

²Feet above confluence with East Fork San Jacinto River

³Elevation computed without consideration of backwater effects from East Fork San Jacinto River

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: CEDAR BAYOU – COW BRANCH

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	-3,009	1,717 ²	23,123	2.4	85.0	85.0	86.0	1.0
B	2,517	2,975 ²	29,949	1.9	89.1	89.1	90.1	1.0
C	7,267	1,877	24,234	2.2	93.3	93.3	94.3	1.0
D	11,062	2,502	34,701	1.5	94.7	94.7	95.7	1.0
E	12,362	3,242	37,612	1.4	95.4	95.4	96.4	1.0
F	14,162	4,616	41,263	1.3	96.2	96.2	97.2	1.0
G	14,302	3,372	34,958	1.5	96.4	96.4	97.4	1.0
H	18,162	1,777	27,138	1.9	98.6	98.6	99.6	1.0
I	22,462	2,753	41,960	1.3	99.7	99.7	100.7	1.0
J	29,062	2,184	29,422	1.8	103.9	103.9	104.9	1.0
K	31,962	2,063	31,763	1.7	105.5	105.5	106.5	1.0
L	35,212	1,561	25,695	2.1	107.3	107.3	108.3	1.0
M	37,362	1,923	30,638	1.8	108.6	108.6	109.6	1.0
N	41,062	1,363	24,243	2.2	111.6	111.6	112.6	1.0
O	43,932	1,942	31,459	1.7	112.9	112.9	113.9	1.0
P	50,312	3,277	38,603	1.4	116.3	116.3	117.3	1.0
Q	55,812	3,641	33,884	1.6	119.5	119.5	120.5	1.0
R	63,482	5,867	45,534	1.2	124.2	124.2	125.2	1.0
S	67,262	6,448	50,541	1.1	125.9	125.9	126.9	1.0
T	71,702	3,332 ²	37,499	1.5	128.1	128.1	129.1	1.0
U	76,262	4,887 ²	43,570	1.3	130.5	130.5	131.5	1.0

¹Feet above county boundary

²This width extends beyond county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: EAST FORK SAN JACINTO RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
EAST FORK SAN JACINTO RIVER (CONTINUED)								
V	77,922	5,850 ²	35,224	1.6	132.0	132.0	133.0	1.0
W	78,072	6,060 ²	42,534	1.3	133.2	133.2	134.2	1.0
X	79,752	6,210 ²	46,259	1.2	134.1	134.1	135.1	1.0
Y	79,872	5,710 ²	42,669	1.3	134.4	134.4	135.4	1.0
Z	84,362	4,928	39,821	1.4	136.3	136.3	137.3	1.0
AA	87,112	5,353	41,910	1.3	137.7	137.7	138.7	1.0
AB	87,782	5,406	45,631	1.2	138.2	138.2	139.2	1.0
AC	90,802	4,968	43,943	1.2	139.7	139.7	140.7	1.0
AD	93,802	6,201	44,648	1.2	141.7	141.7	142.7	1.0

¹Feet above county boundary

²Combined East Fork San Jacinto River/Whiskey Branch floodway

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: EAST FORK SAN JACINTO RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	2,016	84	492	2.9	63.8	63.8	64.6	0.8
B	2,303	84	451	3.1	64.6	64.6	65.5	0.9
C	2,468	84	509	2.8	64.9	64.9	65.7	0.8
D	3,348	61	341	2.3	65.4	65.4	66.0	0.6
E	5,082	98	241	3.2	66.0	66.0	66.6	0.6
F	5,239	76	259	3.0	66.2	66.2	66.7	0.5
G	5,398	60	244	3.2	66.3	66.3	66.9	0.6
H	6,075	77	234	3.1	66.8	66.8	67.4	0.6
I	6,511	68	228	3.1	67.1	67.1	67.7	0.6
J	8,459	93	211	3.4	68.7	68.7	68.9	0.2
K	9,020	63	203	3.5	69.1	69.1	69.2	0.1
L	9,138	72	250	2.9	70.1	70.1	70.3	0.2
M	9,490	85	257	2.8	70.3	70.3	70.4	0.1
N	9,581	70	244	2.9	70.3	70.3	70.5	0.2
O	9,899	64	230	3.1	70.5	70.5	70.6	0.1
P	10,025	72	280	2.5	71.3	71.3	71.5	0.2
Q	10,309	68	237	3.0	71.4	71.4	71.6	0.2
R	11,525	90	232	2.1	72.0	72.0	72.1	0.1
S	13,367	42	131	3.6	72.6	72.6	72.7	0.1
T	13,829	48	135	3.6	73.0	73.0	73.1	0.1
U	13,923	68	262	1.8	75.0	75.0	75.0	0.0

¹Feet above confluence with West Prong Old River and West West Dayton Ditch

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: EAST WEST DAYTON DITCH

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
EAST WEST DAYTON DITCH (CONTINUED)								
V	14,783	94	185	2.6	75.2	75.2	75.2	0.0
W	14,973	108	186	2.6	75.3	75.3	75.3	0.0
X	15,819	67	160	3.0	75.8	75.8	75.8	0.0
Y	15,949	91	183	2.6	76.6	76.6	76.6	0.0
Z	16,430	137	205	1.6	76.8	76.8	76.8	0.0
AA	16,689	63	160	2.0	76.9	76.9	77.0	0.1
AB	17,657	81	146	2.2	77.2	77.2	77.2	0.0
AC	18,832	84	149	2.1	77.7	77.7	77.7	0.0
AD	19,897	62	114	2.8	78.2	78.2	78.2	0.0
AE	20,525	62	111	2.9	78.8	78.8	78.8	0.0
AF	22,167	60	108	3.0	80.4	80.4	80.5	0.1
AG	23,181	66	123	2.6	81.5	81.5	81.5	0.0
AH	24,077	53	78	1.0	82.1	82.1	82.1	0.0
AI	24,249	50	80	1.0	82.8	82.8	82.8	0.0
AJ	25,112	46	28	2.7	83.1	83.1	83.1	0.0
AK	26,907	52	35	2.2	86.5	86.5	86.5	0.0

¹Feet above confluence with West Prong Old River and West West Dayton Ditch

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: EAST WEST DAYTON DITCH

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	100	672 ²	1,635	0.9	35.5	35.5	36.3	0.8
B	2,610	820	1,803	0.8	36.3	36.3	37.2	0.9
C	3,350	820	1,871	0.8	36.6	36.6	37.4	0.8
D	3,580	700	1,987	0.7	37.4	37.4	38.2	0.8
E	5,460	650	2,006	0.6	37.7	37.7	38.6	0.9
F	7,550	380	1,071	1.1	38.5	38.5	39.2	0.7
G	9,270	400	1,058	1.1	39.2	39.2	40.0	0.8
H	12,430	130	384	2.6	41.1	41.1	42.1	1.0
I	14,370	82	357	2.2	43.8	43.8	44.1	0.3
J	16,870	80	301	2.6	45.9	45.9	46.7	0.8
K	19,740	80	312	1.9	48.5	48.5	49.4	0.9
L	22,790	82	245	2.4	51.8	51.8	52.0	0.2
M	25,790	100	315	1.2	53.0	53.0	53.6	0.6

¹Feet above county boundary

²This width extends beyond county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: HICKORY ISLAND GULLY

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	287	35	192	5.3	15.4	9.2 ²	9.7	0.5
B	665	52	232	4.4	15.4	10.3 ²	10.9	0.6
C	756	52	449	2.3	15.4	14.9 ²	15.7	0.8
D	938	93	704	1.4	15.4	14.9 ²	15.8	0.9
E	1,156	77	607	1.7	15.4	15.0 ²	15.8	0.8
F	1,650	59	325	3.1	15.4	15.1 ²	16.0	0.9
G	1,735	63	360	1.6	20.5	20.5	20.9	0.4
H	1,941	78	739	1.4	20.6	20.6	21.0	0.4
I	2,514	86	490	2.1	20.6	20.6	21.0	0.4
J	3,204	40	238	4.3	20.9	20.9	21.3	0.4
K	3,537	84	439	1.5	21.5	21.5	21.8	0.3
L	3,652	94	485	1.4	27.0	27.0	27.0	0.0
M	3,998	110	406	1.6	27.0	27.0	27.0	0.0
N	5,040	60	200	3.3	27.5	27.5	27.5	0.0
O	5,696	44	97	6.9	29.4	29.4	29.4	0.0

¹Feet above county boundary

²Elevation computed without consideration of backwater effects from Trinity River

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: LABBIT CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	3	146	613	2.1	15.4	10.4 ²	11.0	0.6
B	773	49	223	5.6	15.4	10.8 ²	11.5	0.7
C	1,585	60	337	3.7	15.4	13.4 ²	14.0	0.6
D	1,712	60	496	2.5	16.4	16.4	16.9	0.5
E	2,364	143	924	1.4	16.6	16.6	17.5	0.9
F	3,042	110	563	2.2	17.0	17.0	17.9	0.9
G	4,175	96	393	3.2	18.9	18.9	19.5	0.6
H	5,067	68	395	1.7	20.2	20.2	20.9	0.7
I	5,798	26	123	5.5	20.7	20.7	21.5	0.8
J	7,481	54	199	3.4	26.1	26.1	26.2	0.1
K	8,794	47	171	3.9	28.5	28.5	28.5	0.0
L	9,798	49	154	4.3	30.9	30.9	30.9	0.0
M	10,390	49	244	2.7	31.8	31.8	31.9	0.1
N	10,512	49	205	3.2	32.9	32.9	33.6	0.7
O	10,786	41	214	3.1	33.4	33.4	34.1	0.7
P	11,229	52	229	2.9	33.9	33.9	34.5	0.6
Q	11,627	45	209	3.2	34.3	34.3	34.9	0.6

¹Feet above county boundary

²Elevation computed without consideration of backwater effects from Trinity River

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: LITTLE CANEY CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	5,500	467	6,758	2.5	71.5	71.5	72.5	1.0
B	10,960	1,773	12,359	1.4	73.8	73.8	74.8	1.0
C	17,670	1,277	13,659	1.2	76.1	76.1	77.1	1.0
D	21,340	622	7,903	2.1	78.5	78.5	79.5	1.0
E	26,040	914	10,909	1.5	80.7	80.7	81.7	1.0
F	31,230	618	8,266	2.0	83.5	83.5	84.5	1.0
G	39,350	953	10,955	1.5	87.6	87.6	88.6	1.0
H	48,030	728	10,098	1.7	91.8	91.8	92.8	1.0
I	52,900	330	3,004	1.9	91.8	87.4 ²	88.4	1.0
J	58,650	1,670	8,792	0.7	91.8	89.8 ²	90.8	1.0
K	63,400	723	5,108	1.1	92.1	92.1	93.1	1.0
L	70,450	1,514	8,638	0.7	95.3	95.3	96.3	1.0
M	73,820	1,813	8,622	0.7	96.8	96.8	97.8	1.0
N	73,990	2,400	10,624	0.5	97.5	97.5	98.5	1.0
O	80,900	1,711	7,385	0.5	99.8	99.8	100.8	1.0
P	84,650	2,902	9,518	0.4	101.2	101.2	102.2	1.0
Q	86,100	3,202	11,250	0.4	101.6	101.6	102.6	1.0
R	90,900	2,450	8,195	0.5	103.0	103.0	104.0	1.0
S	95,250	849	3,114	0.9	109.2	109.2	110.2	1.0
T	99,900	921	3,508	0.8	114.1	114.1	115.1	1.0

¹Feet above county boundary

²Elevation computed without consideration of backwater effects from Tarkington Bayou

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: LUCE BAYOU

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	4,100	2,710 ²	5,191	0.9	117.6	115.5 ³	116.5	1.0
B	7,180	2,900 ²	6,266	0.7	120.1	188.3 ³	119.3	1.0
C	7,280	3,120 ²	7,305	0.6	120.3	188.3 ³	119.3	1.0
D	11,080	4,560 ²	7,666	0.6	122.0	120.1 ³	121.1	1.0
E	13,960	6,900 ²	6,504	0.7	123.9	122.1 ³	123.1	1.0
F	20,000	685	4,083	1.0	125.0	125.0	126.0	1.0
G	23,690	723	3,839	1.0	126.5	126.5	127.5	1.0
H	23,880	876	5,102	0.8	127.2	127.2	128.2	1.0
I	30,150	1,204	5,047	0.6	130.5	130.5	131.5	1.0
J	39,100	823	3,223	1.0	138.0	138.0	139.0	1.0
K	44,250	748	3,224	1.0	144.5	144.5	145.5	1.0
L	44,350	726	3,355	0.9	144.7	144.7	145.7	1.0
M	44,550	577	2,941	1.0	145.8	145.8	146.8	1.0
N	47,280	224	1,387	1.6	148.1	148.1	149.1	1.0
O	47,400	314	2,024	1.1	149.1	149.1	150.1	1.0
P	50,130	593	3,042	0.7	150.5	150.5	151.5	1.0
Q	51,940	720	2,769	0.7	152.9	152.9	153.9	1.0
R	57,400	911	2,382	0.8	159.3	159.3	160.3	1.0

¹Feet above confluence with Tarkington Bayou

²Combined Tarkington Bayou/Marsh Branch floodway

³Elevation computed without consideration of backwater effects from Tarkington Bayou

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: MARSH BRANCH

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	4,240	401	916	0.9	148.0	147.7 ²	148.7	1.0
B	4,360	411	981	0.8	148.0	147.9 ²	148.9	1.0
C	10,380	1,155	2,235	0.4	153.2	153.2	154.2	1.0
D	10,530	2,038	6,262	0.1	154.4	154.4	155.4	1.0
E	11,750	388	1,130	0.6	155.1	155.1	156.1	1.0
F	12,140	537	1,562	0.4	155.1	155.1	156.1	1.0
G	16,180	372	908	0.5	157.9	157.9	158.6	0.7

¹Feet above confluence with Marsh Branch

²Elevation computed without consideration of backwater effects from Marsh Branch

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: MARSH BRANCH TRIBUTARY NO. 1

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	22,360	283	5,121	5.3	91.8	91.8	92.8	1.0
B	24,200	447	8,497	3.2	93.8	93.8	94.8	1.0
C	25,880	824	15,232	1.8	94.2	94.2	95.2	1.0
D	28,820	503	8,638	3.2	94.8	94.8	95.8	1.0
E	29,075	504	7,699	3.4	95.3	95.3	96.3	1.0
F	32,035	571	10,097	2.6	96.4	96.4	97.4	1.0
G	35,235	677	11,110	2.0	97.9	97.9	98.9	1.0
H	36,235	499	8,086	2.8	98.5	98.5	99.5	1.0
I	37,985	505	8,151	2.7	99.4	99.4	100.4	1.0
J	39,485	868	12,853	1.7	100.2	100.2	101.2	1.0
K	40,905	414	4,529	4.9	100.8	100.8	101.8	1.0
L	41,185	530	4,920	4.5	101.7	101.7	102.7	1.0
M	43,905	760	9,794	2.3	105.0	105.0	105.8	0.8
N	46,605	363	5,894	3.8	107.2	107.2	108.1	0.9
O	51,675	1,143	14,536	1.5	109.5	109.5	110.4	0.9
P	52,775	382	5,224	4.3	110.0	110.0	110.9	0.9
Q	53,375	374	4,263	5.2	111.3	111.3	112.2	0.9
R	53,770	408	5,064	4.4	112.7	112.7	112.7	0.0
S	55,120	548	7,077	3.2	114.2	114.2	114.2	0.0
T	56,820	240	3,734	6.0	115.4	115.4	115.4	0.0
U	59,950	594	9,575	2.3	119.0	119.0	119.0	0.0
V	60,290	596	9,705	2.2	119.2	119.2	119.2	0.0

¹Feet above confluence with Trinity River

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: MENARD CREEK

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	74	71	714	3.4	15.0	8.5 ²	9.2	0.7
B	1,801	80	686	3.1	15.0	9.0 ²	9.9	0.9
C	2,804	76	549	3.9	15.0	9.5 ²	10.3	0.8
D	5,550	75	588	3.6	15.0	11.2 ²	12.0	0.8
E	6,929	146	868	2.1	15.0	11.8 ²	12.8	1.0
F	8,360	59	401	4.6	15.0	12.5 ²	13.7	1.2
G	11,037	78	578	3.2	15.0	14.5 ²	15.7	1.2
H	13,040	73	340	5.5	16.6	16.6	17.3	0.7
I	15,169	63	340	5.5	21.8	21.8	22.0	0.2
J	16,341	79	461	4.0	23.4	23.4	23.9	0.5
K	17,161	84	454	4.1	24.3	24.3	24.7	0.4
L	18,319	38	215	8.6	26.4	26.4	26.6	0.2
M	19,564	59	392	4.8	29.6	29.6	30.4	0.8
N	20,478	72	422	4.4	31.0	31.0	31.6	0.6
O	21,145	74	435	3.6	32.0	32.0	32.4	0.4
P	21,937	84	476	3.3	32.1	32.1	32.5	0.4
Q	22,840	97	538	2.0	32.7	32.7	33.0	0.3
R	24,412	43	201	5.4	33.4	33.4	33.6	0.2
S	25,732	59	276	3.9	36.0	36.0	36.2	0.2
T	26,587	78	375	2.9	36.9	36.9	37.1	0.2
U	27,333	79	439	2.5	37.3	37.3	37.5	0.2

¹Feet above Chambers/Liberty county boundary

²Elevation computed without consideration of backwater effects from Trinity River

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: OLD RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
OLD RIVER (CONTINUED)								
V	27,498	140	754	1.4	40.6	40.6	41.2	0.6
W	28,719	132	629	1.7	40.9	40.9	41.5	0.6
X	29,136	93	496	2.2	41.1	41.1	41.6	0.5
Y	30,133	60	379	2.9	41.5	41.5	41.9	0.4
Z	31,840	63	362	3.0	42.3	42.3	42.8	0.5
AA	33,502	107	437	1.8	43.3	43.3	43.6	0.3
AB	35,356	52	258	1.7	43.8	43.8	44.1	0.3
AC	36,862	65	294	1.5	44.1	44.1	44.4	0.3
AD	37,425	62	234	1.9	44.2	44.2	44.5	0.3
AE	37,542	65	331	1.3	44.9	44.9	45.7	0.8
AF	38,012	54	262	1.7	45.0	45.0	45.7	0.7
AG	38,909	57	219	2.0	45.4	45.4	46.0	0.6
AH	39,738	141	344	1.3	45.8	45.8	46.3	0.5
AI	40,160	103	299	1.5	46.0	46.0	46.4	0.4
AJ	40,327	155	432	0.4	46.0	46.0	46.4	0.4
AK	40,902	63	180	0.9	46.1	46.1	46.4	0.3
AL	41,124	99	203	0.8	46.1	46.1	46.5	0.4
AM	41,457	64	146	1.2	46.2	46.2	46.5	0.3
AN	41,585	84	143	1.2	46.2	46.2	46.6	0.4

¹Feet above Chambers/Liberty county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: OLD RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
OLD RIVER (CONTINUED)								
AO	42,902	68	96	1.7	47.1	47.1	47.2	0.1
AP	43,556	76	125	1.4	47.6	47.6	47.6	0.0
AQ	43,665	111	161	1.0	48.0	48.0	48.0	0.0
AR	43,810	163	242	0.7	49.4	49.4	49.4	0.0
AS	44,751	106	105	1.6	49.5	49.5	49.6	0.1
AT	46,037	53	97	1.7	50.1	50.1	50.3	0.2
AU	46,616	127	197	0.9	50.4	50.4	50.5	0.1
AV	46,947	152	777	0.2	54.3	54.3	55.3	1.0
AW	47,072	152	842	0.2	54.4	54.4	55.3	0.9
AX	47,304	730	2691	0.1	54.4	54.4	55.3	0.9

¹Feet above Chambers/Liberty county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: OLD RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	4930	458	2,351	1.3	144.7	144.7	145.7	1.0
B	10640	1,977	5,454	0.6	148.7	148.7	149.7	1.0
C	10760	2,654	12,016	0.3	150.1	150.1	151.1	1.0
D	12100	1,594	4,930	0.6	151.1	151.1	152.1	1.0
E	12200	2,676	8,928	0.3	153.3	153.3	154.3	1.0
F	14400	326	2,081	1.4	154.9	154.9	155.9	1.0
G	15670	577	2,944	1.0	156.0	156.0	157.0	1.0
H	15730	606	3,134	0.9	156.2	156.2	157.2	1.0
I	16170	451	2,363	1.3	156.6	156.6	157.6	1.0
J	16230	546	2,700	1.1	156.7	156.7	157.7	1.0
K	17650	1,175	4,620	0.6	157.3	157.3	158.3	1.0
L	17750	1,944	8,686	0.3	158.5	158.5	159.5	1.0
M	17850	1,944	6,559	0.5	159.0	159.0	160.0	1.0
N	18120	1,407	6,598	0.5	159.4	159.4	160.4	1.0
O	20800	305	2,189	1.4	162.5	162.5	163.5	1.0
P	21450	700	3,900	0.8	163.0	163.0	164.0	1.0
Q	22475	326	2,146	1.3	164.2	164.2	165.2	1.0
R	22360	663	3,598	0.8	164.8	164.8	165.8	1.0
S	23440	676	3,973	10.7	164.9	164.9	165.9	1.0

¹Feet above confluence with Tarkington Bayou

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: REESE BAYOU

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	4,900	2,178	15,649	0.7	91.8	91.8	92.8	1.0
B	9,880	1,400	12,669	0.9	92.1	92.1	93.1	1.0
C	16,200	2,271	14,237	0.8	94.0	94.0	95.0	1.0
D	19,500	1,591	10,123	1.1	96.0	96.0	97.0	1.0
E	23,250	2,275	12,536	0.9	97.8	97.8	98.8	1.0
F	26,100	1,479	9,544	1.2	99.6	99.6	100.6	1.0
G	32,600	1,364	11,006	1.0	102.4	102.4	103.4	1.0
H	35,600	1,654	10,428	1.1	104.2	104.2	105.2	1.0
I	40,200	1,767	11,232	1.0	107.0	107.0	108.0	1.0
J	44,200	1,296	10,019	1.1	110.0	110.0	111.0	1.0
K	47,450	2,603	14,300	0.8	111.8	111.8	112.8	1.0
L	50,770	2,248	11,873	1.0	114.1	114.1	115.1	1.0
M	55,850	2,710 ²	11,913	1.0	117.6	117.6	118.6	1.0
N	59,190	2,900 ²	13,156	0.9	120.1	120.1	121.1	1.0
O	59,290	3,120 ²	15,157	0.8	120.3	120.3	121.3	1.0
P	61,950	4,560 ²	15,147	0.8	122.0	122.0	123.0	1.0
Q	65,250	6,900 ²	19,033	0.6	123.9	123.9	124.9	1.0
R	68,700	2,363	8,973	0.9	127.1	127.1	128.1	1.0
S	72,000	2,241	9,862	0.8	129.6	129.6	130.6	1.0
T	74,485	2,367	8,838	0.9	132.6	132.6	133.6	1.0
U	74,650	1,792	7,995	1.0	133.7	133.7	134.7	1.0

¹Feet above confluence with Luce Bayou

²Combined Tarkington Bayou / Marsh Branch floodway

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: TARKINGTON BAYOU

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TARKINGTON BAYOU (CONTINUED)								
V	79,950 ¹	660	5,130	1.6	139.0	139.0	140.0	1.0
W	88,250 ¹	1,748	9,792	0.9	143.0	143.0	144.0	1.0
X	93,240 ¹	1,223	6,832	0.9	145.4	145.4	146.4	1.0
Y	93,360 ¹	1,103	9,152	0.7	146.4	146.4	147.4	1.0
Z	96,050 ¹	2,021	8,661	0.7	147.7	147.7	148.7	1.0
AA	96,150 ¹	2,566	16,095	0.4	149.1	149.1	150.1	1.0
AB	101,400 ¹	1,970	8,529	0.8	151.6	151.6	152.6	1.0
AC	108,100 ¹	1,294	6,251	1.1	157.4	157.4	158.4	1.0
TRINITY RIVER								
A	9,895 ²	19,853	173,816	0.7	15.8	15.8	15.8	0.0
B	40,999 ²	13,914	147,044	0.9	20.0	20.0	20.0	0.0
C	88,859 ²	20,446	293,838	0.4	24.3	24.3	24.3	0.0
D	97,029 ²	21,336	233,115	0.5	24.6	24.6	24.6	0.0
E	113,141 ²	17,583	166,834	0.8	25.0	25.0	25.2	0.2
F	119,731 ²	21,464	198,030	0.6	25.3	25.3	25.6	0.3
G	122,397 ²	20,541	198,313	0.6	25.5	25.5	25.8	0.3
H	125,193 ²	12,805	122,156	1.0	25.6	25.6	26.0	0.4

¹Feet above confluence with Luce Bayou

²Feet above county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: TARKINGTON BAYOU – TRINITY RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TRINITY RIVER (CONTINUED)								
I	135,114	15,537	149,761	0.9	26.0	26.0	26.5	0.5
J	135,673	15,538	148,694	0.9	26.5	26.5	26.9	0.4
K	135,759	13,882	143,082	0.9	26.5	26.5	27.0	0.5
L	137,317	13,947	144,983	0.9	26.9	26.9	27.3	0.4
M	139,394	15,211	131,728	1.0	26.9	26.9	27.4	0.5
N	145,032	9,400	66,412	1.9	27.4	27.4	28.0	0.6
O	151,991	5,598	51,476	2.5	30.2	30.2	31.1	0.9
P	153,611	14,440	136,586	0.9	31.0	31.0	31.9	0.9
Q	158,622	13,338	112,659	1.1	31.8	31.8	32.7	0.9
R	165,215	22,242	188,972	0.7	32.3	32.3	33.2	0.9
S	167,679	22,242	204,758	0.6	32.7	32.7	33.6	0.9
T	182,429	20,465	128,359	1.0	33.5	33.5	34.4	0.9
U	198,552	23,383	227,165	0.6	35.2	35.2	36.1	0.9
V	216,936	20,826	157,028	0.8	38.5	38.5	39.5	1.0
W	232,090	12,200	85,438	1.5	41.8	41.8	42.7	0.9
X	238,426	18,700	105,890	1.2	44.6	44.6	45.5	0.9
Y	267,149	17,300	143,618	0.9	50.1	50.1	51.0	0.9
Z	279,684	13,800	100,064	1.3	53.0	53.0	53.8	0.8
AA	281,754	12,800	114,293	1.1	53.6	53.6	54.5	0.9

¹Feet above county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: TRINITY RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TRINITY RIVER (CONTINUED)								
AB	293,864	19,240	165,904	0.8	55.8	55.8	56.8	1.0
AC	316,568	18,053	137,804	0.9	58.7	58.7	59.7	1.0
AD	334,414	20,291	200,414	0.6	60.7	60.7	61.7	1.0
AE	347,056	26,453	206,600	0.6	62.1	62.1	63.1	1.0
AF	368,892	26,200	132,864	1.0	65.4	65.4	66.4	1.0
AG	377,762	11,425	46,760	2.7	68.6	68.6	69.6	1.0
AH	386,835	12,470	68,391	1.9	72.1	72.1	73.0	0.9
AI	390,041	12,970	95,621	1.3	73.4	73.4	74.2	0.8
AJ	411,081	18,600 ²	136,905	0.9	76.9	76.9	77.7	0.8

¹Feet above county boundary

²This width extends beyond county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: TRINITY RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	1,287	1,179	2,554	1.5	31.0	31.0	32.0	1.0
B	6,085	2,333	8,377	0.5	33.2	33.2	34.2	1.0
C	7,669	3,007	9,214	0.4	33.6	33.6	34.5	0.9
D	9,197	2,896	8,486	0.4	33.7	33.7	34.6	0.9
E	11,149	1,164	2,512	1.3	33.7	33.7	34.7	1.0
F	12,429	2,405	4,986	0.6	35.8	35.8	36.1	0.3
G	12,604	2,399	5,672	0.5	35.8	35.8	36.1	0.3
H	14,258	1,922	3,651	0.8	36.0	36.0	36.4	0.4
I	15,898	2,381	4,586	0.7	36.7	36.7	37.3	0.6
J	17,857	395	975	3.1	37.7	37.7	38.5	0.8
K	18,366	405	1,637	1.8	38.9	38.9	39.8	0.9
L	20,951	1,431	3,142	1.0	40.4	40.4	41.4	1.0
M	22,524	1,051	2,671	1.1	41.0	41.0	41.9	0.9
N	25,088	1,151	3,573	0.8	42.1	42.1	43.0	0.9
O	27,385	593	2,062	1.5	43.0	43.0	43.9	0.9

¹Feet above county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: TURTLE BAYOU

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TWIN DITCHES								
A	4,000	785	590	2.5	61.3	61.3	62.3	1.0
B	5,100	685	1339	1.1	63.0	63.0	63.6	0.6
C	6,400	859	1247	1.2	64.0	64.0	64.4	0.4
D	7,650	1310	1420	1.0	64.7	64.7	65.2	0.5
E	7,750	1310	1449	1.0	64.7	64.7	65.2	0.5
F	10,150	1007	1442	1.0	65.4	65.4	66.1	0.7
G	12,500	2338	3241	0.4	66.1	66.1	66.6	0.5
H	13,900	3084	1445	0.8	66.4	66.4	66.9	0.5
UPPER-EAST TWIN DITCH								
A	13900	3084	445	2.1	66.4	66.4	67.4	1.0
B	14950	400	669	1.4	68.9	68.9	69.5	0.6
C	16000	250	467	2.0	70.4	70.4	71.3	0.9
D	17950	300	788	1.1	72.5	72.5	73.2	0.7
E	18100	50	328	2.7	73.1	73.1	73.7	0.6

¹Feet above county boundary

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: TWIN DITCHES – UPPER-EAST TWIN DITCH

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	291	1,020	1,171	3.9	52.6	52.6	53.1	0.5
B	1,006	1,071	3,021	1.3	53.5	53.5	54.0	0.5
C	1,747	397	1,475	2.7	53.8	53.8	54.3	0.5
D	1,883	397	1,776	2.2	54.4	54.4	55.0	0.6
E	2,502	1,058	2,595	1.5	54.6	54.6	55.2	0.6
F	3,262	108	889	4.4	54.7	54.7	55.3	0.6
G	4,068	101	896	4.3	55.1	55.1	55.6	0.5
H	4,213	108	962	4.0	56.2	56.2	56.8	0.6
I	5,230	1,419	3,289	1.2	56.8	56.8	57.3	0.5
J	7,803	1,898	3,920	0.9	57.1	57.1	57.6	0.5
K	9,057	164	712	4.8	57.2	57.2	57.7	0.5
L	9,193	346	1,431	2.4	57.7	57.7	58.1	0.4
M	10,118	102	703	4.9	57.7	57.7	58.3	0.6
N	12,103	132	882	3.9	59.0	59.0	59.4	0.4
O	15,526	113	604	5.7	61.2	61.2	61.4	0.2
P	17,345	617	1,608	2.1	62.6	62.6	63.0	0.4
Q	17,998	567	1,278	2.7	62.8	62.8	63.3	0.5
R	18,053	563	1,454	2.4	62.9	62.9	63.5	0.6
S	19,035	611	1,873	1.4	63.2	63.2	63.9	0.7

¹Feet above confluence with Old River

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: WEST PRONG OLD RIVER

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	785	78	336	4.7	63.2	61.2 ²	61.2	0.0
B	1,513	96	732	2.2	63.2	61.7 ²	61.7	0.0
C	1,771	80	387	4.1	63.2	62.8 ²	62.8	0.0
D	1,937	75	419	3.8	64.9	64.9	64.9	0.0
E	3,163	74	381	3.9	65.6	65.6	65.6	0.0
F	5,874	90	410	3.6	67.5	67.5	67.5	0.0
G	7,151	111	400	3.1	68.3	68.3	68.3	0.0
H	7,305	54	400	3.1	69.1	69.1	69.1	0.0
I	7,962	59	252	1.9	69.4	69.4	69.4	0.0
J	10,239	97	189	2.5	70.0	70.0	70.0	0.0
K	12,134	73	181	2.6	70.9	70.9	70.9	0.0
L	13,303	84	143	2.9	71.6	71.6	71.6	0.0
M	14,055	69	188	2.2	72.0	72.0	72.0	0.0
N	14,211	47	152	2.8	72.7	72.7	72.7	0.0
O	14,858	66	146	2.9	73.1	73.1	73.1	0.0
P	15,748	75	118	3.5	73.9	73.9	73.9	0.0
Q	16,317	69	141	3.0	74.5	74.5	74.5	0.0
R	18,284	70	149	2.5	75.7	75.7	75.7	0.0
S	18,543	78	113	3.3	75.9	75.9	75.9	0.0
T	19,491	51	105	3.6	76.9	76.9	76.9	0.0
U	20,597	49	149	2.5	77.9	77.9	77.9	0.0

¹Feet above confluence with East West Dayton Ditch and West Prong Old River

²Elevation computed without consideration of backwater effects from West Prong Old River

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: WEST WEST DAYTON DITCH

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
WEST WEST DAYTON DITCH (CONTINUED)								
V	21,737 ¹	76	162	2.3	78.6	78.6	78.6	0.0
W	22,386 ¹	62	135	2.8	79.0	79.0	79.0	0.0
X	23,991 ¹	42	40	2.3	80.3	80.3	80.3	0.0
Y	26,089 ¹	40	45	2.1	82.6	82.6	82.6	0.0
WHISKEY BRANCH								
A	4,480 ²	3,332 ³	1,384	1.2	128.1	118.3 ⁴	119.8	1.0
B	7,800 ²	4,887 ³	689	2.4	130.5	123.2 ⁴	124.2	1.0
C	10,280 ²	5,850 ³	415	4.0	132.0	127.0 ⁴	128.0	1.0
D	10,420 ²	6,060 ³	4,410	0.4	133.2	129.3 ⁴	130.3	1.0
E	10,825 ²	6,210 ³	2,249	0.7	134.1	129.6 ⁴	130.6	1.0
F	10,960 ²	5,710 ³	6,063	0.3	134.4	131.3 ⁴	132.3	1.0
G	15,900 ²	270	1,386	1.3	136.2	136.2	137.2	1.0
H	19,440 ²	101	620	2.9	139.5	139.5	140.5	1.0
I	20,900 ²	112	510	3.5	142.5	142.5	143.0	0.5
J	24,780 ²	168	921	1.8	148.3	148.3	149.3	1.0
K	24,920 ²	120	611	2.7	148.7	148.7	149.7	1.0
L	26,300 ²	181	938	1.7	151.2	151.2	152.2	1.0

¹Feet above confluence with East West Dayton Ditch and West Prong Old River

²Feet above confluence with East Fork San Jacinto River

³Combined East Fork San Jacinto River/Whiskey Branch Floodway

⁴Elevation computed without consideration of backwater effects from East Fork San Jacinto River

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: WHISKEY BRANCH

LOCATION		FLOODWAY			1% ANNUAL CHANCE FLOOD WATER SURFACE ELEVATION (FEET NAVD 88)			
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQ. FEET)	MEAN VELOCITY (FEET/SEC)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
A	32,200	2,449	16,442	0.5	43.8	43.8	44.8	1.0
B	37,120	3,000	8,785	0.9	44.3	44.3	45.3	1.0
C	41,900	3,600	10,784	0.8	45.9	45.9	46.9	1.0
D	44,900	1,812	6,246	1.3	47.7	47.7	48.5	0.8
E	45,140	1,812	6,005	1.4	48.0	48.0	48.8	0.8
F	47,050	2,422	10,614	0.8	48.8	48.8	49.7	0.9
G	48,780	1,900	7,128	0.3	49.4	49.1 ²	50.0	0.9
H	50,020	800	4,289	0.5	49.4	49.2 ²	50.1	0.9
I	52,000	800	3,614	0.6	49.5	49.5	50.3	0.8
J	54,700	700	3,141	0.4	49.8	49.8	50.6	0.8
K	57,600	500	1,628	0.7	50.1	50.1	51.0	0.9
L	60,400	450	1,429	0.7	51.0	51.0	52.0	1.0
M	61,150	200	779	1.2	51.5	51.5	52.3	0.8
N	63,530	250	847	1.1	53.3	53.3	54.2	0.9
O	65,360	250	1,162	0.6	53.8	53.8	54.8	1.0

¹Feet above confluence with Pine Island Bayou

²Elevation computed without consideration of backwater effects from Batiste Creek

TABLE 24	FEDERAL EMERGENCY MANAGEMENT AGENCY LIBERTY COUNTY, TX AND INCORPORATED AREAS	FLOODWAY DATA
		FLOODING SOURCE: WILLOW CREEK

Table 25: Flood Hazard and Non-Encroachment Data for Selected Streams

[Not Applicable to this FIS Project]

6.4 Coastal Flood Hazard Mapping

This section is not applicable to this FIS Project

Table 26: Summary of Coastal Transect Mapping Considerations

[Not Applicable to this FIS Project]

6.5 FIRM Revisions

This FIS Report and the FIRM are based on the most up-to-date information available to FEMA at the time of its publication; however, flood hazard conditions change over time. Communities or private parties may request flood map revisions at any time. Certain types of requests require submission of supporting data. FEMA may also initiate a revision. Revisions to FIS projects may take several forms, including Letters of Map Amendment (LOMAs), Letters of Map Revision Based on Fill (LOMR-Fs), Letters of Map Revision (LOMRs) (referred to collectively as Letters of Map Change (LOMCs)), Physical Map Revisions (PMRs), and FEMA-contracted restudies. These types of revisions are further described below. Some of these types of revisions do not result in the republishing of the FIS Report. To assure that any user is aware of all revisions, it is advisable to contact the community repository of flood-hazard data (shown in Table 31, “Map Repositories”).

6.5.1 Letters of Map Amendment

A LOMA is an official revision by letter to an effective NFIP map. A LOMA results from an administrative process that involves the review of scientific or technical data submitted by the owner or lessee of property who believes the property has incorrectly been included in a designated SFHA. A LOMA amends the currently effective FEMA map and establishes that a specific property is not located in a SFHA. A LOMA cannot be issued for properties located on the PFD (primary frontal dune).

To obtain an application for a LOMA, visit <http://www.fema.gov> and download the form “MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill”. Visit the “Flood Map-Related Fees” section to determine the cost, if any, of applying for a LOMA.

FEMA offers a tutorial on how to apply for a LOMA. The LOMA Tutorial Series can be accessed at http://www.fema.gov/plan/prevent/fhm/ot_lmreq.shtm.

For more information about how to apply for a LOMA, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627).

6.5.2 Letters of Map Revision Based on Fill

A LOMR-F is an official revision by letter to an effective NFIP map. A LOMR-F states FEMA's determination concerning whether a structure or parcel has been elevated on fill above the base flood elevation and is, therefore, excluded from the SFHA.

Information about obtaining an application for a LOMR-F can be obtained in the same manner as that for a LOMA, by visiting <http://www.fema.gov> for the "MT-1 Application Forms and Instructions for Conditional and Final Letters of Map Amendment and Letters of Map Revision Based on Fill" or by calling the FEMA Map Information eXchange, toll free, at 1-877-FEMA MAP (1-877-336-2627). Fees for applying for a LOMR-F, if any, are listed in the "Flood Map-Related Fees" section.

A tutorial for LOMR-F is available at http://www.fema.gov/plan/prevent/fhm/ot_lmreq.shtm.

6.5.3 Letters of Map Revision

A LOMR is an official revision to the currently effective FEMA map. It is used to change flood zones, floodplain and floodway delineations, flood elevations and planimetric features. All requests for LOMRs should be made to FEMA through the chief executive officer of the community, since it is the community that must adopt any changes and revisions to the map. If the request for a LOMR is not submitted through the chief executive officer of the community, evidence must be submitted that the community has been notified of the request.

To obtain an application for a LOMR, visit <http://www.fema.gov> and download the form "MT-2 Application Forms and Instructions for Conditional Letters of Map Revision and Letters of Map Revision". Visit the "Flood Map-Related Fees" section to determine the cost of applying for a LOMR. For more information about how to apply for a LOMR, call the FEMA Map Information eXchange; toll free, at 1-877-FEMA MAP (1-877-336-2627) to speak to a Map Specialist.

Previously issued mappable LOMCs (including LOMRs) that have been incorporated into the Liberty County FIRM are listed in Table 27.

Please note that this table only includes LOMCs that have been issued on the FIRM panels updated by this map revision. For all other areas within this county, users should be aware that revisions to the FIS Report made by prior LOMRs may not be reflected herein and users will need to continue to use the previously issued LOMRs to obtain the most current data.

Table 27: Incorporated Letters of Map Change

[Not Applicable to this FIS Project]

6.5.4 Physical Map Revisions

A PMR is an official republication of a community's NFIP map to effect changes to base flood elevations, floodplain boundary delineations, regulatory floodways and planimetric features. These changes typically occur as a result of structural works or improvements, annexations resulting in additional flood hazard areas or correction to base flood elevations or SFHAs.

The community's chief executive officer must submit scientific and technical data to FEMA to support the request for a PMR. The data will be analyzed and the map will be revised if warranted. The community is provided with copies of the revised information and is afforded a

review period. When the base flood elevations are changed, a 90-day appeal period is provided. A 6-month adoption period for formal approval of the revised map(s) is also provided.

For more information about the PMR process, please visit <http://www.fema.gov> and visit the “Flood Map Revision Processes” section.

6.5.5 Contracted Restudies

The NFIP provides for a periodic review and restudy of flood hazards within a given community. FEMA accomplishes this through a national watershed-based mapping needs assessment strategy, known as the Coordinated Needs Management Strategy (CNMS). The CNMS is used by FEMA to assign priorities and allocate funding for new flood hazard analyses used to update the FIS Report and FIRM. The goal of CNMS is to define the validity of the engineering study data within a mapped inventory. The CNMS is used to track the assessment process, document engineering gaps and their resolution, and aid in prioritization for using flood risk as a key factor for areas identified for flood map updates. Visit www.fema.gov to learn more about the CNMS or contact the FEMA Regional Office listed in Section 8 of this FIS Report.

6.5.6 Community Map History

The current FIRM presents flooding information for the entire geographic area of Liberty County. Previously, separate FIRMs, Flood Hazard Boundary Maps (FHBM) and/or Flood Boundary and Floodway Maps (FBFM) may have been prepared for the incorporated communities and the unincorporated areas in the county that had identified SFHAs. Current and historical data relating to the maps prepared for the project area are presented in Table 28, “Community Map History.” A description of each of the column headings and the source of the date is also listed below.

- *Community Name* includes communities falling within the geographic area shown on the FIRM, including those that fall on the boundary line, nonparticipating communities, and communities with maps that have been rescinded. Communities with No Special Flood Hazards are indicated by a footnote. If all maps (FHBM, FBFM, and FIRM) were rescinded for a community, it is not listed in this table unless SFHAs have been identified in this community.
- *Initial Identification Date (First NFIP Map Published)* is the date of the first NFIP map that identified flood hazards in the community. If the FHBM has been converted to a FIRM, the initial FHBM date is shown. If the community has never been mapped, the upcoming effective date or “pending” (for Preliminary FIS Reports) is shown. If the community is listed in Table 28 but not identified on the map, the community is treated as if it were unmapped.
- *Initial FHBM Effective Date* is the effective date of the first FHBM. This date may be the same date as the Initial NFIP Map Date.
- *FHBM Revision Date(s)* is the date(s) that the FHBM was revised, if applicable.
- *Initial FIRM Effective Date* is the date of the first effective FIRM for the community. This is the first effective date that is shown on the FIRM panel.
- *FIRM Revision Date(s)* is the date(s) the FIRM was revised, if applicable. This is the revised date that is shown on the FIRM panel, if applicable. As countywide studies are

completed or revised, each community listed should have its FIRM dates updated accordingly to reflect the date of the countywide study. Once the FIRMs exist in countywide format, as PMRs of FIRM panels within the county are completed, the FIRM Revision Dates in the table for each community affected by the PMR are updated with the date of the PMR, even if the PMR did not revise all the panels within that community.

The initial effective date for the Liberty County FIRM in countywide format was May 2, 2008.

Table 28: Community Map History

Community Name	Initial Identification Date (First NFIP Map Published)	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
City of Ames ^{1 2}	5/24/1977	5/24/1977	None	9/30/1988	5/2/2008
City of Cleveland	3/8/1974	3/8/1974	10/17/1975	8/4/1987	5/2/2008
City of Daisetta	7/2/1976	7/2/1976	None	6/15/1982	5/2/2008 4/3/1987
City of Dayton	6/28/1974	6/28/1974	5/7/1976	9/30/1988	5/2/2008
City of Dayton Lakes	11/15/1989	None	None	11/15/1989	5/2/2008
City of Devers	4/24/1979	4/24/1979	None	5/2/2008	None
City of Hardin	4/24/1977	None	None	5/2/2008	None
Town of Kenefick	4/24/1979	4/24/1979	None	5/2/2008	None
City of Liberty	12/20/1974	12/20/1974	None	11/18/1988	5/2/2008
Liberty County, Unincorporated Areas	5/24/1977	5/24/1977	None	9/30/1988	5/2/2008
City of Mont Belvieu	12/24/1976	12/24/1976	None	8/16/1982	5/2/2008
City of North Cleveland	5/6/1977	5/6/1977	None	5/2/2008	None
City of Plum Grove	6/19/1979	6/19/1979	None	7/16/1987	5/2/2008

¹No Special Flood Hazard Areas Identified

²Dates for this community were taken from Liberty County, Unincorporated Areas

SECTION 7.0 – CONTRACTED STUDIES AND COMMUNITY COORDINATION

7.1 Contracted Studies

Table 29 provides a summary of the contracted studies, by flooding source, that are included in this FIS Report.

Table 29: Summary of Contracted Studies Included in this FIS Report

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Reese Bayou, Whiskey Branch	8/4/1987	Soil Conservation Service	IAA-H-8-77	April 1985	City of Cleveland
Cow Branch, East Fork San Jacinto River, Luce Bayou, Marsh Branch, Marsh Branch Tributary No. 1, Reese Bayou, Tarkington Bayou, Whiskey Branch	9/30/1988	Soil Conservation Service	IAA-H-8-77	April 1985	Liberty County (Unincorporated Areas)
Batiste Creek, Bull Tongue Creek, Cedar Bayou, Hickory Island Gully, Menard Creek, Trinity River, Twin Ditches, Upper-East Twin Ditches, Willow Creek	9/30/1988	The Water Resources Division of the U.S. Geological Survey (USGS)	EMW-E-1154	June 1986	Liberty County (Unincorporated Areas)
Cedar Bayou	Harris County, Texas and Incorporated Areas 5/4/2015	Harris County Flood Control District (HCFCD)	DR 1379	2004	Liberty County
East Fork San Jacinto River	7/16/1987	Soil Conservation Service	IAA-H-8-77	April 1985	City of Plum Grove
Abbot Creek, Barrett Bayou, Barrett Bayou Tributary 1, Barrett Bayou Tributary 2, Big Caney Creek, Bit Ditch, Bowie Creek, Bowie Creek Tributary 1, Brooks Creek, Brooks Creek Tributary 1, Brooks Creek Tributary 2, C100, C102, C103, C104, C105, Cherry Creek, Cherry Creek 2, Cherry Creek 3, Cow Island Bayou,		RAMPP	HSFEH Q-09-D-0369	June 2014	City of Dayton, City of Dayton Lakes, City of Devers, City of Hardin, Town of Kenefick, City of Liberty, Liberty County (Unincorporated Areas), City of Mont Belvieu

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Cow Island Bayou Tributary 1, Cow Island Bayou Tributary 1A, Cow Island Bayou Tributary 2, Cow Island Bayou Tributary 3, Cow Island Bayou Tributary 4, Cow Island Bayou Tributary 5, Crooked Bayou, Crooked Bayou Tributary 1, Crooked Marsh, Dry Cherry Creek, East Prong Old River, East Prong Old River Tributary 1, East Prong Old River Tributary 2, East West Dayton Ditch, French Bayou, French Bayou Tributary 1, French Creek, Gaylor Creek, Gaylor Creek Tributary 1, Gaylor Creek Tributary 2, Gaylor Creek Tributary 3, Gaylor Creek Tributary 4, Gaylor Creek Tributary 4A, Gaylor Creek Tributary 5, Gaylor Creek Tributary 6, Josie Bayou, Josie Bayou Tributary 1, Josie Bayou Tributary 2, Josie Bayou Tributary 3, Josie Bayou Tributary 4, Labbit Creek, Labbit Creek Tributary 1, Lake Liberty Creek, Lee Gully, Linney Creek, Linney Creek Tributary 1, Linney Creek Tributary 2, Linney Creek Tributary 3, Linney Creek Tributary 4, Linney Creek Tributary 5, Linney Creek Tributary 6, Little Caney Creek, Little Caney Creek Tributary 1, Long					

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Island Creek, Long John Creek, Long John Creek Tributary 1, McMurty Bayou, Old River, Old River Drain, Old River Tributary 3, Old River Tributary 4, Old River Tributary 4A, Old River Tributary 4B, Old River Tributary 4C, Pignut Gully, Shiloh Creek, Spinks Creek, Spring Branch, The Cutoff Tributary 1, The Cutoff Tributary 2, Trinity River, Turkey Creek, Turtle Bayou, Turtle Bayou Tributary 1, Turtle Bayou Tributary 2, Unnamed Stream 1, Unnamed Stream 1A, Unnamed Stream 2, Unnamed Stream 3, Unnamed Stream 4, Unnamed Stream 5, Unnamed Stream 6, Unnamed Stream 7, Unnamed Stream 7A, Unnamed Stream 8, Unnamed Stream 9, West Prong Old River, West West Dayton Ditch, Whites Bayou, Whites Bayou Tributary 1, Whites Bayou Tributary 2, Whites Bayou Tributary 3, Whites Bayou Tributary 4, Whites Bayou Tributary 5, Whites Bayou Tributary 5A, Whites Bayou Tributary 5A1, Whites Bayou Tributary 5B, Whites Bayou Tributary 6, Whites Bayou Tributary 7, Whites Bayou Tributary 8, Whites Bayou Tributary 9, Whites Bayou					

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Tributary 10, Whites Bayou Tributary 11, Wood Spring Creek					

*Data not available

7.2 Community Meetings

The dates of the community meetings held for this FIS project and any previous FIS projects are shown in Table 30. These meetings may have previously been referred to by a variety of names (Community Coordination Officer (CCO), Scoping, Discovery, etc.), but all meetings represent opportunities for FEMA, community officials, study contractors, and other invited guests to discuss the planning for and results of the project.

Table 30: Community Meetings

Community	FIS Report Dated	Date of Meeting	Meeting Type	Attended By
Liberty County and Incorporated Areas	5/2/2008	11/3/2005	Initial CCO Meeting	FEMA, the communities, and MAPVI
		4/2/2013	Project Discovery	FEMA, Liberty County, City of Liberty Fire Department, Liberty County EMC, RAMPP, City of Liberty
		4/2/2013	Discovery Closeout	FEMA, Liberty County, City of Liberty Fire Department, Liberty County EMC, RAMPP, San Jacinto County
		8/13/2014	Flood Risk Review	City of Ames, City of Dayton, City of Liberty, Coastal Water Authority, Dannenbaum Engineering, Dayton News, FEMA, LAN, LCSO, Liberty County, Liberty County Engineering Department, Liberty County Fire Department, Liberty County Office of Emergency Management, RAMPP, State Rep District 18, Texas DOT, TFS, Trinity River Authority, Trinity River National Wildlife Refuge

SECTION 8.0 – ADDITIONAL INFORMATION

Information concerning the pertinent data used in the preparation of this FIS Report can be obtained by submitting an order with any required payment to the FEMA Engineering Library. For more information on this process, see <http://www.fema.gov>.

The additional data that was used for this project includes the FIS Report and FIRM that were previously prepared for Liberty County and Incorporated Areas (FEMA 2008).

Table 31 is a list of the locations where FIRM panels for Liberty County can be viewed. Please note that the maps at these locations are for reference only and are not for distribution. Also, please note that only the maps for the community listed in the table are available at that particular repository. A user may need to visit another repository to view maps from an adjacent community.

Table 31: Map Repositories

Community	Address	City	State	Zip Code
City of Ames	City Hall 304 Martin Street	Liberty	TX	77575
City of Daisetta	Municipal Building 101 East Pine Street	Daisetta	TX	77533
City of Dayton	City Hall 117 Cook Street	Dayton	TX	77535
City of Dayton Lakes	Liberty County Engineering Department 2103 Cos Street	Liberty	TX	77575
City of Devers	Liberty County Engineering Department 2103 Cos Street	Devers	TX	77538
City of Hardin	City Hall 142 Cr 2010	Liberty	TX	77575
Town of Kenefick	City Hall 3564 Farm to Market Road 1008	Dayton	TX	77535
City of Liberty	City Secretary's Office, City Hall 1892 Sam Houston Street	Liberty	TX	77575

Community	Address	City	State	Zip Code
Liberty County, Unincorporated Areas	County Engineering Department 2103 Cos Street	Liberty	TX	77575
City of Mont Belvieu	City Hall 11607 Eagle Drive	Mont Belvieu	TX	77523

The National Flood Hazard Layer (NFHL) dataset is a compilation of effective FIRM databases and LOMCs. Together they create a GIS data layer for a State or Territory. The NFHL is updated as studies become effective and extracts are made available to the public monthly. NFHL data can be viewed or ordered from the website shown in Table 32.

Table 32 contains useful contact information regarding the FIS Report, the FIRM, and other relevant flood hazard and GIS data. In addition, information about the state NFIP Coordinator and GIS Coordinator is shown in this table. At the request of FEMA, each Governor has designated an agency of State or territorial government to coordinate that State's or territory's NFIP activities. These agencies often assist communities in developing and adopting necessary floodplain management measures. State GIS Coordinators are knowledgeable about the availability and location of state and local GIS data in their state.

Table 32: Additional Information

FEMA and the NFIP	
FEMA and FEMA Engineering Library website	http://www.fema.gov
NFIP website	http://www.fema.gov/business/nfip
NFHL Dataset	http://msc.fema.gov
FEMA Region 6	Federal Emergency Management Agency, FRC 800 North Loop 288, Denton, TX 76209-3698 940-898-5399
Other Federal Agencies	
USGS website	http://www.usgs.gov
Hydraulic Engineering Center website	http://www.hec.usace.army.mil
State Agencies and Organizations	
State NFIP Coordinator	Mike Segner Texas Water Development Board (TWDB) 1700 North Congress Ave Austin, TX 78701 512-463-3509 Michael.Segner@twdb.state.tx.us
State GIS Coordinator	Mike Segner Texas Water Development Board (TWDB) 1700 North Congress Ave Austin, TX 78701 512-463-3509 Michael.Segner@twdb.state.tx.us

SECTION 9.0 – BIBLIOGRAPHY AND REFERENCES

Table 33 includes sources used in the preparation of and cited in this FIS Report as well as additional studies that have been conducted in the study area.

Table 33: Bibliography and References

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
Corps of Eng HEC-RAS	U.S. Army Corps of Engineers, Hydrologic Engineering Center	<i>HEC-RAS River Analysis System, Generalized Computer Program, Version 3.0.1</i>		Davis, California	March 2001	
Corps of Engineers 1970	U.S. Army Corps of Engineers, Galveston District	<i>Flood Plain Information, East Fork San Jacinto River, Reese and Tarkington Bayous, Cleveland, Texas</i>		Galveston, Texas	June 1970	
Corps of Engineers 1982	U.S. Army Corps of Engineers, Hydrologic Engineering Center	<i>HEC-2 Water Surface Profiles, Generalized Computer Program</i>		Davis, California	September 1982 with updates	
Corps of Engineers 2001	U.S. Army Corps of Engineers - Hydrologic Engineering Center	<i>HEC-HMS Hydrologic Modeling System</i>			January 2001	
Dept of Agriculture 1976	U.S. Department of Agriculture, Soil Conservation Service	<i>Technical Release No. 61, WSP-2 Computer Program, Draft of Second Edition</i>		Washington, D.C.	May 1976	

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
Dept of Agriculture 1983	U.S. Department of Agriculture, Soil Conservation Service	<i>Technical Release No. 20, Computer Program, Project Formulation, Hydrology, Draft of second edition</i>		Washington, D.C.	May 1983	
Dept of the Interior 1961	U.S. Department of the Interior, Geological Survey	<i>Water Supply Paper, Surface Water Supply of the United States</i>		Washington, D.C.	1931-1961	
Dept of the Interior 1977	U.S. Department of the Interior, Geological Survey	<i>Technique for Estimating the Magnitude and Frequency of Floods in Texas</i>	E.E. Schroeder and B.C. Massey	Washington, D.C.	1977	
Dept of the Interior 1981	U.S. Department of Interior, Geological Survey, Office of Water and Data Collection, Interagency Advisory Committee on Water Data	<i>Guidelines for Determining Flood Flow Frequency, Bulletin 17B</i>		Reston, Virginia	Revised September 1981	
Dept of the Interior 1983	U.S. Department of the Interior, Geological Survey	<i>Water Resources Data for Texas, Surface Water Records</i>		Washington, D.C.	1961-1983	
Dept of the Interior 1989	U.S. Department of the Interior, Geological Survey	<i>7.5-Minute Series Topographic Maps</i>	U.S. Geological Survey	Reston, VA	1989	

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
FEMA 1984	Federal Emergency Management Agency	<i>Flood Insurance Study, Montgomery County, Texas, Unincorporated Areas</i>		Washington D.C.	February 1, 1984	http://msc.fema.gov
FEMA 1988	Federal Emergency Management Agency	<i>Flood Insurance Study, Liberty County, Texas, Unincorporated Areas</i>		Washington, D.C.	09/30/1988	http://msc.fema.gov
FEMA 2004	Federal Emergency Management Agency	<i>Flood Insurance Study, Harris County, Texas and Incorporated Areas, Revised Preliminary</i>		Washington D.C.	Prelim 9/30/2004	http://hazards.fema.gov
FEMA 2006	Federal Emergency Management Agency	<i>Flood Insurance Study, Harris County, Texas and Incorporated Areas</i>		Washington, D.C.	08/01/2006	http://msc.fema.gov
FEMA 2008	Federal Emergency Management Agency	<i>Flood Insurance Study, Liberty County, Texas and Incorporated Areas</i>		Washington, DC	5/2/2008	http://msc.fema.gov
FEMA 2014	Federal Emergency Management Agency	<i>Lower Trinity Watershed, Texas Technical Support Data Notebooks</i>	Risk Assessment, Mapping and Planning Partners (RAMPP)	Denton, Texas	6/20/2014	http://hazards.fema.gov
NGS 2005	National Geodetic Survey					http://www.ngs.noaa.gov/cgi-bin/VERTCON/vert_con.prl
NHD 2004	U.S. Department of Agriculture	<i>Liberty TX NHD High</i>	U.S. Geological Survey	Salt Lake City, UT	2004	http://nhd.usgs.gov/

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
NOAA 1979	U.S. Department of Commerce, National Oceanic and Atmospheric Administration	<i>Climatological Data, Texas, Volume 84</i>		Asheville, North Carolina	1979	
NOAA 1983	U.S. Department of Commerce, National Oceanic and Atmospheric Administration	<i>Climatological Data, Texas, Volume 88</i>		Asheville, North Carolina	1983	
NOAA 1984	U.S. Department of Commerce, National Oceanic and Atmospheric Administration	<i>Climatological Data Annual Summary, Texas, 1984, Volume 89</i>		Asheville, North Carolina	1984	
Schaumburg 2011	Schaumburg and Polk, Inc.	<i>Liberty County - DRS No. Cherry Creek Drainage</i>	Schaumburg and Polk, Inc.		March 2011	
State of Texas	State of Texas	<i>High Water Marks</i>			2005	
Taylor 2006	Taylor Engineering, Inc.	<i>S_Wtr_Ln</i>	Taylor Engineering, Inc.		08/01/2006	
Texas Almanac	A.H. Belo Corporation	<i>Texas Almanac and State Industrial Guide 1984-1985</i>		Dallas, Texas	1983	
Texas Plants	F.W. Gould	<i>Texas Plants - A Checklist and Ecological Summary</i>		Dallas, Texas	1962	

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The Weather Channel 2006	The Weather Channel	<i>Monthly Averages for Liberty, Texas</i>			2006	http://www.weather.com
TIGER 2014	U.S. Department of Commerce, U.S. Census Bureau, Geography Division	<i>2014 Liberty County, TX TIGER/Line Shapefile</i>	U.S. Department of Commerce, U.S. Census Bureau, Geography Division	Washington, D.C.	May 2014	http://www2.census.gov/geo/tiger/TIGER2014/ROADS/tl_2014_48291_roads.zip
U.S. Census 2000	U.S. Census Bureau	<i>Liberty County, Texas QuickFacts</i>	U.S. Census Bureau		June 16, 2006	http://www.quickfacts.census.gov
USDA 2012	U.S. Department of Agriculture	<i>2012 NAIP Aerial Imagery</i>	U.S. Department of Agriculture	Salt Lake City, Utah	September 26, 2012	
USGS 10 m DEMs	U.S. Department of Agriculture, Service Center Agencies	<i>National Elevation Data 10 Meter or better</i>	U.S. Department of Agriculture, Natural Resources Conservation Service – National Geospatial Management Center	Forth Worth, Texas	September 2011	http://viewer.nationalmap.gov/viewer/
USGS 2012	U.S. Geological Survey	<i>HUC 8 Boundaries</i>	U.S. Geological Survey	Washington, D.C.	2012	
USGS 2013	U.S. Geological Survey	<i>Surface Water for Texas: Peak Streamflow</i>			09/06/2013	http://waterdata.usgs.gov/tx/nwis/peak?

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USGS 3 m DEMs	U.S. Department of Agriculture, Service Center Agencies	<i>National Elevation Data 3 Meter or better</i>	U.S. Department of Agriculture, Natural Resources Conservation Service – National Geospatial Management Center	Forth Worth, Texas	November 2012	http://viewer.nationalmap.gov/viewer/
Weather Bureau 1963	U.S. Department of Commerce, Weather Bureau	<i>Technical Paper No. 40, Rainfall Frequency Atlas of the United States</i>		Washington D.C.	1961, Revised 1963	