

FLOOD INSURANCE STUDY

FEDERAL EMERGENCY MANAGEMENT AGENCY

VOLUME 1 OF 1



LONG COUNTY, GEORGIA AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
LONG COUNTY, UNINCORPORATED AREAS	130127
LUDOWICI, CITY OF	130128

PRELIMINARY
11/16/2015



FEMA

EFFECTIVE:

FLOOD INSURANCE STUDY NUMBER
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Published Separately

Flood Insurance Rate Map (FIRM)

FLOOD INSURANCE STUDY REPORT LONG COUNTY, GEORGIA

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 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 Project

This FIS Report covers the entire geographic area of Long County, Georgia.

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.

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
Long County, Unincorporated Areas	130127	03060203 03060204 03070106	13183C0025D 13183C0050D 13183C0075D 13183C0100D 13183C0125D 13183C0150D 13183C0175D 13183C0190E 13183C0210D 13183C0250D 13183C0275D 13183C0300E 13183C0325E 13183C0350D 13183C0375D 13183C0400E	
Ludowici, City of	130128	03070106	13183C0250D 13183C0275D	

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 Long County became effective on September 26, 2008. Refer to Table 28 for information about subsequent revisions to the FIRMs.

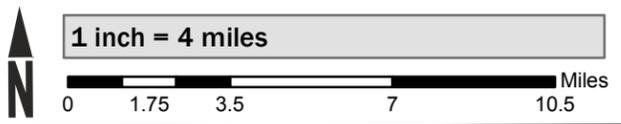
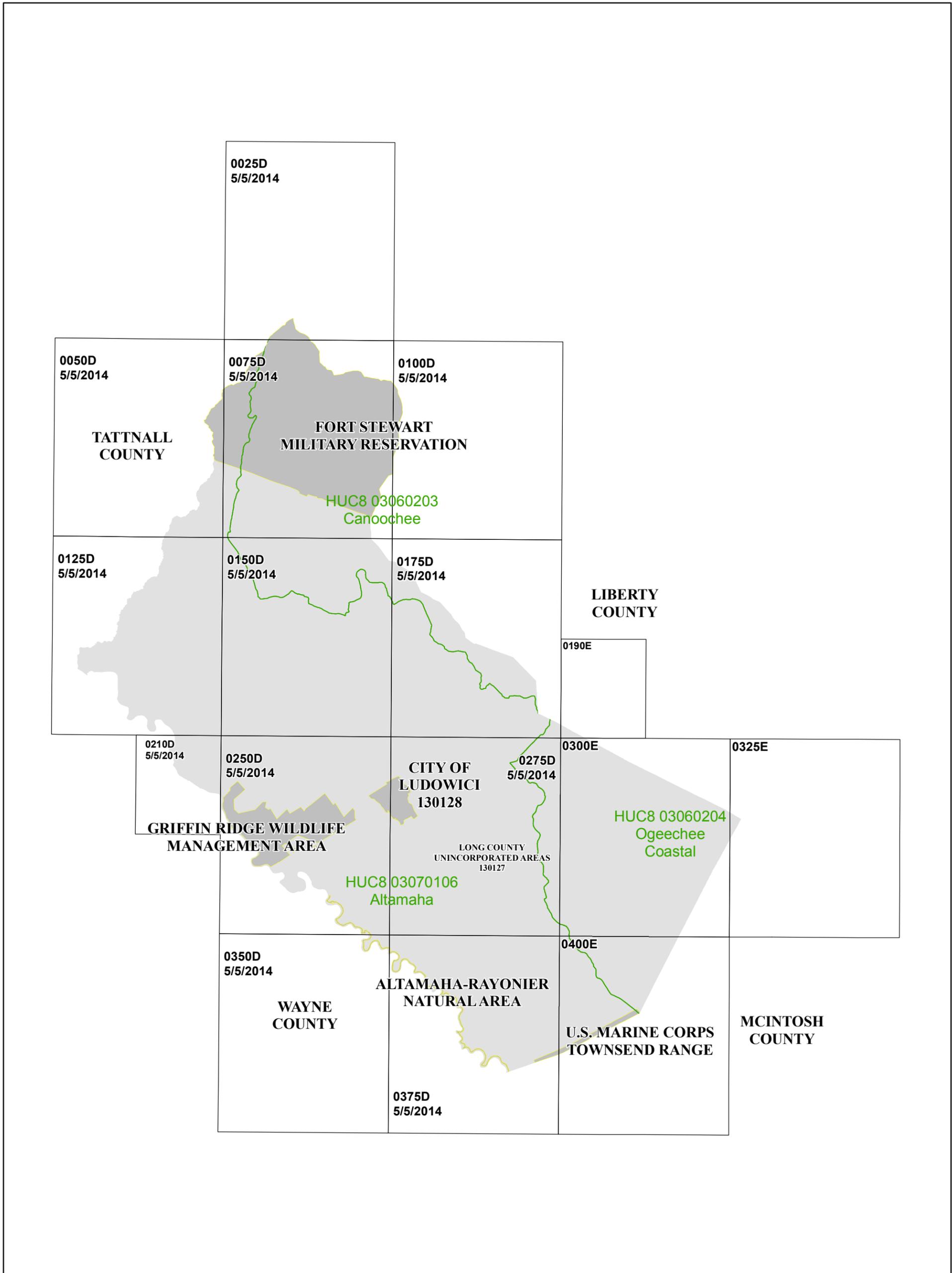
- Selected FIRM panels for the community may contain information (such as floodways and cross sections) that was previously shown separately on the corresponding Flood Boundary and Floodway Map panels. In addition, former flood hazard zone designations have been changed as follows:

<u>Old Zone</u>	<u>New Zone</u>
A1 through A30	AE
B	X (shaded)
C	X (unshaded)

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 www.fema.gov/national-flood-insurance-program-community-rating-system or contact your appropriate FEMA Regional Office for more information about this program.

- 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 www.fema.gov/online-tutorials.

The FIRM Index in Figure 1 shows the overall FIRM panel layout within Long County, and also displays the panel number and effective date for each FIRM panel in the county.



Map Projection:
 Universal Transverse Mercator Zone 17 North
 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



NATIONAL FLOOD INSURANCE PROGRAM
FLOOD INSURANCE RATE MAP INDEX

LONG COUNTY, GEORGIA and Incorporated Areas

PANELS PRINTED:

0025D, 0050D, 0075D, 0100D, 0125D, 0150D, 0175D, 0190E, 0210D, 0250D, 0275D, 0300E, 0325E, 0350D, 0375D, 0400E



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10/30/2015

MAP NUMBER
 13183CINDOC
 MAP REVISED

Each FIRM panel may contain specific notes to the user that provide additional information regarding the flood hazard data shown on that map. However, the FIRM panel does not contain enough space to show all the notes that may be relevant in helping to better understand the information on the panel. Figure 2 contains the full list of these notes.

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 Flood Map Service Center website at 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 Flood 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 Flood 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 Non-Coastal 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 - continued

PROJECTION INFORMATION: The projection used in the preparation of the map was State Plane Georgia East (FIPS 1001 Feet). The horizontal datum was NAD83. 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. 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, 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*

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 by U.S. Geological Survey (USGS) Digital Orthophoto Quadrangles produced at a scale of 1:24,000 from National Aerial Photography Program. Black and white photography data 1999 or later. 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.

NOTES FOR FIRM INDEX

REVISIONS TO INDEX: As new studies are performed and FIRM panels are updated within Long County, Georgia, 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 Long County, Georgia, effective October 30, 2015.

Figure 2. FIRM Notes to Users - continued

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.

Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Long County.

Figure 3: Map Legend for FIRM

SPECIAL FLOOD HAZARD AREAS: <i>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.</i>	
	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.
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.

Figure 3: Map Legend for FIRM - continued

	<p>Regulatory Floodway determined in Zone AE.</p>
<p>OTHER AREAS OF FLOOD HAZARD</p>	
	<p>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.</p>
	<p>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.</p>
	<p>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.</p>
<p>OTHER AREAS</p>	
	<p>Zone D (Areas of Undetermined Flood Hazard): The flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.</p>
	<p>Unshaded Zone X: Areas of minimal flood hazard.</p>
<p>FLOOD HAZARD AND OTHER BOUNDARY LINES</p>	
	<p>Flood Zone Boundary (white line on ortho-photography-based mapping; gray line on vector-based mapping)</p>
	<p>Limit of Study</p>
	<p>Jurisdiction Boundary</p>
	<p>Limit of Moderate Wave Action (LIMWA): Indicates the inland limit of the area affected by waves greater than 1.5 feet</p>
<p>GENERAL STRUCTURES</p>	
<p><i>Aqueduct</i> <i>Channel</i> <i>Culvert</i> <i>Storm Sewer</i></p>	<p>Channel, Culvert, Aqueduct, or Storm Sewer</p>
<p><i>Dam</i> <i>Jetty</i> <i>Weir</i></p>	<p>Dam, Jetty, Weir</p>
	<p>Levee, Dike, or Floodwall</p>
<p><i>Bridge</i></p>	<p>Bridge</p>

Figure 3: Map Legend for FIRM - continued

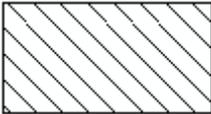
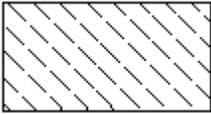
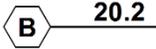
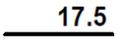
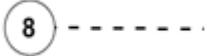
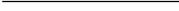
<p>COASTAL BARRIER RESOURCES SYSTEM (CBRS) AND OTHERWISE PROTECTED AREAS (OPA): <i>CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.</i></p>	
 CBRS AREA 09/30/2009	Coastal Barrier Resources System Area: Labels are shown to clarify where this area shares a boundary with an incorporated area or overlaps with the floodway.
 OTHERWISE PROTECTED AREA 09/30/2009	Otherwise Protected Area
<p>REFERENCE MARKERS</p>	
	River mile Markers
<p>CROSS SECTION & TRANSECT INFORMATION</p>	
	Lettered Cross Section with Regulatory Water Surface Elevation (BFE)
	Numbered Cross Section with Regulatory Water Surface Elevation (BFE)
	Unlettered Cross Section with Regulatory Water Surface Elevation (BFE)
	Coastal Transect
	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.
	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.
	Base Flood Elevation Line
<p>ZONE AE (EL 16)</p>	Static Base Flood Elevation value (shown under zone label)
<p>ZONE AO (DEPTH 2)</p>	Zone designation with Depth
<p>ZONE AO (DEPTH 2) (VEL 15 FPS)</p>	Zone designation with Depth and Velocity

Figure 3: Map Legend for FIRM - continued

BASE MAP FEATURES	
 <i>Missouri Creek</i>	River, Stream or Other Hydrographic Feature
	Interstate Highway
	U.S. Highway
	State Highway
	County Highway
 MAPLE LANE	Street, Road, Avenue Name, or Private Drive if shown on Flood Profile
 RAILROAD	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
4276⁰⁰⁰mE	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 Long 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 Long County, Georgia, 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.

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
Altamaha River	Long County, Unincorporated Areas	Southern county boundary	Confluence of Beards Creek	03070106	N/A		N	A	2014
Beards Creek	Long County, Unincorporated Areas	Approximately at Altamaha River	County Boundary	03070106	N/A		N	A	2014
Doctors Creek	Long County, Unincorporated Areas	Confluence of Altamaha River	Approximately 5,820 feet upstream of Rye Patch Road	03070106	N/A		N	A	2007
Horse Creek	Long County, Unincorporated Areas	County boundary	Approximately 2,190 feet upstream of Horsecreek Road	03060203	N/A		N	A	2007
Jones Creek	Long County, Unincorporated Areas; Ludowici, City of	Confluence of Still Branch	Approximately 2,010 feet upstream of the confluence of Jones Creek Tributary 2.10	03070106	N/A		N	A	2007
Kirkland Creek	Long County, Unincorporated Areas	Confluence of Taylors Creek	Approximately 9,800 feet upstream of the confluence of Kirkland Creek Tributary 3	03060203	N/A		N	A	2007
Kirkland Creek Tributary 3	Long County, Unincorporated Areas	Confluence of Kirkland Creek	Approximately 10,380 feet upstream of the confluence of Kirkland Creek	03060203	N/A		N	A	2007

Table 2: Flooding Sources Included in this FIS Report - continued

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
Little Doctor Creek	Long County, Unincorporated Areas	Confluence of Doctors Creek	Approximately 3,730 feet upstream of Rye Patch Road	03070106	N/A		N	A	2007
Little Doctor Creek Tributary 1	Long County, Unincorporated Areas	Confluence of Little Doctor Creek	Approximately 560 feet upstream of Long County Road	03070106	N/A		N	A	2007
Old Millhead Branch	Long County, Unincorporated Areas	Confluence of Taylors Creek	Approximately 1,050 feet upstream of Old Millhead Branch Tributary 5	03060203	N/A		N	A	2007
Old Millhead Branch Tributary 4	Long County, Unincorporated Areas	Confluence of Old Millhead Branch	Approximately 7,200 feet upstream of confluence of Old Millhead Branch	03060203	N/A		N	A	2007
Old Millhead Branch Tributary 5	Long County, Unincorporated Areas	Confluence of Old Millhead Branch	Approximately 4,250 feet upstream of the confluence of Old Millhead Branch	03060203	N/A		N	A	2007
Payne Creek	Long County, Unincorporated Areas	County boundary	Approximately 4,000 feet upstream of the county boundary	03060204	N/A		N	A	2007
Slades Branch	Long County, Unincorporated Areas	County boundary	County boundary	03070106	N/A		N	A	2014
Taylors Creek	Long County, Unincorporated Areas	County boundary	Confluence of Taylors Creek Tributary 13	03060203	N/A		N	A	2007

Table 2: Flooding Sources Included in this FIS Report - continued

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
Taylor's Creek Tributary 2	Long County, Unincorporated Areas	Confluence of Taylor's Creek	Approximately 21,650 feet upstream of the confluence of Taylor's Creek	03060203	N/A		N	A	2007
Taylor's Creek Tributary 6	Long County, Unincorporated Areas	Confluence of Taylor's Creek	Approximately 12,460 feet upstream of the confluence with Taylor's Creek	03060203	N/A		N	A	2007
Taylor's Creek Tributary 7	Long County, Unincorporated Areas	Confluence of Taylor's Creek	Approximately 9,580 feet upstream of the confluence with Taylor's Creek	03060203	N/A		N	A	2007
Taylor's Creek Tributary 12	Long County, Unincorporated Areas	Confluence of Taylor's Creek	Approximately 3,760 feet upstream of the confluence of Taylor's Creek	03060203	N/A		N	A	2007
Taylor's Creek Tributary 13	Long County, Unincorporated Areas	Confluence of Taylor's Creek	Approximately 2,400 feet upstream of the confluence with Taylor's Creek	03060203	N/A		N	A	2007
Unnamed Tributary to Beard's Creek	Long County, Unincorporated Areas	Confluence of Beard's Creek	Not Available	03070106	N/A		N	A	2014

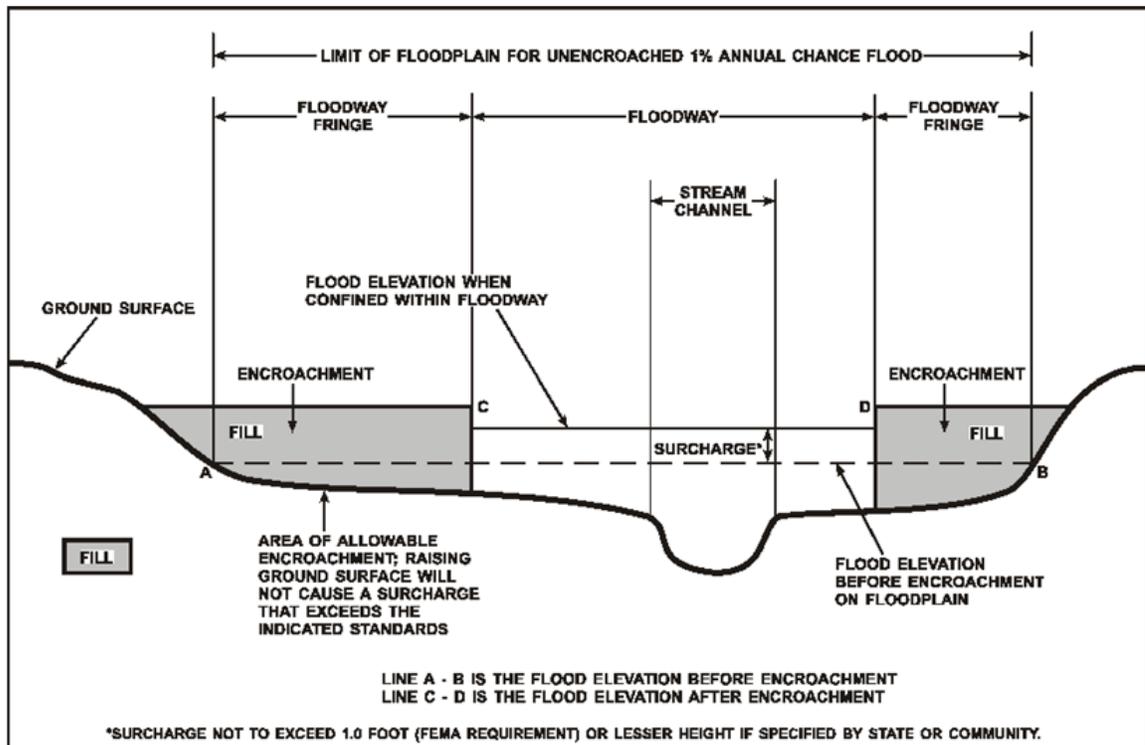
2.2 Floodways

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. No floodways have been mapped for Long County. 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



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

This section is not applicable to this Flood Risk Project.

2.5 Coastal Flood Hazard Areas

This section is not applicable to this Flood Risk Project.

2.5.1 Water Elevations and the Effects of Waves

This section is not applicable to this Flood Risk Project.

Figure 5: Wave Runup Transect Schematic

[Not Applicable to this Flood Risk Project]

2.5.2 Floodplain Boundaries and BFEs for Coastal Areas

This section is not applicable to this Flood Risk Project.

2.5.3 Coastal High Hazard Areas

This section is not applicable to this Flood Risk Project.

Figure 6: Coastal Transect Schematic

[Not Applicable to this Flood Risk Project]

2.5.4 Limit of Moderate Wave Action

This section is not applicable to this Flood Risk 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. Each FIRM panel contains an abbreviated legend for the features shown on the maps. However, the FIRM panel does not contain enough space to show the legend for all map features. Figure 3 shows the full legend of all map features. Note that not all of these features may appear on the FIRM panels in Long County.

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 Long County.

Table 3: Flood Zone Designations by Community

Community	Flood Zone(s)
Long County, Unincorporated Areas	A, X
Ludowici, City of	A, X

3.2 Coastal Barrier Resources System

This section is not applicable to this Flood Risk Project.

Table 4: Coastal Barrier Resources System Information

[Not Applicable to this Flood Risk 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)
Canoochee	03060203	Horse Creek, Kirkland Creek, Kirkland Creek Tributary 3, Old Millhead Branch, Old Millhead Branch Tributary 4, Old Millhead Branch Tributary 5, Taylors Creek, Taylors Creek Tributary 2, Taylors Creek Tributary 6, Taylors Creek Tributary 7, Taylors Creek Tributary 12, Taylors Creek Tributary 13	Drainage watershed area for Horse Creek, Kirkland Creek, Old Millhead Branch, and Taylors Creek and tributaries located in eastern portion of Long County	Not Available
Ogeechee Coastal	03060204	Payne Creek	Drainage watershed for Payne Creek located in the southeastern portion of Long County	Not Available
Altamaha	03070106	Altamaha River, Beards Creek, Doctors Creek, Jones Creek, Little Doctor Creek, Little Doctor Creek Tributary 1, Slades Branch, Unnamed Tributary to Beards Creek	Drainage watershed for Altamaha River, Doctors Creek, Little Doctor Creek, and Slades Branch and tributaries located in the southeastern portion of Long County	Not Available

4.2 Principal Flood Problems

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

Table 6: Principal Flood Problems

Flooding Source	Description of Flood Problems
Miscellaneous within Long County, Georgia	Historically, precipitation which can result in flooding occurs as a result of prolonged, slow-moving low-pressure systems particularly in the cooler months; tropical hurricanes; frontal storm activity, or concentrated thunderstorms, as is particularly the case during the summer months.

Table 7: Historic Flooding Elevations

[Not Applicable to this Flood Risk Project]

4.3 Non-Levee Flood Protection Measures

This section is not applicable to this Flood Risk Project.

Table 8: Non-Levee Flood Protection Measures

[Not Applicable to this Flood Risk Project]

4.4 Levees

This section is not applicable to this Flood Risk Project.

Table 9: Levees

[Not Applicable to this Flood Risk 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.

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.

October 30, 2015 Partial Map Revision

No new Hydrologic analyses were carried out for this revision.

May 5, 2014 Partial Map Revision

Approximately 240 square miles of Automated Approximate Method Zone A and Limited Detailed Analysis floodplain was studied as part of this revised analysis. The two-dimensional XPSWMM-2D software package (version 2011) was utilized for both the hydrologic and hydraulic modeling tasks.

To obtain the 1% annual chance flow rate on the Altamaha River, a gage analysis of annual peak flow records at stream gage 02226000- Altamaha River at Doctortown, GA was performed. PEAKFQ-Win is a program produced by the USGS to evaluate the flood frequency of annual peak flow records according to the USGS's Bulletin 17-B, "Guidelines for Determining Flood Flow Frequency." The Altamaha River gage at Doctortown, GA has an excellent historic record, with 86 years of peak flow data. The 1% annual chance flood (100-year) event at this gage site was calculated to be 211,200 cfs.

Beards Creek is a tributary of the Altamaha River that flows in a southern direction along the border of Long and Tattnall Counties. The Beards Creek watershed lies partially outside of Long County in adjacent Tattnall County. High resolution LiDAR topography data was not available for all portions of the Beards Creek watershed, so it was impossible to include this creek and its tributaries in the larger Zone 1 XP-SWMM 2D modeling domain. Instead, it was decided to model Beards Creek, Slades Branch, and tributary to Beards Creek using the more conventional HEC-RAS hydraulic program. The hydrology for Beards Creek was obtained through gage analysis of USGS Gage # 22258850, Beards Creek near Glennville, GA. On the other hand, the hydrology for the tributaries to Beards Creek was determined using Georgia rural Regression Equations.

September 26, 2008 Countywide Analysis

Hydrologic analyses were carried out to establish peak discharge-frequency relationships for each flooding source studied.

For the approximate analyses listed in Table 1, peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Regression equations estimate peak discharges for ungaged streams based on characteristics of nearby gaged streams.

The USGS has developed regression equations for both rural and urban areas within Georgia. Based on a review of available aerial photos, all of approximate streams studied are in rural watersheds. Therefore the only physiographic parameter utilized for the regression equations is drainage area (square miles).

Stream gage information is provided in Table 12.

Table 10: Summary of Discharges

[Not Applicable to this Flood Risk Project]

Figure 7: Frequency Discharge-Drainage Area Curves

[Not Applicable to this Flood Risk Project]

Table 11: Summary of Non-Coastal Stillwater Elevations

[Not Applicable to this Flood Risk 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
Altamaha River	02226000	USGS	Altamaha River at Doctortown, GA	13,600		
Beards Creek	22258850	USGS	Beards Creek near Glennville, GA	74.4		

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.

October 30, 2015 Partial Map Revision

No new Hydraulic analyses were carried out for this revision.

May 5, 2014 Partial Map Revision

Approximately 240 square miles of Automated Approximate Method Zone A and Limited Detailed Analysis floodplain was studied as part of this revise analysis. The two- dimensional XPSWMM-2D software package (version 2011) was utilized for both the hydrologic and hydraulic modeling tasks.

Initial modeling simulations of the Altamaha River showed that there were two bridges crossing the river that were not appropriately represented within the 2D model. Both the Highway 84/25 bridge and a smaller unnamed bridge located approximately 1000 feet of the Highway 84/25 bridge were only partially represented in the 2D grid. Because the Highway 84/25 bridge and the unnamed downstream bridge have total widths that are less than the grid spacing (180 feet and 120 feet, respectively), when 2D grid elevations were calculated the full elevation of the bridge deck was underrepresented because adjacent ground elevations within the grid square were being picked up

and used to derive an average elevation. Manning's n values for both the channel and overbanks were entered into the hydraulic model to represent the values that were estimated from aerial photography from ESRI Servers. Manning's n roughness parameters were set to 0.05 for channels and 0.12 for overbank areas for all 1D streams.

Hydraulic analysis for Beards Creek, Slades Branch, and Unnamed Tributary to Beards Creek was carried out using HEC-RAS version 4.1.0. Cross sections were cut from the available topographic data using HEC-GeoRAS toolset in Environmental Systems Research Institute (ESRI) ArcMap Geographical Information System (GIS) platform.

Manning's n values for both the channel and overbanks were entered into the hydraulic model to represent the values that were estimated from aerial photography from ESRI Servers. Manning's n roughness parameters were set to 0.05 for channels and 0.12 for overbank areas for all three streams.

Since a subcritical flow regime is assumed, downstream boundary conditions are required. In accordance with FEMA guidelines Appendix C, the starting water surface elevation chosen for profile computations were based on normal depth method.

September 26, 2008 Countywide Analysis

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.

The 1-percent-annual-chance WSELs for the approximate studies listed in Table 1 were computed using the USACE's HEC-RAS hydraulic model, version 3.1.3 (HEC, 2004b). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric 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 Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Altamaha River	Southern county boundary	Confluence of Beards Creek	XPSWMM-2D (version 2011)	XPSWMM-2D (version 2011)	2014	A	Gage No. 02226000 was used in hydrologic analysis. PEAKFQ-Win used to evaluate flood frequency of annual peak flow records. The 1% annual chance flood (100-year) event at this gage site was calculated to be 211,200 cfs. USGS's Bulletin 17-B, "Guidelines for Determining Flood Flow Frequency."
Beards Creek	Approximately at Altamaha River	County boundary	HEC-RAS 4.1	HEC-RAS 4.1.0	2014	A	Hydrology for Beards Creek was obtained through gage analysis of USGS Gage # 22258850, Beards Creek near Glennville,GA. Cross sections were cut from available topographic data using HEC-GeoRAS in Environmental Systems Research Institute (ESRI) ArcMap platform.
Doctors Creek	Confluence of Altamaha River	Approximately 5,820 feet upstream of Rye Patch Road	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993. Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.

Table 13: Summary of Hydrologic and Hydraulic Analyses - continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Horse Creek	County boundary	Approximately 2,190 feet upstream of Horsecreek Road	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Jones Creek	Confluence of Still Branch	Approximately 2,010 feet upstream of the confluence of Jones Creek Tributary 2.10	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Kirkland Creek	Confluence of Taylors Creek	Approximately 9,800 feet upstream of the confluence of Kirkland Creek Tributary 3	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.

Table 13: Summary of Hydrologic and Hydraulic Analyses - continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Kirkland Creek Tributary 3	Confluence of Kirkland Creek	Approximately 10,380 feet upstream of the confluence of Kirkland Creek	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Little Doctor Creek	Confluence of Doctors Creek	Approximately 3,730 feet upstream of Rye Patch Road	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Little Doctor Creek Tributary 1	Confluence of Little Doctor Creek	Approximately 560 feet upstream of Long County Road	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.

Table 13: Summary of Hydrologic and Hydraulic Analyses - continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Old Millhead Branch	Confluence of Taylors Creek	Approximately 1,050 feet upstream of Old Millhead Branch Tributary 5	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Old Millhead Branch Tributary 4	Confluence of Old Millhead Branch	Approximately 7,200 feet upstream of confluence of Old Millhead Branch	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Old Millhead Branch Tributary 5	Confluence of Old Millhead Branch	Approximately 4,250 feet upstream of the confluence of Old Millhead Branch	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.

Table 13: Summary of Hydrologic and Hydraulic Analyses - continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Payne Creek	County boundary	Approximately 4,000 feet upstream of the county boundary	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Slades Branch	County boundary	County boundary	HEC-RAS 4.1	HEC-RAS 4.1.0	2014	A	Hydrology determined using Georgia rural Regression Equations. Cross sections were cut from available topographic data using HEC-GeoRAS in ESRI ArcMap platform.
Taylor's Creek	County boundary	Confluence of Taylor's Creek Tributary 13	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.

Table 13: Summary of Hydrologic and Hydraulic Analyses - continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Taylors Creek Tributary 2	Confluence of Taylors Creek	Approximately 21,650 feet upstream of the confluence of Taylors Creek	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Taylors Creek Tributary 6	Confluence of Taylors Creek	Approximately 12,460 feet upstream of the confluence with Taylors Creek	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Taylors Creek Tributary 7	Confluence of Taylors Creek	Approximately 9,580 feet upstream of the confluence with Taylors Creek	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.

Table 13: Summary of Hydrologic and Hydraulic Analyses - continued

Flooding Source	Study Limits Downstream Limit	Study Limits Upstream Limit	Hydrologic Model or Method Used	Hydraulic Model or Method Used	Date Analyses Completed	Flood Zone on FIRM	Special Considerations
Taylor's Creek Tributary 12	Confluence of Taylor's Creek	Approximately 3,760 feet upstream of the confluence of Taylor's Creek	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Taylor's Creek Tributary 13	Confluence of Taylor's Creek	Approximately 2,400 feet upstream of the confluence with Taylor's Creek	USGS regional regression equations	HEC-RAS 3.1.3	2007	A	Peak discharges were estimated by published USGS regional regression equations (Stamey and Hess, 1993). Only physiographic parameter utilized for the regression equations is drainage area (square miles). HEC-GeoRAS was used to generate preprocessing data (HEC, 2004a). The hydraulic models were prepared without surveying bathymetric data.
Unnamed Tributary to Beards Creek	Confluence of Beards Creek	County boundary	HEC-RAS 4.1	HEC-RAS 4.1.0	2014	A	Hydrology determined using Georgia rural Regression Equations. Cross sections were cut from available topographic data using HEC-GeoRAS in ESRI ArcMap platform.

Table 14: Roughness Coefficients

Flooding Source	Channel “n”	Overbank “n”
Altamaha River	0.05	0.12
Beards Creek	0.05	0.12
Slades Branch	0.05	0.12
Unnamed Tributary to Beards Creek	0.05	0.12

5.3 Coastal Analyses

This section is not applicable to this Flood Risk Project.

Table 15: Summary of Coastal Analyses

[Not Applicable to this Flood Risk Project]

5.3.1 Total Stillwater Elevations

This section is not applicable to this Flood Risk Project.

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

[Not Applicable to this Flood Risk Project]

Table 16: Tide Gage Analysis Specifics

[Not Applicable to this Flood Risk Project]

5.3.2 Waves

This section is not applicable to this Flood Risk Project.

5.3.3 Coastal Erosion

This section is not applicable to this Flood Risk Project.

5.3.4 Wave Hazard Analyses

This section is not applicable to this Flood Risk Project.

Table 17: Coastal Transect Parameters

[Not Applicable to this Flood Risk Project]

Figure 9: Transect Location Map

[Not applicable to this Flood Risk Project]

5.4 Alluvial Fan Analyses

This section is not applicable to this Flood Risk Project.

Table 18: Summary of Alluvial Fan Analyses

[Not applicable to this Flood Risk Project]

Table 19: Results of Alluvial Fan Analyses

[Not applicable to this Flood Risk 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 NAVD88. 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 (NGS) 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 FIRMs 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 Long County are provided in Table 20.

Table 20: Countywide Vertical Datum Conversion

Quadrangle Name	Quadrangle Corner	Latitude	Longitude	Conversion from NGVD29 to NAVD88 (feet)
Glissons Millpond	SW	-81.875	32.000	-0.781
Willie	SW	-81.750	32.000	-0.84
Glennville NE	SW	-81.875	31.875	-0.833

Table 20: Countywide Vertical Datum Conversion - continued

Quadrangle Name	Quadrangle Corner	Latitude	Longitude	Conversion from NGVD29 to NAVD88 (feet)
Taylor's Creek	SW	-81.750	31.875	-0.886
Glennville SE	SW	-81.875	31.750	-0.873
Walthourville	SW	-81.750	31.750	-0.896
Hinesville	SW	-81.625	31.750	-0.945
Ludowici	SW	-81.750	31.625	-0.919
East of Ludowici	SW	-81.625	31.625	-0.938
Riceboro	SW	-81.500	31.625	-0.958
Average Conversion from NGVD29 to NAVD88 = -0.887 feet				

Table 21: Stream-Based Vertical Datum Conversion

[Not applicable to this Flood Risk 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 *Guidelines and Standards for Flood Risk Analysis and Mapping*, www.fema.gov/guidelines-and-standards-flood-risk-analysis-and-mapping.

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
Digital Orthophotography	USGS	1999 or later	1:24,000	Black and White Digital Orthophotography from National Agriculture Imagery Program
Long County Aerials	USDA	10/26/2010	1:12,000	Black and White Digital Orthophoto Quadrangles from National Aerial Photography Program
County Boundaries	Georgia Department of Transportation	12/09/2009	1:100,000	
Road Centerlines and Road Names	Long County GIS	10/08/2009	1:6,000	

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."

Certain flooding sources may have been studied that do not have published BFEs on the FIRMs, or for which there is a need to report the 1% annual chance flood elevations at selected cross sections because a published Flood Profile does not exist in this FIS Report. These streams may have also been studied using methods to determine non-encroachment zones rather than floodways. For these flooding sources, the 1% annual chance floodplain boundaries 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. All topographic data used for modeling or mapping has been converted as necessary to NAVD88.

Table 23: Summary of Topographic Elevation Data used in Mapping

Community	Flooding Source	Source for Topographic Elevation Data					
		Description	Scale	Contour Interval	RMSE _z	Accuracy _z	Citation
Long County	Miscellaneous within Long County	Topographic maps digitized by Geotechnologies, Inc.	1:24,000	5 feet 10 feet	N/A	N/A	USGS 2008

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 base flood elevations.

Table 24: Floodway Data

[Not applicable to this Flood Risk Project]

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

[Not applicable to this Flood Risk Project]

6.4 Coastal Flood Hazard Mapping

This section is not applicable to this Flood Risk Project.

Table 26: Summary of Coastal Transect Mapping Considerations

[Not applicable to this Flood Risk 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 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.

To obtain an application for a LOMA, visit www.fema.gov/floodplain-management/letter-map-amendment-loma 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 www.fema.gov/online-tutorials.

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 www.fema.gov/floodplain-management/letter-map-amendment-loma 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 www.fema.gov/online-tutorials.

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 www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/mt-2-application-forms-and-instructions 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 Long County FIRM are listed in Table 27.

Table 27: Incorporated Letters of Map Change

[Not applicable to this Flood Risk Project]

6.5.4 Physical Map Revisions

Physical Map Revisions (PMRs) are 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 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 Long 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 Flood Hazard Boundary Map (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.
- *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 Physical Map Revisions (PMR) 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 Long County FIRMs in countywide format was 09/26/2008.

Table 28: Community Map History

Community Name	Initial Identification Date	Initial FHBM Effective Date	FHBM Revision Date(s)	Initial FIRM Effective Date	FIRM Revision Date(s)
Long County, Unincorporated Areas	03/17/1978	03/17/1978	None	09/27/1985	09/26/2008 05/04/2014
Ludowici, City of	01/23/1976	01/23/1976	None	09/26/2008	

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
Altamaha River	5/5/2014	Dewberry and Davis, LLC.	Not Available	2014	Long County, Unincorporated Areas
Beards Creek	5/5/2014	Dewberry and Davis, LLC.	Not Available	2014	Long County, Unincorporated Areas
Doctors Creek	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Horse Creek	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas

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

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Jones Creek	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas; Ludowici, City of
Kirkland Creek	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Kirkland Creek Tributary 3	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Little Doctor Creek	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Little Doctor Creek Tributary 1	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Old Millhead Branch	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Old Millhead Branch Tributary 4	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Old Millhead Branch Tributary 5	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Payne Creek	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Slades Branch	5/5/2014	Dewberry and Davis, LLC.	Not Available	2014	Long County, Unincorporated Areas
Taylor's Creek	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Taylor's Creek Tributary 2	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Taylor's Creek Tributary 6	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas

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

Flooding Source	FIS Report Dated	Contractor	Number	Work Completed Date	Affected Communities
Taylor's Creek Tributary 7	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Taylor's Creek Tributary 12	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Taylor's Creek Tributary 13	9/26/2008	PBS&J	EMA-2006-CA-5615	2007	Long County, Unincorporated Areas
Unnamed Tributary to Beards Creek	5/5/2014	Dewberry and Davis, LLC.	Not Available	2014	Long County, Unincorporated Areas

7.2 Community Meetings

The dates of the community meetings held for this Flood Risk Project and previous Flood Risk 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
Long County	10/30/2015	08/19/2015	Work Map	FEMA, Georgia DNR, CDM Smith, and community officials
Long County	5/5/2014	11/9/2010	CCO Meeting	FEMA Region IV, community officials, Georgia Coastal Regional Commission, and various other agencies and affected groups
		11/16/2010	Scoping	FEMA Region IV, community officials, and various other agencies and affected groups
Long County	9/26/2008	12/7/2005	CCO Meeting	FEMA, Georgia DNR, PBS&J, Long County, and the City of Ludowici
		2/7/2008	CCO Meeting	FEMA, Georgia DNR, PBS&J, and Long County

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 www.fema.gov.

The additional data that was used for this project includes the FIS Report and FIRM that were previously prepared for Long County (FEMA 2014).

Table 31 is a list of the locations where FIRMs for Long 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
Long County, Unincorporated Areas	Code Enforcement Office 459 South McDonald Street	Ludowici	GA	31316
Ludowici, City of	Ludowici City Hall 469 North Main Street	Ludowici	GA	31316

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	www.fema.gov/national-flood-insurance-program-flood-hazard-mapping/engineering-library
NFIP website	www.fema.gov/national-flood-insurance-program
NFHL Dataset	msc.fema.gov
FEMA Region IV	Federal Emergency Management Agency, 3003 Chamblee Tucker Road, Atlanta, Georgia 30341
Other Federal Agencies	
USGS website	www.usgs.gov

Table 32: Additional Information - continued

Hydraulic Engineering Center website	www.hec.usace.army.mil
State Agencies and Organizations	
State NFIP Coordinator	Tom Shillock, CFM Dept. of Natural Resources Environmental Protection Division 2 Martin Luther King Jr. Drive Atlanta, Georgia 30334
State GIS Coordinator	Not Applicable

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	<i>Publication Title, "Article," Volume, Number, etc.</i>	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USDA 2010	U.S. Department of Agriculture	<i>Long County Aerials</i>	National Agriculture Imagery Program	Washington, D.C.	10/26/2010	
FEMA 2008	Federal Emergency Management Agency	<i>Long County Flood Insurance Rate Maps</i>	Federal Emergency Management Agency	Washington, D.C.	09/26/2008	
FEMA 2012	Federal Emergency Management Agency	<i>Study Contractor Data</i>	Dewberry and Davis, LLC	Washington, D.C.	10/26/2012	
Georgia DOT 2008	Georgia Department of Transportation	<i>County Boundaries</i>	Georgia Department of Transportation	Atlanta, GA	12/09/2008	
Long County GIS 2009	Long County GIS	<i>Road Centerlines and Road Names</i>	Long County GIS	Long County, GA	10/08/2009	
Dewberry and Davis 2012	Dewberry and Davis, LLC	<i>Submittal Area</i>	Dewberry and Davis, LLC	Atlanta, GA	07/01/2012	
FEMA 1983a	Federal Emergency Management Agency	<i>Flood Insurance Study, Liberty County, Georgia (Unincorporated Areas)</i>	Federal Emergency Management Agency	Washington, D.C.	06/01/1983	

Table 33: Bibliography and References - continued

Citation in this FIS	Publisher/ Issuer	<i>Publication Title, "Article," Volume, Number, etc.</i>	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
FEMA 1983	Federal Emergency Management Agency	<i>Flood Insurance Rate Map, Liberty County, Georgia</i>	Federal Emergency Management Agency	Washington, D.C.	12/01/1983	
FEMA 1988	Federal Emergency Management Agency	<i>Flood Insurance Study, Wayne County, Georgia (Unincorporated Areas)</i>	Federal Emergency Management Agency	Washington, D.C.	09/30/1988	
FEMA 1983b	Federal Emergency Management Agency	<i>Flood Insurance Study. McIntosh County, Georgia (Unincorporated Areas)</i>	Federal Emergency Management Agency	Washington, D.C.	11/15/1983	
FEMA 1992	Federal Emergency Management Agency	<i>Flood Insurance Rate Map McIntosh County, Georgia (Unincorporated Areas)</i>	Federal Emergency Management Agency	Washington, D.C.	10/16/1992	
USACE 2004a	U.S. Army Corps of Engineers	<i>HEC-GeoRAS River Analysis System, Version BETA 6.0</i>	Hydrologic Engineering Center	Davis, CA	04/2004	
USACE 2004b	U.S. Army Corps of Engineers	<i>HEC-RAS River Analysis System, Version 3.1.3</i>	Hydrologic Engineering Center	Davis, CA	04/2004	
NARSAL 2007	NARSAL (Natural Resources Spatial Analysis Laboratory)	<i>Georgia Land Use Trends; Long County: 1998 Land Cover</i>	NARSAL (Natural Resources Spatial Analysis Laboratory)		01/23/2007	http://narsal.ecology.uga.edu

Table 33: Bibliography and References - continued

Citation in this FIS	Publisher/ Issuer	<i>Publication Title, "Article," Volume, Number, etc.</i>	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
National Geodetic Survey 2007	National Geodetic Survey	<i>VERTCON-North American Vertical Datum Conversion Utility</i>	National Geodetic Survey		01/23/2007	http://www.ngs.noaa.gov
NOAA 2007	National Oceanic and Atmospheric Administration	<i>NOAA's National Weather Service</i>	National Oceanic and Atmospheric Administration		01/27/2007	http://www.nws.noaa.gov/
USGS 1993	U.S. Geological Survey	<i>USGS Water Resources Investigations Report 93-4016. Techniques for Estimating Magnitude and Frequency of Floods in Rural Basins of Georgia</i>	Stamey, T.C. and C.W. Hess		1993	
U.S. Census Bureau 2012	U.S. Census Bureau	<i>American FactFinder, Long County, Georgia, 2010</i>	U.S. Census Bureau		06/05/2012	http://factfinder.census.gov/qfd/states/13/13183.html
U.S. Cities Online 2007	U.S. Cities Online	<i>Key to the City: Ludowici. Long County, Georgia</i>	U.S. Cities Online		01/23/2007	http://www.usacitiesonline.com

Table 33: Bibliography and References - continued

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USGS 1993	U.S. Department of the Interior	<i>7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 5 and 10 feet, digitized by Geotechnologies, Inc.; Glissons Millpond, 1993; Glennville, 1993; Glennville NE, 1993; Taylors Creek, 1993; Glennville SW, 1993; Glennville SE, 1993; Walthourville, 1993; Hinesville, 1993; Jesup NW, 1993; Doctortown, 1993; Ludowici, 1993; East of Ludowici, 1993; Riceboro, 1993; Jesup East, 1993; Bug Island, 1993; Townsend, 1993</i>	U.S. Geological Survey		1993	
The Weather Channel 2007	The Weather Channel	<i>Monthly Averages for Ludowici. GA</i>	The Weather Channel		1/23/2007	http://www.weather.com
Chow 1998	McGraw-Hill International Editions	<i>Applied Hydrology</i>	Chow, V.T. et a		1998	

Table 33: Bibliography and References - continued

Citation in this FIS	Publisher/ Issuer	Publication Title, "Article," Volume, Number, etc.	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
Downer 2008	Engineer Research and Development Center	<i>GSSHAWIKI User's Manual, Gridded Surface Subsurface Hydrologic Analysis Version 4.0 for WMS 8.1, ERDC Technical Report</i>	Downer, C.W., Ogden, F.L., and Byrd, A.R	Vicksburg, Mississippi	2008	
FEMA 2003	Federal Emergency Management Agency	<i>Guidelines and Specifications for Flood Hazard Mapping Partners, Appendix C: Guidance for Riverine Flooding Analysis and Mapping</i>	Federal Emergency Management Agency	Washington, D.C.	2003	
NOAA	NOAA	<i>Technical Report NWS 24, A Methodology for Point-to-Area Rainfall Frequency Ratios</i>	NOAA	Washington, D.C.	02/1980	
USDA 2009	United States Department of Agriculture	<i>WinTR-55 Small Watershed Hydrology Program, Version 1.00.09</i>	United States Department of Agriculture		08/05/2009	
Hershfield 1961	United States Department of Commerce	<i>Technical Paper No.40, Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years</i>	David M. Hershfield	Washington, D.C.	05/1961	

Table 33: Bibliography and References - continued

Citation in this FIS	Publisher/ Issuer	<i>Publication Title, "Article," Volume, Number, etc.</i>	Author/Editor	Place of Publication	Publication Date/ Date of Issuance	Link
USGS 2009	United States Geological Survey	<i>Magnitude and Frequency of Rural Floods in the Southeastern United States, 2006: Volume 1</i>	United States Geological Survey	Georgia	2009	
	XP-SWMM, XPSWMM	<i>2011 Getting Started Manual, US (NA)</i>	XP-SWMM, XPSWMM	Portland, Oregon	2011	