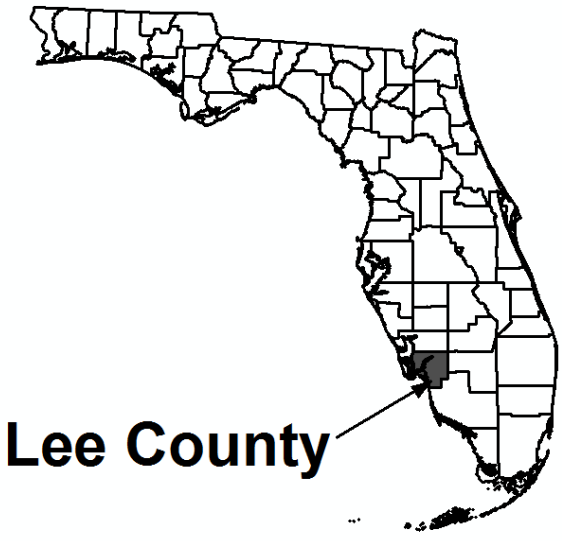
FLOOD INSURANCE STUDY

LEE COUNTY, FLORIDA
AND INCORPORATED AREAS

COMMUNITY NAME	COMMUNITY NUMBER
BONITA SPRINGS, CITY OF	120680
CAPE CORAL, CITY OF	125095
ESTERO, VILLAGE OF	120260
FORT MYERS, CITY OF	125106
FORT MYERS BEACH, TOWN OF	120673
LEE COUNTY, UNINCORPORATED AREAS	125124
SANIBEL, CITY OF	120402



REVISED:
DECEMBER 7, 2018

Federal Emergency Management Agency

FLOOD INSURANCE STUDY NUMBER
12071CV001B

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

Part or all of this Flood Insurance Study may be revised and republished at any time. In addition, part of this Flood Insurance Study may be revised by the Letter of Map Revision process, which does not involve republication or redistribution of the Flood Insurance Study. It is, therefore, the responsibility of the user to consult with community officials and to check the community repository to obtain the most current Flood Insurance Study components. A listing of the Community Map Repositories can be found on the Index Map.

Initial Countywide FIS Effective Date: August 28, 2008

Revised Countywide FIS Date: December 7, 2018

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FLOOD INSURANCE STUDY
LEE COUNTY, FLORIDA AND INCORPORATED AREAS

1.0 INTRODUCTION

1.1 Purpose of Study

This countywide Flood Insurance Study (FIS) investigates the existence and severity of flood hazards in, or revises and updates previous Flood Insurance Rate Maps (FIRMs) for the geographic area of Lee County, Florida, including: the Cities of Bonita Springs, Cape Coral, Fort Myers, and Sanibel; the Town of Fort Myers Beach; the Village of Estero; and the unincorporated areas of Lee County (hereinafter referred to collectively as Lee County).

This FIS aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This FIS has developed flood risk data for various areas of the county that will be used to establish actuarial flood insurance rates. This information will also be used by Lee County to update existing floodplain regulations as part of the Regular Phase of the National Flood Insurance Program (NFIP), and will also be used by local and regional planners to further promote sound land use and floodplain development. Minimum floodplain management requirements for participation in the NFIP are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some States or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the State (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this FIS are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The digital FIRMs were produced in Florida West State Plane Zone (FIPS Zone 0902) coordinates referenced to the North American Datum of 1983 and the GRS 1980 spheroid.

This FIS was prepared to include the unincorporated areas of, and incorporated communities within, Lee County in a countywide format. Information on the authority and acknowledgments for each jurisdiction included in this countywide FIS, as compiled from their previously printed FIS reports, is shown below.

Cape Coral, City of:	For the August 17, 1981, FIS, the hydrologic and hydraulic analyses were performed in 1978 by Tetra Tech, Inc., for the Federal Emergency Management Agency (FEMA), under Contract No. H-4059.

For the September 18, 1985, FIS, the hydrologic and hydraulic analyses were based on the report "Determination of 100-Year Coastal Surge Flood Elevations for Lee County, Florida" (South Florida Water Management District (SFWMD), January 1983).

Fort Myers, City of:

For the April 16, 1979, FIS, the hydrologic and hydraulic analyses were performed in February 1978 by Tetra Tech, Inc., for FEMA under Contract No. H-4059.

For the November 15, 1984, FIS, the hydrologic and hydraulic analyses were based on the report "Determination of 100-Year Coastal Surge Flood Elevations for Lee County, Florida" (SFWMD, January 1983).

Lee County
(Unincorporated Areas):

For the original June 15, 1984, FIS report and September 19, 1984, FIRM (hereinafter referred to as the 1984 FIS), the hydrologic and hydraulic analyses for the detailed studied streams were prepared by Tetra Tech, Inc., for FEMA under Contract No. H-4059. That work was completed in 1978. The 1984 FIS was also prepared based on the coastal surge and wave height analysis data prepared by SFWMD (SFWMD, 1983).

For the November 3, 1989, revision, coastal analyses for three additional transects along the Gulf of Mexico were prepared by Tackney & Associates, Inc. for FEMA. FEMA reviewed and accepted the analyses for the purposes of the revision.

For the March 15, 1994, revision, the revised and new hydrologic and hydraulic analyses were taken from a report prepared by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS, formerly Soil Conservation Service (SCS)) (USDA, 1984).

For the July 20, 1998, revision, the hydrologic and hydraulic analyses for the Imperial River were prepared by Woodward-Clyde Federal Services for FEMA Hazard Mitigation and Technical Assistance Planning under Contract No. EMW-C-4678, Task Order No. 37. This work was completed on March 12, 1995.

Sanibel, City of:	For the April 16, 1979, FIS, the hydrologic and hydraulic analyses for the study were prepared by Tetra Tech, Inc., for FEMA under Contract No. H-4059. This work was completed in February 1978. For the October 15, 1985, FIS, the hydrologic and hydraulic analyses were based on the report "Determination of 100-Year Coastal Surge Flood Elevations for Lee County, Florida" (SFWMD, January 1983).

The authority and acknowledgments for the City of Bonita Springs, the Village of Estero, and the Town of Fort Myers Beach are not available because no FIS reports were ever published for those communities.

For the August 28, 2008 countywide FIS, revised hydrologic and hydraulic analyses were prepared for FEMA by Taylor Engineering, Inc. under Contract No. EMA-97-C0-0137. DeGrove Surveyors, Inc. performed riverine surveying under contract to Taylor Engineering. The restudy completion date was February 2002. Additional hydraulic analyses for the coastal back bay areas were prepared for FEMA by Dewberry & Davis, LLC, under Contract HSFEHQ-04-D-0025. This work was completed in June 2006.

In October 2007, additional topographic data was supplied by Community Services Inc., in the vicinity of the Renaissance Subdivision along Six Mile Cypress Slough.

Revisions to the hydraulic analyses were prepared for multiple riverine flooding sources by several engineering firms as detailed in Table 3 below. This work was completed in December 2007.

This Physical Map Revision (PMR) incorporates a Letter of Map Revision (LOMR), Case Number 12-04-7499P. For LOMR Case Number 12-04-7499P along Ten Mile Canal and North Colonial Waterway, Tomasello Consulting Engineers, Inc. revised the hydrologic and hydraulic analysis and updated the floodplain mapping. Tomasello Consulting Engineers, Inc. also completed a hydrologic and hydraulic analysis and updated floodplain mapping along South Branch and a portion of Halfway Creek. These analyses were incorporated in to this FIS under Contract No. HSFEHQ-09-D-0368, Task Order Number HSEF04-13-J-9001 by BakerAECOM.

1.3 Coordination

Consultation Coordination Officer's (CCO) meetings may be held for each jurisdiction in this countywide FIS. An initial CCO meeting is held typically with representatives of FEMA, the community, and the study contractor to explain the nature and purpose of a FIS, and to identify the streams to be studied by detailed methods. A final CCO meeting is held typically with representatives of FEMA, the community, and the study contractor to review the results of the study.

Prior to this countywide FIS, the following persons or agencies were contacted in an attempt to incorporate all possible sources of data: the Florida Department of Natural Resources, the Florida State Department of Community Affairs, the Florida

State Department of Transportation, the Fort Myers Community Development Department; the Fort Myers Public Works Department, the Lee County Board of Commissioners, the Lee County Division of Transportation, the Lee County Flood Insurance Coordinator, the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), and the Southwest Florida Regional Planning Council. Also contacted were the Sanibel City Planning Department; the SFWMD; the Southwest Florida Water Management District; the U.S. Army Corps of Engineers (USACE), Jacksonville District; the U.S. Geological Survey (USGS); Brevard Engineering; Gee and Jenson, Engineers, Architects, Planners, Inc.; Howard, Needles, Tammen, and Bergendoff; Johnson Engineering; and Woodward- Clyde. The State Coordinator was involved with these studies through the FEMA Regional Office in Atlanta.

The dates of the initial and final CCO meetings held prior to the August 28, 2008 countywide FIS for Lee County and the incorporated communities within its boundaries are shown in Table 1"Pre-Countywide CCO Meetings."

Table 1 – CCO Meeting Dates

Community Name	Initial CCO Date	Final CCO Date
Cape Coral, City of	*	May 10, 1984
Fort Myers, City of	*	May 9, 1984
Lee County (Unincorporated Areas)	*	August 4, 1992
Sanibel, City of	*	May 10, 1984

* Data not available

For the countywide FIS, the following agencies and organizations were contacted in an attempt to incorporate all possible sources of data:

Lee County Board of County Commissioners
Lee County Planning Department
Lee County Public Works Department
Lee County Surveying and Mapping Program
Lee County GIS Department
Dewberry & Davis, LLC
Florida Department of Environmental Protection (FDEP)
Florida Department of Transportation (FDOT) Johnson Engineering, Inc.
Southwest Florida Water Management District (SWFWMD) South Florida Water Management District (SFWMD)
U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Geological Survey (USGS)

The initial CCO meetings occurred February 7, 1997 with additional coordination meetings on February 12, 1998 in Jacksonville and April 3, 1998 in Sanibel. These meetings were attended by representatives of the communities, the NRCS, FEMA, and Taylor Engineering. Final CCO meetings were held October 25 and 26, 2006. These meetings were attended by representatives of the study contractors, the communities, the State of Florida, and FEMA.

2.0 AREA STUDIED

2.1 Scope of Study

This FIS covers the geographic area of Lee County, Florida.

All or portions of the flooding sources listed in Table 2, "Flooding Sources Studied by Detailed Methods," were studied by detailed methods. Limits of detailed study are indicated on the Flood Profiles (Exhibit 1) and on the FIRM (Exhibit 2).

Table 2 – Flooding Sources Studied By Detailed Methods

Bayshore Creek
Bayshore Tributary [1]
Bedman Creek/Dog Canal
Billy Creek
Caloosahatchee River
Carrell Canal
Chapel Branch Creek
Charlotte Harbor
Cypress Creek
Daughtrey Creek
East Branch Daughtrey Creek
East Branch Yellow Fever Creek
Estero Bay
Estero River
Fichter Creek
Ford Street Canal
Gulf of Mexico
Halfway Creek
Halls Creek
Hancock Creek
Hendry Creek
Hendry Creek West
Hickey Creek
Hickey Creek Drainageway
Hickey Creek (Upstream of Hickey Creek Drainageway)
Imperial River
Kickapoo Creek
L-3 Canal
Leitner Creek
Manuels Branch
Marsh Point Creek
Matlacha Pass
Mullock Creek
Mullock Creek Tributary
North Colonial Waterway
Oak Creek
Orange River
Owl Creek
Palm Creek
Pine Island Sound
Popash Creek
Powell Bypass
Powell Creek
Powell Creek (upstream of confluence of Powell Bypass)
Powell Creek Tributary No. 1
San Carlos Bay
Six Mile Cypress Slough
South Branch
Spanish Canal
Spanish Creek
Spring Creek
Stricklin Gully
Stroud Creek
Telegraph Creek
Ten Mile Canal
Thompson Cutoff Tributary [2]
Tributary L-1 (Yellow Fever Creek Tributary)
Tributary L-2 (Yellow Fever Creek Tributary)
Trout Creek/Curry Lake Canal
Winkler Canal
Yellow Fever Creek

[1]Flooding controlled by Bayshore Creek

[2]Detailed analyses are now voided due to the Palm Creek watershed changes

As part of the August 28, 2008 countywide FIS, updated analyses were included for the flooding sources shown in Table 3, "2008 Countywide Scope of Revision."

Table 3 – 2008 Countywide Scope of Study

Stream	Limits of Revised or New Detailed Study
Bayshore Creek	Mouth at the Caloosahatchee River to Nalle Grade Road
Bayshore Tributary	Entire length of stream
Bedman Creek/Dog Creek	Mouth at the Caloosahatchee River to just downstream of East 3rd Street
Billy Creek	Mouth at the Caloosahatchee River to just downstream of Corporation Circle
Caloosahatchee River	Mouth at the San Carlos Bay to Beautiful Island
Carrell Canal	Mouth at the Caloosahatchee River to a point approximately 400 feet upstream of Evans Avenue
Chapel Branch Creek	Mouth at the Caloosahatchee River to a point approximately 700 feet upstream of Rich Road
Charlotte Harbor	Entire shoreline within Lee County
Cypress Creek	Mouth at the Caloosahatchee River to a point approximately 3.8 miles upstream of confluence 3.8 miles upstream of confluence
Daughtrey Creek	Mouth at the Caloosahatchee River to a point approximately 0.9 mile upstream of Nalle Grade Road
East Branch Daughtrey Creek	Mouth at the Daughtrey Creek to Nalle Grade Road
East Branch Yellow Fever Creek	Mouth at the Yellow Fever Creek to US 41
Estero Bay	Entire shoreline within Lee County
Estero River	Mouth at the Caloosahatchee River to a point approximately 0.4 mile upstream of I-75
Fichter Creek	Mouth at the Caloosahatchee River to Fichter Creek Lane
Ford Street Canal	Mouth at the Billy Creek to a point approximately 0.2 mile upstream of Canal Street
Gulf of Mexico	Entire shoreline within Lee County
Halfway Creek	Mouth at the Estero River to Railroad
Halls Creek	Mouth at the Cypress Creek to a point approximately 1 mile upstream of confluence
Hancock Creek	Mouth at the Caloosahatchee River to Diplomat Parkway
Hendry Creek	Mouth at the Caloosahatchee River to US 41
Hendry Creek West	Mouth at the Hendry Creek to just upstream of Winkler Road
Hickey Creek	Mouth at the Caloosahatchee River to the confluence of Hickey Creek Drainageway
Hickey Creek Drainageway	Mouth at the Hickey Creek to a point approximately 1.1 miles upstream of 171 Street
Kickapoo Creek	Mouth at the Caloosahatchee River to a point approximately 0.2 mile upstream of Old Bayshore Road
L-3 Canal	Mouth at the L Canal to a point approximately 0.4 mile upstream of Fowler Street
Leitner Creek	Mouth at the Imperial River to a point approximately 0.3 mile upstream of I-75
Manuels Branch	Mouth at the Caloosahatchee River to a point approximately 0.2 mile upstream of Evans Avenue
Marsh Point Creek	Mouth at the Caloosahatchee River to Tucker Lane
Matlacha Pass	Entire shoreline within Lee County
Mullock Creek	Mouth at the Caloosahatchee River to Oriole Road
Mullock Creek Tributary	Mouth at the Mullock Creek to South Tamiami Trail
North Colonial Waterway	Mouth at the Ten Mile Canal to a point approximately 400 feet upstream of Milan Drive

Table 3 – 2008 Countywide Scope of Study (continued)

Stream	Limits of Revised or New Detailed Study
Oak Creek	Mouth at the Imperial River to a point approximately 0.2 mile upstream of Imperial Street
Orange River	Mouth at the Caloosahatchee River to a point approximately 2.5 miles upstream of Buckingham Road
Owl Creek	Mouth at the Trout Creek to a point approximately 0.2 mile upstream of Shirley Lane
Palm Creek	Mouth at the Caloosahatchee River to a point approximately 0.6 mile upstream of Ruden Road
Pine Island Sound	Entire shoreline with in Lee County
Popash Creek	Mouth at the Caloosahatchee River to a point approximately 1.1 miles upstream of Nalle Grade Road
Powell Creek	Mouth at the Caloosahatchee River to the confluence of Powell Bypass
Powell Bypass	Mouth at the Powell Creek to a point approximately 3.5 miles upstream of Laurel Drive
San Carlos Bay	Entire shoreline with in Lee County
Six Mile Cypress Slough	Mouth at the Ten Mile Canal to a point approximately 1.2 miles upstream of Colonial Boulevard
South Branch	Confluence with Estero River to I-75
Spanish Canal	Mouth at the Spanish Creek to a point approximately 0.8 mile upstream of confluence
Spanish Creek	Mouth at the Caloosahatchee River to a point approximately 0.2 mile upstream of Persimmon Ridge Road
Spring Creek	Mouth at the Caloosahatchee River to a point approximately 0.2 mile upstream of Old 41 Road
Stricklin Gully	Mouth at the Trout Creek to a point approximately 1.2 miles upstream of confluence
Stroud Creek	Mouth at the Caloosahatchee River to a point approximately 0.2 mile upstream of St. Paul Road
Telegraph Creek	Mouth at the Caloosahatchee River to a point approximately 1.5 miles upstream of Telegraph Creek Lane
Ten Mile Canal	Mouth at the Mullock Creek to a point approximately 1.3 miles upstream of Winkler Avenue
Trout Creek/Curry Lake Canal	Mouth at the Caloosahatchee River to the county boundary
Winkler Canal	Mouth at the Caloosahatchee River to just upstream of Evans Avenue
Yellow Fever Creek	Mouth at the Hancock Creek to a point approximately 0.5 mile upstream of Littleton Road

All detailed and approximate flooding sources that were not restudied for the August 28, 2008 countywide FIS and FIRM had their floodplains redelineated based on the updated topographic data (Lee County, 1998).

The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction.

All or portions of numerous flooding sources in the county were studied by approximate methods. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Lee County.

This revision incorporates the determination of letters issued by FEMA resulting in map changes as shown in Table 4, "Letters of Map Change."

Table 4 – Letter of Map Change

Community	Flooding Source(s) and Case Number	Date LOMR Issued
Lee County (Unincorporated Areas)	Estero Bay – 09-04-3111P*	May 27, 2009
Lee County (Unincorporated Areas)	Estero River – 11-04-5887P**	August 10, 2012
City of Fort Myers Lee County (Unincorporated Areas)	Ten Mile Canal & North Colonial Waterway – 12-04-7499P	December 31, 2013
City of Fort Myers Lee County (Unincorporated Areas)	Six Mile Cypress Slough – 08-04-0920P and 12-04-3735	August 29, 2008 January 18, 2013
Lee County (Unincorporated Areas)	Mullock Creek – 14-04-5866P	August 20, 2015

*FIRM Panel 12071C0579F was not updated to reflect mapping revisions.
**Only FIRM Panel 12071C0592G was updated to reflect mapping revisions.

2.2 Community Description

Lee County encompasses an area of 785 square miles in southwest Florida and is bounded by the Gulf of Mexico to the west, Charlotte County to the north, Collier and Hendry Counties to the east, and Collier County to the south. Lee County is served by Interstate 75, U.S. Highway 41, and State Roads 78, 80, and 82 and the Seminole Gulf Railway, a short-line railroad.

The 2010 U.S. Census population of Lee County was 618,754; this is an increase of 40.3% over the 2000 population of 440,888. The City of Fort Myers is the county seat and has a 2010 population of 62,298. The City of Cape Coral is the largest incorporated city in the county with a population of 154,305 (U.S. Department of Commerce, 2010). The other incorporated areas in the county are Bonita Springs, Estero, North Fort Myers, Fort Myers Beach, Lehigh Acres, and the island communities of Boca Grande, Captiva, and Sanibel.

Lee County lies in the subtropical climatic zone. The year in this region is divided into wet and dry seasons. The wet season extends from June through September and coincides with the hurricane season. During this four month period, the county receives nearly two-thirds of its annual precipitation. Due to the moderating effects of the Gulf of Mexico, the coastal regions of the county are warmer in winter and cooler in summer than the interior portions. The City of Fort Myers records an average annual temperature of 74° F.

The topography of Lee County is generally low and flat. Elevations rise eastward to approximately 30 feet North American Vertical Datum of 1988 (NAVD), but much of the developed area is below 10 feet NAVD. The flat topography of the area makes basin boundary delineation difficult, and basin interflow becomes a factor in all major flood events.

A chain of low islands with numerous inlets and large expanses of water forms a barrier to the mainland. These barrier islands are susceptible to complete inundation during a 1-percent annual chance (100-year) storm surge event. The small dunes along the beach face provide very little protection from wave action.

Swampy areas resulting from the flat topography and a lack of surface drainage characterize the interior of the county. Corkscrew Swamp covers a large portion of the southern part of the county and supplies the Imperial River, which drains into Fish Trap and Little Hickory Bays at Bonita Shores. The Caloosahatchee River watershed, located in the central area of the county, is the main surface drainage system. This river flows from the center of the state, Lake Okeechobee, to the southern part of the Charlotte Harbor system in San Carlos Bay/Matlacha Pass.

2.3 Principal Flood Problems

Flooding in the coastal regions of the study area results primarily from hurricanes and tropical storms. Not all storms which pass close to the study areas produce extremely high storm surges. Similarly, storms which produce extreme conditions in one area may not necessarily produce critical conditions in other parts of the study area. However, with the condition of high winds directed onshore, the storms surges produced can inundate the coastal islands and flood the coastal areas behind them for some distance inland. Wave action which accompanies wind-generated storms can cause flooding, erosion, and structural damage, particularly on the offshore islands. The Caloosahatchee River is a broad estuary and, under certain conditions, storm surges generated at its mouth can intrude far upstream. The rainfall which usually accompanies hurricanes and tropical storms can aggravate the flood situation, particularly in areas where the secondary drainage system is poorly developed. Freshwater flooding was considered in the coastal zone, but it is not as significant as flooding caused by storm surge in terms of damaging effects. Inland freshwater flooding is significant in regions near streams and rivers. Because of the flatness of the terrain, most inland areas are characterized by shallow flooding during heavy rainfalls.

Storms passing Florida in the vicinity of Lee County have produced severe floods as well as structural damage. A brief description of several significant storms provides historic information to which coastal flood hazards and the projected flood depths can be compared (USACE, 1968, 1970).

The hurricane of September 11-22, 1926, was one of the most destructive events of the century in Florida. Damage for this storm was estimated at $100 million statewide. High tides up to 12 feet above normal were reported at Fort Myers and Punta Rassa. The offshore islands of Sanibel and Captiva were inundated, with many homes being swept off their foundations. Flooding damage in the Fort Myers, Sarasota, and Bradenton areas was estimated at $3 million.

The hurricane of September 4-21, 1947, entered the Florida coastline at Fort Lauderdale on September 17. As it moved across the peninsula, it maintained full intensity and caused extensive flooding. Winds of 90 knots were recorded at Fort Myers, where storm damage totaled nearly $1 million.

In September 1960, the southern portion of Lee County was particularly affected by Hurricane Donna. High-water marks of 10 to 11 feet National Geodetic Vertical Datum of 1929 (NGVD) were recorded on Eastern Island. The effects of the hurricane were augmented by antecedent rains which, in the previous three weeks, totaled almost 10 inches over the affected areas. This resulted in higher- than-normal water tables.

The fo1lowing is a description of selected tropical storms that have affected Lee County since 1984.

July 21-25, 1985 Hurricane Bob

Hurricane Bob, relatively short-lived, struck the southwest Florida coast near Fort Myers on July 21-25, 1985, as a tropical storm. Winds reached 50-70 miles per hour (mph). Bob crossed Lake Okeechobee and went out to sea near Vero Beach on the 23rd of July. The hurricane then turned to the north, skirting Daytona on the 24th.

October 9-13, 1987 Hurricane Floyd

Even though Hurricane Floyd did not make landfall on the gulf coast of Florida, it poured large amounts of rain as it traveled from the western tip of Cuba through the Florida Keys. One of the meteorological stations in Lee County recorded almost seven inches of rain.

November 17-26, 1988 Hurricane Keith

Hurricane Keith, a tropical storm during November 17-24, 1988, moved into Florida's west coast between Ft. Myers and Tampa as a tropical storm with 65 mph winds. The storm crossed the state intact and entered the Atlantic Ocean. Heavy rains were recorded and tornadoes were sighted throughout the state.

August 16-28, 1992 Hurricane Andrew

Hurricane Andrew developed into a Category 4 hurricane on August 23rd while en route to the southern tip of Florida. When it made landfall just south of Miami on the 24th, it had sustained winds of 145 mph and gusts up to 175 mph. The entire southern portion of the Florida Peninsula, from Vero Beach south through the Keys and up the west coast to Fort Myers, fell under a Hurricane Warning. Even though Hurricane Andrew became one of the most powerful hurricanes to hit Florida, the reported highest rainfall in Lee County totaled

less than one inch on the 24th.

November 8-21, 1994 Hurricane Gordon

This hurricane formed on November 8th, just off the coast of Nicaragua. It traveled erratically toward Florida, moved through Jamaica, crossed eastern Cuba and the Florida Keys, and finally made landfall very close to Fort Myers on the 16th. The tropical system crossed Florida with sustained winds of 45 mph and heavy rains. Rainfall amounts up to 2.5 inches were recorded in Lee County. This tropical storm became a hurricane only after it crossed the peninsula and reached the Atlantic Ocean.

August 22-28, 1995 Tropical Storm Jerry

Even though this storm never became a hurricane, it dropped large amounts of rain throughout Florida. On August 24th, 1995, a meteorological station in Lee County recorded 5.1 inches of rain. The system made landfall near Palm Beach, traveled across Florida into the Gulf of Mexico around Cedar Key, and dissipated close to the Florida-Georgia border.

October 22 – November 5, 1998 Hurricane Mitch

Probably the strongest hurricane to strike Central America in modern times, Hurricane Mitch became a Category 5 hurricane while in the Caribbean. After it made landfall in Honduras, it quickly reduced power and dropped huge amounts of rain in the region. Then it traveled through Guatemala, Mexico, crossed the Gulf of Mexico, and made landfall close to Fort Myers in Lee County. The storm did not have much wind organization, but it still carried large amounts of rainfall, as registered on November 5, 1998. That day a Lee County rain station measured 6.3 inches of rain.

September 19-22, 1999 Tropical Storm Harvey

Tropical Storm Harvey, a short-lived tropical system, crossed Florida from the Gulf of Mexico just south of Lee County and entered the Atlantic Ocean in about 72 hours. The amount of rain recorded for the county reached 5.1 inches.

September 11-19, 2001 Hurricane Gabrielle

Hurricane Gabrielle, originating in the Gulf of Mexico, traveled northeast through Florida and made landfall just south of Tampa Bay. Gabrielle didn't become a hurricane until it was deep in the Atlantic Ocean. Hurricane Gabrielle made its path through Florida as a tropical storm, dropping up to 3.3 inches of rain in Lee County.

August 9-14, 2004 Hurricane Charley

Hurricane Charley strengthened rapidly just before striking the southwestern coast of Florida as a Category 4 hurricane. Charley was the strongest hurricane to hit the United States since Andrew in 1992 and, although small in size, it caused catastrophic wind damage in Charlotte County, Florida. Serious damage occurred well inland over the Florida peninsula. A storm surge of 4.2 feet was measured by a tide gauge in Estero Bay, near Horseshoe Key. This is near Fort Myers Beach. Storm surges of 3.4 and 3.6 feet were

measured on tide gauges on the Caloosahatchee River, near Fort Myers. There were also visual estimates of storm surges of 6 to 7 feet on Sanibel and Estero Islands. Maximum rainfall totals from gauges in Florida ranged up to a little over 5 inches, but radar-estimated storm total precipitation over central Florida were as high as 6 to 8 inches.

Directions of several historical storms occurring in the vicinity of Lee County are shown in Figure 1, "Historical Storm Tracks."

2.4 Flood Protection Measures

Limited but effective flood protection/reduction measures exist within Lee County. Such measures include numerous small flood control canals, limited oceanfront seawalls and revetments, and ongoing beach nourishment and management. Beach management measures include county zoning ordinances, building codes designed to reduce flood damage, and hurricane advisories and emergency plans. This FIS evaluates and incorporates available information concerning these flood protection measures where appropriate.

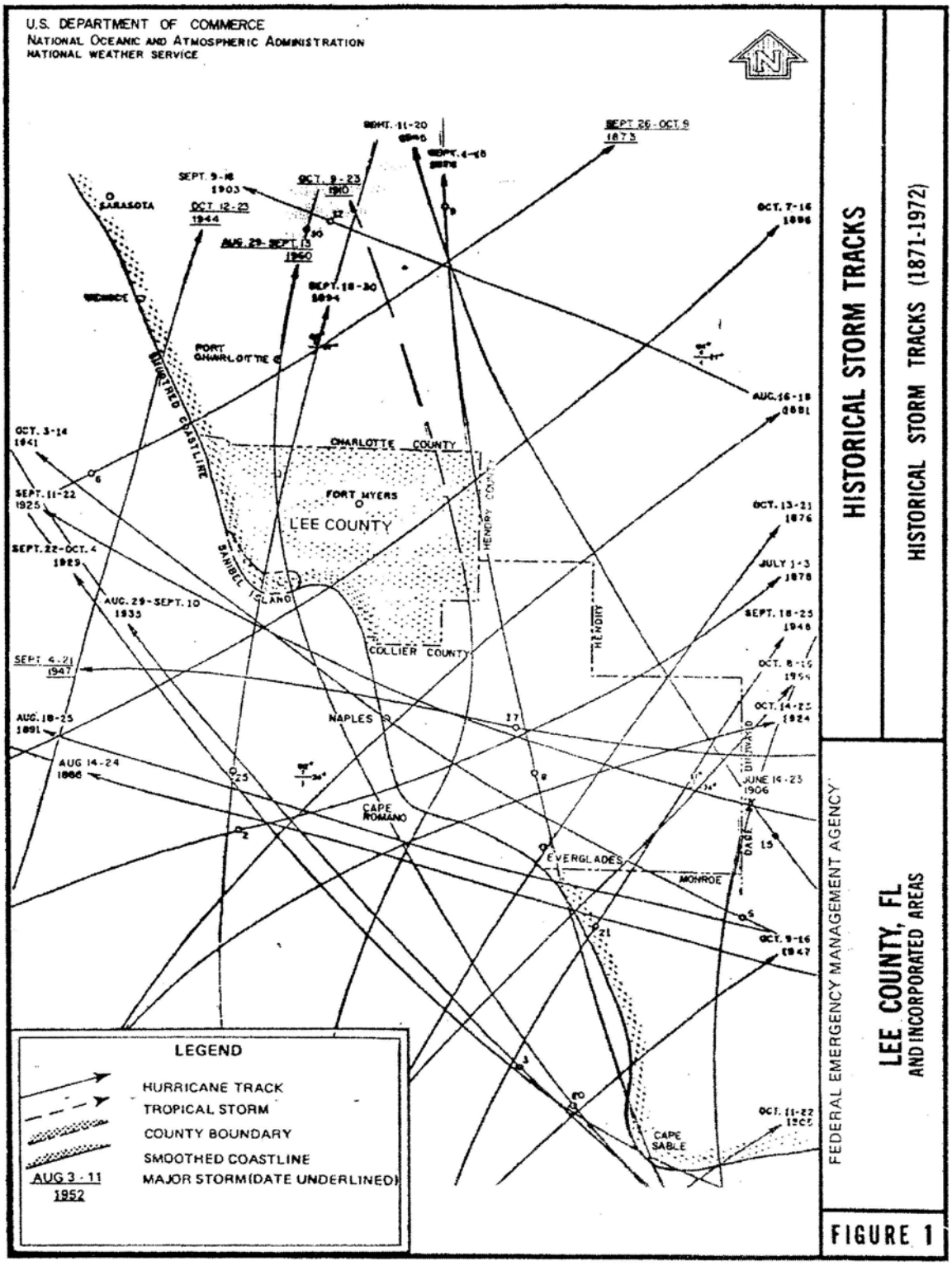

Figure 1 – Historical Storm Tracks

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this FIS. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 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-, 50-, 100-, and 500-year floods, have a 10-, 2-, 1-, and 0.2-percent 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 which equals or exceeds the 1 00-year flood (1-percent chance of annual exceedance) in any 50-year period is approximately 40 percent (4 in 10), and, 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 county at the time of completion of this FIS. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

The Cities of Cape Coral, Fort Myers, and Sanibel and the unincorporated areas of Lee County have previously printed FIS reports. The hydrologic analyses described in those reports have been compiled and are summarized below.

The following paragraphs describe the hydrologic methodologies used to develop the June 15, 1984, the March 15, 1994 and the July 20, 1998 FISs for the unincorporated areas of Lee County; the September 18, 1985, FIS for the City of Cape Coral; the October 17, 1984, FIS for the City of Fort Myers; and the October 15, 1985, FIS for the City of Sanibel.

Several sources of rainfall data were utilized for the inland as well as the combined coastal/inland portions of the study. A log-normal analysis has been applied to various interior and coastal locations in Florida and has been found to give reasonable results (USACE, September 1953). The computed values of maximum long-duration rainfall obtained from such an analysis for one- to four-day durations were matched with the values obtained from isohyet curves developed by the U.S. Weather Bureau (U.S. Department of Commerce, 1964, 1977). In addition, actual hourly rainfall data provided by the NOAA were applied through watershed models to generate annual peak flows (U.S. Department of Commerce, May 1961). The floods of the required frequencies were then formulated by performing a log- Pearson Type III analysis (U.S. Water Resources Council, December 1967). These results were comparable with those obtained by using synthetic flood hydrographs.

Inundation from the Gulf of Mexico caused by the passage of storms (storm surge) was determined using the joint probability method (U.S. Department of Commerce, April 1970). The storm populations were described by probability distributions of 5 parameters that influence surge heights: central pressure depression (which measures the intensity of the storm), radius to maximum winds, forward speed of the storm, shoreline crossing point, and crossing angle. These characteristics were described statistically based on an analysis of observed storms in the vicinity of Lee County (U.S. Department of Commerce, 1975, 1964-

1977, 1965, May 1975, March 1957). Digitized storm information for all storms from 1886 to 1977 was used to correlate statistics (U.S. Department of Commerce, 1886-1977).

For areas subject to flooding directly from the Gulf of Mexico, the FEMA standard storm surge model was used to simulate the coastal surge generated by any chosen storm (that is, any combination of the 5 storm parameters defined previously). By performing such simulations for a large number of storms, each of known total probability, the frequency distribution of surge height can be established as a function of coastal location. These distributions incorporate the large-scale surge behavior, but do not include an analysis of the added effects associated with much finer scale wave phenomena, such as wave height or runup. As the final step in the calculations, the astronomic tide for the region is then statistically combined with the computed storm surge to yield recurrence intervals of total water level (Tetra Tech, Inc., 1981).

A summary of the parameters used for the area is presented in Table 5, "Parameter Values for Surge Elevations."

For the 1994 revision to the Lee County FIS, revised flood discharges were established by valley flood routings computed using the SCS TR-20 computer program (USDA, May 1982). On two of the creeks, this program yielded flood discharges that appeared excessive. After experimenting with other flood routing models, USGS Water Resources Investigation Report 82-42 was chosen for analysis of Powell Creek and USGS Water Resources Investigation Report 82-4012 was used for Daughtrey Creek (U.S. Department of the Interior, 1983, 1982).

For the 1998 revision to the Lee County FIS, the HEC-1 hydrologic computer model was used to compute discharges for the Imperial River, from its confluence with Fish Trap Bay to Bonita Grande Drive. The SCS unit hydrograph method in HEC-1 was used. Existing watershed conditions were used except for the drainage areas of I-75 and Bonita Grande Drive. Input parameters developed by the SCS were used to represent the watershed. SC Type ll storm methodology was used for the distribution of the rainfall data.

Table 5 – Parameter Values for Surge Elevations

CENTRAL PRESSURE DEPRESSION (MILLIBARS)	97.5	87.5	77.5	67.5	57.5	47.5	37.5	27.5	17.5
ASSIGNED PROBABILITIES[1]	0.020	0.023	0.035	0.055	0.070	0.105	0.142	0.230	0.320
STORM RADIUS TO MAXIMUM WINDS (NAUTICAL MILES)		15				30			
PROBABILITY[1]		0.61				0.39			
FORWARD SPEED (KNOTS)		8		14		20			
PROBABILITIES:									
ENTERING		0.46		0.35		0.19			
ALONGSHORE		0.46		0.35		0.19			
EXITING		0.50		0.43		0.07			
DIRECTION OF STORM PATH (DEGREES FROM TRUE NORTH)	ENTERING			ALONGSHORE			EXITING		
	63	18		333			288	243	
PROBABILITY[1]	0.29	0.27		0.21			0.19	0.04	
FREQUENCY OF STORM OCCURRENCE (STORM/NAUTICAL MILE/YEAR)									

[1] AVERAGE OF ENTERING, ALONGSHORE, AND EXITING PROBABILITIES

TABLE 5

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

PARAMETER VALUES FOR SURGE ELEVATIONS

Coastal Analyses

The modeled surge elevations determined by Tetra Tech, Inc in 1981 and published in the previous FIS reports were not revised as part of this restudy. However, the effective 10-percent and 1-percent annual chance surge elevations were utilized to develop 0.2-percent annual chance surge elevations for the areas south of the Caloosahatchee River and Estero Bay. The values were based on a standard normal cumulative distribution, with a mean of zero and a standard deviation of one. The resultant linear regression equation predicted the values of the 0.2-percent annual chance surge elevations. The storm-surge elevations for the 10-, 2-, 1-, and 0.2-percent annual chance floods have been shown in Table 6, "Summary of Coastal Stillwater Elevations."

Table 6 – Summary of Coastal Stillwater Elevations

Flooding Source and Location	Elevation (feet NAVD 88) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
CHARLOTTE HARBOR				
Between county boundary and Yucca Pen Creek	2.4	N/A	6.5	8.7
From Yucca Pen Creek to Gator Slough Canal	2.3	N/A	6.3	8.4
From north end of Pine Island to Pineland along shoreline	2.8	N/A	5.8	N/A
PINE ISLAND SOUND				
Between Pineland and Maria Drive along the shoreline	2.9	N/A	6.5	N/A
Between Maria Drive and south end of Pine Island	3.1	N/A	6.5	N/A
Useppa Island, Bird Key	2.3	N/A	6.1	N/A
Part Island	2.3	N/A	6.1	N/A
MATLACHA PASS				
From Gator Slough Canal to Buzzard Bay	2.2	N/A	6.3	8.5
Between north end of Pine Island and State Road 78	3.6	N/A	6.3	7.7
Between State Road 78 and south end of Pine Island	3.5	N/A	7.3	9.3
CALOOSAHATCHEE RIVER				
From mouth to Beautiful Island	3.3	N/A	7.0	8.1
GULF OF MEXICO				
On Gasparilla Island between county boundary and Boca Grande	3.5	7	8.1	10.5
Between Boca Grande and south end of Gasparilla Island	3.2	6.6	7.9	10.2
From north end of Cayo Costa to the midpoint of the island along the coast	3.5	6.6	7.7	9.9
From midpoint of Cayo Costa to south end of the island,	4.3	7.5	8.7	11

Table 6 – Summary of Coastal Stillwater Elevations (continued)

Flooding Source and Location	Elevation (feet NAVD 88) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
GULF OF MEXICO (continued)				
Entire shoreline of Captiva and North Captiva Islands	4.5	7.7	8.8	11.1
Between Captiva and Sanibel Island	4.1	N/A	9.1	N/A
Shoreline between Blind Pass and Bowman's Beach	4.1	N/A	9.1	N/A
From the intersection of Colony and Wulfert Roads to the intersection of Sea Bell and Bowman's Beach Roads	3.1	N/A	6.9	N/A
Shoreline between Bowman's Beach Road and east end of Rue Bayou	4.1	N/A	8.3	N/A
From about 1 ,000 feet southeast of the intersection of State Road 867 and Bowman's Beach Road to the intersection of Gulf Pines Drive and Old Baryon Way	2.4	N/A	6.6	N/A
Shoreline between east end of Rue Bayou and Rabbit Road	4.1	N/A	8.2	N/A
Shoreline between Rabbit Road and Tarpon Bay Road	4.1	N/A	9.7	N/A
From the intersection of Sanibel-Captiva and Rabbit Roads to the intersection of Sanibel-Captiva Road and Grand Central Avenue	2.9	N/A	6.7	N/A
Shoreline between Tarpon Bay Road and Camino DelMar	4.4	N/A	11.1	N/A
From the intersection of Tarpon Bay and Palm Ridge Roads to the intersection of Cotton Court and Bunting Lane	2.2	N/A	7.5	N/A
Shoreline between Camino Del Mar to about 0.5 mile west of east end of Middle Gulf Drive	4.5	N/A	11.2	N/A
Shoreline from about 0.5 mile west of east end of Middle Gulf Drive to Lindgren Boulevard	4.7	N/A	11.3	N/A
From the intersection of Periwinkle Way and Ybel Road to the intersection of Periwinkle Way and Elinor Way	2	N/A	7.8	N/A
Shoreline between Lindgren Boulevard and Point YbeL	4.9	N/A	11.7	N/A
From the intersection of Periwinkle Way and Bailey Road to the intersection of Periwinkle Way and Seagrape Lane	1.8	N/A	8.1	N/A
SAN CARLOS BAY				
Between Punta Rassa and Bunch Beach	5.2	10.0	11.5	14.0
Between Bunch Beach and Bodwitch Point	5.4	9.8	11.3	14.1

Table 6 – Summary of Coastal Stillwater Elevations (continued)

Flooding Source and Location	Elevation (feet NAVD 88) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
GULF OF MEXICO				
Between Bod witch Point and Cottage Avenue on Estero Island	4.9	9.7	11.3	14.3
Between Cottage Avenue on Estero Island and Big Carlos Pass	4.9	9.6	11.2	14.3
Between Big Carlos Pass and New Pass	4.1	9.8	11.7	14.8
Between New Pass and Big Hickory Pass	5.2	8.8	11.5	14.3
Between Big Hickory Pass and county boundary	4.8	8.9	11.3	13.2
About 1 mile northwest of the intersection of Bonita Beach Road and Hickory Boulevard along the shoreline	4.8	8.9	11.3	13.2
About 2,400 feet northwest of the intersection of Bonita Beach Road and Hickory Boulevard along the shoreline	4.8	8.9	11.3	13.2
About 1 ,950 feet southeast of the intersection of Bonita Beach Road and Hickory Boulevard along the shoreline	4.8	8.9	9.9	N/A
ESTERO BAY				
Between Hell Peckish Bay and Estero River along the shoreline	2.5	N/A	9.5	13.2
Between Estero River and Coconut Road along the shoreline	2.7	N/A	10.4	14.5
From Coconut Road to about 1 mile south of Spring Creek	2.8	N/A	10.3	14.3
From 1 mile south of Spring Creek to Imperial River	2.8	N/A	10.0	13.8
About 1 mile northwest of the intersection of Bonita Beach Road and Hickory Boulevard along the	2.8	N/A	9.2	12.7
About 2,400 feet northwest of the intersection of Bonita Beach Road and Hickory Boulevard along the shoreline	2.8	N/A	9.2	12.7
About 1,950 feet southeast of the intersection of Bonita Beach Road and Hickory Boulevard along the shoreline	2.8	N/A	9.2	12.7

Riverine Analyses

Information on the methods used to determine peak discharge-frequency relationships for the streams restudied as part of this countywide FIS is shown below.

The Advanced Interconnected Pond Routing (AdiCPR) model by Streamline Technologies was applied to estimate the desired discharge-frequency relationships for streams studied in detail in this revised FIS. This methodology was appropriate for the characteristic drainage basin conditions. Limited stream gauge records for these streams precluded effective model calibration and statistical comparisons. AdiCPR modeling incorporated the SCS unit hydrograph method, which can apply lower peak rate factor of 256 for runoff generation and dynamically stormwater through open channels via the energy equation. Parameters supplied to the model of each stream included subbasin runoff curve numbers, Jag times, stream cross sections, and Manning's n roughness factors. Drainage basins were delineated from USGS (1970 - 1993) 1:24,000 scale, 7.5-minute series quadrangle maps. Bradley S. Vance, P.E. of the Environmental Services Division of the Natural Resources Management Department for Lee County, Florida, provided further refinements. Many basins have no clear natural divide. Mr. Vance made use of his extensive local knowledge to guide Taylor Engineering's efforts. Curve numbers were calculated with the SCS curve number method (SCS, 1986) based on land use coverage in combination with SCS soil coverage provided in digital GIS format by SFWMD. Lag times were calculated with the TR-55 Microcomputer Program System (Version 2.10). Channel roughness factors (Manning's n) were chosen by engineering judgment based on field observation, aerial photographs, and published text and photographs with recommended roughness values (USGS, 1989 and Chow, 1959). These roughness factors ranged between 0.03-0.06 for channels and 0.08-0.18 for over-bank areas. Energy slope, reach length, and average cross section data were determined from USGS quadrangle maps, in both paper and digital formats.

The updated drainage basin data show that the uppermost reach of Powell Creek Tributary No. 1 actually drains into the East Branch Yellow Fever Creek watershed. As a result, approximately one mile of streamline has been removed from the upstream end of the Powell Creek Tributary No. 1 profile, and the corresponding drainage area has been included in the East Branch Yellow Fever Creek discharge computations.

The AdICPR models were used to estimate peak discharges for the 10-, 4-, 1-, and 0.2-percent annual chance floods throughout each stream study reach. For these storm events, total storm rainfall amounts were based on values published in Management and Storage of Surface Waters, Permit Information Manual Volume IV (SFWMD, 1996). The temporal rainfall distribution used in the models was the SFWMD 72-hour total rainfall.

Taylor Engineering compared the computed discharges at the downstream end of each of the major flooding sources with two previous discharge-frequency studies, as well as the USGS Regional Regression Equations for both natural flow conditions and urbanized conditions. Field observation indicates a low to medium level of urbanization throughout the study area. The two previous discharge frequency studies include the effective FEMA FIS and a NRCS study (1992, 1993) in three separate phases during 1992 and 1993. The comparison indicates a reasonable agreement with the urbanized regression results (published standard error of +1- 40%). Discharges calculated for this study tend to fall

below those in the effective FIS and rise significantly above, in some instances, those in the NRCS studies.

For this revision, a revised hydrologic analysis within the Ten Mile Canal Basin was completed by Tomasello Consulting Engineers, Inc (TCE). This model was submitted and approved by FEMA under LOMR Case Number 12-04-7499P. Flood discharges were computed using a S2DMM model (Tomasello, 2008). The design rainfall amounts for the basin applied as SFWMD Modified Type II, 3-day distributions are included in Table 7, "Design Storm Rainfall Amounts – Ten Mile Canal Basin". The antecedent condition for the application of the design rainfall was a continuous application of the average rainfall for the months of August and September (10.05 in/mo = 0.33 inches/day). All structure gates within the basin were assumed closed and then opened on the end of the 2nd day of the 3-day event. Based on a 2012 Report titled "Hydrologic/Hydrodynamic Riverine Study of the Ten Mile Canal Basin", prepared by TCE, rainfall runoff parameters were calibrated to observed data during heavy rains in July 2005 and validated to an event in September 2000.

Table 7 – Design Storm Rainfall Amounts – Ten Mile Canal Basin

Design Frequency	24-Hour Rainfall Amount (inches)	3-Day Rainfall Amount (inches)
10%	6.5	8.8
4%	8.0	10.9
1%	10.0	13.6
0.2%	13.0	17.7

In addition, a revised hydrologic analysis within the Estero Basin was completed by TCE, utilizing the S2DMM model with rainfall and antecedent condition assumptions similar to those utilized in the Ten Mile Canal Basin. Based on a June 2017 Report titled "Hydrologic/Hydrodynamic Flood Study for Estero River South Branch", prepared by TCE, rainfall runoff parameters were calibrated to observed data during heavy rains in August 1995 and validated to an event in October 1995.

A summary of the drainage area-peak discharge relationships for all detailed methods is shown in Table 8, "Summary of Discharges".

This page has been superseded. See new page as a result of 19-04-2304P

Table 8 – Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
BAYSHORE CREEK					
At mouth	3.0	622	840	1,171	1,542
At Bayshore Road	2.58	551	734	1,020	1,332
BEDMAN CREEK/ DOG CANAL					
At mouth	16.1	2,945	4,228	5,731	2,289

see also page 21a - (a new page has been added regarding Bedman Creek/Dog Canal dated November 22, 2019 per LOMR 18-04-7584P)

below those in the effective FIS and rise significantly above, in some instances, those in the NRCS studies.

For this revision, a revised hydrologic analysis within the Ten Mile Canal Basin was completed by Tomasello Consulting Engineers, Inc (TCE). This model was submitted and approved by FEMA under LOMR Case Number 12-04-7499P. Flood discharges were computed using a S2DMM model (Tomasello, 2008). The design rainfall amounts for the basin applied as SFWMD Modified Type II, 3-day distributions are included in Table 7, "Design Storm Rainfall Amounts – Ten Mile Canal Basin". The antecedent condition for the application of the design rainfall was a continuous application of the average rainfall for the months of August and September (10.05 in/mo = 0.33 inches/day). All structure gates within the basin were assumed closed and then opened on the end of the 2nd day of the 3-day event. Based on a 2012 Report titled "Hydrologic/Hydrodynamic Riverine Study of the Ten Mile Canal Basin", prepared by TCE, rainfall runoff parameters were calibrated to observed data during heavy rains in July 2005 and validated to an event in September 2000.

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10%	6.5	8.8
4%	8.0	10.9
1%	10.0	13.6
0.2%	13.0	17.7

In addition, a revised hydrologic analysis within the Estero Basin was completed by TCE, utilizing the S2DMM model with rainfall and antecedent condition assumptions similar to those utilized in the Ten Mile Canal Basin. Based on a June 2017 Report titled "Hydrologic/Hydrodynamic Flood Study for Estero River South Branch", prepared by TCE, rainfall runoff parameters were calibrated to observed data during heavy rains in August 1995 and validated to an event in October 1995.

A summary of the drainage area-peak discharge relationships for all the streams studied by detailed methods is shown in Table 8, "Summary of Discharges".

Table 8 – Summary of Discharges

Flooding Source and Location	Drainage Area (Square Miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
BAYSHORE CREEK					
At mouth	3.0	622	840	1,171	1,542
At Bayshore Road	2.58	551	734	1,020	1,332
BEDMAN CREEK/ DOG CANAL					
At mouth	14.0	414	979	2,186	3,716

REVISED DATA

REVISED TO
REFLECT LOMR
EFFECTIVE: December 26, 2019

Table 8 – Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
BEDMAN CREEK / DOG CANAL - continued					
Just downstream of 16th Terrace	8.05	346	842	1,622	2,549
Just downstream of Weir S-D-2	6.12	346	596	1,214	1,909
Just downstream of 10th Place	3.97	161	383	783	1,230

This page has been superseded. See new page as a result of 19-04-2304P

REVISED TO
REFLECT LOMR
EFFECTIVE: November 22, 2019

REVISED DATA

Table 8 – Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
BEDMAN CREEK / DOG CANAL - continued					
Just upstream of published cross-section K	12.1	355	843	1,878	3,193
Just downstream of 16th Terrace	8.05	346	842	1,622	2,549
Just downstream of Weir S-D-2	6.12	346	596	1,214	1,909
Just downstream of 10th Place	3.97	161	383	783	1,230

DATA REVISED BY LOMR EFFECTIVE NOVEMBER 22, 2019

REVISED TO REFLECT LOMR EFFECTIVE: December 26, 2019

Table 8 – Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
BILLY CREEK					
At mouth	12.88	2,522	3,186	4,227	5,374
At Marsh Avenue	6.87	1,175	1,536	2,156	2,868
CARRELL CANAL					
At mouth	1.68	359	441	564	704
Cleveland Avenue	0.997	212	260	331	413
CHAPEL BRANCH CREEK					
At mouth	1.88	386	532	883	984
At Bayshore Road	1.22	288	386	524	657
CYPRESS CREEK					
At mouth	20.97	1,517	2,124	3,123	4,141
DAUGHTREY CREEK					
At mouth	34.26	1,582	2,001	2,607	3,232
At Bayshore Road	33.61	1,078	1,368	1,726	2,073
At I-75	30.82	836	1,100	1,552	2,044
EAST BRANCH DAUGHTREY CREEK					
At mouth	4.79	538	783	807	2,041
At I-75	3.45	392	518	709	952
At Nalle Grade Road	2.06	337	444	606	799
EAST BRANCH YELLOW FEVER CREEK					
At Pine Island Road	3.91	747	968	1,197	1,555
At US 41	1.35	266	349	473	617
ESTERO RIVER					
At mouth	61.54	3,152	4,435	6,185	8,419
At South Tamiami Trail	58.17	3,070	4,314	6,073	8,254
At I-75	41.19	2,351	3,258	4,698	6,395
FICHTER CREEK					
At mouth	5.65	712	947	1,310	1,716
FORD STREET CANAL					
At mouth	1.36	376	439	660	853
At Dr. Martin Luther King Jr. Boulevard	0.99	305	387	510	651
HALFWAY CREEK					
At mouth	6.45	545	638	761	897

Table 8 – Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
HALLS CREEK					
At mouth	1.07	209	280	391	519
HANCOCK CREEK					
At Hancock Bridge Parkway	10.31	1,653	2,076	2,645	3,349
At Pondella Road	8.84	1,415	1,800	2,298	3,000
At Pine Island Road	0.48	108	144	200	264
HENDRY CREEK					
At mouth	5.51	842	1,043	1,336	1,670
At Gladiolus Drive	2.42	195	245	320	406
HENDRY CREEK WEST					
At Summerline Road	1.25	416	527	695	885
HICKEY CREEK/HICKEY CREEK DRAINAGEWAY					
At mouth	25.38	3,159	4,310	5,716	7,459
IMPERIAL RIVER					
At mouth	105.0	*	*	4,950	*
At Seaboard Coast Line Railroad	65.4	*	*	3,073	*
Above Bonita Grande Road	21.0	*	*	2,833	*
KICKAPOO CREEK					
At mouth	1.8	706	924	1,259	1,639
L-3 CANAL					
At mouth	1.7	339	416	531	658
At Cleveland Avenue	0.8	172	211	269	335
LEITNER CREEK					
At mouth	1.76	430	554	742	957
At I-75	0.93	228	301	413	543
MANUELS BRANCH					
At mouth	1.38	264	330	429	541
Just downstream of Cleveland Avenue	0.889	170	212	275	346
MARSH POINT CREEK					
At mouth	2.53	768	975	1,286	1,642
At Bayshore Road	1.42	420	535	707	903

*Data not available

Table 8 – Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
MULLOCK CREEK					
At mouth	6.79	1,655	2,087	2,751	3,844
At South Tamiami Trail	6.13	1,285	1,586	2,064	2,993
At CSX Transportation	4.1	1,192	1,523	2,032	2,722
MULLOCK CREEK TRIBUTARY					
At South Tamiami Trail	0.74	219	282	376	484
NORTH COLONIAL WATERWAY					
Downstream of Metro Parkway	3.6	330	350	335	360
OAK CREEK					
At mouth	2.36	650	846	1,161	1,539
OAK CREEK (continued)					
At Old US 41 Road	1.43	440	574	793	1,061
At Bonita Beach Road	1.17	292	379	517	681
At Imperial Street	0.44	274	360	498	653
ORANGE RIVER					
At Palm Beach Boulevard	86	6,520	8,048	10,427	13,116
At Buckingham Road	65.3	4,476	5,607	7,607	10,154
OWL CREEK					
At mouth	2.44	632	858	1,193	1,565
At SR 31	1.39	393	513	694	904
PALM CREEK					
At mouth	3.17	563	770	1,081	1,421
At Bayshore Road	3.08	682	877	1,162	1,551
At Deal Road	1.65	363	474	644	837
POPASH CREEK					
At mouth	17.37	709	936	1,274	1,781
At SR 78	16.94	711	939	1,276	1,799
At county boundary	13.5	687	912	1,258	1,663
POWELL CREEK					
At mouth	10.09	1,887	2,368	3,226	4,313
POWELL BYPASS					
At mouth	6.06	1,200	1,430	1,981	2,612
POWELL CREEK TRIBUTARY NO. l					
At mouth	3.12	376	7501	999	1,499

Table 8 – Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
SIX MILE CYPRESS SLOUGH					
At mouth	34.4	2,578	3,588	5,026	6,521
At Daniels Parkway	26.47	2,086	2,880	4,079	5,420
At I-75	5.14	993	1,334	1,834	2,384
SOUTH BRANCH					
At mouth	14.24	356	421	586	698
At I-75	11.85	252	337	468	560
SPANISH CANAL					
At mouth	0.56	123	167	235	314
SPANISH CREEK					
At mouth	7.44	1,124	1,603	2,243	2,669
At River Road	7.15	1,018	1,438	2,018	2,620
SPRING CREEK					
At mouth	11.7	1,692	2,143	2,872	3,746
At South Tamiami Trail	5.34	1,303	1,646	2,178	2,861
STRICKLIN GULLY					
At mouth	2.62	625	839	1,167	1,549
STROUD CREEK					
At mouth	8.35	975	1,254	1,584	2,044
At Bayshore Road	7.94	999	1,308	1,771	2,307
TELEGRAPH CREEK					
At mouth	81.17	5,117	7,125	10,637	14,778
TEN MILE CANAL					
At mouth	70.4	2,260	3,290	4,190	5,205
At Daniels Parkway	11	1,410	1,700	1,990	2,270
At Colonial Boulevard	3.9	495	545	615	620
TROUT CREEK/CURRY LAKE CANAL					
At mouth	29.42	2,469	3,788	5,475	7,723
At River Road	28.08	3,023	4,223	6,000	7,731
Just upstream of Stricklin Gully	16.36	1,107	1,317	1,605	2,142
WINKLER CANAL					
At mouth	1.34	325	365	463	574
Just downstream of Cleveland Avenue	0.56	141	168	209	245

REVISED DATA

REVISED TO
REFLECT LOMR
EFFECTIVE: December 31, 2019

Table 8 – Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
SIX MILE CYPRESS SLOUGH					
At mouth	34.4	2,578	3,588	5,026	6,521
At Daniels Parkway	26.47	2,086	2,880	4,079	5,420
At I-75	5.14	993	1,334	1,834	2,384
SOUTH BRANCH					
At mouth	14.24	356	421	586	698
At I-75	11.85	252	337	468	560
SPANISH CANAL					
At mouth	0.56	123	167	235	314
SPANISH CREEK					
At mouth	7.44	1,124	1,603	2,243	2,669
At River Road	7.15	1,018	1,438	2,018	2,620
SPRING CREEK					
At mouth	11.7	1,692	2,143	2,872	3,746
At South Tamiami Trail	5.34	1,303	1,646	2,178	2,861
STRICKLIN GULLY					
At mouth	2.62	625	839	1,167	1,549
STROUD CREEK					
At mouth	8.35	975	1,254	1,584	2,044
At Bayshore Road	7.94	999	1,308	1,771	2,307
TELEGRAPH CREEK					
At mouth	81.17	5,117	7,125	10,637	14,778
TEN MILE CANAL					
At mouth	70.4	2,260	3,290	4,190	5,205
At Daniels Parkway	11	1,410	1,700	1,990	2,270
At Colonial Boulevard	3.9	495	545	615	620
TROUT CREEK/CURRY LAKE CANAL					
At mouth	29.42	2,469	3,788	5,475	7,723
At mouth	29.42	2,469	3,788	5,475	7,273
At River Road	28.08	3,023	4,223	6,000	7,731
WINKLER CANAL					
At mouth	1.34	325	365	463	574
Just downstream of Cleveland Avenue	0.56	141	168	209	245

Table 8 – Summary of Discharges (continued)

Flooding Source and Location	Drainage Area (Square Miles)	PEAK DISCHARGES (cfs) 10-Percent-Annual-Chance	4-Percent-Annual-Chance	1-Percent-Annual-Chance	0.2-Percent-Annual-Chance
YELLOW FEVER CREEK					
At Pine Island Road	1.51	365	476	675	967
At Littleton Road	0.95	183	252	358	483
TRIBUTARY L-1 (YELLOW FEVER CREEK TRIBUTARY					
At mouth	0.84	550	7761	856	1,056
TRIBUTARY L-2 (YELLOW FEVER CREEK TRIBUTARY)					
At mouth	0.36	122	1791	200	252

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the source studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals. Users should be aware that flood elevations shown on the FIRM represent rounded whole-foot elevations and may not exactly reflect the elevations shown on the Flood Profiles or in the Floodway Data tables in the FIS report. For construction and/or floodplain management purposes, users are encouraged to use the flood elevation data presented in this FIS in conjunction with the data shown on the FIRM.

Cross sections were determined from topographic maps and field surveys. All bridges, dams, and culverts were field surveyed to obtain elevation data and structural geometry. All topographic mapping used to determine cross sections is referenced in Section 4.1.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the FIRM (Exhibit 2).

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.

All qualifying bench marks within a given jurisdiction that are cataloged by the National Geodetic Survey (NGS) and entered into the National Spatial Reference System (NSRS) as First or Second Order Vertical and have a vertical stability classification of A, B, or C are shown and labeled on the FIRM with their 6- character NSRS Permanent Identifier.

Bench marks cataloged by the NGS and entered into the NSRS vary widely in vertical stability classification. NSRS vertical stability classifications are as follows:

- Stability A: Monuments of the most reliable nature, expected to hold position/elevation well (e.g., mounted in bedrock)

- Stability B: Monuments which generally hold their position/elevation well (e.g., concrete bridge abutment)

- Stability C: Monuments which may be affected by surface ground movements (e.g., concrete monument below frost line)

- Stability D: Mark of questionable or unknown vertical stability (e.g., concrete monument above frost line, or steel witness post)

In addition to NSRS bench marks, the FIRM may also show vertical control monuments established by a local jurisdiction; these monuments will be shown on the FIRM with the appropriate designations. Local monuments will only be placed on the FIRM if the community has requested that they be included, and if the monuments meet the aforementioned NSRS inclusion criteria.

To obtain current elevation, description, and/or location information for bench marks shown on the FIRM for this jurisdiction, please contact the Information Services Branch of the NGS at (301) 713-3242, or visit their Web site at www.ngs.noaa.gov.

It is important to note that 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 Technical Support Data Notebook associated with this FIS and FIRM. Interested individuals may contact FEMA to access this data.

Pre-countywide Analyses

The Cities of Cape Coral, Fort Myers, and Sanibel and the unincorporated areas of Lee County have previously printed FIS reports. The hydraulic analyses described in those reports have been compiled and are summarized below.

All coastal analyses described in the above mention FIS reports are superseded by the current study although surge elevations utilized in the study stil1 refer to ones reported in the 1998 FIS report for Lee County and the 1985 FIS report for the City of Sanibel.

Water-surface elevations for riverine floods of the selected recurrence intervals were computed using the USACE HEC-2 step-backwater computer program (USACE, November 1976). Starting water-surface elevations for all streams studied in detail were taken from historical flood elevations of the Caloosahatchee River.

Channel roughness factors (Manning's "n") used in the computer program were estimated by field inspection and varied from 0.035 to 0.100 on the overbanks and 0.010 to 0.050 in the channels.

Hydraulic analyses, considering storm characteristics and the shoreline and bathymetric characteristics of the flooding sources studied, were carried out to provide estimates of the elevations of floods of the selected recurrence intervals along each of the shorelines.

The FEMA storm surge model was utilized to simulate the hydrodynamic behavior of the

surge generated by the various synthetic storms. This model utilizes a grid pattern approximating the geographical features of the study area and the adjoining areas. Surges were computed utilizing grids of 5 nautical miles, 1 nautical mile, and 2,000 feet, depending on the resolution required.

Underwater depths and land heights for the model grid systems were obtained from topographic-aerial photographs of Lee County and from USGS topographic maps (Hamrick Aerial Surveys, February, November 1981; U.S. Department of the Interior, 1956-1973).

Water-surface elevations were determined using the SCS WSP-2 step-backwater computer program and adjusted as necessary to consider the effects of backwater from the Caloosahatchee River (USDA, May 1976). Water-surface elevations on Daughtrey Tributaries Nos. 2 and 4 are controlled by Daughtrey Creek, and water surface elevations for Marsh Point Creek Tributary and Marsh Point East are controlled by the Caloosahatchee River.

Cross sections for the Imperial River were obtained from field surveys performed by the NRCS. Water-surface elevations were developed using the USACE HEC-2 computer program (USACE, November 1976). Starting water-surface elevations were developed from rating curves taken at the downstream end of detailed study. Channel roughness factors were based on field investigation and ranged from 0.025 to 0.200 in the channel and from 0.040 to 0.250 on the overbanks.

Countywide Analyses

Information on the methods used to determine peak discharge-frequency relationships for the streams restudied as part of the countywide FIS is shown below.

Hydraulic analyses consisted of riverine and coastal components. The paragraphs below describe each component separately.

Riverine Analyses

The results of the hydrologic analyses provide estimates for riverine flood elevations of the selected recurrence intervals. The USACE HEC-RAS hydraulic computer model, Version 2.2, was applied to all streams (USACE, April 1997). HEC-RAS methodology applies backwater computations at selected cross sections along the studied streams. The water-surface elevations are calculated from discharges estimated from the hydrologic models (see Hydrology).

Channel cross sections for all of the systems were acquired from existing models and supplemented by field surveys. Cross sections from existing models supplied by SWFWMD were supplemented by field surveys supplied by Degrove Surveyors. The *Key to Cross Section Labeling* in the Technical Support Data Notebook identifies these sections.

Overbank cross section data were obtained from 2-foot contour data supplied by Lee County. Structure data were obtained from the county's existing models and selected structures were field verified. Where discrepancies were found, updated structure information was requested from the county.

Channel roughness factors in the hydraulic computations were determined by engineering judgment shaped by field observations, aerial photographs, and published text with photographs and recommended roughness values. Roughness values for the main channels typically ranged from 0.030 to 0.186. Roughness values for the overbanks ranged from 0.050 to 0.186.

Taylor Engineering applied judgment and compared observed high water levels to check the reasonableness of the hydraulic model results. Computation results reflect only the effects of unobstructed flow. The flood elevations therefore, remain valid only if hydraulic structures remain unobstructed, operate properly, and do not fail. As FEMA guidelines require, computations of riverine flood levels along rivers subject to flooding by coastal surges do not consider the effects of concomitant surge flooding of equal frequency magnitude.

Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

ADA Engineering imported the HEC-RAS 2.2 model of Orange River prepared by Taylor Engineering into HEC-RAS 3.1.3 (USACE, 2005). ADA Engineering removed cross section 47 from the model and replaced it with cross section 47.1 based on certified survey data (AIM Engineering & Surveying, Inc.,2007).

Banks Engineering imported the HEC-RAS 2.2 models of Bayshore Creek and Popash Creek prepared by Taylor Engineering into HEC-RAS 3.1.3 (USACE, 2005). Banks Engineering updated cross sections 10.1 through 22.4 from the Bayshore Creek and cross sections 17 through 22 from the Popash Creek model based on detailed certified survey data (Banks Engineering, 2007). PBS&J revised the floodway encroachment stations in the Banks Engineering HEC-RAS 3.1.3 models of Bayshore Creek and Popash Creek to better reflect expansion and contraction of the flood way conveyance.

Greenhorne & O'Mara imported the HEC-RAS 2.2 model of Estero River prepared by Taylor Engineering into HEC-RAS 3.1.3 (USACE, 2005). Greenhorne & O'Mara updated cross sections 20.1 - 24.4 based on detailed certified survey data (Barraco and Associates, Inc., 2007; WilsonMiller, August and November 2007). PBS&J revised the floodway encroachment stations in the Banks Engineering HEC-RAS 3.1.3 model of Estero River to better reflect expansion and contraction of the floodway conveyance and adjusted the ineffective flow stations at the I-75 crossing.

PBS&J revised the HEC-RAS 2.2 prepared by Taylor Engineering of the following streams to better reflect expansion and contraction of the floodway conveyance (where applicable, additional modifications are explained in parentheses): Bedman Creek/Dog Canal (ineffective flow stations added in vicinity of 17th Street culverts), Billy Creek, Carrell Canal (ineffective flow station added upstream of Evans Avenue), Chapel Branch Creek, Cypress Creek, Fichter Creek, Ford Street Canal, Halfway Creek, Halls Creek, Hancock Creek, Hendry Creek (adjusted channel bank station at cross section 24), Hendry Creek West (adjusted ineffective flow stations upstream of Summerlin Drive), Kickapoo Creek, L-3 Canal (revised computation method for bridge at cross section 11.25), Leitner Creek, Marsh Point Creek (adjusted channel bank stations at cross section 18.1), Mullock Creek, Mullock Creek Tributary, Owl Creek (adjusted stationing of cross sections 14.2 and

14.25), Palm Creek (adjusted ineffective flow stations at Bayshore Road), Powell Creek/Powell Bypass (adjusted manning's n value for the left overbank from cross sections 1 through 5.4), Six Mile Cypress Slough (adjusted channel bank station at cross section 32), Spanish Creek (revised computation method for bridge at cross section 5.25, Spring Creek, Stroud Creek, and Telegraph Creek.

This revision incorporates LOMR Case Number 12-04-7499P along Ten Mile Canal and North Colonial Waterway. In 2012, Tomasello Consulting Engineers, Inc. (TCE) developed a S2DMM model of the Ten Mile Canal Basin. The analysis is bounded on the north by Hanson Street in the City of Fort Myers, on the west by the Ten Mile Canal, and to the east and south by the Six Mile Cypress Parkway. Ten Mile Canal and the North Colonial Waterway are represented in the model as offset channel cross sections. The channel cross-sections were derived from an effective FEMA FIS HEC-RAS input.
Also for this revision, floodways were revised for Ten Mile Canal, North Colonial Waterway and a portion of South Branch using HEC-RAS 4.1.0.

Similarly, TCE developed a S2DMM model of the Estero Basin for South Branch and Halfway Creek. The analysis is generally bounded on the north by Corkscrew Road in the Village of Estero, on the west by the U.S. 41, to the south by City of Bonita Springs, and to the east by the Corkscrew Regional Ecosystem Watershed. South Branch and Halfway Creek are represented in the model as offset channel cross sections. The Halfway Creek channel cross-sections were derived from effective FEMA FIS HEC-RAS input. The South Branch channel sections were derived from an updated HEC-RAS model that included updates from LOMR 11-04-4299P and 15-04-9858P to reflect the Corkscrew Road crossing, Three Oaks Parkway, and a pedestrian bridge located between them. In addition, the S2DMM and HEC-RAS models included more detailed topographic information based on Lee County DOT roadway plans, LiDAR data, site specific topographic survey and permitted development plans from SFWMD.

Coastal Analyses

Areas of coastline subject to significant wave attack are referred to as coastal high hazard zones. The USACE has established the 3-foot breaking wave as the criterion for identifying the limit of coastal high hazard zones (USACE, 1975). The 3-foot wave has been determined as the minimum size wave capable of causing major damage to conventional wood frame and brick veneer structures.

Figure 2 is a profile for a typical transect illustrating the effects of energy dissipation and regeneration on a wave as it moves inland. This figure shows the wave crest elevations being decreased by obstructions, such as buildings, vegetation, and rising ground elevations, and being increased by open, unobstructed wind fetches. Figure 2 also illustrates the relationship between the local still water elevation, the ground profile and the location of the V/A boundary.

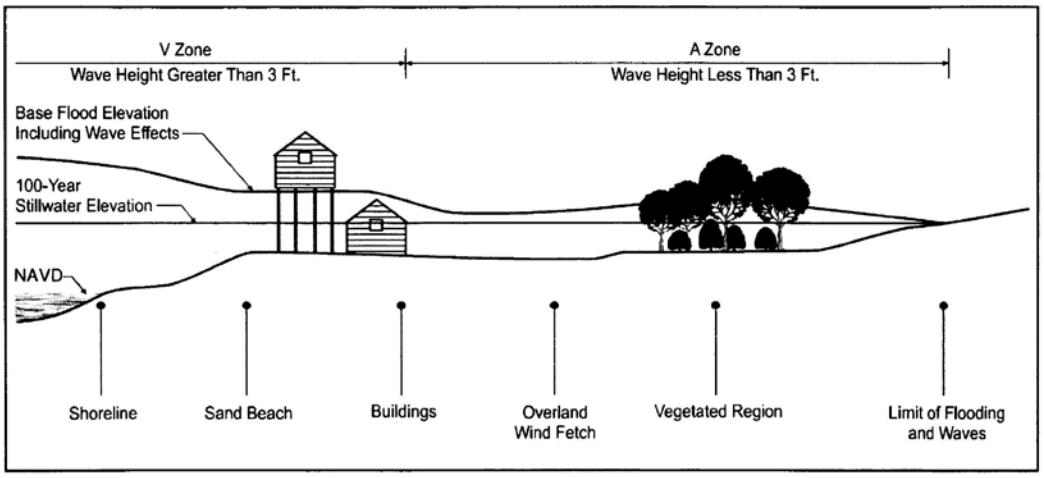

Figure 2 – Transect Schematic

The coastal flooding analyses for this study reflect calculated 1-percent annual chance stillwater levels reported in the 1998 FIS for the unincorporated areas of Lee County and in the 1985 FIS for the City of Sanibel, originally determined by Tetra Tech for Lee County (Tetra Tech, 1981, Tetra Tech, 1983; Greenhorne & O'Mara, 1984).

The previous FIS did not include 0.2-percent annual chance flood stillwater elevations. Therefore, a linear regression equation was developed using the published 10- and 1-percent annual chance flood stillwater elevations. The regression equation was based on normal cumulative distribution, with a mean of zero and a standard deviation of one, to predict the stillwater elevations of the 0.2- percent annual chance flood event.

Transects were located along the entire Lee County coastline with consideration given to the physical and cultural characteristics of the land so that they would closely represent conditions in their locality. Transects were spaced close together in areas of complex topography and dense development. In areas having more uniform characteristics, they were spaced at larger intervals. It was also necessary to locate transects in areas where unique flooding existed and in areas where computed wave heights varied significantly between adjacent transects. Along each transect, wave heights and elevations were computed considering the combined effects of changes in ground elevation, vegetation, and physical features.

The selected transect locations illustrated in Figure 3 "Transect Location Map", are based on Florida Department of Environmental Protection (FDEP) field surveys of beach and near-shore profiles, supplemented with the county's photogrammetric contour maps with 2-ft contours and the USGS (1970- 1993) l :24,000 scale topographic maps with 5-ft contours. Surveys were positioned at and tied into FDEP reference monuments. All elevations were referenced to NAVD88.

From the previous FIS surge elevations, beach erosion was computed along each transect to determine the vertical and horizontal limits of the eroded escarpment corresponding to the 1-percent annual chance flood event. As detailed in the FEMA guidelines (FEMA, January 1995 and March 1995), transects with frontal dune reservoirs exceeding 540 square feet (ft) experience dune retreat while those with reservoirs less than 540 ft experience dune

removal. In Lee County, the frontal dune reservoir generally encompasses less than 540 ft^2 ; thus, at most transects dune removal characterizes the 1-percent annual chance storm erosion. The FEMA guidelines do not address the case of submerged dunes with elevations below the 1 0-percent and/or 1-percent annual chance stillwater level. In these cases, comparisons of transect profiles were made with existing post-storm survey data. Dune erosion was performed manually using engineering judgment and FDEP post-storm profiles. Inland limit of the VE Zone was extended to the limit of the Primary Frontal Dune (PFD) where appropriate.

Representative wave conditions accompanying 1-percent annual chance flooding events came from available USACE Wave Information Study wave hind cast data from one gage offshore from Lee County (station 17). Wave set-up (not included in the previous studies) was determined using the Shore Protection Manual (USACE, 1984).

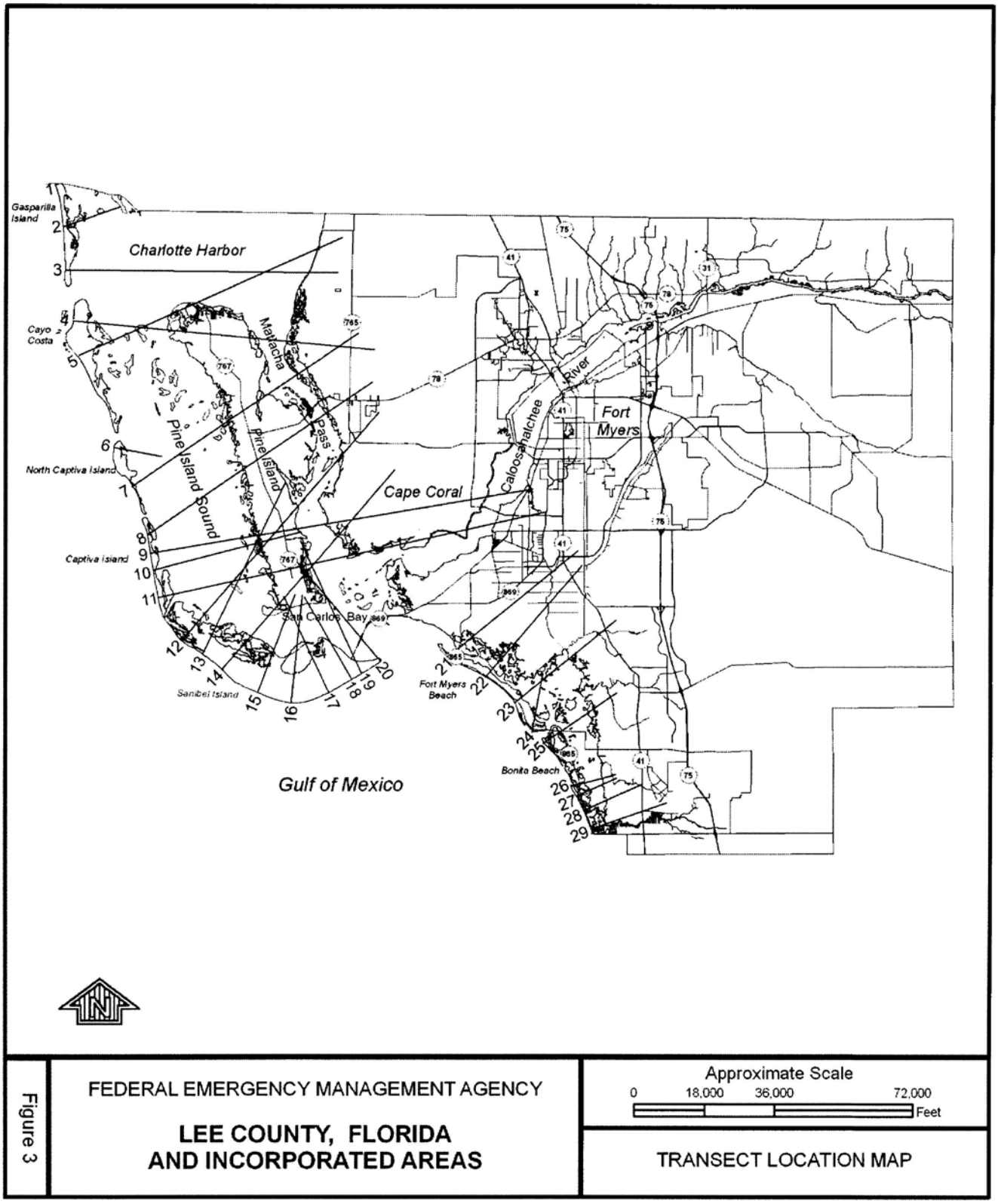

Figure 3 – Transect Location Map

The wave model WHAFIS (FEMA, March 1995) provided the maximum expected wave crest elevation along each transect. This methodology accounted for fetch length, submerged bathymetry, and type and extent of land cover along each transect. Aerial photographs and observations from field inspections provided density, types, and physical dimensions of rigid and flexible vegetation (e.g., height, stem diameters, horizontal spacing, etc.), buildings, and other structures.

Following the above mentioned methodology Taylor Engineering, Inc. performed in 2002 wave analyses along twenty-nine transects in Lee County. The analyses covered only the barrier islands and were terminated on the interior sounds and bays of Charlotte Harbor, Pine Island Sound, San Carlos Bay and Estero Bay.

In 2006 Dewberry, following FEMA Appendix D: "Guidance for Coastal Flooding Analyses and Mapping" (April 2003), extended inland eight-teen transects to meet the stillwater elevation in the back bay areas of Estero Bay, Ostego Bay, San Carlos Bay, Pine Island Sound, and Matlacha Pass. Other nine were only extended partially in order to cover representative areas and to guide in mapping. Transition between stillwater elevations was carried out using a general rule of a 1-foot drop every 1,000 feet.

FEMA's wave runup methodology (April 2003) was not applied along the Lee County shoreline because ground elevations of the barrier islands did not rise above the 1-percent annual chance still water level.

Transect locations, stillwater starting elevations, as well as initial wave crest elevations are listed in Table 9, "Transect Descriptions." In Table 10, "Transect Data," flood hazard zones and base flood elevations for each transect are provided, along with the 1-percent annual chance stillwater elevation for the respective flooding source.

Table 9 – Transect Descriptions

		STILLWATER ELEVATION IN FEET (NAVD88)		
TRANSECT	LOCATION	10-PERCENT	1-PERCENT	WAVECREST[1]
1	At the Lee County/Charlotte County line	3.52	9.82	15.10
2	At the intersection of Gasparilla Road and 15 Street	3.22	9.62[2]	15.42
3	About 4,050 feet from the south end of Gasparilla Island	3.22	9.62[2]	15.42
4	About 6,000 feet from the north end of Cayo Costa	3.52	9.42[2]	15.11
5	About 22,200 feet from the south end of Cayo Costa	3.52	9.42[2]	15.11

[1]Because of map scale limits, the maximum wave elevation may not be shown on the FIRM
[2]Includes wave setup of 1.7 feet

Table 9 – Transect Descriptions (continued)

TRANSECT	LOCATION	STILLWATER ELEVATION IN FEET (NAVD88) 10-PERCENT	1-PERCENT	WAVECREST[1]
6	About 2,100 feet from the north end of North Captiva Island along Hodgepodge Lane	4.52	10.52[2]	16.79
7	About 7,800 feet from the south end of North Captiva Island	4.52	10.52[2]	16.79
8	At the intersection of Sand Drift Road. and South Seas Plantation Road	4.52	10.52[2]	16.17
9	At the intersection of Sea Turtle Court and South Seas Plantation Road	4.52	10.52[2]	16.17
10	About 1 mile from intersection of Captiva Road and Murmond Lane	4.52	10.52[2]	16.17
11	Extends through DEP monument number R-104	4.52	10.52[2]	16.17
12	About 4,000 feet south of the intersection of Wulfert Road and Troon Court, through Clam Bayou	4.12	10.62[3]	16.32
13	About 2,700 feet southwest of the intersection of Buckthorn Lane and Sanibel Captiva Road	4.12	9.82[3]	15.10
14	At the intersection of White Ibis Road and Watersedge Lane	4.12	9.82[3]	15.10
15	At the intersection of Sawgrass Place and West Gulf Drive	4.12	11.22[3]	17.24
16	About 300 feet east from the intersection of Daniels Drive and West Gulf Drive	4.12	11.22[3]	17.24
17	About 150 feet east from the intersection of Olde Middle Gulf Drive and Middle Gulf Drive	4.52	12.72[2]	19.53
18	At the intersection of Sand Dollar Drive and Lindgren Boulevard	4.72	12.82[2]	19.68
19	About 70 feet east from the intersection of Spoon Bill Court and East Gulf Drive	4.92	13.22[2]	20.29
20	About 300 feet west of the end of Sanibel Island	4.92	13.22[2]	20.29
21	At the intersection of Matanzas Street and Matanzas Court	4.92	12.82[3]	19.68
21.5	100 ft east of the intersection of Estero Boulevard and Fishermans Wharf Drive	4.92	12.82[3]	19.68
22	At the intersection of Estero Boulevard and Connecticut Street	4.92	12.82[3]	19.68
23	At the intersection of Noddy Tern Drive and Widgeon Terrace	4.92	12.72[3]	19.53

[1]Because of map scale limits, the maximum wave elevation may not be shown on the FIRM
[2]Includes wave setup of 1.7 feet
[3]Includes wave setup of 1.5 feet

Table 9 – Transect Descriptions (continued)

TRANSECT	LOCATION	STILLWATER ELEVATION IN FEET (NAVD88) 10-PERCENT	1-PERCENT	WAVECREST[1]
24	About 100 feet east of the intersection of Estero Boulevard and Buccaneer Drive	4.92	12.72[3]	19.53
25	About 1,050 feet from the north end of Black Island	4.12	13.12[4]	20.14
26	About 20 feet from the north tip of Bonita Beach peninsula	5.22	12.92[4]	19.84
27	At the intersection of Estero Boulevard and Hickory Boulevard	4.82	12.72[4]	19.53
28	About 100 feet south of the intersection of Hickory Boulevard and Harmony Lane	4.82	12.72[4]	20.53
29	Extends through DEP monument number R-238	4.82	12.72[4]	20.15

[1]Because of map scale limits, the maximum wave elevation may not be shown on the FIRM
[2]Includes wave setup of 1.7 feet
[3]Includes wave setup of 1.5 feet
[4]Includes wave setup of 1.4 feet

Table 10 – Transect Data

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
Gulf of Mexico	1	3.5	7.0	9.8[1]	10.5	VE	12-15
						AE	9-12
Gulf of Mexico	2	3.2	6.6	9.6[1]	10.2	VE	12-15
						AE	10-12
Charlotte Harbor		2.4	N/A	6.5	8.7	VE	10
Gulf of Mexico	3	3.2	6.6	9.6[1]	10.2	VE	11-15
						AE	9-11
Charlotte Harbor		2.3	N/A	6.3	8.4	VE	8-10
						AE	6-8
Gulf of Mexico	4	3.5	6.6	9.4[1]	9.9	VE	11-15
						AE	8-11
Pine Island Pass		2.8	N/A	5.8	N/A	VE	8-10
						AE	6-8
Matlacha Pass		2.2	N/A	6.3	8.5	VE	8-9
						AE	6-8

*North America Vertical Datum of 1988
[1]Includes wave setup of 1.7 feet
[2]Includes wave setup of 1.5 feet
[3]Includes wave setup of 1.4 feet

Table 10 – Transect Data (continued)

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
Gulf of Mexico	5	3.5	6.6	9.4[1]	9.9	VE	11-15
						AE	8-11
Pine Island Pass		2.8	N/A	5.8	N/A	VE	8-10
						AE	6-8
Charlotte Harbor		2.4	N/A	6.5	8.7	VE	9-10
						AE	7-9
Gulf of Mexico	6	4.5	7.7	10.5[1]	11.1	VE	13-17
						AE	11-13
		4.5	7.7	8.82	11.1	VE	11-12
						AE	9-11
Gulf of Mexico	7	4.5	7.7	10.5[1]	11.1	VE	12-17
						AE	11-12
Pine Island Sound		2.9	N/A	6.5	N/A	VE	9-12
						AE	7-9
Matlacha Pass		3.6	N/A	6.3	7.7	VE	8-9
						AE	6-8
Gulf of Mexico	8	4.5	7.7	10.5[1]	11.1	VE	12-16
						AE	11-12
Pine Island Sound		2.9	N/A	6.5	N/A	VE	9-10
						AE	7-9
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9
Gulf of Mexico	9	4.5	7.7	10.5[1]	11.1	VE	12-16
						AE	11-12
Pine Island Sound		3.1	N/A	6.5	N/A	VE	9-10
						AE	7-9
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9
Caloosahatchee River		3.3	N/A	7.0	8.1	VE	9-10
						AE	7-9
Gulf of Mexico	10	4.5	7.7	10.5[1]	11.1	VE	12-16
						AE	11-12
Pine Island Sound		3.1	N/A	6.5	N/A	VE	9-10
						AE	7-9
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-10
						AE	7-9

*North America Vertical Datum of 1988
[1]Includes wave setup of 1.7 feet
[2]Includes wave setup of 1.5 feet
[3]Includes wave setup of 1.4 feet

Table 10 – Transect Data (continued)

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
Gulf of Mexico	11	4.5	7.7	10.5[1]	11.1	VE	11-16
						AE	10-11
Pine Island Sound		3.1	N/A	6.5	N/A	VE	9-11
						AE	7-9
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9
Caloosahatchee River		3.3	N/A	7.0	8.1	VE	9-10
						AE	7-9
Gulf of Mexico	12	4.1	N/A	10.6[2]	N/A	VE	12-16
						AE	9-12
Pine Island Sound		3.1	N/A	6.5	N/A	VE	9-10
						AE	7-9
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9
Gulf of Mexico	13	4.1	N/A	10.6[2]	N/A	VE	11-16
						AE	9-11
Pine Island Sound		3.1	N/A	6.5	N/A	VE	9-10
						AE	7-9
Gulf of Mexico	14	4.1	N/A	10.2[2]	N/A	VE	12-16
						AE	9-12
Pine Island Sound		3.1	N/A	6.5	N/A	VE	9-10
						AE	7-9
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9
Gulf of Mexico	15	4.1	N/A	9.5[2]	N/A	VE	12-15
						AE	8-12
Pine Island Sound		3.1	N/A	6.5	N/A	VE	9-11
						AE	7-9
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9
Gulf of Mexico	16	4.1	N/A	11.2[2]	N/A	VE	13-17
						AE	10-13
Pine Island Sound		3.1	N/A	6.5	N/A	VE	9-11
						AE	7-9
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9

*North America Vertical Datum of 1988
[1]Includes wave setup of 1.7 feet
[2]Includes wave setup of 1.5 feet
[3]Includes wave setup of 1.4 feet

Table 10 – Transect Data (continued)

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
Gulf of Mexico	17	4.5	N/A	12.8[2]	N/A	VE	14-20
						AE	11-14
Pine Island Sound		3.1	N/A	6.5	N/A	VE	9-11
						AE	7-9
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9
Gulf of Mexico	18	4.7	N/A	13.2[2]	N/A	VE	15-20
						AE	12-15
Pine Island Sound		3.1	N/A	6.5	N/A	VE	10-11
						AE	8-10
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9
Gulf of Mexico	19	4.9	N/A	13.2[2]	N/A	VE	15-20
						AE	12-15
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9
Gulf of Mexico	20	4.9	N/A	13.2[2]	N/A	VE	15-20
						AE	12-15
Matlacha Pass		3.5	N/A	7.3	9.3	VE	9-11
						AE	7-9
Gulf of Mexico	21	4.9	9.7	12.8[2]	14.3	VE	14-20
						AE	13-14
Estero Bay		2.5	N/A	9.4	13.2	VE	10-13
						AE	9-10
Gulf of Mexico	21.5	4.9	9.7	12.8[2]	14.3	VE	13-20
						AE	10-13
Estero Bay		2.5	N/A	9.4	13.2	AE	10-11
Gulf of Mexico	22	4.9	9.7	12.8[2]	14.3	VE	13-20
						AE	11-13
Estero Bay		2.5	N/A	9.4	13.2	VE	11-12
						AE	9-11
Gulf of Mexico	23	4.9	9.6	12.7[2]	14.3	VE	13-20
						AE	11-13
Estero Bay		2.5	N/A	9.3	13.2	VE	11-14
						AE	9-11

*North America Vertical Datum of 1988
[1]Includes wave setup of 1.7 feet
[2]Includes wave setup of 1.5 feet
[3]Includes wave setup of 1.4 feet

Table 10 – Transect Data (continued)

FLOODING SOURCE	TRANSECT	STILLWATER ELEVATION (feet NAVD*) 10-PERCENT	2-PERCENT	1-PERCENT	0.2-PERCENT	ZONE	BASE FLOOD ELEVATION (feet NAVD*)
Gulf of Mexico	24	4.9	9.6	12.7[2]	14.3	VE	14-20
		4.9	9.6	11.2	14.3	VE	11-14
						AE	11
Gulf of Mexico	25	4.1	9.82	13.1[3]	14.8	VE	15-20
						AE	13-15
Estero Bay		2.7	N/A	10.4	14.5	VE	13-15
						AE	10-13
Gulf of Mexico	26	5.2	8.8	12.9[3]	11.5	VE	15-20
						AE	13-15
Estero Bay		2.8	N/A	10.3	14.3	VE	13-15
						AE	10-13
Gulf of Mexico	27	4.8	8.9	12.7[3]	13.2	VE	14-20
						AE	13-14
Estero Bay		2.8	N/A	10.0	13.8	VE	12-14
						AE	10-12
Gulf of Mexico	28	4.8	8.9	12.7[3]	13.2	VE	14-20
						AE	13-14
Estero Bay		2.8	N/A	10.0	13.8	VE	12-15
						AE	10-12
Gulf of Mexico	29	4.8	8.9	12.7[3]	13.2	VE	14-20
						AE	13-14
Estero Bay		2.8	N/A	10.0	13.8	AE	10-12

*North America Vertical Datum of 1988
[1]Includes wave setup of 1.7 feet
[2]Includes wave setup of 1.5 feet
[3]Includes wave setup of 1.4 feet

3.3 Vertical Datum

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 in use for newly created or revised FIS reports and FIRMs was the National Geodetic Vertical Datum of 1929 (NGVD 29). With the finalization of the North American Vertical Datum of 1988 (NAVD 88), many FIS reports and FIRMs are being prepared using NAVD 88 as the referenced vertical datum shift of 1.18 ft. (NGVD 29 - 1.18 ft. = NAVD 88).

For this countywide FIS, all flood elevations shown in the FIS report and on the FIRM are referenced to NAVD 88. Structure and ground elevations in the community must, therefore, be referenced to NAVD 88. It is important to note that adjacent communities may be referenced to NGVD 29. This may result in differences in base flood elevations across corporate limits between the communities.

For information regarding conversion between the NGVD and NAVD, 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/NGS 12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, MD 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 Technical Support Data Notebook associated with the FIS report and FIRM for this community. Interested individuals may contact FEMA to access these data.

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. To assist in this endeavor, each FIS provides 1-percent annual chance floodplain data, which may include a combination of the following: 10-, 2-, 1-, and 0.2-percent annual chance flood elevations; delineations of the 1- and 0.2-percent annual chance floodplains; and 1-percent annual chance floodway. This information is presented on the FIRM and in many components of the FIS, including Flood Profiles, Floodway Data Tables, and Summary of Stillwater Elevation tables. Users should reference the data presented in the FIS as well as additional information that may be available at the local community map repository before making flood elevation and/or floodplain boundary determinations.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1-percent annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance flood is employed to indicate additional areas of flood risk in the county. For the streams studied in detail, the l and 0.2-percent annual chance floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic data (Lee County, 1998).

For the 2008 countywide FIS, between cross sections and coastal transects, the boundaries were interpolated using digital topographic maps with a contour interval of 2 feet (Lee County, 1998).

Additional topographic data was used to delineate the floodplain along Bayshore Creek and Popash Creek (Banks Engineering, 2007), Estero River (Barraco and Associates, Inc., 2007; WilsonMiller, August and November 2007), Orange River (AIM Engineering & Surveying, Inc., 2007), and Six Mile Cypress Slough (Community Engineering Services, Inc., 2007).

For the flooding sources studied by approximate methods, the boundaries of the 1-percent annual chance floodplains were delineated using updated topographic data (Lee County, 1998).

The 1- and 0.2-percent annual chance floodplain boundaries are shown on the FIRM (Exhibit 2). On this map, the 1-percent annual chance floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A, AE, and VE), and the 0.2-percent annual chance floodplain boundary corresponds to the boundary of areas of moderate flood hazards. In cases where the 1- and 0.2-percent annual chance floodplain boundaries are close together, only the 1-percent 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.

For the streams studied by approximate methods, only the 1-percent annual chance floodplain boundary is shown on the FIRM (Exhibit 2).

4.2 Floodways

Encroachment on floodplains, such as structure 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 this aspect of floodplain management. Under this concept, the area of the 1-percent annual chance floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 1-percent annual chance flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this FIS are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this FIS 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. The results of the floodway computations are tabulated for selected cross sections (Table 9). The computed floodways are shown on the FIRM (Exhibit 2). In cases where the floodway and 1-percent annual chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Flood way" elevations presented in Table 9 for certain downstream cross sections are lower than the regulatory flood elevations in that area, which must take into account the 1-percent annual chance flooding due to backwater from other sources.

Encroachment into areas subject to inundation by floodwaters having hazardous velocities

aggravates the risk of flood damage, and heightens potential flood hazards by further increasing velocities. A listing of stream velocities at selected cross sections is provided in Table 9, "Floodway Data." In order to reduce the risk of property damage in areas where the stream velocities are high, the community may wish to restrict development in areas outside the floodway.

No floodway was computed for the Hickey Creek (upstream of Hickey Creek Drainageway), Powell Creel (upstream of confluence of Powell Bypass), Powell Creek Tributary No. 1, Tributary L-1 (Yellow Fever Creek Tributary), and Tributary L-2 (Yellow Fever Creek Tributary).

For this revision, floodways were revised for Ten Mile Canal, North Colonial Waterway, South Branch and a portion of Halfway Creek using HEC-RAS 4.1.0.

The area between the floodway and 1-percent annual chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent annual chance flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 4.

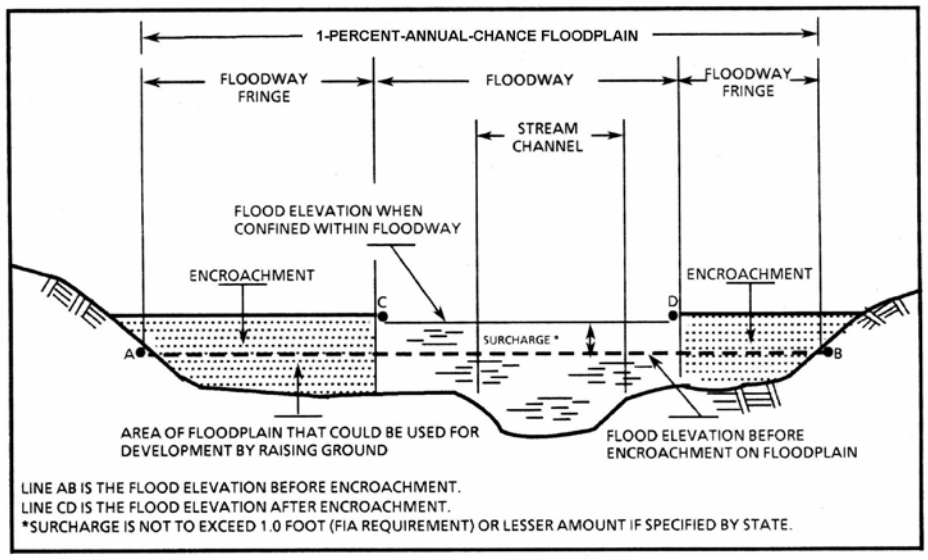

Figure 4 – Floodway Schematic

4.3 Velocity Zones

High hazard zones, V Zones, are defined as areas with wave heights equal to or greater than 3 feet (FEMA, March 1995). Some V Zones on the barrier islands have increased as a result of the inclusion of wave setup and beach erosion considerations, elements the pre-countywide FIS did not include. V Zones typically decrease landward as ground elevations and building/vegetation density increase where the wave height drops below 3 feet, V Zones change to A Zones.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BAYSHORE CREEK								
A	800	265	594	1.8	6.8[2]	0.8[3]	1.4	0.6
B	2,100	250	920	1.1	6.8[2]	3.4[3]	3.5	0.1
C	3,400	345	1,577	0.7	6.8[2]	3.7[3]	4.3	0.6
D	4,237	275	561	1.9	6.8[2]	4.0[3]	4.7	0.7
E	6,533	220	445	2.3	8.6	8.6	9.2	0.6
F	7,686	280	838	1.2	10.6	10.6	11.5	0.9
G	9,991	260	1,101	0.7	12.8	12.8	13.7	0.9
H	11,242	418	2,728	0.3	19.8	19.8	19.9	0.1
I	16,272	115	312	1.8	20.4	20.4	21.2	0.8
J	17,727	550	2,177	0.3	21.7	21.7	22.6	0.9
K	18,981	675	1,779	0.3	21.8	21.8	22.7	0.9
L	19,279	675	2,131	0.2	21.8	21.8	22.7	0.9
M	19,678	775	1,999	0.2	21.8	21.8	22.7	0.9
N	21,321	1,084	2,144	0.2	21.8	21.8	22.8	1.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

BAYSHORE CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BAYSHORE CREEK (Continued)								
O	23,967	34	142	2.2	22.2	22.2	23.1	0.9
P	24,798	469	581	0.5	23.5	23.5	23.6	0.1
BEDMAN CREEK / DOG CANAL								
A	1,760	1,159	2,906	1.5	6.9	6.9	7.7	0.8
B	2,730	1,610	3,715	1.1	7.9	7.9	8.6	0.7
C	4,160	1,142	3,632	1.1	9.9	9.9	10.3	0.4
D	5,304	266	1,431	2.9	10.7	10.7	11.1	0.4
E	6,562	304	1,689	2.5	12.0	12.0	12.4	0.4
F	7,731	375	2,080	2.0	12.6	12.6	13.1	0.5
G	8,665	378	1,987	2.0	13.1	13.1	13.7	0.6
H	9,705	452	2,646	1.4	13.8	13.8	14.6	0.8
I	10,589	400	2,166	1.9	14.5	14.5	15.2	0.7
J	11,624	657	4,028	0.9	14.6	14.6	15.6	1.0

[1] Feet above mouth.

This page has been superseded by the new page as part of 19-04-2304P (2780 Joel Blvd)

TABLE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

A

K / DOG CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BAYSHORE CREEK (Continued)								
O	23,967	34	142	2.2	22.2	22.2	23.1	0.9
P	24,798	469	581	0.5	23.5	23.5	23.6	0.1
BEDMAN CREEK / DOG CANAL								
A	1,828	451	1,278	1.7	7.0	6.1[2]	6.9	0.8
B	2,775	134	745	2.9	7.0	6.8[2]	7.4	0.6
C	4,138	215	768	2.9	8.3	8.3	8.8	0.5
D	5,349	196	936	2.3	9.5	9.5	9.7	0.2
E	6,571	176	843	2.6	10.1	10.1	10.4	0.3
F	7,778	178	830	2.6	10.7	10.7	11.1	0.4
G	8,711	213	768	2.8	11.3	11.3	11.7	0.4
H	9,753	221	994	2.1	12.1	12.1	12.4	0.3
I	10,643	179	1,214	1.8	12.9	12.9	13.1	0.2
J	11,673	289	1,341	1.6	13.1	13.1	13.4	0.3

[1] Feet above mouth.

[2] Elevation computed without consideration of backwater effects of Caloosahatchee River.

REVISED DATA

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

REVISED TO REFLECT LOMR
EFFECTIVE: December 26, 2019

BAYSHORE CREEK - BEDMAN CREEK / DOG CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BEDMAN CREEK / DOG CANAL (Continued)								
K	12,724	786	4,349	0.8	14.9	14.9	15.9	1.0
L	13,924	1,138	6,237	0.6	15.0	15.0	16.0	1.0
M	15,024	1,507	7,603	0.5	15.1	15.1	16.1	1.0
N	15,774	1,361	4,077	0.9	15.3	15.3	16.3	1.0
			723	4.2	19.9	19.9	20.3	0.4
			2,026	1.1	24.3	24.3	24.7	0.4
			3,546	0.5	24.5	24.5	25.0	0.5
			2,312	0.5	26.1	26.1	26.4	0.3
			1,650	0.2	26.1	26.1	26.4	0.3
			693	0.5	26.1	26.1	26.5	0.4
			772	5.6	6.8[2]	1.3[3]	1.8	0.5
			787	5.5	6.8[2]	4.8[3]	5.2	0.4
C	5,126	778	1,244	3.4	6.8[2]	6.1[3]	6.6	0.5

this page has been superseded by a new 06P page dated November 22, 2019 per LOMR 18-04-7584P

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

BEDMAN CREEK / DOG CANAL - BILLY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BEDMAN CREEK / DOG CANAL (Continued)								
K	12,724	786	4,349	0.8	14.9	14.9	15.9	1.0
L	13,924	1,138	6,237	0.6	15.0	15.0	16.0	1.0
M	15,024	1,507	7,603	0.5	15.1	15.1	16.1	1.0
N	15,774	1,361	4,077	0.9	15.3	15.3	16.3	1.0
O	21,474	86	723	4.2	19.9	19.9	20.3	0.4
P	29,922	215 / 1604	943	2.1	23.6	23.6	24.6	1.0
		128	1,056	1.3	23.9	23.9	24.8	0.9
		151	794	1.2	24.5	24.5	25.3	0.8
		125	678	1.3	24.7	24.7	25.5	0.8
		96	516	0.7	24.8	24.8	25.6	0.8
BI								
		107	772	5.6	6.8[2]	1.3[3]	1.8	0.5
		115	787	5.5	6.8[2]	4.8[3]	5.2	0.4
C	5,126	178	1,244	3.4	6.8[2]	6.1[3]	6.6	0.5

This page has been superseded by page from LOMR 19-04-2304P effective date of 12-26-19

REVISED DATA

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

[4] Total width / width within county boundary

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

REVISED TO REFLECT LOMR EFFECTIVE: November 22, 2019

BEDMAN CREEK / DOG CANAL - BILLY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BEDMAN CREEK / DOG CANAL (Continued)								
K	12,798	257	1,256	1.7	13.5	13.5	13.8	0.3
L	14,060	324	1,714	1.1	13.8	13.8	14.3	0.5
M	15,006	308	1,060	1.8	14.1	14.1	14.5	0.4
N	15,931	179	414	4.5	14.8	14.8	15.3	0.5
O	21,474	86	723	4.2	19.9	19.9	20.3	0.4
P	29,922	215 / 160[4]	943	2.1	23.6	23.6	24.6	1.0
Q	32,949	128	1,056	1.3	23.9	23.9	24.8	0.9
R	39,208	151	794	1.2	24.5	24.5	25.3	0.8
S	43,011	125	678	1.3	24.7	24.7	25.5	0.8
T	46,732	96	510	0.7	24.8	24.8	25.6	0.8
BILLY CREEK								
A	505	107	772	5.6	6.8[2]	1.3[3]	1.8	0.5
B	3,482	115	787	5.5	6.8[2]	4.8[3]	5.2	0.4
C	5,126	178	1,244	3.4	6.8[2]	6.1[3]	6.6	0.5

REVISED DATA

DATA REVISED BY LOMR EFFECTIVE NOVEMBER 22, 2019

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

[4] Total width / width within county boundary

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

REVISED TO REFLECT LOMR EFFECTIVE: December 26, 2019

BEDMAN CREEK / DOG CANAL - BILLY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
BILLY CREEK (Continued)								
D	7,656	155	1,750	1.6	6.9	6.9	7.6	0.7
E	8,475	60	548	5.2	7.7	7.7	8.6	0.9
F	10,258	295	1,475	1.9	9.4	9.4	10.3	0.9
G	11,665	176	1,319	2.2	10.2	10.2	11.1	0.9
H	12,825	575	4,289	0.7	10.7	10.7	11.7	1.0
I	13,695	1,144	6,316	0.5	10.8	10.8	11.8	1.0
J	15,035	744	4,009	0.7	10.8	10.8	11.8	1.0
K	16,585	629	2,777	1.0	11.1	11.1	12.1	1.0
L	18,733	448	1,374	2.1	13.2	13.2	14.1	0.9
M	19,443	163	728	2.6	13.8	13.8	14.8	1.0
N	20,550	150	695	2.7	16.1	16.1	16.9	0.8
O	20,943	254	895	2.1	16.8	16.8	17.7	0.9
P	21,616	475	1,745	1.0	17.4	17.4	18.4	1.0

[1] Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

BILLY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CARRELL CANAL								
A	2,085	30	87	5.6	6.8[2]	3.2[3]	3.2	0.0
B	2,315	70	465	1.0	11.0	11.0	11.0	0.0
C	3,062	50	226	1.9	11.3	11.3	11.3	0.0
D	3,927	57	233	1.8	11.5	11.5	11.5	0.0
E	4,549	62	242	1.6	11.7	11.7	11.7	0.0
F	5,018	50	210	1.8	11.9	11.9	11.9	0.0
G	5,866	60	211	1.7	12.2	12.2	12.2	0.0
H	6,325	50	306	1.1	12.3	12.3	12.3	0.0
I	6,825	40	212	1.4	12.4	12.4	12.4	0.0
J	7,712	56	297	0.8	12.6	12.6	12.6	0.0
K	8,966	60	290	0.4	12.7	12.7	12.7	0.0
L	9,631	60	287	0.3	12.7	12.7	12.7	0.0
M	10,271	40	161	0.2	12.7	12.7	12.7	0.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

CARRELL CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CHAPEL BRANCH CREEK								
A	0	56	271	3.3	6.8[2]	-0.2[3]	0.8	1.0
B	1,300	148	544	1.1	6.8[2]	0.9[3]	1.8	0.9
C	3,600	445	1,623	0.4	6.8[2]	1.6[3]	2.6	1.0
D	4,800	632	2,076	0.3	6.8[2]	1.8[3]	2.8	1.0
E	5,817	85	284	2.1	6.8[2]	2.8[3]	3.8	1.0
F	7,292	88	362	1.7	6.8[2]	5.5[3]	6.5	1.0
G	8,084	62	293	2.1	6.8[2]	6.4[3]	7.3	0.9
H	12,179	62	158	3.4	14.2	14.2	14.8	0.6
I	13,264	205	564	0.9	14.8	14.8	15.7	0.9
J	13,893	43	299	1.4	15.4	15.4	16.2	0.8
K	14,412	47	319	1.3	15.8	15.8	16.6	0.8
L	15,141	195	1,499	0.2	19.5	19.5	19.9	0.4
M	15,751	27	180	1.8	19.5	19.5	19.9	0.4
N	16,103	138	598	0.5	19.5	19.5	20.2	0.7

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

CHAPEL BRANCH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CHAPEL BRANCH CREEK (Continued)								
O	17,465	119	395	0.5	19.5	19.5	20.4	0.9
P	18,819	35	127	0.4	19.5	19.5	20.4	0.9
Q	20,043	36	158	0.3	19.5	19.5	20.4	0.9
R	20,758	43	120	0.4	19.5	19.5	20.5	1.0
CYPRESS CREEK								
A	0	68	427	7.3	6.8[2]	2.2[3]	3.2	1.0
B	1,627	376	1,218	2.6	6.8[2]	5.9[3]	6.3	0.4
C	4,590	54	579	4.9	8.6	8.6	9.6	1.0
D	5,290	706	2,928	1.0	9.7	9.7	10.6	0.9
E	5,620	470	2,107	1.3	9.9	9.9	10.8	0.9
F	6,780	1,110	2,931	1.0	10.8	10.8	11.8	1.0
G	7,531	778	3,158	0.9	11.3	11.3	12.3	1.0
H	8,111	1,479	5,538	0.5	11.6	11.6	12.6	1.0
I	8,622	894	3,798	0.7	12.8	12.8	13.5	0.7

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

CHAPEL BRANCH CREEK - CYPRESS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
CYPRESS CREEK (Continued)								
J	9,414	743	6,229	0.4	12.8	12.8	13.5	0.7
K	10,614	822	3,534	0.8	13.0	13.0	13.7	0.7
L	11,594	180	1,202	2.2	13.6	13.6	14.4	0.8
M	13,134	200	1,513	1.8	15.2	15.2	16.0	0.8
N	14,134	35	391	6.9	16.5	16.5	17.1	0.6
O	15,034	148	1,922	1.4	17.6	17.6	18.6	1.0
P	16,774	136	1,810	1.5	17.7	17.7	18.7	1.0
Q	18,394	879	9,582	0.3	17.8	17.8	18.8	1.0
R	20,275	363	4,362	0.6	17.9	17.9	18.9	1.0
DAUGHTREY CREEK								
A	3,100	265	1,478	1.2	6.8[2]	1.0[3]	1.6	0.6
B	4,157	90	846	2.0	6.8[2]	1.1[3]	1.7	0.6
C	5,513	60	382	4.5	6.8[2]	2.1[3]	2.5	0.4
D	7,013	241	1,020	1.7	6.8[2]	3.5[3]	4.1	0.6

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

CYPRESS CREEK - DAUGHTREY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
DAUGHTREY CREEK (Continued)								
E	8,513	47	384	4.5	6.8[2]	4.6[3]	5.2	0.6
F	10,243	100	829	2.1	7.0	7.0	7.4	0.4
G	11,751	226	789	2.0	9.5	9.5	10.1	0.6
H	12,336	81	613	2.5	9.6	9.6	10.4	0.8
I	13,636	50	440	3.5	10.0	10.0	10.9	0.9
J	16,236	88	391	4.0	12.8	12.8	13.2	0.4
K	18,036	108	744	2.1	14.4	14.4	14.6	0.2
L	19,178	341	885	1.8	14.9	14.9	15.4	0.5
M	19,587	94	399	3.9	15.1	15.1	15.7	0.6
N	20,563	63	411	3.8	15.8	15.8	16.7	0.9
O	20,993	89	557	2.8	16.2	16.2	17.0	0.8
P	22,238	789	826	1.9	16.9	16.9	17.8	0.9
Q	24,338	179	619	2.5	18.3	18.3	19.2	0.9
R	25,674	96	479	3.2	19.9	19.9	20.9	1.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

DAUGHTREY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
DAUGHTREY CREEK (Continued)								
S	27,063	1,309	6,078	0.3	22.0	22.0	22.9	0.9
T	27,773	1,686	5,372	0.3	22.1	22.1	22.9	0.8
U	31,384	2,322	4,338	0.4	23.5	23.5	23.8	0.3
V	32,060	3,447	3,388	0.5	23.6	23.6	24.1	0.5
W	33,370	1,061	2,317	0.7	23.6	23.6	24.3	0.7
X	36,170	1,247	1,588	1.0	24.4	24.4	25.4	1.0
EAST BRANCH DAUGHTREY CREEK								
A	0	109	493	1.6	6.8[2]	3.5[3]	4.5	1.0
B	687	38	299	2.4	6.8[2]	5.3[3]	6.2	0.9
C	1,914	80	512	1.4	7.0	7.0	8.0	1.0
D	3,369	171	922	0.8	10.0	10.0	10.5	0.5
E	4,352	224	513	1.4	11.3	11.3	12.3	1.0
F	5,352	195	528	1.3	12.6	12.6	13.5	0.9

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

DAUGHTREY CREEK - EAST BRANCH DAUGHTREY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
EAST BRANCH DAUGHTREY CREEK (Continued)								
G	6,652	410	1,140	0.6	13.3	13.3	14.2	0.9
H	7,652	130	279	2.5	14.6	14.6	15.5	0.9
I	9,952	514	1,344	0.5	15.6	15.6	16.6	1.0
J	10,796	316	510	1.4	16.6	16.6	17.4	0.8
K	11,122	765	1,657	0.4	16.8	16.8	17.7	0.9
L	12,412	200	567	1.3	19.5	19.5	19.9	0.4
M	13,042	94	641	1.1	20.0	20.0	20.6	0.6
N	14,389	2,262	6,114	0.1	20.1	20.1	20.7	0.6
O	15,117	370	751	0.8	20.1	20.1	20.9	0.8
P	15,305	1,137	3,179	0.2	20.2	20.2	21.0	0.8
Q	15,808	582	1,853	0.3	20.2	20.2	21.1	0.9
R	16,359	292	639	1.0	21.2	21.2	21.7	0.5
S	16,821	1,924	3,619	0.2	21.2	21.2	21.8	0.6

[1] Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

EAST BRANCH DAUGHTREY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
EAST BRANCH DAUGHTREY CREEK (Continued)								
T	18,154	235	554	1.1	21.6	21.6	22.4	0.8
U	20,668	410	1,334	0.5	22.7	22.7	23.7	1.0
V	22,453	997	1,831	0.3	22.8	22.8	23.8	1.0
EAST BRANCH YELLOW FEVER CREEK								
A	0	212	256	4.7	6.8[2]	3.2[3]	3.9	0.7
B	1,130	212	673	1.8	6.8	6.8	7.8	1.0
C	1,780	238	994	1.2	7.4	7.4	8.4	1.0
D	2,180	249	800	1.5	11.0	11.0	11.9	0.9
E	3,359	61	291	3.5	13.7	13.7	14.5	0.8
F	4,278	101	442	2.3	14.6	14.6	15.5	0.9
G	5,358	673	1,616	0.6	14.8	14.8	15.8	1.0
H	8,051	476	1,966	0.5	15.4	15.4	16.2	0.8
I	9,450	877	2,130	0.4	15.5	15.5	16.3	0.8

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

EAST BRANCH DAUGHTREY CREEK - EAST BRANCH YELLOW FEVER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
EAST BRANCH YELLOW FEVER CREEK (Continued)								
J	10,514	135	244	3.1	15.6	15.6	16.6	1.0
K	11,798	587	978	0.6	16.6	16.6	17.5	0.9
L	13,368	828	1,643	0.4	17.0	17.0	17.8	0.8
M	14,528	475	1,281	0.4	17.1	17.1	17.9	0.8
N	15,658	36	186	2.6	17.7	17.7	18.4	0.7
ESTERO RIVER								
A	550	777	4,791	1.3	9.5[2]	8.3[3]	8.3	0.0
B	2,050	411	3,797	1.6	9.5[2]	8.5[3]	8.6	0.1
C	2,800	696	5,624	1.1	9.5[2]	8.6[3]	8.7	0.1
D	3,800	829	7,438	0.8	9.5[2]	8.7[3]	8.9	0.2
E	4,600	659	3,304	1.8	9.5[2]	8.7[3]	8.9	0.2
F	5,100	695	5,126	1.2	9.5[2]	8.8[3]	9.0	0.2
G	6,281	858	5,208	1.2	9.5[2]	9.0[3]	9.3	0.3
H	8,861	539	3,795	1.6	9.6	9.6	9.9	0.3

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Estero Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

EAST BRANCH YELLOW FEVER CREEK - ESTERO RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
ESTERO RIVER (Continued)								
I	9,911	997	4,569	1.3	9.8	9.8	10.1	0.3
J	11,024	475	3,981	1.5	10.0	10.0	10.3	0.3
K	13,511	565	3,847	1.6	10.6	10.6	11.0	0.4
L	14,511	540	2,675	2.3	10.9	10.9	11.3	0.4
M	15,817	200	1,641	3.7	11.1	11.1	12.0	0.9
N	17,811	1,390	5,574	0.9	13.0	13.0	14.0	1.0
O	19,207	786	5,926	0.9	13.3	13.3	14.2	0.9
P	20,221	2,071	3,358	1.5	13.8	13.8	14.6	0.8
Q	21,134	343	2,542	2.0	14.9	14.9	15.7	0.8
R	23,267	1,405	6,047	0.8	15.9	15.9	16.8	0.9
S	23,996	1,096	4,550	1.1	16.2	16.2	17.1	0.9
T	24,946	1,684	5,616	0.9	16.9	16.9	17.9	1.0
U	25,692	1,891	7,900	0.6	17.2	17.2	18.2	1.0
V	27,820	2,670	9,667	0.5	18.5	18.5	19.1	0.6

[1] Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

ESTERO RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
ESTERO RIVER (Continued)								
W	28,840	818	4,426	1.0	19.6	19.6	20.4	0.8
X	29,610	1,653	8,303	0.6	19.9	19.9	20.8	0.5
FICHTER CREEK								
A	0	90	470	2.8	6.8[2]	1.2[3]	2.2	1.0
B	804	44	226	3.9	6.8[2]	3.3[3]	3.6	0.3
C	1,134	40	248	3.6	6.8[2]	3.8[3]	4.0	0.2
D	2,184	19	115	7.7	6.8[2]	6.5[3]	7.2	0.7
E	2,697	26	262	3.4	8.2	8.2	9.0	0.8
F	4,201	130	372	1.8	10.7	10.7	11.1	0.4
G	5,430	17	105	6.4	14.4	14.4	14.7	0.3
FORD STREET CANAL								
A	1,722	40	280	2.1	9.0	9.0	9.7	0.7
B	2,622	36	171	3.2	9.3	9.3	10.0	0.7
C	3,572	35	121	4.5	10.5	10.5	10.8	0.3

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

ESTERO RIVER - FICHTER CREEK - FORD STREET CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
FORD STREET CANAL (Continued)								
D	4,207	38	160	3.4	12.1	12.1	12.3	0.2
E	4,802	32	133	3.8	12.6	12.6	12.8	0.2
F	5,174	31	140	1.4	13.5	13.5	13.7	0.2
G	5,787	35	136	1.4	13.7	13.7	13.9	0.2
H	6,892	38	161	1.2	13.8	13.8	14.0	0.2
I	8,047	35	113	1.7	14.9	14.9	15.0	0.1
J	8,949	50	160	1.2	16.0	16.0	16.8	0.8
K	9,283	65	195	0.8	16.1	16.1	17.1	1.0
L	9,564	65	118	0.8	16.9	16.9	17.4	0.5
M	9,874	65	120	0.7	16.9	16.9	17.5	0.6
N	10,199	65	128	0.7	16.9	16.9	17.7	0.8
O	10,445	20	46	0.7	16.9	16.9	17.7	0.8
P	10,944	20	47	0.6	17.4	17.4	17.9	0.5
Q	11,248	21	38	0.8	17.6	17.6	18.2	0.6

[1] Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

FORD STREET CANAL

HALFWAY CREEK			FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
MBR NO.(I,J)	CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(S2DMM)	HEC-RAS	HEC-RAS	
	A	1,448	709	1,412	1.0	9.5[2]	1.6[3]	1.8	0.2
	B	4,078	922	1,322	1.1	9.5[2]	1.9[3]	2.1	0.2
	C	6,189	950	992	1.5	9.5[2]	3.2[3]	3.2	0.0
	D	7,364	185	490	3.0	9.5[2]	4.1[3]	4.1	0.0
	E	9,546	565	836	1.7	9.5[2]	7.8[3]	7.8	0.0
	F	11,726	455	1,142	1.3	9.5[2]	8.8[3]	8.8	0.0
	G	13,026	900	2,570	0.6	9.5[2]	9.0[3]	9.0	0.0
	H	14,960	660	1,303	1.1	9.7	9.7	9.8	0.1
	I	16,124	470	1,115	1.3	10.0	10.0	10.1	0.1
	J	17,217	118	531	2.7	13.7	13.7	13.9	0.2
	K	17,380	231	1,262	1.0	13.7	13.7	14.3	0.6
	L	18,505	460	1,704	0.7	13.8	13.8	14.4	0.6
1515 (85,2) 1516 (86,2)	M	19,891	400	1,551	0.8	14.1[4]	13.9	14.5	0.6
1515 (85,2) 1516 (86,2)	N	20,007	400	1,678	1.6	14.1[4]	14.8	15.4	0.6
1631 (85,2)	O	21,287	500	1,479	0.8	14.1[4]	14.8	15.7	0.9
1746 (84,2) 1747 (85,20)	P	22,635	500	2,526	0.5	14.7[4]	16.4	17.1	0.7

[1]Feet above confluence with Estero River.

[2]Elevation computed without consideration of wave effects.

[3]Elevation computed without consideration of backwater effects from Estero River.

[4]The regulatory elevations were defined with the S2DMM 2D model and should be used for flood insurance and floodplain management decisions. The HEC-RAS 1D model was used to define the floodway width and the "Without Floodway" elevations do not agree with S2DMM model.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

HALFWAY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HALLS CREEK								
A	178	68	513	0.8	6.8[2]	4.0[3]	4.5	0.5
B	1,068	18	96	2.0	6.8[2]	4.0[3]	4.7	0.7
C	1,548	18	76	2.6	6.8[2]	4.3[3]	5.2	0.9
D	3,238	108	191	1.0	6.8[2]	6.6[3]	7.5	0.9
E	3,584	24	67	2.9	7.1	7.1	8.0	0.9
F	3,765	402	2,289	0.1	8.2	8.2	8.4	0.2
G	4,065	28	58	3.4	8.6	8.6	8.8	0.2
H	4,322	54	212	0.9	10.2	10.2	11.1	0.9
I	5,195	28	116	1.7	12.7	12.7	13.0	0.3

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

HALLS CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT[3] FLOODWAY	WITH FLOODWAY	INCREASE
HANCOCK CREEK								
A	1,000	332	1,720	1.5	6.8	0.0	0.9	0.9
B	2,696	91	814	3.3	6.8	1.6	2.2	0.6
C	4,136	226	1,943	1.2	6.8	2.1	2.6	0.5
D	6,005	140	1,133	2.0	6.8	2.3	2.7	0.4
E	7,435	198	1,057	0.5	6.8	2.5	2.9	0.4
F	8,635	237	2,585	0.2	6.8	2.5	2.9	0.4
G	9,935	153	991	0.5	6.8	2.5	2.9	0.4
H	12,135	134	1,164	0.4	6.8	2.5	2.9	0.4
I	13,310	68	524	1.0	6.8	2.5	2.9	0.4
J	14,567	188	503	1.0	6.8	5.0	5.9	0.9
K	15,626	90	288	1.3	6.8	5.5	6.3	0.8
L	16,350	47	162	1.2	6.8	5.9	6.8	0.9
M	17,028	29	203	1.0	6.8	6.5	7.4	0.9

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

HANCOCK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HANCOCK CREEK (Continued)								
N	17,409	22	216	0.9	10.8	10.8	11.4	0.6
O	19,593	50	221	0.7	10.8	10.8	11.5	0.7
HENDRY CREEK								
A	0	756	5,894	0.6	9.5[2]	1.7[3]	2.7	1.0
B	4,600	902	6,031	0.4	9.5[2]	1.8[3]	2.8	1.0
C	8,600	492	3,756	0.6	9.5[2]	1.8[3]	2.8	1.0
D	11,100	2,190	7,573	0.3	9.5[2]	1.9[3]	2.8	0.9
E	13,350	324	2,280	1.0	9.5[2]	2.0[3]	2.9	0.9
F	17,100	250	1,725	0.8	9.5[2]	2.2[3]	3.1	0.9
G	21,600	165	1,213	1.1	9.5[2]	2.4[3]	3.3	0.9
H	24,300	538	1,278	1.0	9.5[2]	2.7[3]	3.7	1.0
I	27,470	400	2,119	0.3	9.5[2]	4.8[3]	5.3	0.5
J	28,539	158	1,367	0.0	9.5[2]	5.2[3]	5.7	0.5
K	30,658	2,194	8,638	0.0	9.5[2]	5.2[3]	5.7	0.5

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Estero Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

HANCOCK CREEK - HENDRY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HENDRY CREEK (Continued)								
L	31,176	1,633	5,601	0.0	9.0	5.2[3]	5.7	0.5
M	31,807	1,970	6,160	0.0	8.0	5.2[3]	5.7	0.5
N	34,054	745	6,664	0.0	7.0	5.2[3]	5.7	0.5
O	35,987	40	120	0.4	7.0	5.3[3]	5.8	0.5
P	36,697	57	134	0.2	7.0	5.3[3]	5.8	0.5
Q	37,526	38	82	0.3	7.0	5.3[3]	5.8	0.5
HENDRY WEST CREEK								
A	3,855	632	2,081	0.3	9.5	3.1[3]	4.0	0.9
B	5,405	54	376	1.8	9.5	6.9[3]	6.9	0.0
C	10,372	50	148	0.2	7.0	7.0[3]	7.3	0.3
HICKEY CREEK								
A	0	222	1,296	4.4	6.8	2.2[4]	3.2	1.0
B	991	90	873	6.5	6.8	5.0[4]	5.3	0.3

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Estero Bay.

[4] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

HENDRY CREEK - HENDRY CREEK WEST - HICKEY CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HICKEY CREEK (Continued)								
C	1,667	144	941	6.1	6.8[3]	6.2[4]	6.7	0.5
D	2,891	318	2,284	2.3	7.7	7.7	8.2	0.5
E	4,391	945	5,239	1.0	8.2	8.2	8.9	0.7
F	5,691	1,118	4,348	1.2	8.5	8.5	9.2	0.7
G	7,191	196	1,543	3.4	9.0	9.0	9.7	0.7
H	8,691	1,006	4,551	1.2	9.6	9.6	10.5	0.9
D								
I	11,623	170	1,134	4.3	15.4	15.4	15.7	0.3
J	27,006	96	959	2.1	21.7	21.7	22.3	0.6
K	32,808	64	837	1.0	22.1	22.1	22.7	0.6
IMPERIAL RIVER								
A	2,000	130[2]	927	5.3	10.0[3]	1.3[5]	1.3	0.0
B	4,000	199[2]	1,706	2.9	10.0[3]	1.7[5]	2.0	0.3

Superseded by new page per LOMR 19-4-0766P effective date of 01-29-2020

[1] Feet above mouth.

[2] Value is inaccurate, as the floodway has been adjusted in this area to reflect more detailed and up-to-date stream channel configuration.

[3] Elevation computed without consideration of wave effects.

[4] Elevation computed without consideration of backwater effects from Caloosahatchee River.

[5] Elevation computed without consideration of backwater effects from Fish Trap Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

HICKEY CREEK - HICKEY CREEK DRAINAGEWAY - IMPERIAL RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
HICKEY CREEK (Continued)								
C	1,667	139	941	6.1	6.8[3]	6.2[4]	6.7	0.5
D	2,891	280	2,233	3.0	7.5	7.5	8.2	0.7
E	4,391	945	4,255	2.5	8.1	8.1	8.9	0.8
F	5,691	1,118	4,348	1.2	8.5	8.5	9.2	0.7
G	7,091	196	1,543	3.4	9.0	9.0	9.7	0.7
H	8,813	1,006	4,551	1.2	9.6	9.6	10.5	0.9
HICKEY CREEK DRAINAGEWAY								REVISED DATA
I	11,623	170	1,134	4.3	15.4	15.4	15.7	0.3
J	27,006	96	959	2.1	21.7	21.7	22.3	0.6
K	32,808	64	837	1.0	22.1	22.1	22.7	0.6
IMPERIAL RIVER								
A	2,000	130[2]	927	5.3	10.0[3]	1.3[5]	1.3	0.0
B	4,000	199[2]	1,706	2.9	10.0[3]	1.7[5]	2.0	0.3

[1] Feet above mouth.

[2] Value is inaccurate, as the floodway has been adjusted in this area to reflect more detailed and up-to-date stream channel configuration.

[3] Elevation computed without consideration of wave effects.

[4] Elevation computed without consideration of backwater effects from Caloosahatchee River.

[5] Elevation computed without consideration of backwater effects from Fish Trap Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

REVISED TO REFLECT LOMR EFFECTIVE: January 29, 2020

HICKEY CREEK - HICKEY CREEK DRAINAGEWAY - IMPERIAL RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH[2] (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[3]	WITHOUT[4] FLOODWAY	WITH FLOODWAY	INCREASE
IMPERIAL RIVER (Continued)								
C	5,000	210	1,507	3.3	10.0	1.9	2.2	0.3
D	7,000	228	1,812	2.7	10.0	2.3	2.6	0.3
E	10,000	280	2,033	2.4	10.0	2.8	3.0	0.2
F	11,000	240	2,205	2.2	10.0	2.9	3.1	0.2
G	13,250	255	1,854	2.7	10.0	3.2	3.4	0.2
H	13,450	260	1,851	2.7	10.0	3.2	3.4	0.2
I	15,000	150	1,441	3.4	10.0	3.4	3.6	0.2
J	22,000	110	1,079	2.8	10.0	5.2	5.6	0.4
K	23,000	150	1,060	2.9	10.0	5.6	6.0	0.4
L	23,750	150	1,327	2.3	10.0	5.9	6.3	0.4
M	24,150	150	1,138	2.7	10.0	6.4	6.8	0.4
N	26,000	310	1,441	2.1	10.0	7.3	8.0	0.7
O	27,600	296	2,081	1.5	10.0	8.3	8.8	0.5
P	28,600	333	1,551	2.0	10.0	9.1	9.5	0.4

[1] Feet above mouth.

[2] Value is inaccurate, as the floodway has been adjusted in this area to reflect more detailed and up-to-date stream channel configuration.

[3] Elevation computed without consideration of wave effects.

[4] Elevation computed without consideration of backwater effects from Fish Trap Bay.

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
IMPERIAL RIVER (Continued)								
Q	32,700	1,200[2]	5,407	0.6	11.8	11.8	12.3	0.5
R	33,700	1,000[2]	5,458	0.6	12.0	12.0	12.5	0.5
S	35,000	1,600[2]	8,450	0.4	12.5	12.5	13.1	0.6
T	37,175	1,600[2]	6,437	0.5	13.3	13.3	13.9	0.6
U	37,500	1,600[2]	7,089	0.4	13.4	13.4	14.0	0.6
V	[illegible]	[illegible][2]	4,255	0.7	14.5	14.5	14.9	0.4
[illegible]	[illegible]	[illegible][2]	6,099	0.5	15.9	15.9	16.3	0.4
KICK								
[illegible]	[illegible]	[illegible]	433	2.9	6.8[3]	2.5[4]	3.0	0.5
[illegible]	[illegible]	[illegible]	648	1.3	7.5	7.5	7.9	0.4
[illegible]	[illegible]	[illegible]	1,726	0.6	7.6	7.6	8.2	0.6
D	1,107	247	1,254	0.8	7.6	7.6	8.2	0.6
E	1,217	226	2,068	0.4	7.6	7.6	8.2	0.6
F	2,047	147	1,051	0.7	7.6	7.6	8.2	0.6

superseded by new page per LOMR19-04-5595P effective date of 10-13-20

[1] Feet above mouth.

[2] Value is inaccurate, as the floodway has been adjusted in this area to reflect more detailed and up-to-date stream channel configuration.

[3] Elevation computed without consideration of wave effects.

[4] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

IMPERIAL RIVER - KICKAPOO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
IMPERIAL RIVER (Continued)								
Q	32,700	1,200[2]	5,407	0.6	11.8	11.8	12.3	0.5
R	33,700	1,000	5,532	0.8	12.1	12.1	12.6	0.5
S	35,000	1,140	6,961	0.8	12.7	12.7	13.4	0.7
T	37,491	1,275	5,870	1.1	13.4	13.4	14.4	1.0
U	37,820	1,500	7,520	1.5	13.7	13.7	14.6	0.9
V	40,312	850	3,707	0.8	14.2	14.2	15.1	0.9
W	43,174	1,544[5]	4,554	0.8	14.5	14.5	15.4	0.9
KICKAPOO CREEK								
A	0	314	433	2.9	6.8[3]	2.5[4]	3.0	0.5
B	604	334	848	1.3	7.5	7.5	7.9	0.4
C	754	278	1,726	0.6	7.6	7.6	8.2	0.6
D	1,107	247	1,254	0.8	7.6	7.6	8.2	0.6
E	1,217	226	2,068	0.4	7.6	7.6	8.2	0.6
F	2,047	147	1,051	0.7	7.6	7.6	8.2	0.6

[1] Feet above mouth.

[2] Value is inaccurate, as the floodway has been adjusted in this area to reflect more detailed and up-to-date stream channel configuration

[3] Elevation computed without consideration of wave effects

[4] Elevation computed without consideration of backwater effects from Caloosahatchee River

[5] The measured top width on the FIRM may differ due to ineffective flow, the exclusion of small pocket areas due to map scale limitations.

REVISED DATA

REVISED BY LOMR
EFFECTIVE: February 23, 2016

TABLE 9

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

REVISED TO
REFLECT LOMR
EFFECTIVE: October 13, 2020

IMPERIAL RIVER - KICKAPOO CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
KICKAPOO CREEK (Continued)								
G	2,436	129	516	1.2	7.6	7.6	8.2	0.6
H	2,948	153	682	0.5	7.6	7.6	8.3	0.7
I	3,593	147	674	1.5	7.6	7.6	8.4	0.8
J	4,880	147	387	0.6	8.1	8.1	9.0	0.9
L-3 CANAL								
A	0	55	194	2.7	8.3	8.3	8.3	0.0
B	970	56	295	1.6	8.8	8.8	8.8	0.0
C	2,270	61	305	1.5	9.1	9.1	9.1	0.0
D	3,930	42	190	1.7	9.4	9.4	9.4	0.0
E	5,080	40	204	1.5	9.8	9.8	9.8	0.0
F	6,890	52	232	1.4	10.4	10.4	10.5	0.1
G	7,915	30	154	1.9	11.1	11.1	11.3	0.2
H	9,210	40	196	0.6	11.6	11.6	11.8	0.2
I	11,230	40	131	1.0	14.0	14.0	14.0	0.0

[1]Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

KICKAPOO CREEK - L-3 CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
L-3 CANAL (Continued)								
J	12,330	68	274	0.1	14.0	14.0	14.0	0.0
K	12,780	43	171	0.2	14.0	14.0	14.0	0.0
L	13,430	43	184	0.2	14.0	14.0	14.0	0.0
LEITNER CREEK								
A	837	68	418	1.7	10.0[2]	6.0[3]	6.4	0.4
B	3,611	18	126	5.1	10.0[2]	7.7[3]	8.1	0.4
C	4,225	105	556	1.2	11.8	11.8	12.6	0.8
D	4,679	185	835	0.8	11.8	11.8	12.6	0.8
E	6,569	370	1,390	0.4	11.9	11.9	12.9	1.0
F	8,569	445	709	0.6	12.3	12.3	13.2	0.9
G	10,569	250	590	0.7	12.5	12.5	13.4	0.9
H	10,965	80	437	0.9	12.9	12.9	13.9	1.0
I	11,204	60	350	1.2	13.4	13.4	14.4	1.0
J	11,452	100	462	0.9	13.9	13.9	14.9	1.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Fish Trap Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

L-3 CANAL - LEITNER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
LEITNER CREEK (Continued)								
K	12,877	700	2,513	0.2	13.9	13.9	14.9	1.0
MANUELS BRANCH								
A	0	27	72	6.0	6.8[2]	0.2[3]	0.9	0.7
B	380	24	95	4.3	6.8[2]	2.0[3]	2.0	0.0
C	1,562	30	134	2.8	6.8[2]	6.4[3]	6.4	0.0
D	1,799	36	182	2.0	7.1	7.1	7.1	0.0
E	2,527	48	118	2.8	7.5	7.5	7.5	0.0
F	2,961	38	134	2.5	8.3	8.3	8.3	0.0
G	4,442	34	74	3.7	10.3	10.3	10.3	0.0
H	4,837	38	135	2.0	10.9	10.9	10.9	0.0
I	5,467	44	186	1.2	11.2	11.2	11.2	0.0
J	6,127	43	156	1.2	11.3	11.3	11.3	0.0
K	6,787	40	153	1.0	11.5	11.5	11.5	0.0
L	7,452	40	115	1.1	11.6	11.6	11.6	0.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

LEITNER CREEK - MANUELS BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MANUELS BRANCH (Continued)								
M	8,137	40	86	1.0	11.8	11.8	11.8	0.0
N	8,766	30	55	0.9	12.0	12.0	12.0	0.0
MARSH POINT CREEK								
A	0	140	674	1.9	6.8[2]	-0.2[3]	0.8	1.0
B	3,000	74	377	1.9	6.8[2]	2.4[3]	2.8	0.4
C	4,700	52	307	2.3	6.8[2]	3.1[3]	3.7	0.6
D	7,993	63	431	1.1	7.5	7.5	7.7	0.2
E	9,268	72	343	1.4	7.9	7.9	8.0	0.1
F	11,208	50	194	0.7	10.7	10.7	11.0	0.3
G	12,599	40	208	0.7	11.8	11.8	12.0	0.2
H	13,910	44	175	0.8	11.9	11.9	12.1	0.2
I	15,237	32	158	0.9	12.9	12.9	13.8	0.9
J	16,298	32	129	1.1	13.1	13.1	13.9	0.8
K	19,194	47	126	1.1	16.0	16.0	16.9	0.9

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

MANUELS BRANCH - MARSH POINT CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MULLOCK CREEK								
A	9,500	185	1,320	1.6	9.5[2]	3.0[3]	3.9	0.9
B	10,250	201	1,267	1.6	9.5[2]	3.1[3]	4.0	0.9
C	10,353	201	1,356	1.5	9.5[2]	3.1[3]	4.0	0.9
D	11,503	180	1,461	1.4	9.5[2]	3.2[3]	4.1	0.9
E	13,303	110	961	2.1	9.5[2]	3.5[3]	4.4	0.9
F	14,583	2,168	6,105	0.3	9.9	9.9	9.9	0.0
G	17,056	1,517	1,287	1.6	11.7	11.7	12.0	0.3
H	20,874	1,432	2,501	0.4	14.6	14.6	15.5	0.9
I	22,521	1,602	2,952	0.3	14.7	14.7	15.6	0.9
J	22,743	1,642	3,046	0.3	14.7	14.7	15.6	0.9
K	23,966	1,572	2,866	0.1	14.7	14.7	15.6	0.9
MULLOCK CREEK TRIBUTARY								
A	0	180	1,473	0.6	9.5[2]	3.23	4.2	1.0
B	1,545	224	1,055	0.5	9.5[2]	3.23	4.2	1.0

[1]Feet above mouth.

[2]Elevation computed without consideration of wave effects.

[3]Elevation computed without consideration of backwater effects from Estero Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

MULLOCK CREEK - MULLOCK CREEK TRIBUTARY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
MULLOCK CREEK TRIBUTARY (Continued)								
C	3,945	103	282	2.0	9.5[2]	4.2[3]	4.7	0.5
D	6,229	853	1,539	0.4	9.5[2]	5.5[3]	5.5	0.0
E	7,143	769	1,552	0.4	9.5[2]	6.1[3]	6.3	0.2
F	8,691	409	1,028	0.4	9.5[2]	9.0[3]	9.2	0.2
G	8,833	410	954	0.4	9.5[2]	9.4[3]	9.6	0.2
H	10,835	93	211	1.8	12.8	12.8	12.9	0.1

[1]Feet above mouth.

[2]Elevation computed without consideration of wave effects.

[3]Elevation computed without consideration of backwater effects from Estero Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

MULLOCK CREEK TRIBUTARY

FLOODING SOURCE			FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
MBR NO.(I,J)	CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
NORTH COLONIAL WATERWAY						(S2DMM)	HEC-RAS	HEC-RAS	
1575(9,23)	A	5,200	46	170	1.8	17.5	15.1	15.5	0.3
1574(9,24)	B	5,817	55	233	1.2	17.5	15.3	15.6	0.3
1572(9,26)	C	6,617	55	253	1.1	17.5	15.4	15.7	0.3
1571(9,27)	D	7,417	53	253	1.1	17.5	15.5	15.7	0.2
1569(9,29)	E	8,217	56	264	1.1	17.6	15.5	15.8	0.3
1567(9,31)	F	9,017	53	256	1.1	17.6	15.6	15.8	0.2
1566(9,32)	G	9,817	56	269	1.0	17.6	15.6	15.9	0.3

[1] Feet above mouth.

[2] The regulatory elevations were defined with the S2DMM 2D model and should be used for flood insurance and floodplain management decisions. The HEC-RAS 1D model was just used to define the floodway width and the "Without Floodway" elevations do not agree with S2DMM model.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

NORTH COLONIAL WATERWAY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
OAK CREEK								
A	200	70	252	4.3	10.0[2]	-0.4[4]	0.3	0.7
B	2,803	50	295	3.3	10.0[2]	4.1[4]	4.1	0.0
C	4,537	50	412	2.1	10.0[2]	5.1[4]	5.1	0.0
D	6,472	77	445	1.6	10.0[2]	6.0[4]	6.1	0.1
E	7,668	274	871	0.6	10.0[2]	6.1[4]	6.2	0.1
F	8,778	40	208	2.5	10.0[2]	6.4[4]	6.5	0.1
G	12,090	30	166	3.0	10.4	10.4	10.9	0.5
H	12,648	135	1,447	0.3	11.0	11.0	12.0	1.0
I	13,270	263	806	0.5	11.1	11.1	12.0	0.9

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Ten Mile Canal.

[4] Elevation computed without consideration of backwater effects from Fish Trap Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

OAK CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
ORANGE RIVER								
A	1,200	315	2,760	3.8	6.8[2]	1.9[3]	2.4	0.5
B	2,300	315	2,912	3.6	6.8[2]	2.5[3]	2.9	0.4
C	4,770	200	1,974	5.3	6.8[2]	4.5[3]	5.1	0.6
D	8,690	633	5,025	1.9	6.8[2]	6.0[3]	6.7	0.7
E	10,740	772	5,435	1.7	6.8[2]	6.4[3]	7.1	0.7
F	12,840	1,561	9,862	1.0	6.8[2]	6.8[3]	7.5	0.7
G	14,640	1,559	8,838	1.1	7.0	7.0	7.8	0.8
H	15,958	2,183	11,734	0.8	7.2	7.2	8.0	0.8
I	16,758	1,785	8,897	1.1	7.3	7.3	8.1	0.8
J	18,258	2,590	11,744	0.8	7.6	7.6	8.4	0.8
K	19,058	2,770	14,135	0.7	7.8	7.8	8.7	0.9
L	20,658	1,965	8,813	1.1	8.0	8.0	8.9	0.9
M	21,758	1,008	4,664	2.0	8.3	8.3	9.2	0.9

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

ORANGE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
ORANGE RIVER (Continued)								
N	22,758	3,062	13,031	0.6	8.6	8.6	9.5	0.9
O	24,992	1,716	8,175	0.9	9.0	9.0	9.9	0.9
P	25,800	1,150	5,718	1.3	9.2	9.2	10.1	0.9
Q	27,300	2,316	11,646	0.7	9.6	9.6	10.6	1.0
R	28,100	3,082	14,488	0.5	9.7	9.7	10.7	1.0
S	29,024	123	1,099	6.9	9.7	9.7	10.6	0.9
T	30,507	1,751	11,314	0.7	11.1	11.1	11.8	0.7
U	32,660	1,765	8,903	0.9	11.9	11.9	12.8	0.9
V	34,582	3,417	18,197	0.5	12.5	12.5	13.4	0.9
W	35,582	1,795	12,999	0.6	12.7	12.7	13.6	0.9
X	36,752	1,531	7,693	1.1	12.9	12.9	13.8	0.9
Y	38,542	742	5,035	1.6	14.3	14.3	15.2	0.9
Z	39,942	1,185	8,786	0.9	15.0	15.0	16.0	1.0
AA	42,342	2,781	10,530	0.8	16.1	16.1	17.1	1.0

[1] Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

ORANGE RIVER

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
ORANGE RIVER (Continued)								
AB	44,050	2,263	12,982	0.6	16.8	16.8	17.7	0.9
AC	44,830	2,731	13,732	0.6	17.1	17.1	18.0	0.9
OWL CREEK								
A	0	210	981	1.2	6.8[2]	-0.1[3]	0.9	1.0
B	1,003	701	3,626	0.3	6.8[2]	4.3[3]	5.2	0.9
C	4,818	120	445	2.2	6.8[2]	6.3[3]	7.2	0.9
D	6,641	125	689	1.0	10.4	10.4	10.9	0.5
E	7,451	120	388	1.8	11.1	11.1	11.4	0.3
F	9,077	148	811	1.2	18.0	18.0	19.0	1.0
G	9,582	177	887	0.3	18.0	18.0	19.0	1.0
H	10,717	169	557	0.5	18.2	18.2	19.2	1.0
I	12,282	135	251	0.2	19.8	19.8	20.7	0.9
J	12,392	115	248	0.2	20.0	20.0	21.0	1.0
K	12,632	115	225	0.2	20.0	20.0	21.0	1.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

ORANGE RIVER - OWL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
PALM CREEK								
A	0	149	265	4.1	6.8[2]	0.0[3]	1.0	1.0
B	2,514	200	927	1.3	9.2	9.2	9.8	0.6
C	3,684	50	261	3.9	10.4	10.4	11.3	0.9
D	4,854	1,097	2,754	0.4	12.7	12.7	13.7	1.0
E	5,800	112	385	2.4	14.4	14.4	15.3	0.9
F	6,474	385	1,392	0.7	14.7	14.7	15.7	1.0
G	6,572	375	989	0.9	16.1	16.1	16.6	0.5
H	7,391	155	478	1.8	16.6	16.6	17.4	0.8
I	7,625	277	1,010	0.9	17.0	17.0	17.9	0.9
J	8,375	305	1,182	0.6	17.1	17.1	18.0	0.9
K	9,283	167	359	2.1	18.0	18.0	18.7	0.7
L	9,510	250	554	1.4	18.1	18.1	19.1	1.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

PALM CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
PALM CREEK (Continued)								
M	11,241	536	1,210	0.5	19.2	19.2	20.1	0.9
N	11,608	172	734	0.9	20.0	20.0	20.8	0.8
O	13,365	250	832	0.7	20.1	20.1	21.0	0.9
P	14,039	265	867	0.6	20.1	20.1	21.1	1.0
Q	15,335	400	669	0.6	20.6	20.6	21.6	1.0
R	16,325	106	241	1.6	21.6	21.6	22.5	0.9
S	17,295	152	414	0.9	22.4	22.4	23.4	1.0
POPASH CREEK								
A	0	265	1,108	1.1	6.8[2]	-0.1[3]	0.9	1.0
B	1,225	64	384	3.3	6.8[2]	1.4[3]	1.8	0.4
C	2,025	96	401	3.2	6.8[2]	2.1[3]	2.8	0.7
D	2,925	380	1,715	0.7	6.8[2]	2.5[3]	3.5	1.0
E	3,925	125	717	1.8	6.8[2]	2.8[3]	3.8	1.0
F	4,830	68	428	3.0	6.8[2]	3.5[3]	4.4	0.9

[1]Feet above mouth.

[2]Elevation computed without consideration of wave effects.

[3]Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

PALM CREEK - POPASH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
POPASH CREEK (Continued)								
G	5,660	40	363	3.5	6.8[2]	4.1[3]	5.0	0.9
H	7,675	60	266	4.2	6.8[2]	6.1[3]	7.0	0.9
I	8,576	86	466	2.4	7.0	7.0	8.0	1.0
J	11,612	44	219	5.1	12.3	12.3	13.2	0.9
K	13,218	132	621	1.8	14.0	14.0	15.0	1.0
L	14,519	48	242	4.7	15.7	15.7	16.5	0.8
M	15,920	40	255	4.4	18.3	18.3	19.3	1.0
N	16,845	600	1,839	0.6	19.4	19.4	20.4	1.0
O	18,469	500	1,642	0.7	20.0	20.0	20.9	0.9
P	19,202	350	976	1.2	20.2	20.2	21.1	0.9
Q	19,793	500	1,307	0.9	20.4	20.4	21.3	0.9
R	20,375	850	1,434	0.8	20.7	20.7	21.5	0.8
S	21,357	1,200	1,603	0.7	21.1	21.1	22.0	0.9
T	22,213	1,074	1,753	0.7	21.5	21.5	22.5	1.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

POPASH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
POPASH CREEK (Continued)								
U	22,368	1,197	2,083	0.6	21.6	21.6	22.6	1.0
V	23,529	600	1,060	1.2	22.6	22.6	23.5	0.9
W	24,085	1,100	1,316	0.9	23.1	23.1	24.0	0.9
X	24,684	1,087	1,176	1.1	23.7	23.7	24.2	0.5
Y	25,927	2,000	3,224	0.4	23.7	23.7	24.7	1.0
Z	27,224	943	1,435	0.9	24.4	24.4	25.3	0.9
AA	29,526	1,077	2,572	0.5	25.1	25.1	26.1	1.0

[1] Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

POPASH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
POWELL CREEK								
A	200	160	1,083	2.9	6.8[2]	0.9[3]	1.6	0.7
B	1,400	240	811	3.9	6.8[2]	2.7[3]	3.1	0.4
C	2,400	450	1,393	2.3	6.8[2]	4.7[3]	5.2	0.5
D	3,674	350	2,214	1.2	6.8[2]	6.6[3]	7.5	0.9
E	4,573	635	2,883	0.9	6.8[2]	6.7[3]	7.7	1.0
F	5,373	652	3,368	0.8	6.9	6.9[3]	7.9	1.0
G	7,116	305	1,443	1.7	8.0	8.0	8.7	0.7
H	8,582	75	457	4.3	9.2	9.2	10.1	0.9
I	8,935	32	447	4.4	10.5	10.5	11.1	0.6
J	10,768	600	1,811	1.1	11.0	11.0	11.9	0.9
K	11,038	560	1,231	1.6	11.4	11.4	12.0	0.6
L	11,243	500	1,713	1.2	11.5	11.5	12.2	0.7
M	12,212	500	1,413	1.4	11.9	11.9	12.8	0.9

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

POWELL CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
POWELL BYPASS								
N	12,370	85	503	0.5	11.9	11.9	12.8	0.9
O	12,829	90	477	0.5	11.9	11.9	12.8	0.9
P	13,398	82	491	0.5	11.9	11.9	12.9	1.0
Q	14,787	79	511	0.4	11.9	11.9	12.9	1.0
R	16,187	80	394	0.5	12.0	12.0	12.9	0.9
S	17,606	38	422	0.5	12.0	12.0	12.9	0.9
T	19,308	117	233	0.7	12.1	12.1	13.0	0.9
U	21,432	38	69	1.2	15.4	15.4	15.4	0.0
V	22,732	45	78	1.1	15.7	15.7	15.8	0.1
W	24,682	50	54	1.5	16.9	16.9	16.9	0.0
X	25,702	52	140	0.6	17.0	17.0	17.0	0.0
Y	27,382	54	88	0.9	17.5	17.5	17.5	0.0
Z	29,982	51	59	0.7	18.0	18.0	18.1	0.1

[1] Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

POWELL BYPASS

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
POWELL BYPASS (Continued)								
AA	32,632	52	59	0.7	18.5	18.5	18.5	0.0
AB	36,282	44	35	1.1	19.9	19.9	19.9	0.0
SIX MILE CYPRESS SLOUGH								
A	155	150	1,115	4.5	12.5	12.3[2]	12.8	0.5
B	1,390	1,500	5,865	0.7	12.9	12.9	13.4	0.5
C	2,690	900	3,859	1.1	13.1	13.1	13.6	0.5
D	4,003	889	2,902	1.4	13.7	13.7	14.5	0.8
E	5,517	700	3,197	1.3	14.3	14.3	15.1	0.8
F	7,855	1,200	4,348	0.9	14.9	14.9	15.5	0.6
G	8,743	922	3,111	1.3	15.3	15.3	15.8	0.5
H	10,703	1,700	5,967	0.7	16.0	16.0	16.3	0.3
I	11,403	1,700	6,083	0.7	16.0	16.0	16.3	0.3
J	12,413	1,900	7,363	0.6	16.5	16.5	16.7	0.2

[1] Feet above mouth.

[2] Elevation computed without consideration of backwater effects from Estero River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

POWELL BYPASS - SIX MILE CYPRESS SLOUGH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SIX MILE CYPRESS SLOUGH (Continued)								
K	13,677	1,757	6,659	0.6	16.6	16.6	16.8	0.2
L	14,977	371	1,396	2.9	17.4	17.4	17.8	0.4
M	16,507	1,250	5,762	0.7	17.7	17.7	18.2	0.5
N	21,317	1,100	5,729	0.7	18.5	18.5	19.2	0.7
O	24,000	1,863	9,257	0.4	18.6	18.6	19.3	0.7
P	26,785	1,600	6,868	0.5	18.6	18.6	19.3	0.7
Q	30,435	2,000	8,331	0.2	18.7	18.7	19.4	0.7
R	33,115	1,850	6,307	0.3	18.8	18.8	19.4	0.6
S	37,430	1,600	8,282	0.2	21.4	21.4	21.9	0.5
T	39,830	1,000	4,111	0.4	21.4	21.4	21.9	0.5
U	42,689	2,678	7,923	0.2	21.6	21.6	22.1	0.5
V	44,739	1,978	8,418	0.1	21.6	21.6	22.1	0.5
W	46,197	522	1,871	0.6	21.6	21.6	22.3	0.7
X	47,397	500	2,318	0.5	21.7	21.7	22.7	1.0

[1] Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

SIX MILE CYPRESS SLOUGH

SOUTH BRANCH			FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
MBR NO.(I,J)	CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(S2DMM)	HEC-RAS	HEC-RAS	
7072(4,77)	A	0	317	1,747	0.3	13.4	11.4[3]	12.4	1.0
7072(4,77)	B	1,471	196	934	0.6	13.4	11.4[3]	12.4	1.0
6932(4,79)	C	1,493	237	902	0.7	13.4	11.4[3]	12.4	1.0
6931(4,80)	D	2,629	564	722	0.8	13.4	11.7[3]	12.6	0.9
6930(4,81)	E	3,009	120	588	0.7	13.4	11.7[3]	12.6	0.9
6928(4,83)	F	4,373	173	574	0.6	13.4	11.8[3]	12.7	0.9
6927(4,84)	G	5,333	150	395	0.9	14.5	12.1[3]	12.9	0.8
6925(4,86)	H	6,393	411	862	0.5	14.9	12.5[3]	13.2	0.7
6924(4,87)	I	7,673	634	702	0.7	15.3	13.7	14.3	0.6
6923(4,88)	J	8,505	659	546	0.9	15.4	13.9	14.4	0.5
6922(4,89)	K	9,432	534	534	0.8	15.4	14.4	15.0	0.6
6921(4,90)	L	10,432	686	1,257	0.4	15.4	14.8	15.3	0.5
6921(4,90)	M	11,185	584	749	0.6	15.4	14.9	15.4	0.5

[1] Feet above confluence with Estero River.

[2] The regulatory elevations were defined with the S2DMM 2D model and should be used for flood insurance and floodplain management decisions. The HEC-RAS 1D model was used to define the floodway width and the "Without Floodway" elevations do not agree with S2DMM model.

[3] Elevation computed without consideration of backwater effects from Estero River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL

AND INCORPORATED AREAS

FLOODWAY DATA

SOUTH BRANCH

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SPANISH CANAL								
A	0	46	273	0.9	12.4	12.4	13.4	1.0
B	1,170	70	255	0.9	12.5	12.5	13.5	1.0
C	2,930	50	234	1.0	12.7	12.7	13.6	0.9
D	4,122	44	250	0.9	18.4	18.4	18.4	0.0
SPANISH CREEK								
A	0	42	231	9.7	6.8[2]	2.2[3]	3.2	1.0
B	916	195	767	2.9	8.1	8.1	8.6	0.5
C	2,081	312	1,313	1.5	9.3	9.3	10.2	0.9
D	4,446	89	546	3.7	11.3	11.3	12.2	0.9
E	4,590	41	240	8.4	11.8	11.8	12.4	0.6
F	4,841	465	1,238	1.6	13.8	13.8	14.1	0.3
G	6,481	714	1,741	1.2	15.5	15.5	16.1	0.6
H	7,331	1,199	3,321	0.6	16.0	16.0	16.8	0.8
I	9,075	1,200	3,056	0.7	17.0	17.0	17.6	0.6

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

SPANISH CANAL - SPANISH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SPANISH CREEK (Continued)								
J	10,685	1,400	3,342	0.6	17.5	17.5	18.5	1.0
K	12,191	1,320	2,793	0.8	19.1	19.1	20.0	0.9
L	13,281	1,320	3,792	0.2	19.2	19.2	20.2	1.0
SPRING CREEK								
A	3,036	681	3,102	1.1	10.3[2]	1.7[3]	2.5	0.8
B	5,636	366	2,136	1.6	10.3[2]	3.2[3]	4.1	0.9
C	8,236	325	2,663	1.2	10.3[2]	3.5[3]	4.4	0.9
D	10,236	130	1,139	2.9	10.3[2]	3.8[3]	4.7	0.9
E	11,836	245	2,045	1.1	10.3[2]	4.1[3]	5.1	1.0
F	13,136	795	4,916	0.4	10.3[2]	4.1[3]	5.1	1.0
G	14,336	388	2,489	0.9	10.3[2]	4.1[3]	5.0	0.9
H	15,336	207	1,586	1.4	10.3[2]	4.3[3]	5.2	0.9
I	16,636	121	951	2.3	10.3[2]	4.4[3]	5.3	0.9
J	17,936	75	676	3.2	10.3[2]	4.7[3]	5.6	0.9

[1] Feet above mouth.

Elevation computed without consideration of wave effects.

Elevation computed without consideration of backwater effects from Estero Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

SPANISH CREEK - SPRING CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
SPRING CREEK (Continued)								
K	19,911	148	1,153	1.9	10.3[2]	5.3[3]	6.3	1.0
L	22,986	279	1,333	1.3	10.3[2]	7.8[3]	8.6	0.8
M	24,207	530	1,790	0.9	10.3	10.3	11.1	0.8
N	25,960	55	389	3.8	11.1	11.1	12.0	0.9
O	26,027	51	396	3.7	13.0	13.0	13.6	0.6
P	26,959	428	970	1.4	13.4	13.4	14.2	0.8
Q	27,988	950	2,711	0.5	13.4	13.4	14.4	1.0
STRICKLIN GULLY								
A	1,180	404	2,018	0.6	13.4	13.4	14.4	1.0
B	2,590	650	1,960	0.5	13.7	13.7	14.7	1.0
C	3,961	134	505	2.0	15.0	15.0	15.9	0.9
D	5,511	255	873	1.1	16.8	16.8	17.8	1.0
E	7,611	751	2,146	0.5	17.9	17.9	18.8	0.9

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Estero Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

SPRING CREEK - STRICKLIN GULLY

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
STROUD CREEK								
A	0	56	365	4.3	6.8[2]	0.0[3]	1.0	1.0
B	1,850	55	429	4.1	6.8[2]	1.8[3]	2.2	0.4
C	2,880	168	673	2.6	6.8[2]	2.7[3]	3.1	0.4
D	5,971	359	1,464	1.2	7.5	7.5	8.1	0.6
E	7,544	76	363	4.8	9.1	9.1	9.6	0.5
F	8,537	554	743	2.0	12.5	12.5	13.3	0.8
G	9,867	275	1,014	1.5	14.4	14.4	15.3	0.9
H	10,637	588	1,593	1.0	14.9	14.9	15.8	0.9
I	11,767	675	1,088	1.4	16.7	16.7	17.5	0.8
J	13,067	750	2,094	0.7	17.9	17.9	18.7	0.8
K	14,569	833	1,448	1.1	19.4	19.4	19.9	0.5
L	15,578	404	998	1.5	20.0	20.0	20.6	0.6
M	15,969	931	2,775	0.5	20.5	20.5	21.2	0.7

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

STROUD CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
STROUD CREEK (Continued)								
N	17,374	875	2,562	0.5	20.7	20.7	21.7	1.0
O	19,629	1,086	2,858	0.5	21.4	21.4	22.0	0.6
P	21,714	1,060	2,673	0.5	21.6	21.6	22.4	0.8
Q	22,228	1,299	2,398	0.5	22.8	22.8	23.8	1.0
R	23,514	1,600	3,410	0.3	23.1	23.1	24.1	1.0
TELEGRAPH CREEK								
A	0	500	1,541	6.9	6.8[2]	5.2[3]	5.2	0.0
B	1,790	823	4,795	2.2	8.3	8.3	9.2	0.9
C	3,153	330	2,313	4.6	9.5	9.5	9.8	0.3
D	4,430	310	2,804	3.8	10.4	10.4	11.3	0.9
E	5,718	962	6,465	1.7	11.4	11.4	12.4	1.0
F	7,755	330	2,737	3.9	12.2	12.2	13.1	0.9
G	9,211	590	4,105	2.6	14.7	14.7	15.5	0.8
H	9,462	940	5,776	1.9	15.0	15.0	16.0	1.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

STROUD CREEK - TELEGRAPH CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TELEGRAPH CREEK (Continued)								
I	10,932	732	5,860	1.9	15.9	15.9	16.9	1.0
J	12,088	750	4,689	2.5	16.6	16.6	17.5	0.9
K	13,430	902	7,845	1.5	17.7	17.7	18.6	0.9
L	15,528	1,220	7,356	0.1	17.9	17.9	18.9	1.0
M	16,847	1,882	9,354	0.1	17.9	17.9	18.9	1.0
N	17,307	1,566	9,742	0.1	17.9	17.9	18.9	1.0

[1] Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

TELEGRAPH CREEK

FLOODING SOURCE			FLOODWAY			BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)			
MBR NO.(I,J)	CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY[2]	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TEN MILE CANAL						(S2DMM)	HEC-RAS	HEC-RAS	
1562(7,10)	A	800	442	1,194	3.5	9.5[3]	1.6	2.1	0.6
1550	B	7,000	209	3,674	1.1	9.5[3]	6.0	6.4	0.4
1547	C	8,500	164	1,566	2.7	9.5[3]	6.2	6.8	0.6
1543(26,10)	D	10,490	111	805	5.2	9.5[3]	7.1	7.2	0.1
1539(30,10)	E	12,491	227	2,153	2.0	10.0	7.8	8.6	0.8
1532(37,10)	F	16,000	83	744	4.8	10.2	9.0	9.6	0.6
1523(46,10)	G	20,500	82	781	2.7	11.5	10.4	10.8	0.4
1517(52,10)	H	23,500	102	1,040	1.9	11.8	10.8	11.1	0.3
1510(59,10)	I	27,000	92	738	2.7	12.5	11.3	11.6	0.3
1504(65,10)	J	30,000	66	523	2.3	13.0	12.0	12.2	0.2
1498(71,10)	K	33,330	84	527	2.3	13.6	12.5	12.7	0.2
1493(76,10)	L	35,500	77	668	1.8	13.9	12.8	13.0	0.2
1486(83,10)	M	39,000	76	485	2.5	14.2	13.1	13.3	0.2
1481(88,10)	N	41,500	83	529	1.6	14.9	13.5	13.6	0.1
1479(88,12)	O	42,500	113	616	1.0	15.0	13.7	13.8	0.1
1476(88,15)	P	44,000	62	298	2.1	15.1	14.0	14.1	0.1
1474(88,17)	Q	45,000	81	430	1.4	15.2	14.2	14.2	0.0
1468(88,23)	R	48,000	49	253	1.6	15.8	14.4	14.4	0.0
1454(88,37)	S	54,930	22	68	0.5	15.9	14.5	14.6	0.1

[1] Feet above mouth.

[2] The regulatory elevations were defined with the S2DMM 2D model and should be used for flood insurance and floodplain management decisions. The HEC-RAS 1D model was just used to define the floodway width and the "Without Floodway" elevations do not agree with S2DMM model.

[3] Elevation computed without consideration of backwater effects from Estero Bay.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

TEN MILE CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TROUT CREEK/CURRY LAKE CANAL								
A	2,944	1,503	6,713	0.9	6.8[2]	5.1[3]	5.2	0.1
B	5,344	3,372	9,355	0.6	6.8[2]	5.6[3]	6.0	0.4
C	6,709	3,326	9,900	0.6	6.8[2]	5.9[3]	6.4	0.5
D	9,347	3,338	8,297	0.7	6.8[2]	6.6[3]	7.3	0.7
E	10,800	869	2,610	2.3	9.2	9.2	9.3	0.1
F	15,216	1,191	4,019	1.1	11.7	11.7	12.7	1.0
G	16,366	654	2,445	1.8	12.9	12.9	13.8	0.9
H	18,151	1,038	3,137	1.1	14.4	14.4	15.3	0.9
I	19,824	838	2,072	1.7	17.4	17.4	18.4	1.0
J	20,924	1,633	4,578	0.8	18.6	18.6	19.5	0.9
K	22,091	1,876	4,661	0.7	19.3	19.3	20.2	0.9
L	23,934	1,531	3,421	1.0	21.2	21.2	22.2	1.0

[1]Feet above mouth.

[2]Elevation computed without consideration of wave effects.

[3]Elevation computed without consideration of backwater effects fr

this page has been superseded by a new 88P page dated June 25, 2019 per LOMR 19-04-0850P

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

TROUT CREEK/CURRY LAKE CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TROUT CREEK/CURRY LAKE CANAL								
A	2,950	613	800	4.0	6.8[2]	5.3[3]	5.9	0.6
B	5,340	1, 573	741	2.2	6.8[2]	5.9[3]	6.8	0.9
C	6, 718	2,324	349	3.3	6.8[2]	6.3[3]	7.2	0.9
D	9, 344	1,202	461	1.5	6.8[2]	6.7[3]	7.6	0.9
E	10,800	800	752	3.8	9.2	9.3	9.5	0.2
F	15,216	1,191	4,019	1.1	11.7	11.7	12.7	1.0
G	16,366	654	2,445	1.8	12.9	12.9	13.8	0.9
H	18,151	1,038	3,137	1.1	14.4	14.4	15.3	0.9
I	19,824	838	2,072	1.7	17.4	17.4	18.4	1.0
J	20,924	1,633	4,578	0.8	18.6	18.6	19.5	0.9
K	22,091	1,876	4,861	0.7	19.3	19.3	20.2	0.9
L	23,934	1,531	3,424	1.0	21.2	21.2	22.2	1.0

Revised Data

This page has been superseded by a new page per LOMR 18-04-3990P effective Dec. 31, 2019

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TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

REVISED TO REFLECT LOMR EFFECTIVE: June 25, 2019

TROUT CREEK/CURRY LAKE CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
TROUT CREEK/CURRY LAKE CANAL								
A	2,944	1,503	6,713	0.9	6.8[2]	5.1[3]	5.2	0.1
B	5,344	3,372	9,355	0.6	6.8[2]	5.6[3]	6.0	0.4
C	6,709	3,326	9,900	0.6	6.8[2]	5.9[3]	6.4	0.5
D	9,347	3,338	8,297	0.7	6.8[2]	6.6[3]	7.3	0.7
E	10,800	860	2,610	2.3	9.2	9.2	9.3	0.1
F	15,216	1,191	4,019	1.1	11.7	11.7	12.7	1.0
G	16,366	654	2,445	1.8	12.9	12.9	13.8	0.9
H	18,151	1,053	2,817	0.6	14.4	14.4	14.9	0.5
I	19,839	1,090	1,276	1.2	16.3	16.3	17.0	0.7
J	20,799	2,580	1,558	0.7	17.9	17.9	18.3	0.4
K	21,708	2,575	2,449	0.4	19.0	19.0	19.3	0.3
L	23,137	1,703	1,528	0.7	20.3	20.3	21.0	0.7

REVISED REACH

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee Rive

Please contact FEMA's Map Service Center as there is a discrepancy in this page. Previously updated content/numbers in the previous version with effective date June 25, 2019 was not carried over to this version.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

REVISED TO REFLECT LOMR
EFFECTIVE: December 31, 2019

TROUT CREEK/CURRY LAKE CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
WINKLER CANAL								
A	0	29	157	3.0	6.8[2]	-0.2[3]	0.8	1.0
B	642	38	195	2.3	6.8[2]	4.2[3]	4.2	0.0
C	1,775	34	67	5.8	6.8[2]	6.7[3]	6.7	0.0
D	1,985	40	127	3.1	8.1	8.1	8.1	0.0
E	3,575	49	120	2.4	8.9	8.9	8.9	0.0
F	4,917	40	145	2.0	9.6	9.6	9.6	0.0
G	5,487	44	154	1.7	10.0	10.0	10.0	0.0
H	5,987	39	166	1.5	10.3	10.3	10.3	0.0
I	7,147	35	150	1.3	10.7	10.7	10.7	0.0
J	7,974	40	153	1.0	11.0	11.0	11.0	0.0
K	8,319	43	141	1.0	11.2	11.2	11.2	0.0
L	9,139	13	94	1.1	11.3	11.3	11.3	0.0
M	9,773	39	82	0.8	11.4	11.4	11.4	0.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

FLOODWAY DATA

WINKLER CANAL

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE[1]	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
WINKLER CANAL (Continued)								
N	10,463	29	98	0.4	11.5	11.5	11.5	0.0
O	10,764	41	135	0.3	11.5	11.5	11.5	0.0
P	11,098	49	66	0.1	11.5	11.5	11.5	0.0
Q	11,189	16	3	1.1	11.6	11.6	11.6	0.0
YELLOW FEVER CREEK								
A	0	115	740	0.9	6.8[2]	1.6[3]	2.6	1.0
B	700	115	743	0.9	6.8[2]	1.6[3]	2.6	1.0
C	1,125	57	295	2.3	6.8[2]	1.7[3]	2.6	0.9
D	2,425	57	260	2.6	6.8[2]	2.5[3]	3.1	0.6
E	4,220	50	357	1.9	6.8[2]	3.5[3]	4.0	0.5
F	5,474	60	222	2.8	6.8[2]	4.2[3]	4.5	0.3
G	7,192	60	247	1.5	6.8[2]	6.0[3]	6.2	0.2
H	9,701	52	157	2.3	7.2	7.2	7.3	0.1
I	10,631	194	317	1.1	7.7	7.7	7.7	0.0

[1] Feet above mouth.

[2] Elevation computed without consideration of wave effects.

[3] Elevation computed without consideration of backwater effects from Caloosahatchee River.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

WINKLER CANAL - YELLOW FEVER CREEK

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION (FEET NAVD)			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
YELLOW FEVER CREEK (Continued)								
J	11,506	60	320	1.5	7.9	7.9	8.0	0.1
K	13,170	28	99	2.6	10.2	10.2	10.3	0.1
L	14,200	18	122	2.1	11.4	11.4	11.7	0.3

[1] Feet above mouth.

TABLE 11

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL
AND INCORPORATED AREAS

FLOODWAY DATA

YELLOW FEVER CREEK

5.0 INSURANCE APPLICATION

For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no BFEs or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance floodplains that are determined in the FIS report by detailed methods. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AH

Zone AH is the flood insurance rate zone that corresponds to areas of 1-percent-annual-chance shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to areas of 1-percent-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 detailed hydraulic analyses are shown within this zone.

Zone AR

Zone AR is the flood insurance risk zone that corresponds to an area of special flood hazard formerly protected from the base flood event by a flood-control system that was subsequently decertified. Zone R indicates that the former flood-control system is being restored to provide protection from the 1-percent-annual-chance or greater flood event.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 1-percent-annual-chance floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No BFEs or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no BFEs are shown within this zone.
Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 1-percent-annual-chance coastal floodplains that have additional hazards associated with storm waves. Whole-foot BFEs derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 0.2-percent-annual-chance floodplain, areas within the 0.2-percent-annual-chance floodplain, areas of 1-percent-annual-chance flooding where average depths are less than 1-foot, areas of 1-percent-annual-chance flooding where the contributing drainage area is less than 1 square mile (sq. mi.), and areas protected from the base flood by levees. No BFEs or depths are shown within this zone.

Zone X (Future Base Flood)

Zone X (Future Base Flood) is the flood insurance risk zone that corresponds to the 1-percent-annual-chance floodplains that are determined based on future-conditions hydrology. No BFEs or base flood depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The FIRM is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 1-percent annual chance floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 1- and 0.2-percent annual chance floodplains. Floodways and the locations of selected cross sections used in the hydraulic analyses and floodway computations are shown where applicable.

The current FIRM presents flooding information for the entire geographic area of Lee County. Previously, separate FIRMs were prepared for each identified flood-prone incorporated community and the unincorporated areas of the county. Historical data relating to the maps prepared for each community, up to and including this countywide FIS, are presented in Table 14, "Community Map History."

COMMUNITY NAME	INITIAL IDENTIFICATION	FLOOD HAZARD BOUNDARY MAP REVISIONS DATE	FIRM EFFECTIVE DATE	FIRM REVISIONS DATE
Bonita Springs, City of	September 19, 1984[1]	None	September 19, 1984[1]	November 4, 1992[1] March 15, 1994[1] September 20, 1996[1] July 20, 1998[1] December 20, 2000[1] May 5, 2003[1]
Cape Coral, City of	March 27, 1975	None	August 17, 1981	September 18, 1985
Estero, Village of	September 19, 1984[1]	None	September 19, 1984[1]	
Fort Myers, City of	April 16, 1979	None	April 16, 1979	November 15, 1984
Fort Myers Beach, Town of	September 19, 1984[1]	None	September 19, 1984[1]	November 4, 1992[1] March 15, 1994[1] September 20, 1996[1] July 20, 1998[1] December 20, 2000[1] May 5, 2003[1]

[1]This community did not have its own FIRM prior to the August 28, 2008 FIS. The land area for this community was previously shown on the FIRM for the unincorporated areas of Lee County, but was not identified as a separate NFIP community. Therefore, the dates for this community were taken from the FIRM for Lee County.

TABLE 12

FEDERAL EMERGENCY MANAGEMENT AGENCY

LEE COUNTY, FL AND INCORPORATED AREAS

COMMUNITY MAP HISTORY

7.0 OTHER STUDIES

Johnson Engineering prepared the Lee County Surface Water Management Plan for the Board of Lee County Commissioners in 1992. Johnson reviewed and modeled hydrology and hydraulics for a majority of the county waterways. These plans included basin boundary maps, flood profiles, HEC-1 and HEC-2 model runs, and land use and structure data. The PIS used the structure data extensively.

The USDA-NRCS studied flooding in Lee County in 1992-93 in Flood Prone Areas of Lee County, Florida Floodplain Management Study. This 4-phase study included basin boundary maps, flood profiles, HEC-1 and HEC-2 model runs, and land use and soil type data.

Johnson Engineering prepared Surface Water Management Fort Meyers, Florida for the City of Fort Meyers in 1987. The primary purpose of the report was to develop a New Capital Improvements Program. The plan included basin boundary maps, identification of problem areas, flood profiles, and land use data.

PISs have been prepared for Charlotte County and incorporated areas (FEMA, 2003), Collier County and incorporated areas (FEMA, 2005), and the unincorporated areas of Hendry County (FEMA, 1981).

Information pertaining to revised and unrevised flood hazards for each jurisdiction within Lee County has been compiled into this PIS. Therefore, this PIS supersedes all previously printed PIS reports and FIRMs for all of the incorporated and unincorporated jurisdictions within Lee County.

8.0 LOCATION OF DATA

Information concerning the pertinent data used in the preparation of this FIS can be obtained by contacting FEMA, Federal Insurance and Mitigation Administration, Koger Center - Rutgers Building, 3003 Chamblee Tucker Road, Atlanta, Georgia 30341

9.0 BIBLIOGRAPHY AND REFERENCES

1. Chow, V.T. (1959) . Open-Channel Hydraulics. New York: McGraw-Hill Book Company.

2. Community Engineering Services, Inc. (2007) Master Paving, Grading, and Drainage Plan of Vittoria Terr. and Villagio Way, Renaissance Phase 2.

3. Degrove Surveyors, Inc. Survey Report For FEMA Flood Insurance Restudy of Lee County, Florida. Jacksonville, Florida.

4. Federal Emergency Management Agency. (November 17, 2005). Flood Insurance Study CoJlier County, Florida and Incorporated Areas. Washington, D.C.

5. Federal Emergency Management Agency. (May 5, 2003). Flood Insurance Study, Charlotte County, Florida and Incorporated Areas. Washington, D.C.

6. Federal Emergency Management Agency. (April 2003). Appendix D: Guidance for Coastal Flooding Analyses and Mapping. Washington, D.C.

7. Federal Emergency Management Agency. (July 20, 1998). Flood Insurance Study, Lee County, Florida, Unincorporated Areas. Washington, D.C.

8. Federal Emergency Management Agency. (January and March 1995). Flood Insurance Study: Guidelines and Specifications for Study Contractors. Washington, D.C.

9. Federal Emergency Management Agency. (March 1995). Guidelines and Specifications for Wave Elevation Determination and V Zone Mapping. Washington, D.C.

10. Federal Emergency Management Agency. (June 1986). Flood Insurance Study, Collier County, Florida, Unincorporated Areas. Washington, D.C.

11. Federal Emergency Management Agency. (Flood Insurance Study report, November 17, 1 981; Flood Insurance Rate Map, May 17, 1 982). Flood Insurance Study, Hendry County, Florida, Unincorporated Areas. Washington, D.C.

12. Federal Emergency Management Agency. (February 1981). Users Manual for Wave Height Analysis. Washington, D.C.

13. Florida Department of Transportation. (1987). Drainage Manual (Volume 2-A). Tallahassee, Florida

14. Greenhorne & O'Mara, Inc. (1984). Determination of Revised Preliminary Base Flood Elevations, City of Sanibel, Florida.

15. Hamrick Aerial Surveys, Inc. (February 1981, November 1981). Topographic-Aerial Photos of Lee County, Florida.

16. Johnson Engineering, Inc. (December 1987). Surface Water Management Fort Myers, Florida. An Update Report for The City of Fort Myers. Fort Myers, Florida.

17. Johnson Engineering, Inc. (September 1987). Surface Water Management, Fort Myers Planning Area. A Report for The City of Fort Mvers. Fort Myers, Florida.

18. Johnson Engineering, Inc., et al. December 1992. Lee County Surface Water Management Plan. Lee County, Florida.

19. Johnson Engineering, Inc., et al. (June 1991). Lee County Surface Water Management Plan. Lee County, Florida.

20. Johnson Engineering, Inc., et al. (February 1990). Six Mile Cypress Watershed Plan. Lee County, Florida.

21. National Academy of Sciences. (1977). Methodology for Calculating Wave Action Effects Associated With Storm Surges.

22. South Florida Water Management District. (1996). Permit Information Manual Volume IV. Management and Storage of Surface Waters.

23. South Florida Water Management District. (January 1983). Determination of 100-Year Coastal Surge Flood Elevations for Lee County, FL, with Appendices.

24. Streamline Technologies, Inc. (September 1995). ICPR Advanced: User's Manual Version 2.0. Winter Park, Florida.

25. Tetra Tech, Inc. (1981). Coastal Flooding Storm Surge Model, Part 1 -Methodology, Part 2- User's Guide, Part 3- Codes, Prepared for the Federal Emergency Management Agency.

26. Tetra Tech, Inc. (1983). Coastal Flooding Storm Surge Study, Lee County, Florida. Pasadena, California.

27. U.S. Army Corps of Engineers, Hydrologic Engineering Center. (May 2005). HEC-RAS River Analysis System 3.1.3. Davis, California.

28. U.S. Army Corps of Engineers, Galveston District. (June 1975). Guidelines for Identifying Coastal High Hazard Zones.

29. U.S. Army Corps of Engineers, Jacksonville District. (July 1970). Special Flood Hazard Information Report on South Lee County Coastal Areas. Jacksonville, Florida.

30. U.S. Army Corps of Engineers, Jacksonville District. (May 1968). Flood Plain Information, Charlotte and No11h Lee Counties. Jacksonville, Florida.

31. U.S. Army Corps of Engineers, Jacksonville District. (September 1953). Rainfall- Frequency Estimates, Partial Definite Projects Report, Central and Southern Florida Project for Flood Control and Other Purposes. Jacksonville, Florida.

32. U.S. Army Corps of Engineers, Hydrologic Engineering Center. (April 1997). HEC- RAS River Analysis System: User's Manual and Hydraulic Reference Manual. Davis, California.

33. U.S. Army Corps of Engineers, Hydrologic Engineering Center. (February 1991). HEC-2 Water Surface Profiles: User's Manual. Davis, California.

34. U.S. Army Corps of Engineers, Hydrologic Engineering Center. (November 1976). HEC-2 Water-Surface Profiles Generalized Computer Program. Davis, California.

35. U.S. Army Corps of Engineers. (1984). Shore Protection Manual. Waterways Experiment Station, Vicksburg, Mississippi.

36. U.S. Department of Agriculture, Soil Conservation Service. (July 1993). Flood Prone Areas of Lee County, Florida. Flood Plain Management Study (Phase II, Tributaries to Caloosahatchee River). Gainesville, Florida.

37. U.S. Department of Agriculture, Soil Conservation Service. (1993). Flood Prone Areas of Lee County, Florida. Flood Plain Management Study (Phase III, Tributaries to Caloosahatchee River). Gainesville, Florida.

38. U.S. Department of Agriculture, Soil Conservation Service. (1992). Flood Prone Areas of Lee County, Florida. Flood Plain Management Study (Phase I, Estero Bay Area). Gainesville, Florida.

39. U.S. Department of Agriculture, Soil Conservation Service. (1986). Technical Release No. 55. Urban Hydrology for Small Watersheds. Littleton, Colorado.

40. U.S. Department of Agriculture, Soil Conservation Service. (1984). Floodplain Management Study, Lee County, Florida. Gainesville, Florida.

41. U.S. Department of Agriculture, Soil Conservation Service. (May 1982). Technical Release No. 20. Computer Program for Project Formulation, Hydrology. Gainesville, Florida.

42. U.S. Department of Agriculture, Soil Conservation Service. (May 1976). Technical Release No. 61. WSP-2 Computer Program.

43. U.S. Department of Commerce, Bureau of the Census. (July 8, 2014). http://guickfacts.census.gov/qfd/statesll2/l207l.htrnl. Accessed November 21, 2014.

44. U.S. Department of Commerce, Environmental Science Services Administration. (April 1970). Technical Memorandum WBTM, Hydro 11. Joint Probability Method of Tide Frequency Analysis. Myers, V.A. (author).

45. U.S. Department of Commerce, National Hurricane Research Project. (March 1957). Survey of Meteorological Factors Pertinent to Reduction of Loss of Life and Property in Hurricane Situations. Report No. 5.

46. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. (1975). Tropical Cyclone Deck. Silver Springs, Maryland.

47. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. (March 1974). SPLASH (Special Program To List Amplitudes & Surges from Hurricanes) Part 2. General Track and Variant Storm Conditions. Silver Springs, Maryland.

48. U.S. Department of Commerce, National Oceanic and Atmospheric Administration. (April 1972). SPLASH (Special Program To List Amplitudes & Surges from Hurricanes) Part 1. Landfall Storms. Silver Springs, Maryland.

49. U.S. Department of Commerce, National Weather Service. (1964 to 1977). Monthly Weather Review. Abstracts of Previous Year Hurricane Season.

50. U.S. Department of Commerce, Weather Bureau. (1961). Technical Paper No. 40. Rainfall Frequency Atlas of the United States. Hershfield, D. M. (author). Washington, D.C.

51. U.S. Department of Commerce, Weather Bureau. (1977). Digitized Rainfall Data for Rainfall Station in Southern Florida.

52. U.S. Department of Commerce, Weather Bureau. (May 1975). Technical Report NWS- 15. Some Climatological Characteristics of Hurricanes and Tropical Storms, Gulf and East Coasts of the U.S. Ho, F.P.; Schwerdt, R.W.; and Goodyear, H.V. (authors).

53. U.S. Department of Commerce, Weather Bureau. (1965). Technical Paper No. 55. Tropical Cyclones of the North Atlantic Ocean, 1871-1963. Cry, G.W. (author).

54. U.S. Department of Commerce, Weather Bureau. (1964). Technical Paper No. 40. Two to Ten Day Precipitation for Return Periods of 2 to 100 Years in the Contiguous United States.

55. U.S. Department of the Interior, Geological Survey. (1999). Water Resources Data. Florida. Water Year 1999. Volume 3A. Southwest Florida Surface Water. Water-Data Report FL-99-3A. Washington, DC.

56. U.S. Department of the Interior, Geological Survey. (1989). Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains. Water-Supply Paper 2339. Washington, DC.

57. U.S. Department of the Interior, Geological Survey. (1983). Open-File Report 82-42. Magnitude and Frequency of Flooding on Small Urban Watersheds in the Tampa Bay Area, West-Central Florida. Lopez, M.A. and Woodham, W.M. (authors). Washington, DC.

58. U.S. Department of the Interior, Geological Survey. (1982). WRI 82-4012. Technique for Estimating Magnitude and Frequency of Floods on Natural-Flow Streams in Florida. Washington, DC.

59. U.S. Department of the Interior, Geological Survey. 7.5 Minute Series (Topographic) Quadrangle Maps. Scale 1:24,000. Contour Interval: 5 feet. All for Florida. Alva, Photorevised 1973; Alva SE, Photorevised 1973; Alva SW, Photorevised 1987; Bermont, Photorevised 1987; Bokeelia, Photorevised 1987; Bonita Springs, Photorevised 1972; Captiva Island, Photorevised 1987; Corkscrew, Photorevised 1987; Corkscrew NW, Photorevised 1987; Corkscrew SW, Photorevised 1987; Estero, Photorevised 1987; Ft. Myers, Photorevised 1987; Ft. Myers Beach, Photorevised 1987; Ft. Myers NW, Photorevised 1987; Ft. Myers SE, Photorevised 1987; Ft. Myers SW, Photorevised 1987; Gilchrest, Photorevised 1987; Matlacha, Photorevised 1987; Olga, Photorevised 1987; Pine Island Center, Photorevised 1987; Placida, Photorevised 1987; Port Boca Grande, Photorevised 1987; Punta Gorda SE, Photorevised 1987; Punta Gorda SW, Photorevised 1987; Sanibel, Photorevised 1987; Telegraph Swamp, Photorevised 1987; Telegraph Swamp NW, Photorevised 1987; Telegraph Swamp SW, Photorevised 1987; Tuckers Comer, Photorevised 1987; Wulfert, Photorevised 1987.

60. U.S. Water Resources Council. (December 1967). Bulletin 15. A Uniform Technique for Determining Flood Flow Frequencies.

61. WilsonMiller. (August 2007). Topographic Survey Estero on the River Part of Sec. 28, Twp. 46, Rge. 25, Lee County, Florida.

62. WilsonMiller (November 2007). Survey Data for US 41 Bridge, Railroad Bridge, and Sandy Lane Bridge over Estero River.

63. U.S. Army Corps of Engineers, Hydrologic Engineering Center. (January 2010). HEC-RAS River Analysis System 4.1.0 Davis, California.

64. Tomasello Consulting Engineers, Inc., S2DMM Hydraulic Modeling System, (February 2008).

65. Tomasello Consulting Engineers, Inc., *Hydrologic/Hydrodynamic Riverine Study of the Ten Mile Canal Basin*, June, 2011.

66. Tomasello Consulting Engineers, Inc., Case No. 11-04-6624P Letter dated 11/4/2011.

67. USGS Water Data for Florida, USGS Water Data Report, http://wdr.water.usgs.gov/wy2011/pdfs/02291669.2011.pdf

68. Federal Emergency Management Agency. (May 16, 2012). Flood Insurance Study Collier County, Florida and Incorporated Areas. Washington, D.C.

69. Tomasello Consulting Engineers, Inc., *Setup IV Report for Golden Gate Main Canal West Basin Collier County*, January, 2011.

70. South Florida Water Management District, *Environmental Resource Permit Information Manual Volume IV, 2012.* http://www.sfwmd.gov/portal/page/portal/xrepository/sfwmd_repository_pdf/erp_vol_iv_manual.pdf

71. Tomasello Consulting Engineers, Inc., *Case No 14-04-A039S Appeal Report Hydrologic/Hydrodynamic Flood Study for Estero River South Branch*, November 2015, Revised June 2017.