2018
City of Vestavia Hills, Alabama

Floodplain Management Plan

Prepared under the direction of the
City of Vestavia Hills Floodplain Management Planning Committee

With the support of the City of Vestavia Hills Engineering Department by:

SCHOEL Consulting Engineers

In association with:

Lehe Planning LLC
URBAN AND ENVIRONMENTAL PLANNING

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June 8, 2018

2018 City of Vestavia Hills Floodplain Management Plan

City of Vestavia Hills Floodplain Management Planning Committee

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Chapter 1 – Introduction

1.1 Background

The City of Vestavia Hills, incorporated in 1950, is primarily located in southern Jefferson County but partially extends into northern Shelby County. It had a 2013 population estimated by the Census Bureau at 34,018 with an area approximately 19.4 square miles. Preserving natural areas and improving access to recreation is a primary focus for the City and one that can be addressed through the development of this plan.

The National Flood Insurance Program (NFIP) maintains Flood Insurance Studies for Jefferson and Shelby Counties with detailed flood data and publishes Flood Insurance Rate Maps (FIRMs) that identify areas prone to flooding. These tools form the basis for the City's participation in the National Flood Insurance Program (NFIP). Vestavia Hills has various water features, three of which have been mapped through the NFIP: Patton Creek, Little Shades Creek and the Cahaba River.

According to FEMA's most recent Flood Insurance Studies, "The City of Vestavia Hills is most susceptible to flooding in the early spring, but major flooding due to heavy rains may occur during any season. The area primarily affected is along the east side of U.S. Route 31 just upstream of the U.S. Route 31 crossing of Patton Creek. Low frequency flooding results, in part, from debris impeding flow through the box culvert spans in the U.S. Route 31 crossing. Debris impeding flow through the Interstate Route 65 culvert poses a special flood hazard to the City of Vestavia Hills. Blockage of the five box culvert spans under this roadway may increase the severity of floods of any frequency in the business district." In addition to Patton Creek, portions of Little Shades Creek have caused repetitive flooding of homes in the Meadowlawn Estates neighborhood.

At a minimum, the NFIP requires adoption and enforcement of an approved flood hazard prevention ordinance to regulate building and development of mapped flood zones. The City of Vestavia Hills has participated in the NFIP since 1981, which entitles homeowners, renters, and businesses to purchase affordable flood insurance. NFIP-backed insurance is available to all properties, not just those located in flood zones.

As of the date of this Plan, the City is not participating in the NFIP's Community Rating System Program ("CRS"). The City intends to apply following adoption of this Plan and use this Plan to guide its participation. The CRS is an incentive program whereby policy holders within a participating jurisdiction receive reduced flood insurance rates. A community receives credits for its proactive flood hazard mitigation activities

that exceed the NFIP minimum participation requirements: the more CRS credits, the higher the CRS Class.

One primary mechanism by which Vestavia Hills can receive CRS credits is through the development and implementation of this 2017 City of Vestavia Hills Floodplain Management Plan ("FMP"), which serves as a road map for improving the City's NFIP participation. The preparation of this Plan has been made possible by a FEMA Flood Mitigation Assistance (FMA) grant awarded to the City in October of 2014.

1.2 Purpose of Plan

Through a careful and inclusive planning process, the FMP will demonstrate the following benefits:

- Identify existing and future flood-related hazards and their causes;
- Ensure that a comprehensive review of all activities and mitigation measures is conducted so that the most appropriate solutions will be implemented to address the hazard;
- Ensure that the recommended activities meet the goals and objectives of the community, are in coordination with land use and comprehensive planning, do not create conflicts with other activities, and are coordinated so that the costs of implementing individual activities are reduced;
- Ensure that the criteria used in community land use and development programs account for the hazards faced by existing and new development;
- Educate residents and property owners about the hazards, loss reduction measures, and the natural and beneficial functions of floodplains;
- Build public and political support for activities and projects that prevent new problems, reduce losses, and protect the natural and beneficial functions of floodplains; and
- Build a constituency that wants to see the plan's recommendations implemented.

Chapters 3 through 6 in this Plan follow a four-phase planning approach -: I) The Planning Process, II) Risk Assessment, III) Mitigation Strategy, and IV) Plan Maintenance – and are further organized to address the ten CRS Planning Steps, as shown on the following table:

Table 1-1. Plan Organization and the CRS Planning Steps

FMP Chapters	CRS Planning Step
Chapter 1 – Introduction	
Chapter 2 – Community Profile	
Chapter 3 – The Planning Process	Step 1: Organize to prepare the plan Step 2: Involve the public Step 3: Coordinate
Chapter 4 – Risk Assessment	Step 4: Assess the hazard Step 5: Assess the problem
Chapter 5 – Mitigation Strategy	Step 6: Set goals Step 7: Review possible activities Step 8: Draft an action plan
Chapter 6 – Plan Maintenance	Step 9: Adopt the plan Step 10: Implement, evaluate, revise

1.3 CRS Program

The CRS Program is a voluntary incentive program that provides reduced flood insurance premiums to policyholders in a participating jurisdiction. The three primary goals of the CRS program are:

1. Reduce flood damage to insurable property;
2. Strengthen and support the insurance aspects of the NFIP; and
3. Encourage a comprehensive approach to floodplain management.

The CRS program credits floodplain management practices that go above and beyond the minimum requirements of regulating construction in designated flood zones. CRS credits are issued to communities who develop ways in which flooding threats can be reduced or minimized to existing construction, elevate new buildings above the minimum levels, protect non-NFIP mapped areas, and help insurance agents and community members with flood insurance issues, among other creditable mitigation activities.

CRS Communities can be included as one of the ten possible CRS Classes, with Class 1 receiving the most credits and providing the largest flood insurance premium reduction of 45% and Class 9 with a 5% reduction. Class 10 means the community does not participate in the CRS or has not earned the minimum required points. The CRS classes are based on completion of 19 activities organized into four categories: 1) Public Information; 2) Mapping and Regulations; 3) Flood Damage reduction; and 4) Warning and Response. The City of Vestavia Hills does not currently participate in the CRS program; however, development of this Plan allows the City to guide its future CRS standing.

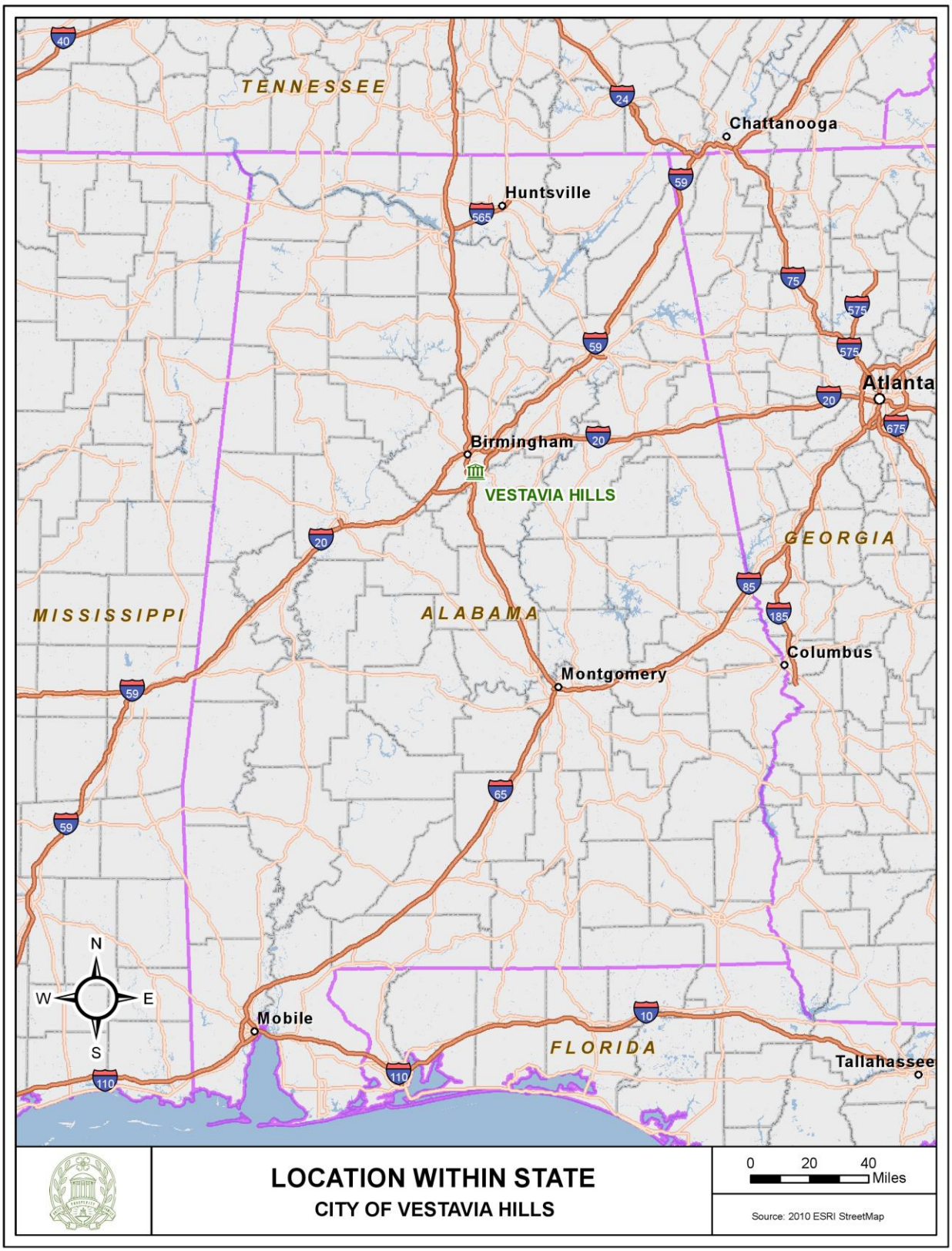
Chapter 2 – Community Profile

2.1 History and Geographic Setting

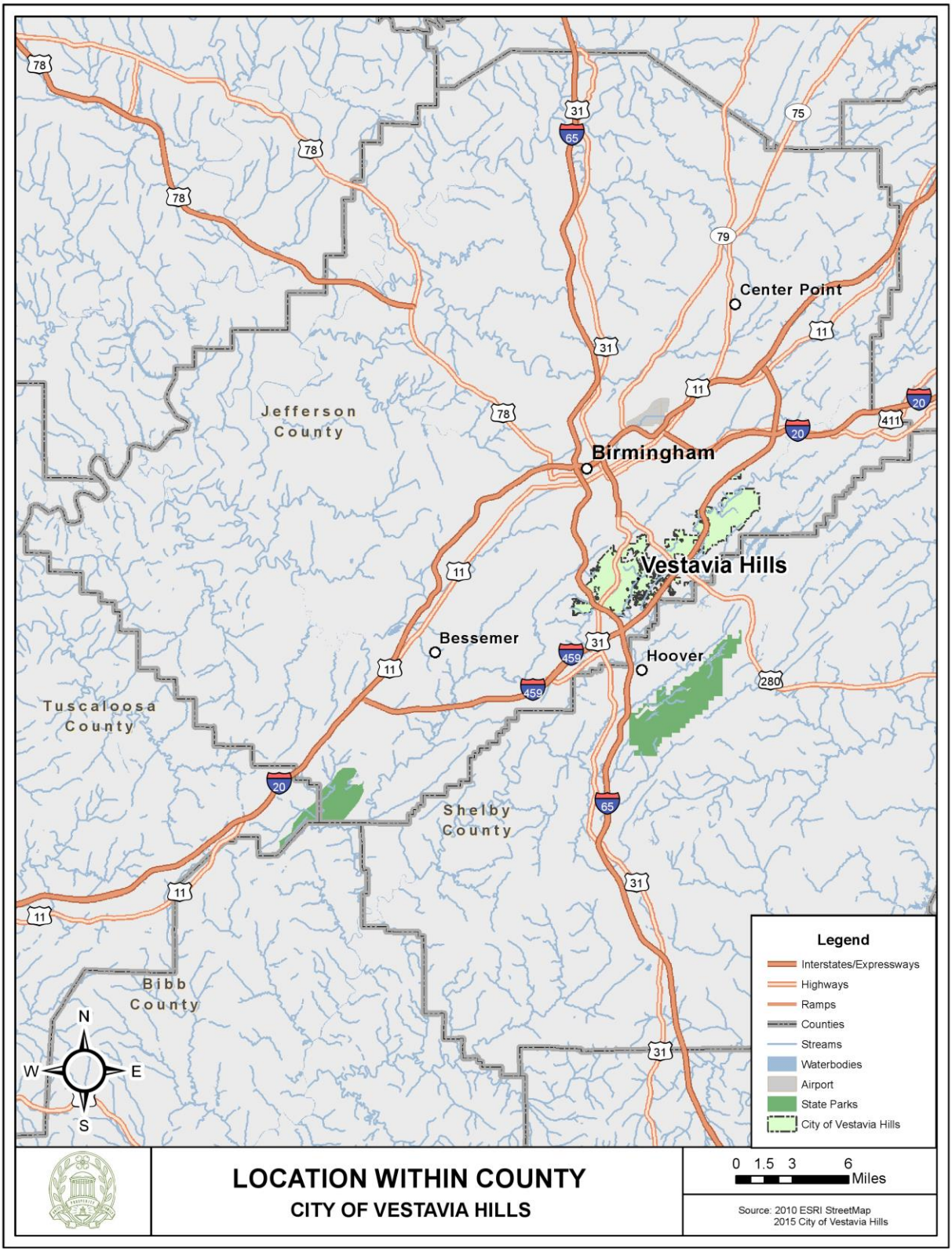
The City of Vestavia Hills was named after former Birmingham mayor George B. Ward's 20-acre estate, which was located atop Shades Mountain, at the northern edge of the city. The estate's design (built in 1925) mimicked the Temple of Vesta in Rome, hence the name Vestavia. Ward also designed Sibyl Temple after the Temple of Sibyl in Tivoli, Italy, which currently sits on the hill at US 31 South and Shades Crest Road and serves as a landmark for the city. Subdivision development began (by Charles Byrd) in 1946 and the suburb was incorporated as a city on November 8, 1950. Since then, rapid development and annexation has led to significant growth.

The City of Vestavia Hills is located in central Alabama, just south of Birmingham (Map 2-1) and encompasses 19.4 square miles (land and water). It sits atop Shades Mountain, which is part of the Appalachian Mountains. It is part of the greater Birmingham-Hoover Metropolitan Statistical Area and one of 22 suburbs with more than 10,000 residents. The city is primarily located in Jefferson County and also extends into Shelby County (Map 2-2).

Map 2-1. Location Within State



Map 2-2. Location Within County



2.2 Government

The City of Vestavia Hills has been governed by a council-manager form of government since November 2012, after voters approved the change in August 2010. Previously, it had been governed by a mayor-council form of government. The mayor, who presides over the city council, and four council members are voted at-large every four years. The city council meets twice a month, every 2nd and 4th Monday, at council chambers located in City Hall. A new City Hall was opened in October 2015 at its new location on Montgomery Highway.

2.3 Physical Features

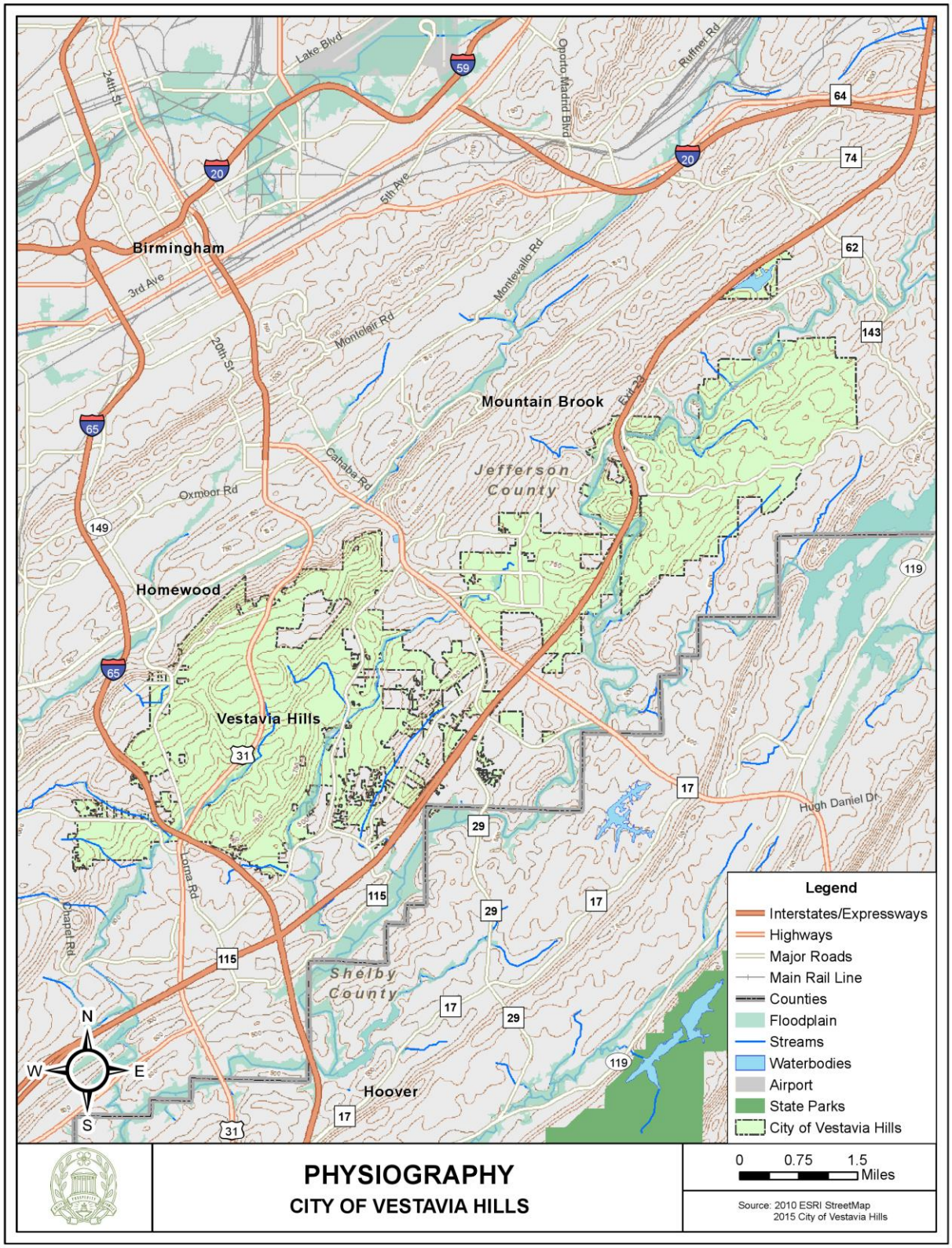
Principal riverine bodies within the City of Vestavia Hills include Patton Creek, Little Shades Creek, and the Cahaba River. The Cahaba River watershed has important implications for the city in that it encompasses the entire municipality. The watershed is delineated by Red Mountain (to the northwest) and Double Oak Mountain (to the southeast). Any drainage from these two ridgelines flows to the Cahaba River. The Cahaba River is also a major source of drinking water for the area. (Source: Vestavia Hills Comprehensive Plan)

The city's topography is such that flat areas are few and there are areas of severe slopes (15% or greater), which limit development of anything other than residential. Ridges such as Shades Mountain, Little Valley Mountain, Jones Ridge, Dolly Ridge, and Rocky Ridge run northeast to southwest and Patton Creek, Little Shades Creek, and the Cahaba River run in the valleys between. Much of the commercial development is within the City is concentrated along the US-31 corridor near Patton Creek where the topography is less severe.

The Red Mountain Geological Cut, which was responsible for creating the Red Mountain Expressway, connected Vestavia Hills to greater Birmingham. As a result, the "cut exposes geological strata spanning millions of years, including the red ore seam that spurred Birmingham's development" (Wikipedia). The cut was designated a National Natural Landmark in 1987. Rock outcrops are abundant along the ridges throughout the City, especially within the Patton Creek watershed. The soil type common to the ridges is Gorgas-Rock outcrop and has high runoff potential. The soils along the Cahaba River, specifically in the Liberty Park area are primarily Nauvoo-Montevallo Association and have a moderately low runoff potential. Other soil types such as Townley-Urban land complex and Nauvoo-Urban land complex are distributed within the City.

Map 2-3 "Physiography" shows the major physiographic features in the city, including waterbodies, floodplain, streams, and nearby state parks.

Map 2-3. Physiography



2.4 Climate

Vestavia Hill's climate is humid with mild winters and hot summers. The average annual rainfall is approximately 54 inches. The mean temperature is 45.7 degrees Fahrenheit in the winter and 79.2 degrees Fahrenheit in the summer. Spring and fall temperatures average at 63 degrees Fahrenheit. Table 2-1 shows the weather observations for the City of Vestavia Hills, based on data for the greater Birmingham area.

Table 2-1. Weather Observations

Category	Observation
Average Winter Temperature	45.7
Average Winter Minimum Temperature	35.6
Lowest Temperature (January 21, 1985)	-6
Average Summer Temperature	79.2
Average Summer Maximum Temperature	89.6
Highest Temperature (July 29, 1930)	107
Average Annual Precipitation	53.6 in
Heaviest One-Day Rainfall (December 27, 1942)	7.7 in
Average Season Snowfall	1.9 in

Source: SE Regional Climate Center, 2012 (based on data for Birmingham)

2.5 Demographics

Population Growth and Density

The City of Vestavia Hills, though not the largest city in Jefferson or Shelby counties, has experienced an increase in population over the last decade, ending in 2010. In 2010, the population of the County was 34,033, a 39% increase over the 2000 level of 24,476. Table 2-2 portrays population data for the City of Vestavia Hills in comparison to the City of Hoover, City of Homewood, Shelby County, Jefferson County and the State of Alabama. Despite a population decrease in Jefferson County, the City of Vestavia Hills experienced a significant increase from 2000 to 2010. The city's rate of increase over this ten-year period exceeds that of neighborhood jurisdictions, as well as the state. A 2013 population estimate 34,018 shows a comparable population to the 2010 Census count.

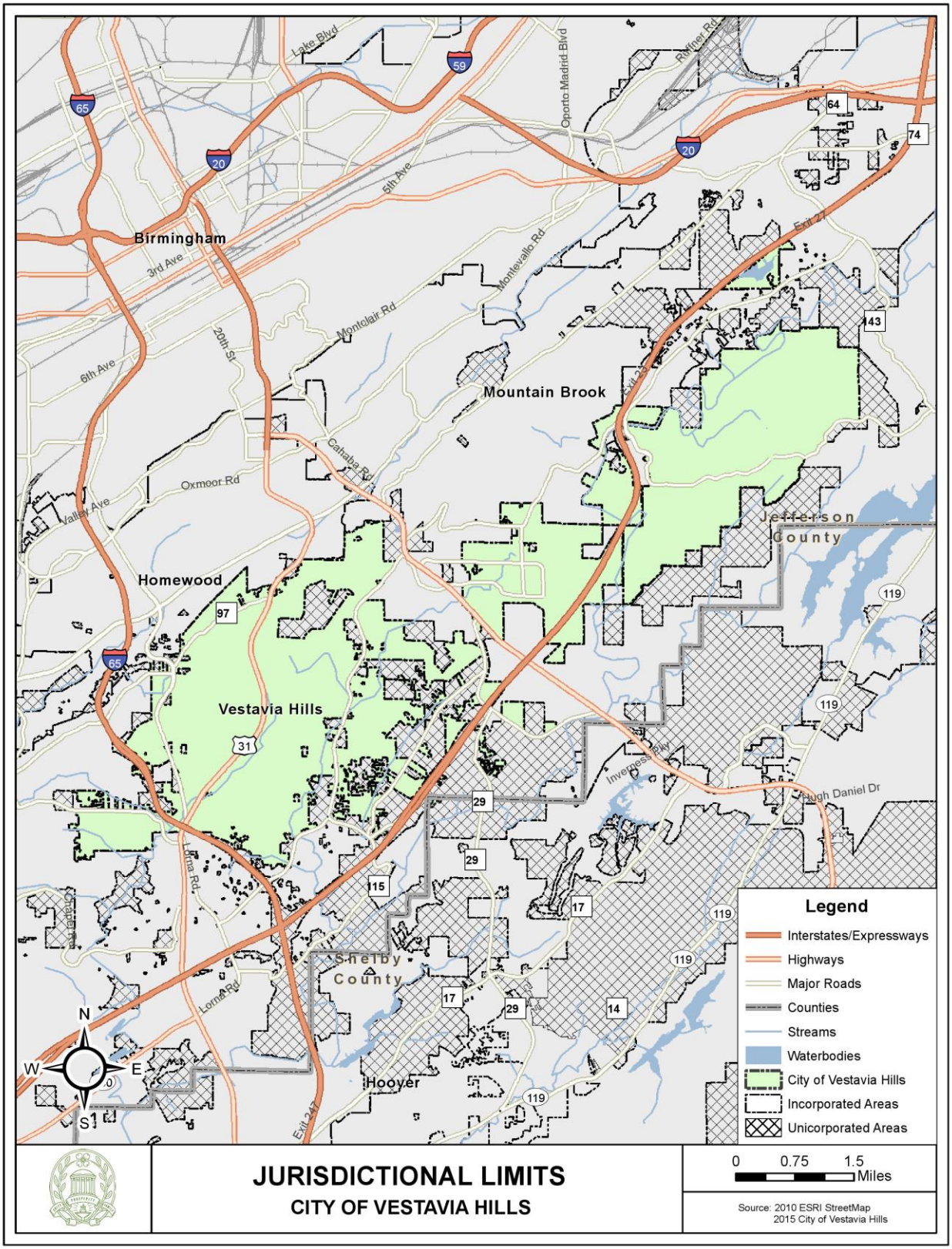
Table 2-2. Population Change from 2000 to 2010

Jurisdiction	2000	2010	Number Change	Percent Change
City of Vestavia Hills	24,476	34,033	9,557	39%
City of Hoover	62,742	81,619	18,877	30.2%
City of Homewood	25,043	25,167	124	0.5%
City of Mountain Brook	20,604	20,413	-191	-0.9%
Shelby County	142,293	195,085	52,792	37.1%
Jefferson County	662,047	658,466	-3,581	-0.5%
State of Alabama	4,447,100	4,779,736	332,636	7.5%

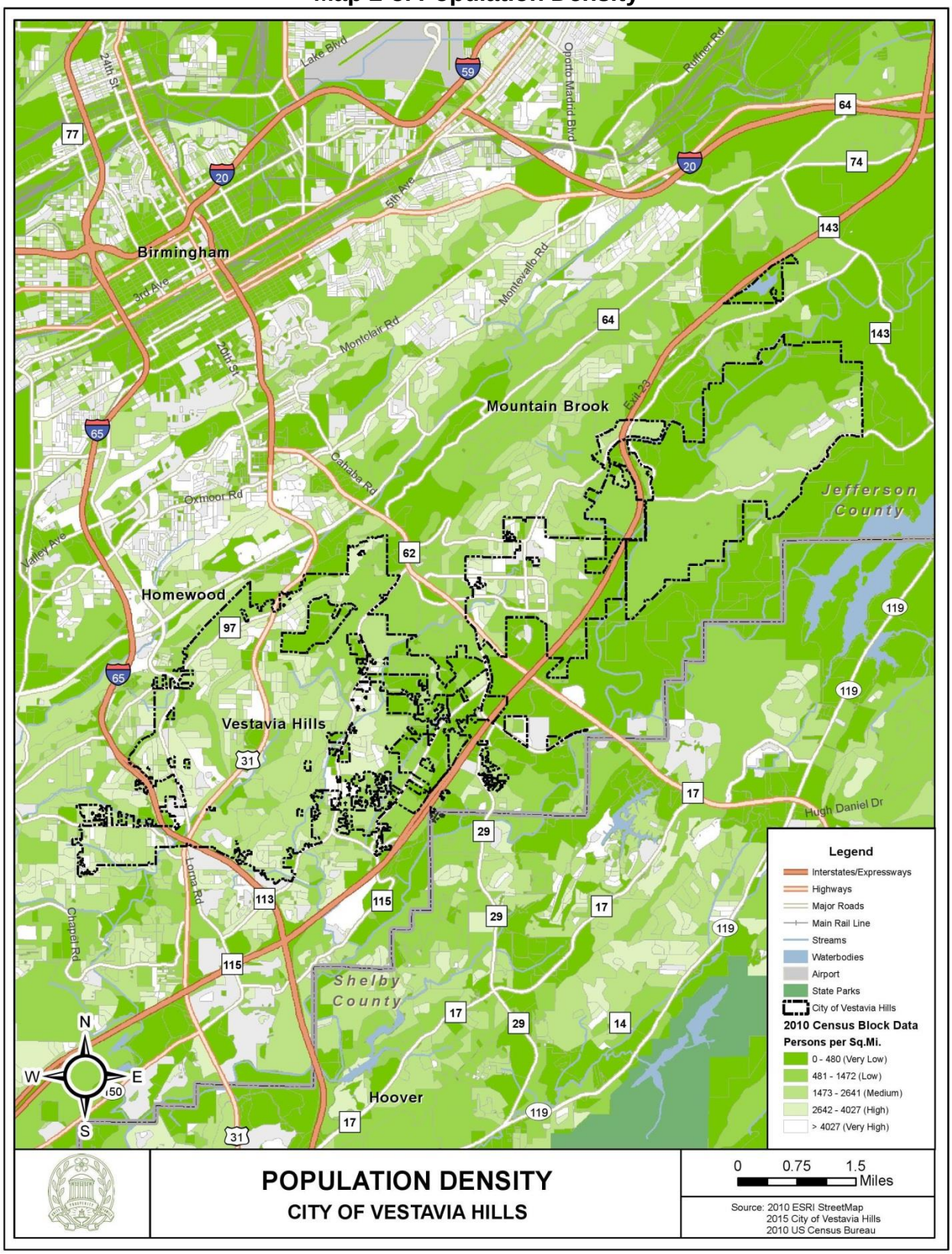
Source: U.S. Census Bureau, 2010

Map 2-4 “Jurisdictional Limits” highlights the study area in comparison to neighboring municipalities, such as Mountain Brook, Homewood, and Hoover. In contrast to Homewood and Mountain Brook but similar to Hoover, Vestavia Hills adjoins vast unincorporated areas that are potential areas for annexation, as growth expands. Map 2-5 portrays population density for the City of Vestavia Hills (2010 U.S. Census block group) and neighboring jurisdictions. Areas in the city surrounding the Highway 31 corridor have higher persons per square mile compared to areas in the northwest portion of the city limits.

Map 2-4. Jurisdictional Limits



Map 2-5. Population Density



2.6 Economy

Business and Industry

Vestavia Hills has five business districts, Vestavia North, Vestavia South, Cahaba Heights, Rocky Ridge and Liberty Park. Vestavia North and South are divided at the Vestavia Hills Civic Center on Highway 31. Vestavia North extends out to Shades Crest Road and includes the Vestavia Hills Municipal Complex, City Center, retail stores, and restaurants. Vestavia South extends to Interstate 65 and encompasses car dealerships, office parks, fast food establishments, retailers, and furniture stores. Cahaba Heights is located off of Highway 280 near the Summit Shopping Center. It includes the Altadena area, represented by unique shops and antique stores. Rocky Ridge, between Highway 280 and Interstate 459, has specialty shops, grocery and hardware stores, restaurants, offices, and boutiques and includes Dolly Creek Station, located off of Acton Road. The Liberty Park business district is a planned unit development, located off of Interstate 459 and Liberty Parkway, housing residential neighborhoods, apartment homes, recreational parks, and Prominence Shops. Top employers in Vestavia Hills (for 2013) are shown in Table 2-3.

Table 2-3. Major Employers (2013)

1. Vestavia Hills City School System
2. Vulcan Materials
3. City of Vestavia Hills
4. Life Time Fitness
5. Charter Communication
6. Publix Alabama, LLC
7. Naphcare
8. Royal Automotive
9. AirMed International
10. Darden Restaurants (Red Lobster)
11. Western Supermarkets
12. Wal-Mart Stores East LP

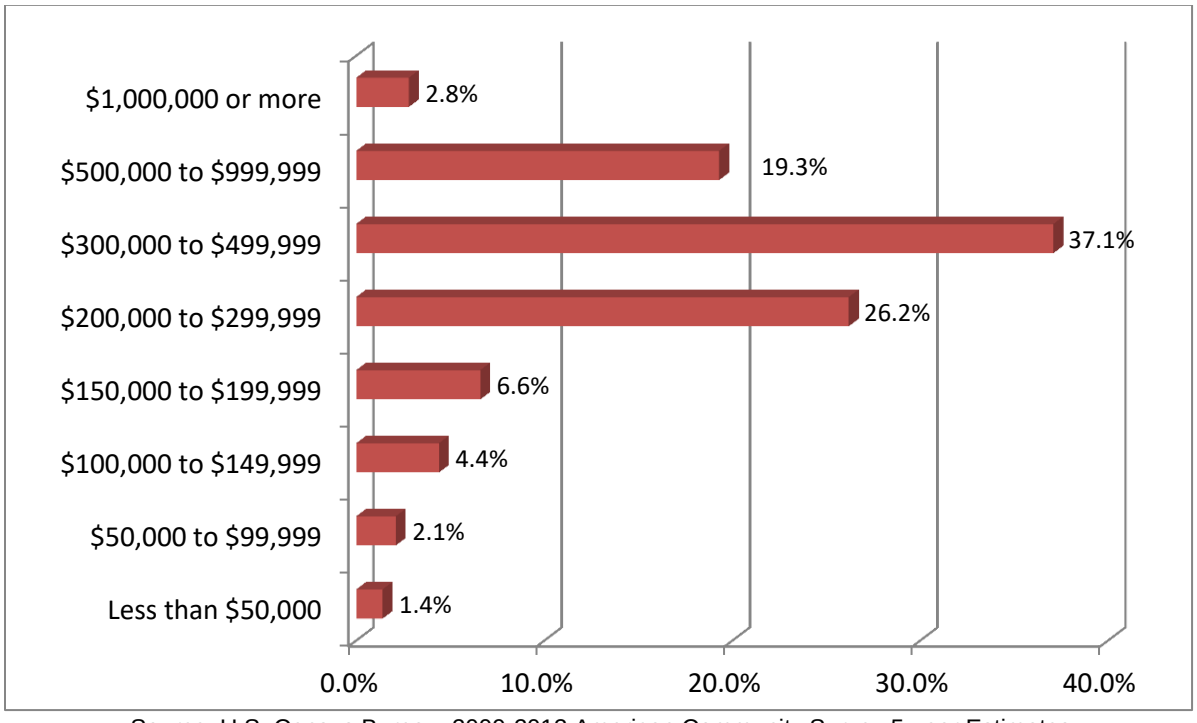
Source: Vestavia Hills Chamber of Commerce, 2013

Income and Housing

Median household income for Vestavia Hills is $81,067 (2009-2013 American Community Survey 5-year estimates). The City's low percentage of 5.4% percent of families living below the poverty line has little effect on housing values. American Community Survey (2009-2013) estimates approximately 14,634 housing units exist in Vestavia Hills. The majority of owner-occupied housing values fall within the $300,000 to $499,999 range, at 37.1%. About 26% of housing units are valued between $200,000 and $299,999, while 19% are valued at $500,000 or greater (see Chart 2-1). The median value for a home in Vestavia Hills is $338,100. This exceeds the median house value for the state by $215,600.

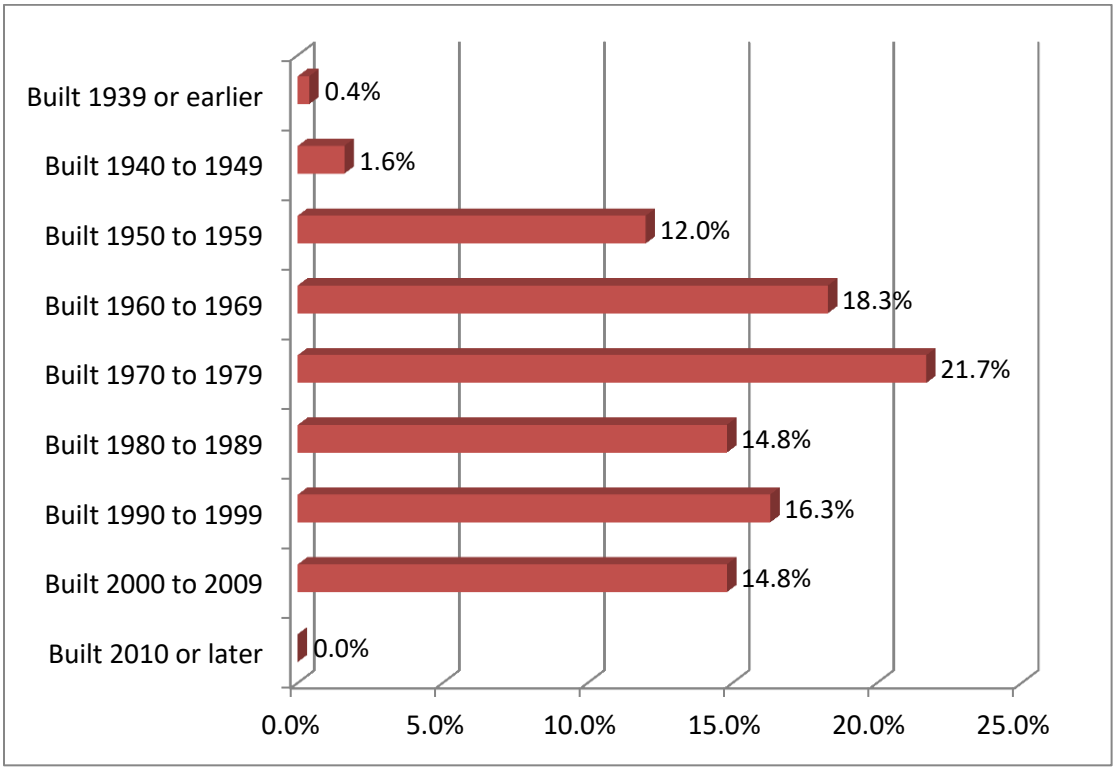
Chart 2-2 "Housing Stock by Age" shows that the majority of housing in Vestavia Hills was constructed between 1960 and 1979, comprising 40% of the total housing stock. The city has an almost equal representation of housing built from 1950 to 1959 (12%); 1980 to 1989 (14.8%); 1990 to 1999 (16.3%); and 2000 to 2009 (14.8%).

Chart 2-1. Housing Units by Value



Source: U.S. Census Bureau, 2009-2013 American Community Survey 5-year Estimates

Chart 2-2. Housing Stock by Age



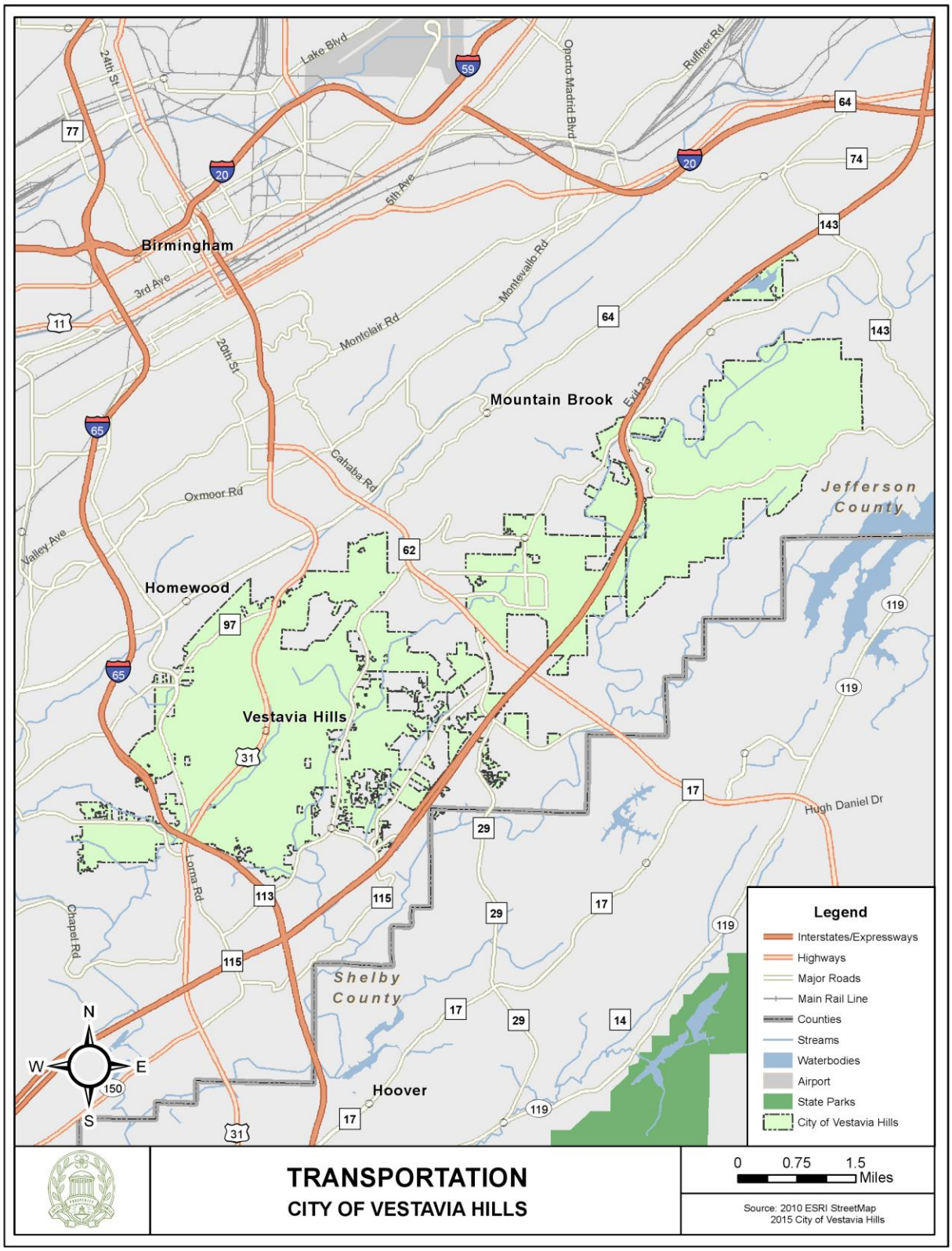
Source: U.S. Census Bureau, 2009-2013 American Community Survey 5-year Estimates

2.7 Transportation

The City of Vestavia Hills is served by Interstate 459 extending from the northeast to the southwest and Interstate 65 extending from the northwest to the south. Access to Interstate 20 can be obtained via I-459 or I-65. Major highways in the city include U.S. Highways 31 and 280 and major collector roads, such as Rocky Ridge Road, Shades Crest Road, Cahaba Heights Road, Dolly Ridge Road, Altadena Road, Liberty Parkway, Overton Road, and Columbiana Road.

The Red Mountain Expressway (or Elton B. Stephens Expressway) opened in 1977, connecting Vestavia Hills to Birmingham. The closest airport is the Birmingham-Shuttlesworth International Airport, located 11 miles to the north of the city. Bus service is provided by the Birmingham Jefferson County Transit Authority and the city is served by one route extending from 1st Ave North in Birmingham to the Riverchase Galleria, along Highway 31 in Hoover. See Map 2-6.

Map 2-6. Transportation



Chapter 3 – Planning Process

3.1 Organization

The 2018 City of Vestavia Hills Floodplain Management Plan (FMP) was developed in accordance with the National Flood Insurance Program's Community Rating System CRS Coordinator's Manual (FEMA, FIA-15/2017), Activity 510 "Floodplain Management Planning." The corresponding FMP chapters for each of the 10 CRS Planning Steps are described in the table below. Supporting documentation, Appendices A – H, accompany the main document and are noted throughout.

Table 3-1. 10-Step Planning Process

FMP Chapters	CRS Planning Step
Chapter 1 – Introduction	
Chapter 2 – Community Profile	
Chapter 3 – The Planning Process	Step 1: Organize to prepare the plan Step 2: Involve the public Step 3: Coordinate
Chapter 4 – Risk Assessment	Step 4: Assess the hazard Step 5: Assess the problem
Chapter 5 – Mitigation Strategy	Step 6: Set goals Step 7: Review possible activities Step 8: Draft an action plan
Chapter 6 – Plan Maintenance	Step 9: Adopt the plan Step 10: Implement, evaluate, revise

Floodplain Management Planning Committee

Prior to beginning the plan drafting process, the Vestavia Hills City Manager created the City of Vestavia Hills Floodplain Management Planning Committee (FMPC). The City Manager appointed six members to oversee the preparation of this plan and its ongoing implementation and maintenance. Prior to adoption of this plan, the City Council passed a resolution (see Appendix A) to recognize the planning process and confirm the FMPC membership. Christopher Brady, the City Engineer and Floodplain Administrator, was appointed Chairman and is actively involved in the floodplain management planning and implementation processes.

The FMPC members, from various City departments, have been assigned lead responsibility for plan implementation. They have expertise in the following six categories of floodplain management activities:

1) Preventive measures (e.g., land use and development codes and ordinances);
2) Property protection (e.g., building elevation and floodproofing);
3) Natural resources protection;
4) Emergency services;
5) Structural flood control projects; and
6) Public information.

Table 3-2 "Floodplain Management Planning Committee" shows the initial membership that participated in the drafting phase of this plan. Their meeting attendance is documented in Appendix E. In some circumstances, the appointed FMPC member may have designated an alternative member to attend the FMPC meeting.

Table 3-2. City of Vestavia Hills Floodplain Management Committee

MEMBERS

City Department Representatives	Position	Role/Expertise
Christopher Brady, PE, CFM, Chairman	City Engineer	Structural projects
Jeffrey Downes	City Manager	Public information
Keith Blanton	Building Official	Property protection
Brian Davis	Public Services	Natural resources protection
Conrad Garrison	City Planner	Preventive measures
Scott Key	Fire Marshal	Emergency services

The process began with step 1 of the 10 step CRS planning process, which was conducted through the organization of the FMPC by the City Council. The FMPC met five times throughout the drafting phase of the plan. All meetings were held in the Executive Conference Room at City Hall and were open to the public. At each meeting, committee members would review and discuss plan materials presented by the planning team. The materials covered all of the key steps of the floodplain management planning process, as described in Table 3-3 below. Although the FMPC met to review and plan for all chapters of the plan, it was especially important that the key steps of the planning process, Steps 4-8 were sufficiently discussed. The table below shows at which meetings each of the key steps were covered.

Table 3-3. Key Steps at FMPC Meetings

FMPC Meetings	Chapters Reviewed	CRS Key Planning Steps
1. Tuesday, 3/10/2015	1. Introduction 6. Plan Maintenance	
2. Tuesday, 7/28/2015	2. Community Profile 4. Part I. Risk Assessment	Step 4. Assess the hazard
3. Tuesday, 9/29/2015	4 Part II. Risk Assessment	Step 5. Assess the problem
4. Tuesday, 11/21/2017	5 Part I. Mitigation Strategy	Step 6. Set goals Step 7. Review possible activities
5. Tuesday, 5/1/2018	5 Part II. Mitigation Strategy	Step 8. Draft an action plan

Meeting materials, including agendas, slide presentations, committee exercises, and supplemental information were made available to FMPC members and the general public via the project website. Appendix E includes meeting agendas and sign in sheets.

Meetings were suspended after the third meeting while the City moved its operations to a new City Hall and elected a new Mayor and City Council in 2016. The FMPC resumed meetings in 2017 and completed the plan after its May 1, 2018, meeting for Council adoption.

3.2 Public Involvement

All of the five FMPC meetings were open meetings and well-advertised via the project website at http://vestavia.floodplainmanagementplan.com/ .

Community Meetings

Upon completion of the draft plan, the City held a community meeting for the public to review the final plan and offer public comments. This public meeting was held May 21, 2018 at 6:00 pm in the Executive Conference Room of City Hall located at 1032 Montgomery Highway, Vestavia Hills, AL 35216. The City issued a media release and posted a meeting announcement on the plan website. The purpose of this community meeting was to display the final draft plan and encourage the public to review the plan and provide feedback prior to Council adoption. Representatives from the Floodplain Management Planning Committee (FMPC), City Council members, City staff, and the consultant team were available to answer questions. Attendees were encouraged to submit written comments on the Community Survey form. The City posted the form on the City's website at http://vhal.org/ to allow individuals to submit their comments directly

on-line and view responses. The survey was available for a two week period between May 22 and June 5, 2018. (See Appendix F "Community Involvement Documentation" for complete documentation of this event).

Additional Public Outreach Efforts

In addition to the community meeting and open-forum FMPC meetings, the planning team created a website at http://vestavia.floodplainmanagementplan.com/ detailing the floodplain management planning process, providing up-to-date meeting information, as well as making available for download draft plan chapters, appendices, agendas, slide presentations, and other meeting materials. During the community meeting, attendees were given another opportunity to voice their concerns and encouraged to submit written comments to the FMPC.

3.3 Coordination

Coordination between the Floodplain Management Planning Committee (FMPC), and its Chairman, the City Engineer/Floodplain Administrator, with the planning consultant team was crucial to the successful development of this plan. The FMPC represents membership from diverse City departments and interests.

FMPC members completed two planning exercises. The first exercise allowed members to record their concerns on a city-wide map of all flood hazard areas. This was helpful to the planning consultants' drafting of the risk assessment. Later in the planning process, the members completed the "Alternative Mitigation Measures Exercise" (Appendix G). This exercise provided a means to review and evaluate potential floodplain mitigation measures to be selected for the Floodplain Management Action Plan (Chapter 5). The Floodplain Management Action Plan includes measures that are consistent with the six floodplain management activities recognized by the CRS Program and takes into consideration City funding and technical capabilities, among other considerations. (See Chapter 5 "Mitigation Strategy" for a complete discussion of the development of the Floodplain Management Action Plan).

In addition to coordination with various agencies, the planning team collected and reviewed applicable plans, studies and reports. Review of existing documents, data and technical information was very useful in the drafting of the plan, in that it supported the risk assessment and helped develop the mitigation strategy to further the goals of floodplain management planning. Specifically, in the drafting of Chapters 2 "Community Profile," 4 "Risk Assessment," and 5 "Mitigation Strategy" the planning team reviewed and incorporated information from the following plans and studies:

- 2014 Jefferson County Multi-Hazard Mitigation Plan,
- FEMA Flood Insurance Study, Jefferson County, Alabama and Incorporated Areas, dated September 29, 2006
- NFIP's Repetitive Loss Inventory,

- Vestavia Hills Comprehensive Master Plan 2004-2025,
- City of Vestavia Hills Subdivision Regulations,
- City of Vestavia Hills Zoning Ordinance,
- City of Vestavia Hills Stormwater Management Ordinance,
- City of Vestavia Hills Flood Damage Prevention Ordinance, and
- City of Vestavia Hills Building and Technical Codes.

Other public outreach activities related to floodplain management planning typically falls under the umbrella of multi-hazard mitigation planning activities conducted by the Jefferson County Emergency Management Agency (EMA). The Jefferson County EMA oversees the preparation and implementation of the 2014 Jefferson County Multi-Hazard Mitigation Plan and subsequent updates. The Floodplain Management Planning Committee is fully supportive of county-wide activities conducted by the Jefferson County EMA.

Chapter 4 – Risk Assessment

4.1 Overview

This chapter details the risk assessment process for the development of this 2018 City of Vestavia Hills Floodplain Management Plan for the City's current incorporated limits, as well as adjacent unincorporated areas, which may be annexed over the next 20 years, as the City grows. This assessment process is based upon the requirements of steps 4 and 5 of the 10-step planning process outlined in the 2013 Community Rating System Coordinator's Manual.

Section 4.2 covers the first part of the risk assessment required by Step 4: Assess the Hazard. It presents a hazard profile, which includes the sources, frequency, extent, and causes of flooding and associated hazards. Step 5 of the risk assessment process – Assess the Problem - is presented in Section 4.3. It examines vulnerabilities of the population, structures, public infrastructure and critical facilities to flooding and related natural hazards, the economic impacts of flooding on the community, and the impacts on natural and beneficial floodplain functions.

4.2 Flood Hazard Profile: Assessment of the Hazard

In non-coastal locations, riverine flooding occurs when runoff from rainfall, snowmelt, or storm surge exceeds the capacity of the stream or river and overflows into the adjacent floodplain. Flooding can lead to injury or death due to drowning caused by swift currents of the flood waters. In addition, flooding can cause property damage as a result of inundation by sediment laden water.

The severity of a flood is primarily dependent upon two factors: 1) rainfall intensity and 2) duration. A heavy rain over a short time span, such as a thunderstorm, can result in flash flooding. Flash flooding is typically defined as a rapid water level rise in a stream or creek beginning within six hours of the rainfall event. Most of the areas within the City of Vestavia Hills that have experienced past flooding are a result of flash flooding. Only those areas within the City along the Cahaba River have a watershed response time greater than six hours. Extended periods of steady to heavy rainfall can also lead to flooding. This type of event is more commonly identified with a tropical storm moving inland from the Gulf of Mexico, but can also be associated with a slow moving or stalled front.

4.2.1 The Special Flood Hazard Area (SFHA)

The Special Flood Hazard Area (SFHA) shown on the Flood Insurance Rate Map (FIRM) is the FEMA-designated area of land covered by the floodwaters of the base flood. The base flood is defined by FEMA as the flood having a one percent chance of

being equaled or exceeded in any given year. The base flood may also be referred to as the "100-year flood." The SFHAs, as shown on the FEMA Flood Insurance Rate Maps (FIRMs) are depicted on Maps 4-1 and 4-2, which follow.

The City of Vestavia Hills' major water feature is the Cahaba River and includes several tributaries and smaller streams that are susceptible to flooding. The FEMA Flood Insurance Study (FIS) for Jefferson County identifies the following streams where a SFHA is defined:

- Cahaba River;
- Little Shades Creek;
- Patton Creek; and
- Huckleberry Branch

The Cahaba River is the largest waterbody in size and drainage area within the City. The watershed is a mixture of residential, commercial, and undeveloped areas. Much of the City is located in the upper Cahaba watershed. Liberty Park, a large mixed-use development located within Vestavia Hills, lies immediately to the southeast of the Cahaba. Although in close proximity to the Cahaba, Liberty Park is at a low risk of flooding due to its location along the high bluffs above the river. Further downstream, the Cahaba River SFHA widens where the valley opens below Caldwell Mill Road in the Altadena area. This area along the Cahaba is currently a golf course and undeveloped land, but may be developed in the future. Residential developments are sited along the ridges out of the SFHA. The Cahaba River has an approximate flood depth of 35 feet in the channel and velocities ranging from 4 to 6 feet per second. The Cahaba has a relatively long warning time compared to the other streams within the City at roughly 8 hours.

Little Shades Creek is a tributary to the Cahaba River, and most of it is located within Vestavia Hills. The watershed is primarily residential with small commercial areas in several places. Two primary areas of flooding occur along this stream. The Meadowlawn neighborhood (Cahaba Heights) is located in the upper watershed and mapped as a Zone "A" and the Ashley Woods neighborhood off Rocky Ridge Road is mapped as a Zone "AE" on the FIRM. The SFHA in the Meadowlawn neighborhood is relatively large and encompasses many residential properties. Due to the proximity at the top of the watershed, flooding can occur quickly with little opportunity for warning (less than 1 hour). The depth of flooding is approximately 12 feet within the channel (5-6 feet in the overbank areas) with slow moving floodwaters roughly 3 feet per second. Downstream at the Ashley Woods neighborhood, the flashy nature of the flooding leaves little opportunity for warning (less than 2 hours). Although the depth of flooding is similar to Meadowlawn (approximately 12 feet), the channel velocities are significantly higher ranging from 6 to 12 feet per second.

Patton Creek is also a tributary to the Cahaba River with the upper reach within Vestavia Hills before flowing into the City of Hoover. The U.S. Highway 31 corridor runs adjacent to much of the creek with significant commercial development in close proximity

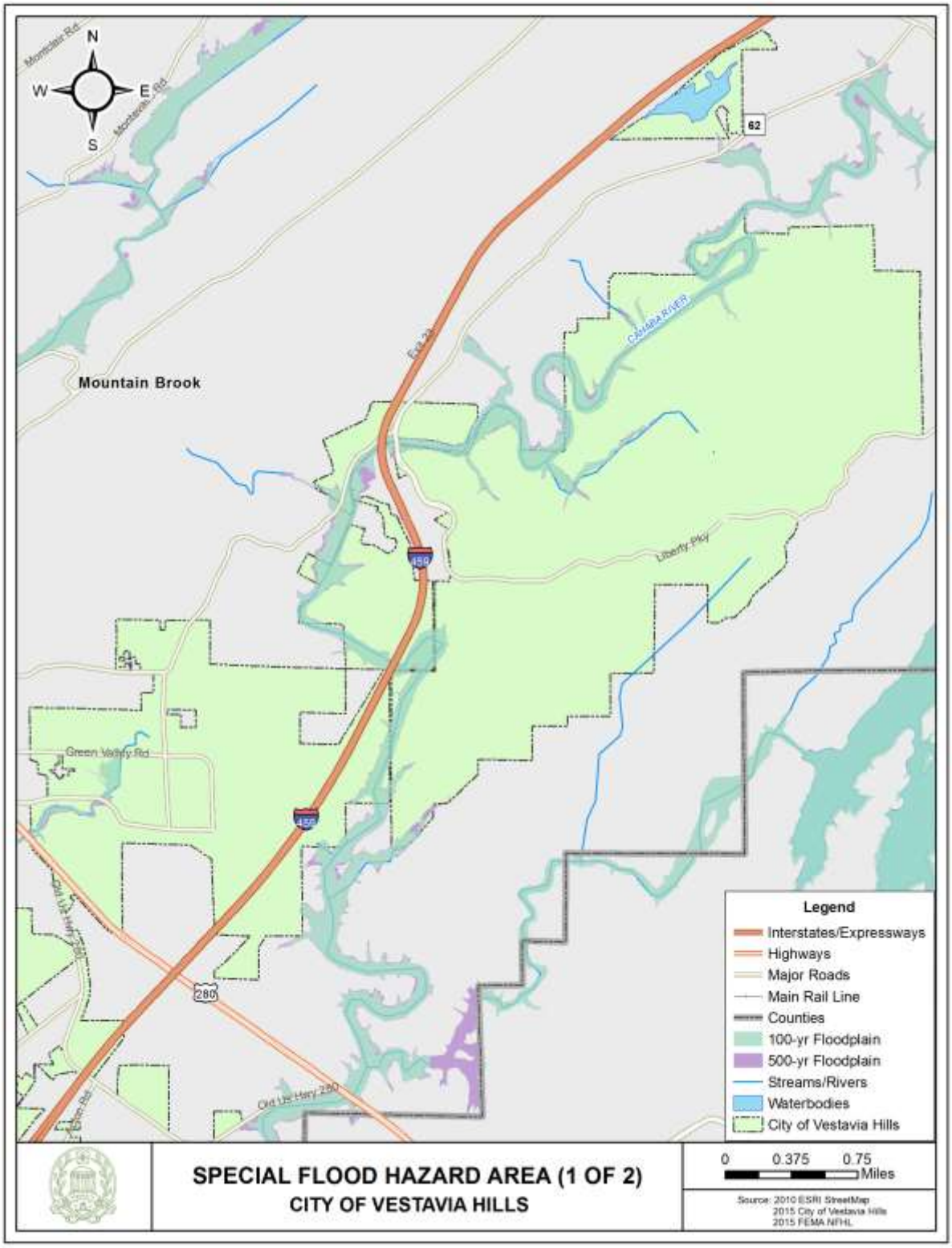
to the creek and within the floodplain. Patton Creek is prone to flash flooding with a warning time of an hour or less. Several businesses and the major corridor U.S. Highway 31 are at risk of flooding leading to life endangerment and property damage. Flood depths are in the range of 10 to 15 feet within the channel and velocities approximately 6 feet per second.

Huckleberry Branch is a tributary to Patton Creek. The stream is relatively straight and steep with narrow floodplain as it flows from Shades Mountain towards the Highway 31/Interstate 65 intersection. Huckleberry Branch joins with Patton Creek immediately below the interchange. Huckleberry Branch has less than one hour warning time due to the flashy nature of the watershed. The flood risk to residents and businesses is low due to the small depth of flooding (3-4 feet) and the narrow floodplain situated in a steep valley away from developed areas.

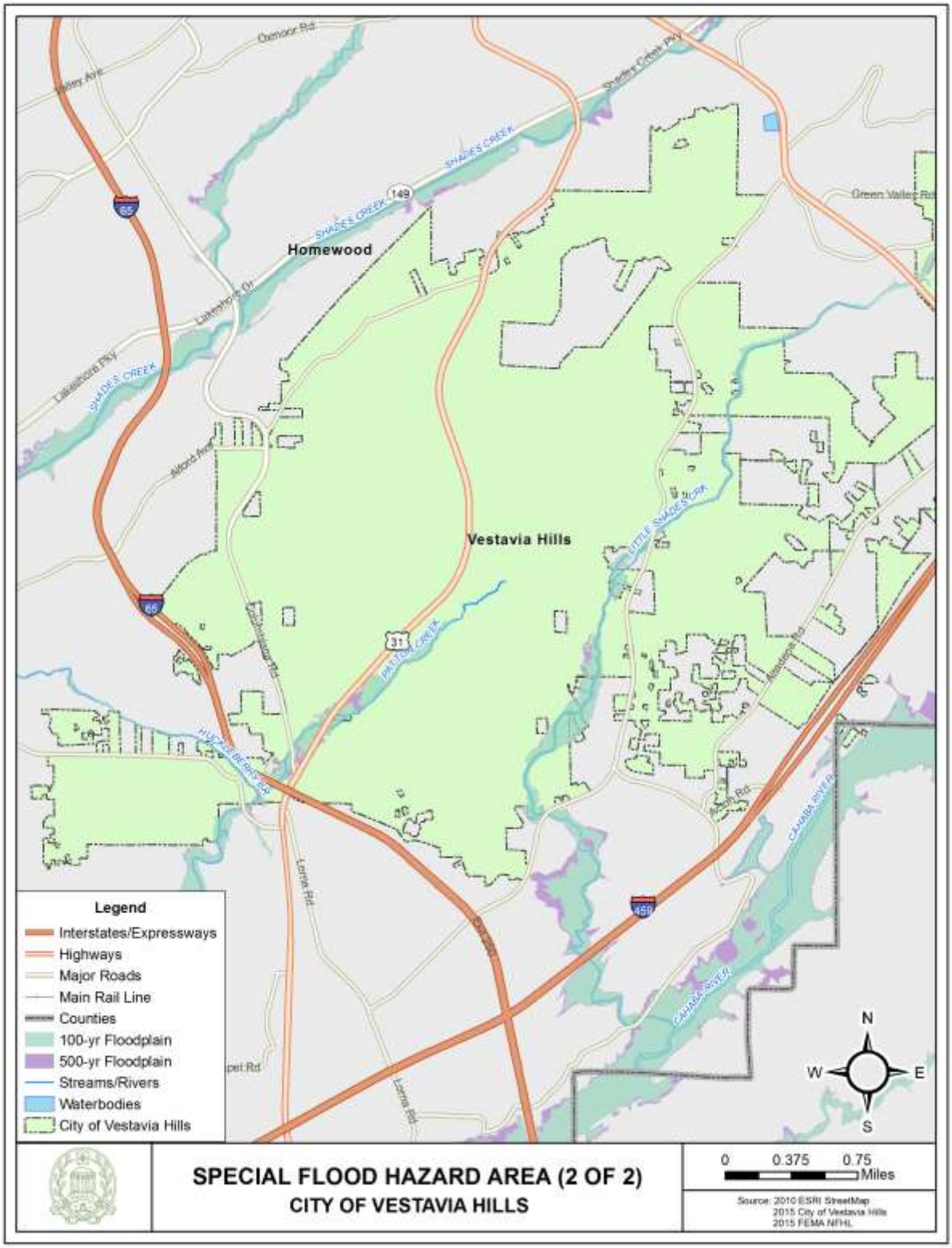
The SFHA covers approximately 1,777 acres in total within the City or roughly 14.3% of the City (Maps 4-1 and 4-2 below). SFHAs mapped as Zone “A” based on approximate methods make up only 14.4 acres or 0.8% of the total SFHA within the City. The major Zone “A’ area is located in the Meadowlawn neighborhood within Cahaba Heights along Little Shades Creek.

All four of the streams previously discussed have detailed studies as part of the Jefferson County Flood Insurance Study. Revised or new detailed studies were completed for Little Shades Creek, Patton Creek, and Huckleberry Branch and included in the Jefferson County FIS dated September 29, 2006. A new detailed study and mapping has recently been completed for the Cahaba River and preliminary products released on April 26, 2018. These are expected to become effective in the spring of 2019.

Map 4-1. Special Flood Hazard Area, Map 1 of 2



Map 4-2. Special Flood Hazard Area, Map 2 of 2

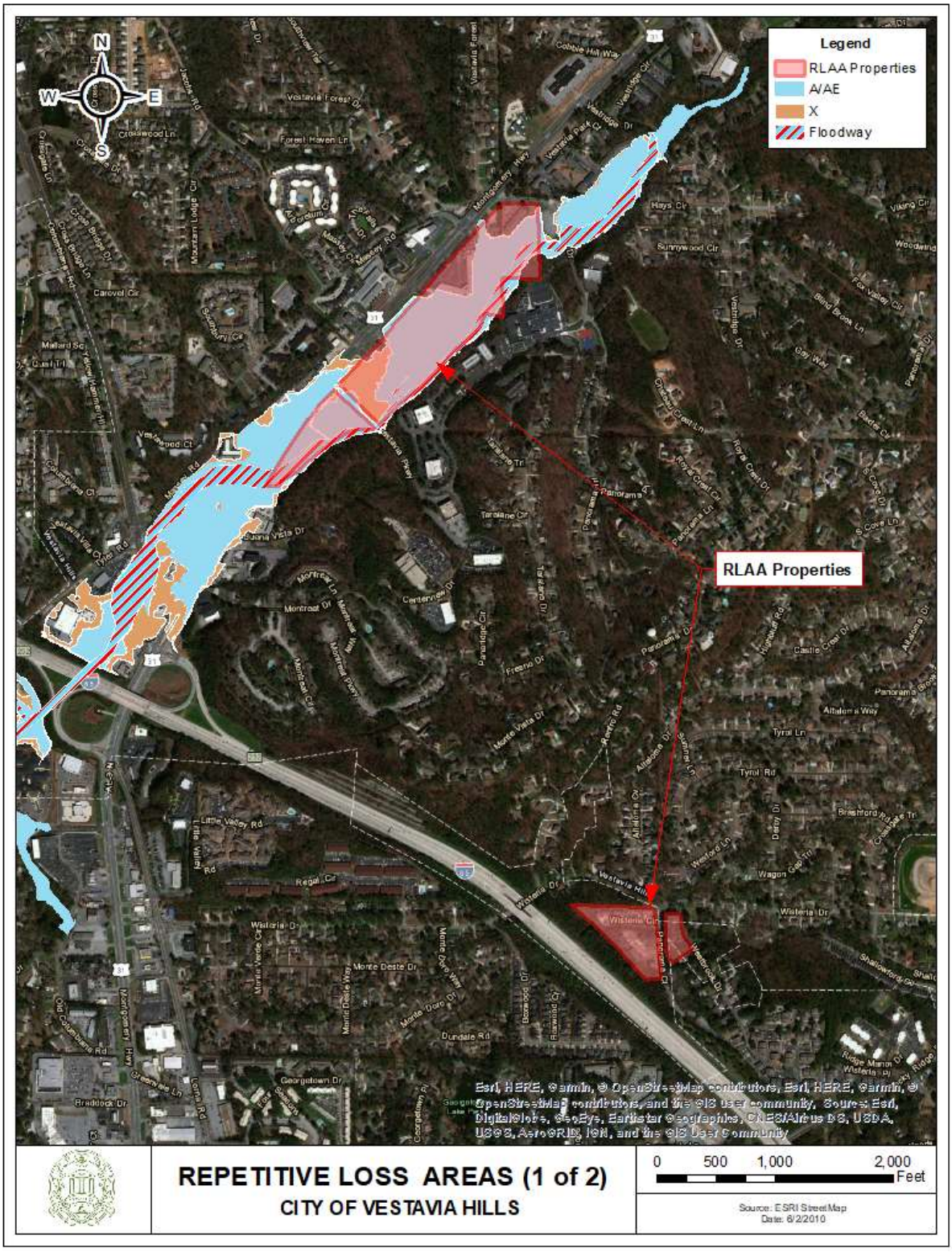


4.2.2 Repetitive Loss Properties

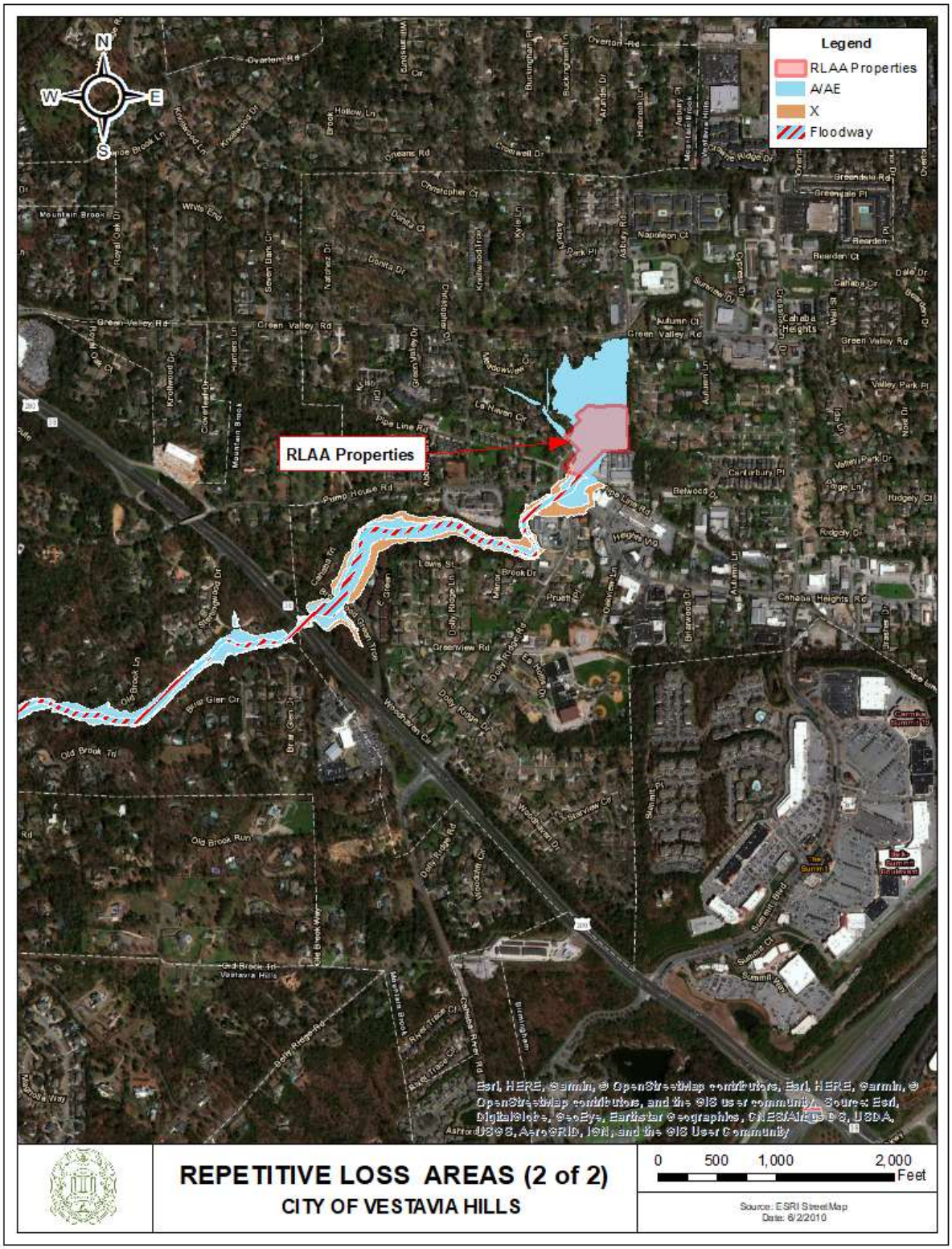
The City of Vestavia Hills has three repetitive loss properties, based on recent data provided by the State of Alabama Office of Water Resources. Repetitive loss properties are defined as those properties for which two or more flood insurance claims of more than $1,000 have been paid by the NFIP within any 10-year period. The repetitive loss properties are not concentrated in distinct areas, but instead distributed throughout the City. One repetitive loss property is located in the Little Shades Creek watershed in a mapped Zone A. The second repetitive loss property is located on the U.S. Highway 31 corridor in the Patton Creek Watershed in a mapped Zone AE. A third property is not within a mapped special flood hazard area. From this information Repetitive Loss Areas were identified that include the repetitive loss properties and adjacent properties with similar characteristics and potential for flooding.

The locations of the City's repetitive loss areas are shown below on Maps 4-3 and 4-4.

Map 4-3. Repetitive Loss Areas, Map 1 of 2



Map 4-4. Repetitive Loss Areas, Map 2 of 2



4.2.3 Other Identified Areas of Flooding

Other than the SFHA, no additional areas of flooding have been identified within the City. No additional areas of flooding were noted during the FMPC meetings or through the public meetings conducted during the planning process, where members of the FMPC and the public were asked to identify flood hazard areas. In addition, a review of other planning studies included no mention of other areas of flooding outside of the SFHA. Should, in the future, areas not currently within the SFHA experience flooding due to local drainage issues, riverine flooding, or other causes, they should be noted for future revisions to this plan.

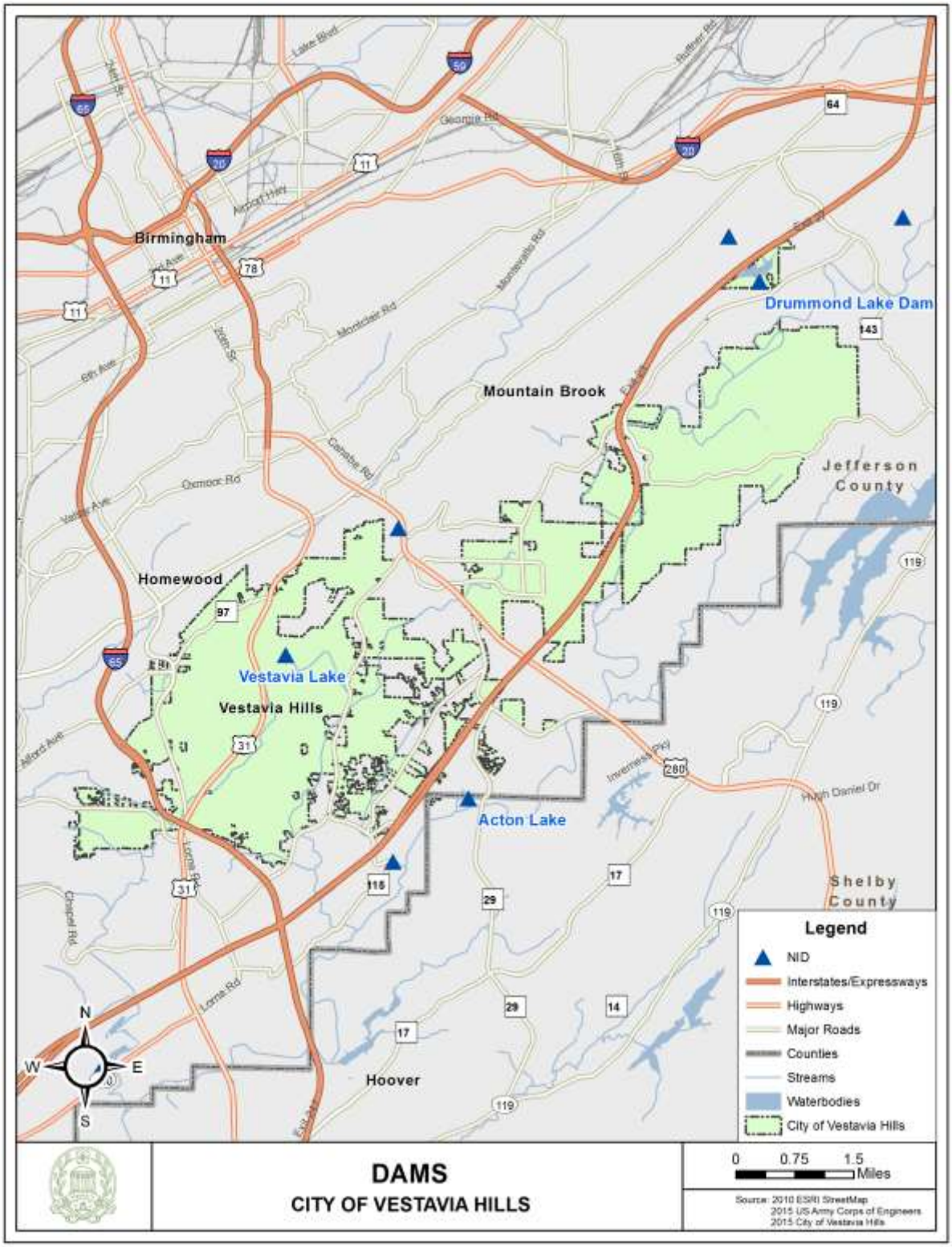
4.2.4 Flood-Related Special Hazards

Less-frequent hazards within the City include flooding from dams, levees, and land subsidence. This section includes an inventory of these potential flood-related special hazards should dams fail or, in the case of land subsidence, occur.

Dam Failures

The National Inventory of Dams lists two dams within the City: Vestavia Lake and Drummond Lake dams and Acton Lake (Altadena Lake) in unincorporated Jefferson County, adjacent to the City. Vestavia Lake is a private, recreational lake completed in 1950 on a tributary to Little Shades Creek. The earthen dam is approximately 30 feet in height and the estimated storage capacity is 72 acre-feet and does not pose a measurable flood hazard to structures. Drummond Lake is located in the northern-most section of the City and is also a private, recreational lake. The lake is located on a tributary to the Cahaba River. The impoundment is formed by a dam approximately 86 feet in height and has an estimated storage of 2,206 acre-feet. The area below the lake to the Cahaba is primarily undeveloped; however, a few residential structures not within the City may be threatened in the case of a dam failure. Acton Lake, also referred to as Altadena Lake, is a private, recreational lake bordered by residential properties. It was created on a tributary to the Cahaba River. The earthen dam is roughly 18 feet in height with an estimated 90 acre-feet of storage. Currently, the area downstream is a golf course so there is no measurable flood hazard. This area has been identified recently as an area of future development. Map 4-5 shows the locations of the dams listed in the National Inventory of Dams.

Map 4.5 - Dams


Birmingham
Mountain Brook
Homewood
Vestavia Hills
Vestavia Lake
Drummond Lake Dam
Acton Lake
Hoover
Jefferson County
Shelby County
Legend
NID
Interstates/Expressways
Highways
Major Roads
Counties
Streams
Waterbodies
City of Vestavia Hills
N
S
E
W
DAMS
CITY OF VESTAVIA HILLS
0 0.75 1.5 Miles
Source: 2010 ESRI StreetMap
2015 US Army Corps of Engineers
2015 City of Vestavia Hills

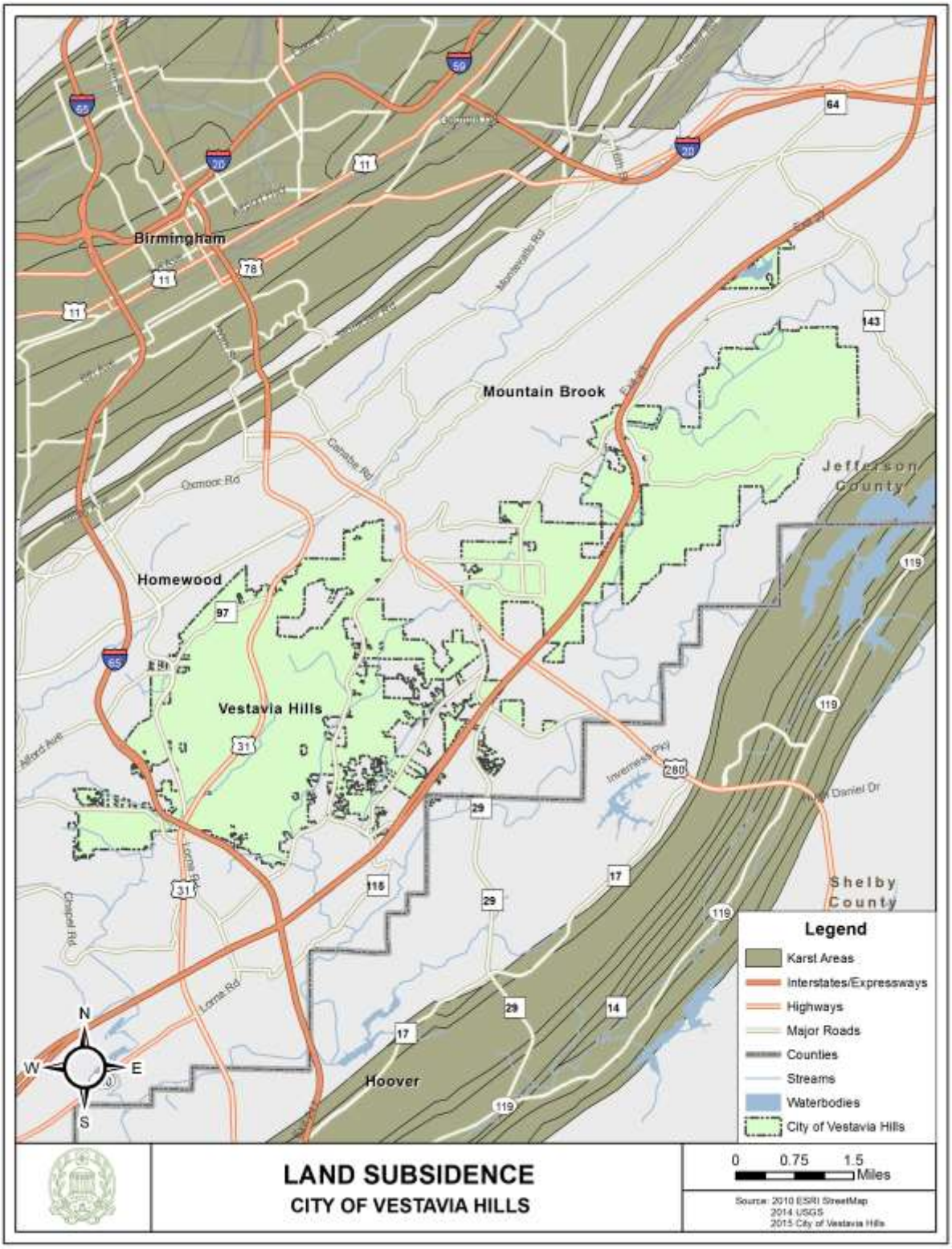
Levees

Levees are man-made structures that help contain or control the flow of water during a flood. It is important to note that levees reduce the risk of flooding; however, they do not eliminate the risk. A search of the U.S. Army Corps of Engineers National Levee database resulted in no known levees within or adjacent to the City. A further review indicated no known levees.

Land Subsidence (Sinkholes)

The final hazard discussed in this section is land subsidence or sinkholes. Land subsidence occurs when large amounts of groundwater have been withdrawn from certain types of rocks. The rock compacts because the water contributes to structural integrity and when withdrawn, collapses in on itself. This area is subject to karst topography which is susceptible to land subsidence. Karst topography is a region where the terrain has been dissolved by the physical and chemical weathering of the bedrock. These areas are composed of carbonate rocks, such as dolomite and limestone, or have high concentrations of evaporate, such as salt and gypsum. Karst is characterized by surface and subsurface features ranging from sinkholes, caves, springs, and complex underground drainage systems. A 2014 report from the USGS titled Karst in the United States: A Digital Map Compilation and Database by David Weary and Daniel Doctor includes a GIS dataset of karst and potential karst areas in the Contiguous United States. By mapping this dataset (Map 4-6 below), it appears that the mapped karst areas lie to the northwest and southeast of the City. Based on this information, it can be inferred that since no karst areas are within or adjacent to the City of Vestavia Hills, the risk associated with land subsidence is therefore low.

Map 4.6 - Land Subsidence



4.2.5 Past Floods

The City has experienced several significant flood events in the past. These are listed in Table 4-1 below. In addition to the flood events listed in Table 4-1, Appendix B includes summary tables of past flash flooding events, flooding events, and hurricane and tropical storm events from the National Climatic Data Center. The area has been included in several Presidential Disaster Declarations. A table listing the flood hazard related Presidential Disaster Declarations can be found in Appendix B, as well.

Table 4-1. Major Flood Events Since 2002

Date	Type	Description
September 22, 2002	Flooding	Flooding along Patton Creek/US-31; 5.3" in 6 hours
July 26, 2004	Flash Flood	Flooding along Patton Creek/US-31; Approximately 4" in 5 $^{1}/_{2}$ hours
September 16, 2004	Hurricane Ivan	Approximately 8.5" of rainfall from September 15 – 17
August 25, 2008	Tropical Storm Fay	Approximately 8" of rainfall from August 22 – 27
November 10, 2009	Hurricane Ida	Approximately 4" of rainfall
September 4, 2011	Tropical Storm Lee	Approximately 7.5" of rainfall from September 3 - 7
August 7, 2013	Flash Flood	Flooding along Patton Creek/US-31
April 7, 2014	Flash Flood	Flooding along Patton Creek/US-31; Cars, dumpsters, and utility trailer blocking Columbiana Road culvert; Flooding reported in the Meadowlawn community
May 28, 2015	Flash Flooding	Flooding of US-31; 1.5 to 2 inches in one hour
July 26, 2018	Flash Flooding	Flooding of US-31; 2 to 4 inches in one hour

Source: NWS Birmingham, Birmingham News, Schoel Engineering

4.2.6 Assessment of Future Flooding Locations and Problems

When assessing the flood hazard, it is imperative to not only study historic events and present day studies, but also to consider future factors that may affect the flooding magnitude and frequency. Three items that were considered and addressed in this plan are development within the watersheds, development within the floodplain, and climate change.

Development within the Watershed

Due to the continued urban growth within the City of Vestavia Hills and Birmingham Metropolitan Area, it is expected that flooding may increase in magnitude and frequency in the future. Post-construction stormwater management practices and controls attempt to mitigate hydrologic changes due to development and help offset the increased flow and volume of runoff. Even with properly implemented stormwater management practices, increased development within a watershed will likely result in adverse hydrologic changes and increased flooding. Little Shades Creek, Patton Creek, and Huckleberry Branch watersheds can be considered fully developed. Little Shades Creek has some potential development pockets remaining. The Cahaba River watershed has large tracts of undeveloped land in Leeds, Trussville, and Unincorporated Jefferson County. A summary of the development potential for each watershed is indicated in Table 4-2. This summary is based on the planning team's professional knowledge of local conditions and growth trends.

Table 4-2. Watershed Development Potential

Watershed	Size (Square Miles)	Development Potential
Cahaba Basin	144.7	High
Little Shades Creek	11.0	Moderate
Patton Creek	9.6	Low
Huckleberry Branch	1.8	Low

Development within the Floodplain

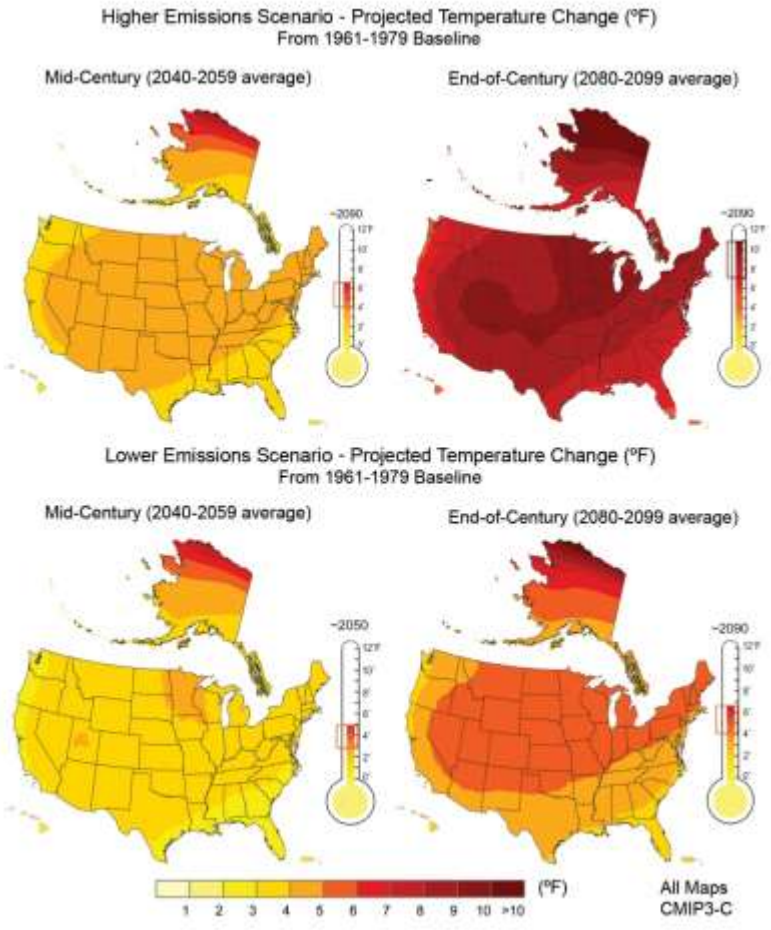
Similar to development potential for a watershed, an assessment of potential changes specifically within the floodplain was made for each waterbody. Development within a floodplain contributes to a loss of floodplain storage, increased velocities, and increased flows. This can result in downstream flood elevation increases. Due to the steep topography and narrow floodplains, the potential for increased development within the floodplains for Little Shades Creek and Huckleberry Branch are very low. The floodplain along Patton Creek is essentially fully developed at present. Any redevelopment within the Patton Creek floodplain, due to current frequent flooding, will most likely be limited to the current development footprint with possible flood mitigation measures implemented. The steep bluffs and narrow floodplain is prohibitive to future

development within the floodplain for the Cahaba River in the Vestavia Hills and Leeds area. In the upper Cahaba watershed, the topography is less challenging for development and the potential to develop within the floodplain is high. Continued growth of the Birmingham metropolitan area could result in more development within the Cahaba watershed and floodplain, specifically in the Trussville area.

4.2.7 Climate Change

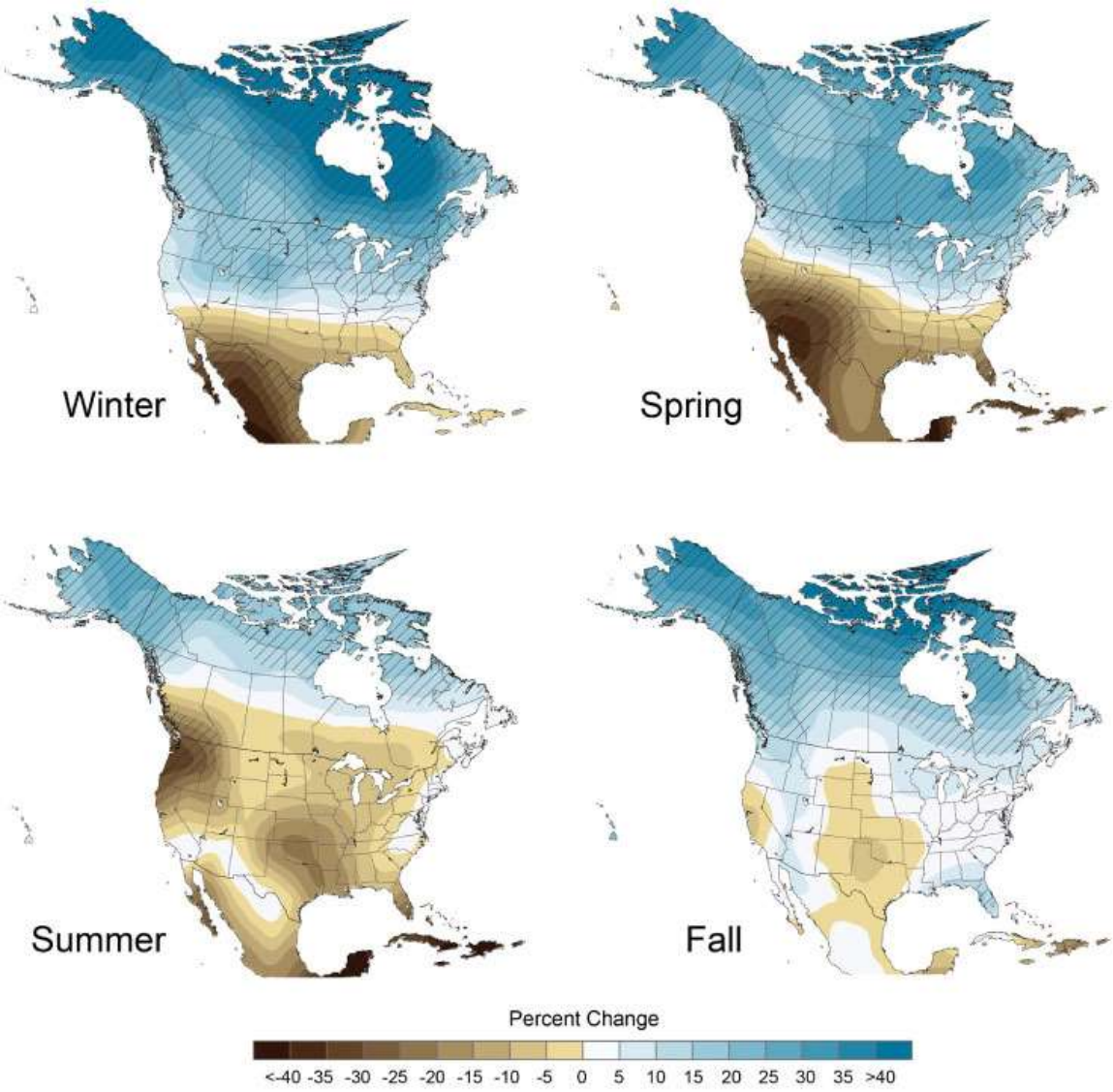
Based on climate change projections by the U.S. Global Change Research Program (USGCRP), average temperatures within Central Alabama are expected to increase by about 4°F to 7°F, depending on the emissions scenario and climate model (Map 4-7). The USGCRP also concludes that within the Southeast region of the U.S., very heavy precipitation events have increased over recent decades and further increases are projected. Although heavy precipitation events are projected to increase, the seasonal precipitation in central Alabama is projected to decrease up to 10% (Map 4-8).

Map 4-7. Projected Temperature Change



Source: USGCRP, 2009

Map 4-8. Projected Future Changes in Precipitation Relative to the Recent Past



Source: USGCRP, 2009

4.2.8 Other Natural Hazards

In addition to flooding, many other natural hazards affect the City of Vestavia Hills. The 2009 Jefferson County Multi-Hazard Mitigation Plan, as amended in 2011, identifies these additional hazards, which are listed in Table 4-3 below.

Table 4-3. Other Natural Hazards

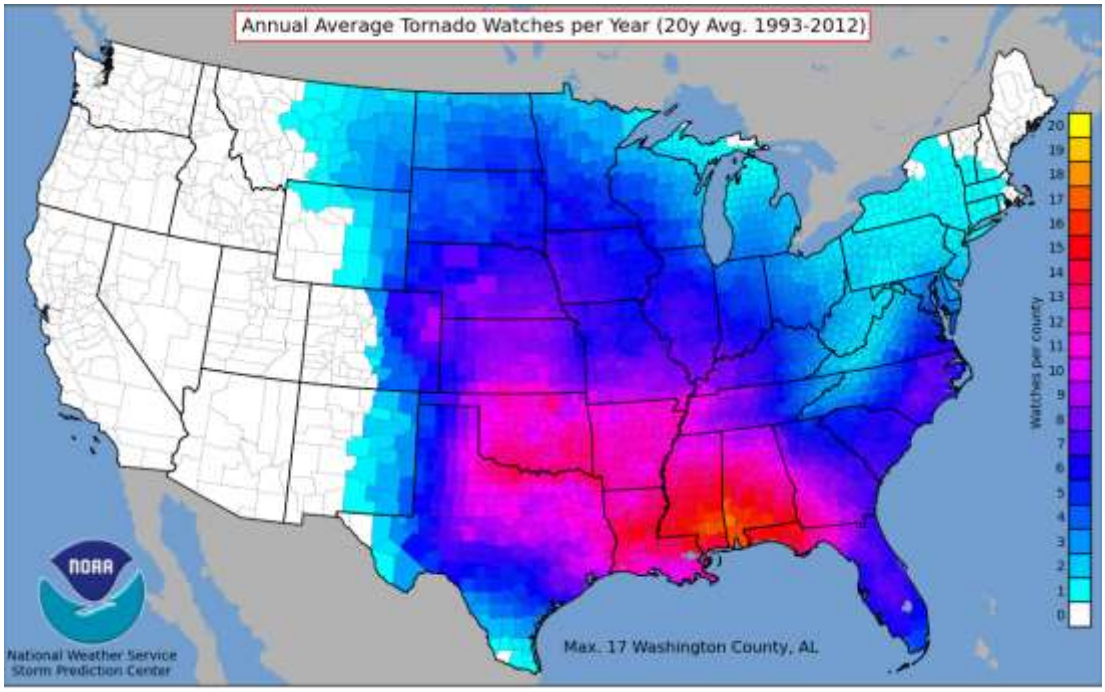
Hazards	Associated Hazards
Tornadoes	High Winds Severe Storms
Severe Storms	Thunderstorms Hail Lightning High Winds Tornadoes Floods
Winter Storms / Freezes	Snow Storms Ice Storms Extreme Cold
Wildfires	Severe Storms Drought
Hurricanes	Tropical Storms Tropical Depressions Severe Storms High Winds Floods
Droughts / Heat Waves	Extreme Heat Wildfires Sinkholes
Landslides	Severe Storms
Earthquakes	Landslides

Tornadoes

Tornadoes have frequently occurred within Jefferson County, resulting in lost lives, destroyed homes, and utility interruptions. Based on an analysis of the National Weather Service severe weather data, Jefferson County averages at least one tornado per year. Over the last 20 years, 31 tornadoes have been reported in Jefferson County. Of those 31 occurrences, 3 are identified within Vestavia Hills and Cahaba Heights. As shown on Map 4-9, Jefferson County is placed under a Tornado Watch on average 12 times per year.

Jefferson County's location makes it more susceptible to tornadoes compared to southern counties in Alabama. However, within Jefferson County, the locations of tornadoes are largely random. All areas and jurisdictions in Jefferson County are equally at risk. The 2009 Jefferson County Multi-Hazard Mitigation Plan notes that Jefferson County lies within a moderately high threat area and based on historical data can anticipate frequent tornadoes.

Map 4-9. Annual Average Tornado Watches per Year



Source: National Weather Service Storm Prediction Center, 2015

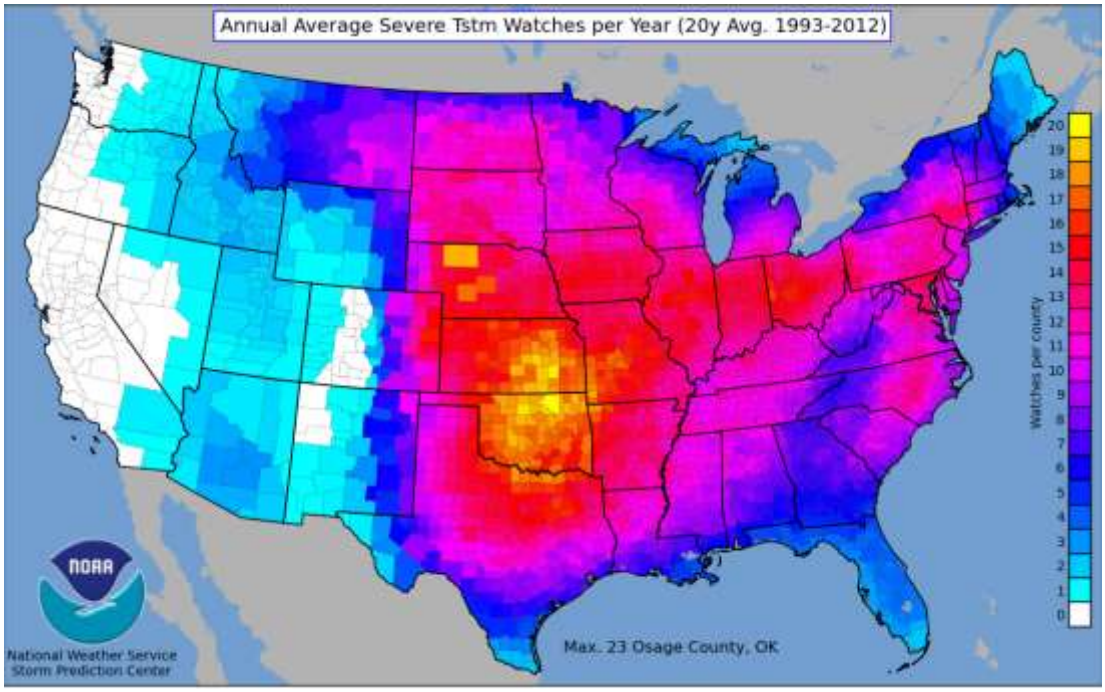
Severe Storms

According to the National Weather Service data, Jefferson County can expect to see thunderstorms, although not all are severe, 57.6 days per year based on historical data from 1950 to 2009. All areas of Jefferson County have equal exposure to severe storms. As shown on Map 4-10, Jefferson County is placed under a Severe Thunderstorm Watch on average 11 times per year.

Unlike flooding and tornadoes, severe storms lack geographic centers and boundaries, and therefore cannot be substantively mapped. As noted in the 2009 Jefferson County Multi-Hazard Mitigation Plan, as amended in 2011:

> *Frequent annual severe storm events are certain. Thunderstorms, hail and lightning will continue and can be expected to affect all Jefferson County jurisdictions. High winds, which sometimes accompany severe storms as described here, are however, somewhat less frequent. Large, damaging hail does occasionally occur, but is relatively rare.*

Map 4-10. Annual Average Severe Thunderstorm Watches per Year



Source: National Weather Service Storm Prediction Center, 2015

Winter Storms

The risks associated with winter storms and freezes include deaths, power outages, crop damage, and road hazards. The average snowfall for Jefferson County is 1.2 inches per year. Typical winter temperatures are above freezing, but temperatures below freezing do sometimes occur. Since 1995, there have been 17 recorded winter storm events (winter storm, heavy snow, ice storm, and winter weather) and 26 extreme cold events in Jefferson County.

Jefferson County can expect roughly one winter storm event per year. Typical winter storms pose only a mild risk, but the infrequent, severe winter storms/freezes (e.g., blizzard of 1993, winter storm of 2014) can cause major transportation disruptions, lengthy power outages, substantial property damages, frostbite, and fatalities.

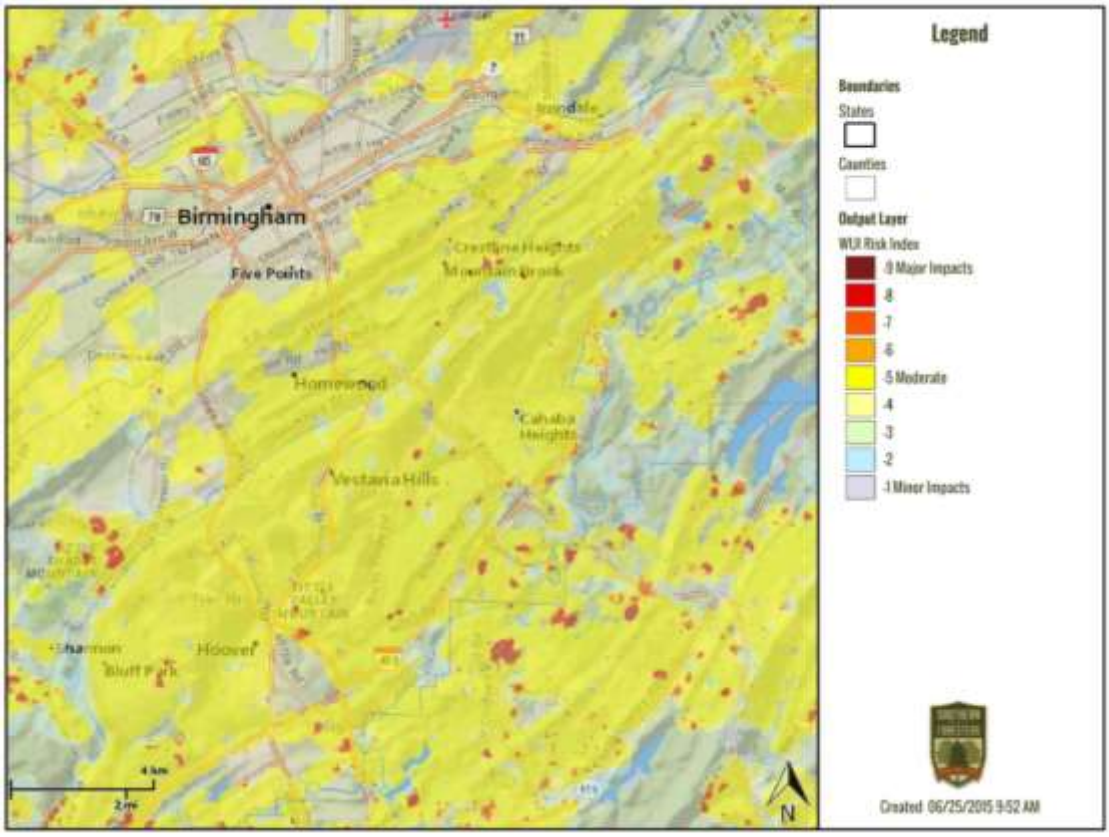
Wildfires

The two primary categories of wildfires in Jefferson County are wildland fires and interface fires. Wildland fires feed on natural vegetation. Interface fires feed on both vegetation and human development. Interface fires as so named because they occur at the interface of nature and human developments.

Vestavia Hills is most susceptible to urban interface fires. The Wildland Urban Interface (WUI) Risk Index is a rating of the potential impact of a wildfire on people and their homes. The WUI Risk Index is based on housing density and proximity to rural areas. Map 4-11 below depicts the WUI Risk Index for Vestavia Hills and the surrounding communities. Most of the City is classified as Moderate Impacts in

accordance to the WUI Risk Index. A few, small, isolated pockets of increased impacts and higher risk are located within Vestavia Hills, with the largest located in the Liberty Park neighborhood.

Map 4-11. Vestavia Hills Wildland Urban Interface Risk Index



Source: Southern Group of State Foresters Wildfire Risk Assessment Portal, 2015

The Alabama Forestry Commission maintains a record of wildfire information. A total of 253 wildfires impacting 7,375 acres have occurred within Jefferson County during the period of 2009-2014. This is on average 42 wildfires per year.

Hurricanes

Vestavia Hills is located more than 200 miles inland of the Gulf of Mexico; however, it is still vulnerable to hurricanes and tropical storms. Table B-3 located in Appendix B lists 4 hurricane and tropical storm events that have affected Jefferson County and the City of Vestavia Hills in the last 20 years (1995-2014).

The extent of hurricane damage in Jefferson County depends primarily on wind speeds, tornado formation, and flooding. Defining the probability of future events is difficult as described in the 2009 Jefferson County Multi-Hazard Mitigation Plan, as amended in 2011:

As is the case with most natural hazards, past records are no guarantee of the probability of future hurricane events affecting Jefferson County. However, based

on historical data, the County can reasonably expect some impact from at least one hurricane or tropical storm per year. The level of risk and location of potential damage within Jefferson County is random, and cannot be accurately predicted with historical data.

Droughts/Heat Waves

Jefferson County experiences occasional droughts and affects all jurisdictions with equal frequency. Droughts cause widespread crop and pasture losses, wildfires, and severe shortages of water resources. According to the National Climatic Data Center Storm Event Database, Jefferson County has experienced a drought event in seven of the last twenty years (1995-2014). The most severe drought spanned 2006-2008. Based on historical data, Jefferson County can expect, on average, one drought event per year.

Landslides

The impact from a landslide can include loss of life, damage to buildings, lost productivity, disruption in utilities and transportation systems, and reduced property values. According to the 2009 Jefferson County Multi-Hazard Mitigation Plan, as amended in 2011, Jefferson County lies in an area with moderate susceptibility for landslides, but a low incidence. As recently as April 2014, the City of Vestavia Hills experienced a landslide which blocked the northbound side of U.S. Highway 31 as shown in the following photo.

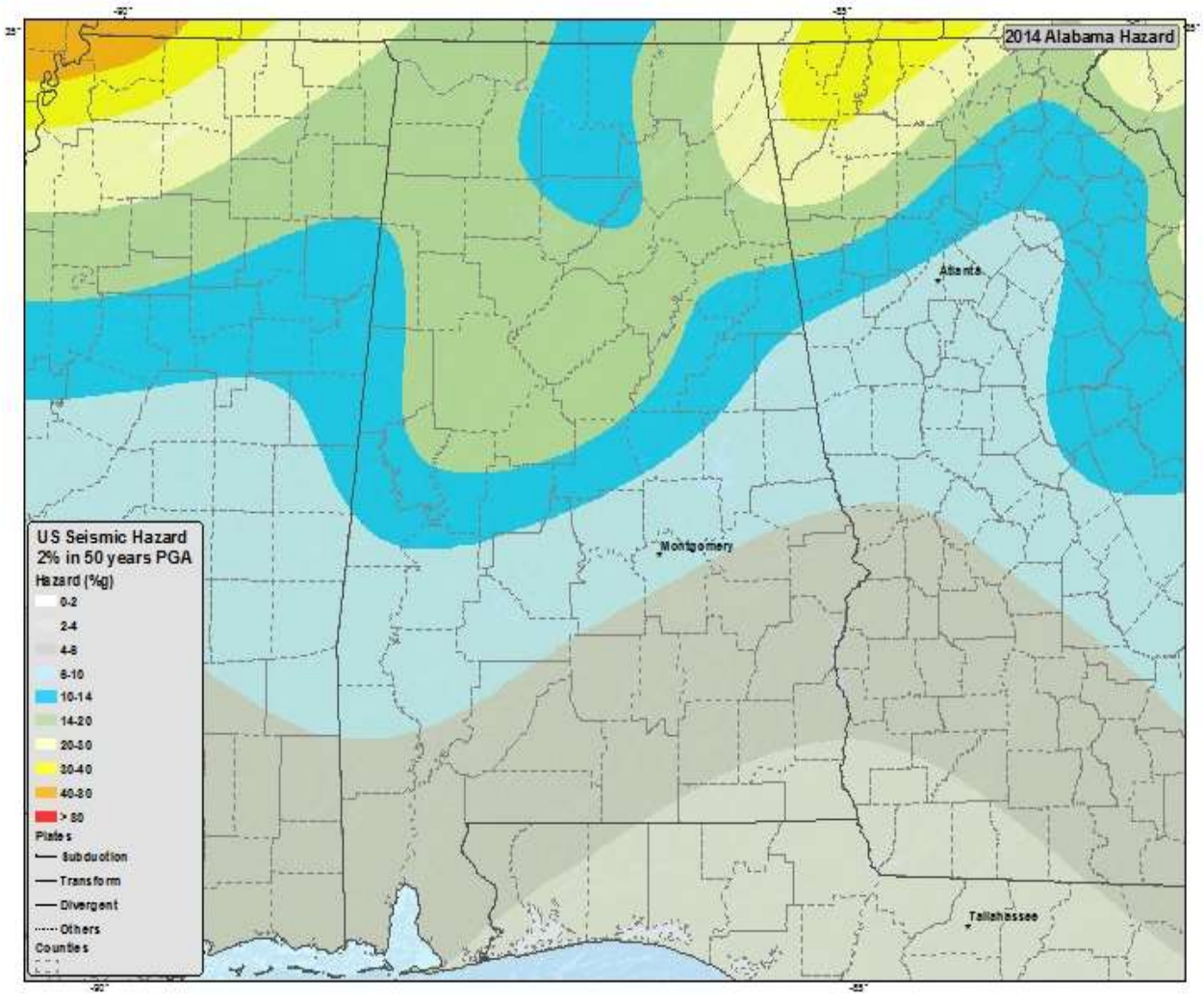
Image 4-1. Landslide at Highway 31 in Vestavia Hills

Source: Vestavia Hills Police Department/Facebook, 2014

Earthquakes

Earthquakes are a rare occurrence in Jefferson County. Since 1886, the Geological Survey of Alabama has a record of 15 earthquakes within Jefferson County. A small magnitude 1.6 earthquake occurred on December 14, 2012 with the epicenter located near Grants Mill Road in the vicinity of the Liberty Park neighborhood. The USGS publishes national seismic hazard maps which show likelihood of exceeding a level of earthquake shaking in a given time period. The shaking intensity is measured in peak ground acceleration (PGA) which is acceleration (shaking) of the ground expressed as a percentage of gravity (%g), or as a percentage of 9.8 meters per second squared. Map data from the USGS Earthquake Hazards Program 2014 seismic hazard map (Map 4-12) shows the City of Vestavia Hills has a 2% chance of exceeding shaking above 14%g in the next 50 years.

Map 4-12. 2014 Alabama Seismic Hazard Map



Source: USGS, 2014

4.3 Vulnerabilities and Hazard Impacts: Assessing the Problem

Understanding the vulnerabilities and impacts of existing and future structures, critical facilities, and infrastructure to flooding and related hazards, provides a basis for establishing priorities for mitigation. The vulnerability assessment presented by this section is critical to planning and implementing responsive flood hazard mitigation measures.

FEMA's risk assessment software HAZUS-MH (version 2.2) was used to estimate flood losses for the study region, and the results have been integrated into this plan. HAZUS-MH provides an analytic, decision support tool to help communities make informed decisions regarding land use within their flood prone areas. A "Level 1 Analysis" of the 100-year flood event was modeled within HAZUS-MH. It utilizes the most recent datasets for the State of Alabama that is included in the software package. The HAZUS dataset includes 2010 Census data, such as demographic characteristics of the Vestavia Hills study region from the 2010 Census, square footage for different building occupancy types, and numbers and locations of bridges, in addition to other data from a variety of sources.

4.3.1 Summary of Vulnerability and Impacts

This risk assessment examines the City of Vestavia Hill's flood hazard vulnerabilities and impacts to the public health, safety and welfare, including impacts on populations, structures, critical facilities, the local economy, and other resources. A brief summary of impacts of flooding and related hazards can be found in Table 4-4 "Summary of Flood-Related Hazards and Community Impacts" below. This table is an abridged version, based upon the comparable Table 5-20 found in the 2014 Jefferson County Hazard Mitigation Plan Update. Table C-1 located in Appendix C of this document includes all other natural hazards identified in this plan.

For the purposes of summarizing the impacts and quantifying the risk associated with the various hazards, the following descriptions and measurements are used in Table 4-4:

Location. Location measures the geographic extent of the identified hazard in one of three ways, as follows:

1) *County-wide* - the entire geographic area is affected;
2) *Location specific* - a significant portion of the community is affected; or
3) *Minimal* - a negligible area is affected.

Probability. Probability measures the likelihood of the hazard occurring within the community, based on historical incidence. The scale for frequency runs as follows:

1) *Very high* - annually;
2) *High* - every two to three years;
3) *Moderate* - every three to ten years;
4) *Low* - every ten years; or
5) *Very low* - rare.

Extent. Extent measures the severity of the hazard and its potential to cause casualties, business losses, and damage to structures. The scale utilized runs as follows:

1) *Severe* - the potential for devastating casualties, business losses, and structure damage;
2) *Moderately severe* - the potential for some casualties and significant, but less than devastating, business losses and structure damage;
3) *Somewhat severe* – moderate potential for economic losses and structure damage; or
4) *Not severe* – slight or minimal potential for economic losses and structure damage

Exposure. Exposure measures the percentage of structures within the community, including buildings, critical facilities, and infrastructure lifelines, that are exposed to the hazard. The classifications are defined as follows:

1) *High* - includes more than approximately 25 percent of the structures;
2) *Medium* - includes 10 percent to 25 percent of the structures; or
3) *Low* - includes less than 10 percent of the structures.

Damage Potential. Damage potential measures the damage that can be expected should an event take place. The classifications are defined as follows:

1) *High* - a hazard could damage more than 5 percent of the structures in a community;
2) *Medium* - a hazard could damage between 1 and 5 percent of the structures in a community; or
3) *Low* - a hazard could damage less than 1 percent of the structures in a community.

Table 4-4. Summary of Flood-Related Hazards and Community Impacts

Flood-Related Hazard	Community Impacts			Impacts to Vulnerable Community Buildings, Critical Facilities, and Infrastructure	
	Location (Geographic Extent of Hazard in the Community)	**Probability** (Frequency of Hazard Occurrence in the Community)	**Extent** (Magnitude of Severity of Hazard in the Event of Occurrence)	**Level of Exposure** (Degree of Structures Exposed to the Hazard)	**Level of Damage Potential** (Percentage of Likely Damage to Exposed Structures)
Floods	Location Specific	Very High	Severe	Low	High
Dam/Levee Failures	Location Specific	Very Low	Not Severe	Low	Low
Sinkholes (Land Subsidence)	Location Specific	Low	Not Severe	Low	Low

4.3.2 Description of Impacts

Life Safety

Vulnerability to flood hazards includes the impacts to the social structure, such as, injury and death, and the psychological effects on the populous. Flood impacts to life safety can be a direct impact to life safety due to injury or death, but can also have impacts on public safety by limiting access to personal or emergency vehicles when transportation corridors are closed. Proper warning and evacuation procedures should be planned and implemented to reduce the risks to residents and visitors.

Within the risk assessment study region of the City of Vestavia Hills and its environs, HAZUS-MH reports the region contains over 34,000 households and a total population of 79,506 people (2010 Census Bureau data). Although HAZUS-MH does not provide estimates on injury or death, the model estimates that 380 households will be displaced due to a 100-year flood event. Displacement includes households evacuated from within or very near to the inundated area. Of those displaced, 820 people (out of a total population of 79,506) will seek temporary shelter in public shelters.

Public Health

Impacts due to flooding create hazards to public health during and after a flood event. Hazardous and toxic substances can be released into the flood waters where the public may come in contact with these substances. These substances include household, commercial and industrial chemicals, sanitary sewer overflows and pets or wildlife that may die during the event. Utilities, such as power, gas and water, may also be shut down during and after an event. This could cause potential health hazards to

the elderly with poor mobility or members of the public with special health care needs. Mold is another public health hazard after a flood event, when inundated structures sustain water damage and remain damp from flood waters.

Critical Facilities

Critical facilities are defined as those that are essential to the health and welfare of the community and are critical subsequent to hazard events. Examples include medical care facilities (hospitals and other care facilities), police and fire facilities, emergency management facilities, schools, and emergency shelters.

The 2014 Jefferson County Hazard Mitigation Plan Update includes an inventory of critical facilities for Vestavia Hills, grouped by proximity to a City fire station. The inventory included in this plan has been aggregated to show those critical facilities within the City of Vestavia Hills based on classification. This information can be found in Tables 4-5 through 4-11 and Maps 4-13 through 4-19.

Table 4-5. Government Facilities

Agency	Address	Description	Lat	Lon
Liberty Park Maintenance Shed	4700 Sicard Hollow Rd	Local	33.4762	-86.6717
U.S. Post Office	745 Montgomery Hwy	Federal	33.4443	-86.7901
United States Postal Service	3105 Sunview Dr	Federal	33.4615	-86.7348
Vestavia Hills Chamber of Commerce	1975 Merryvale Rd	Local	33.4336	-86.7891
Vestavia Hills City Hall	1032 Montgomery Hwy	Local	33.4378	-86.7911
Vestavia Hills Civic Center	1975 Merryvale Rd	Local	33.4336	-86.7891
Vestavia Hills Maintenance Dept	1280 Montgomery Hwy	Local	33.4298	-86.7902
Vestavia Hills Vehicle Maintenance Facility	1280 Montgomery Hwy	Local	33.4298	-86.7902

Map 4-13. Government Facilities

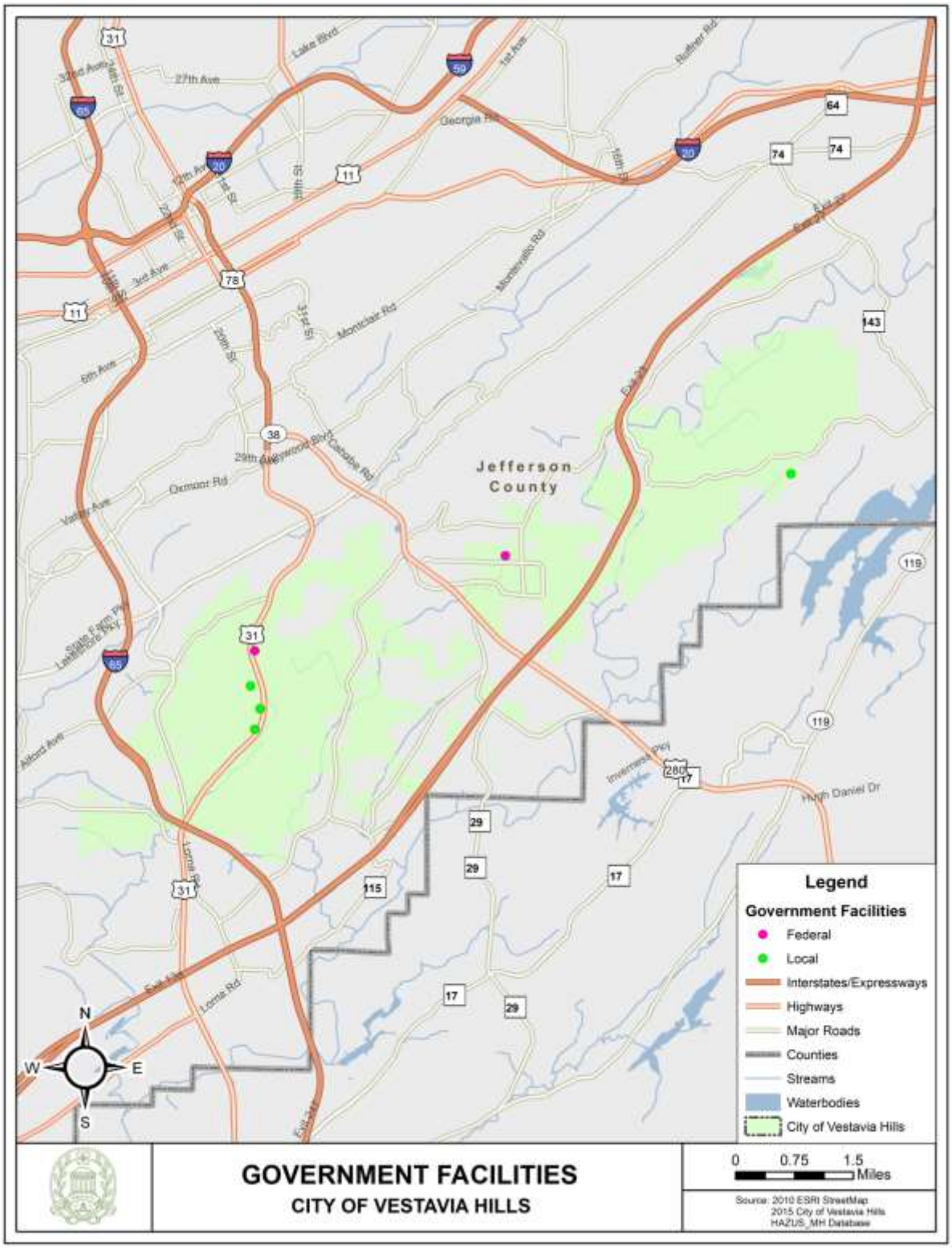


Table 4-6. Public Safety Facilities

Name	Address	Description	Zip Code	Lat	Lon
Birmingham Jefferson County EMA	513 Montgomery Hwy	Emergency	35216	33.4507	-86.7878
Jefferson County Sheriffs Office	3000 Shades Crest Rd	Police	35216	33.4621	-86.7597
Vestavia Hills Fire Station 1	509 Montgomery Hwy	Fire	35216	33.4507	-86.7878
Vestavia Hills Fire Station 2	2925 Columbiana Rd	Fire	35243	33.4169	-86.8056
Vestavia Hills Fire Station 3	3201 Morgan Dr	Fire	35216	33.4221	-86.7784
Vestavia Hills Fire Station 4	13041 Liberty Pkwy	Fire	35242	33.4751	-86.6896
Vestavia Hills Fire Station 5	3241 Cahaba Heights Rd	Fire	35243	33.4538	-86.7287
Vestavia Hills Police Department	1032 Montgomery Hwy	Police	35216	33.4507	-86.7878

Map 4-14. Public Safety Facilities

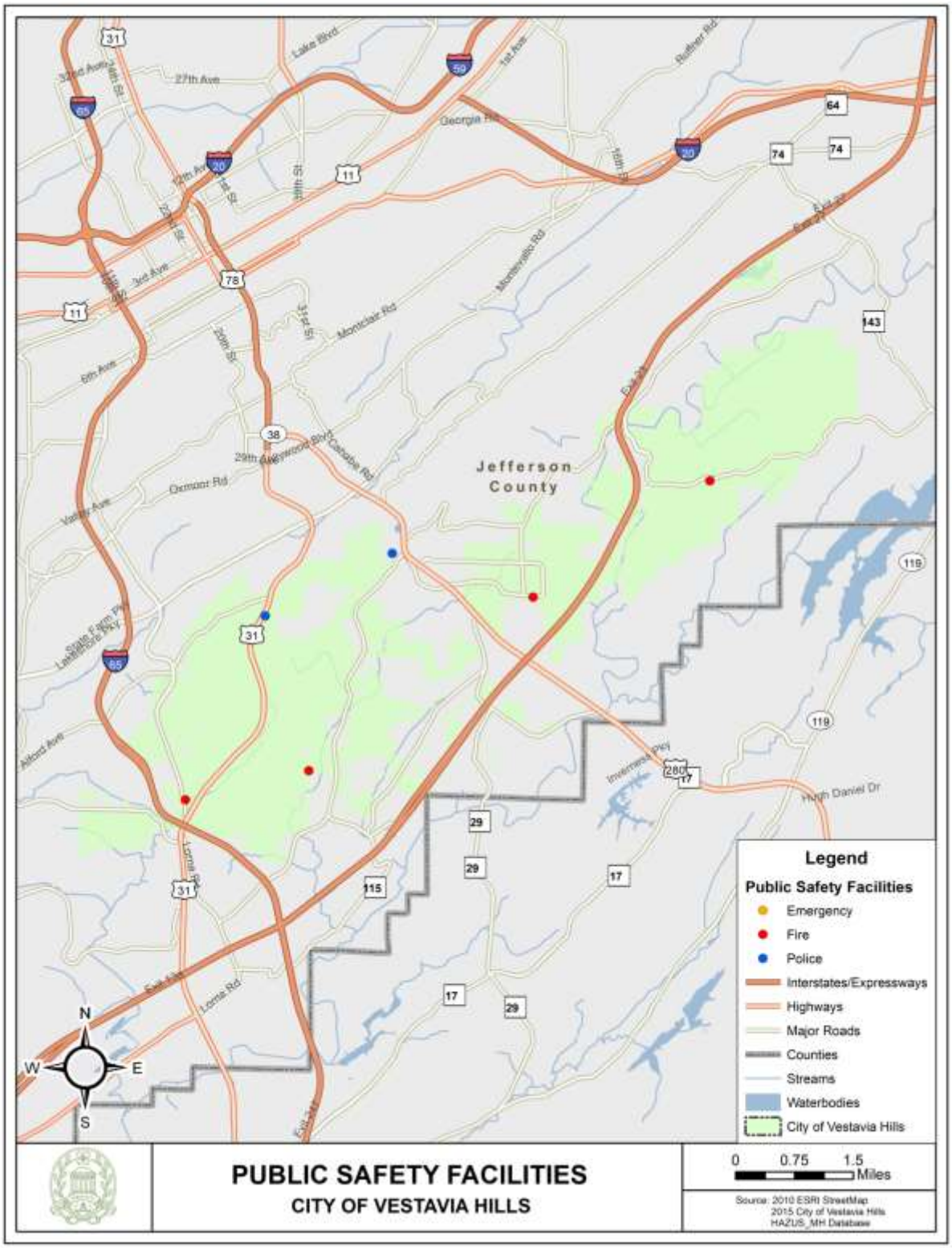


Table 4-7. Schools

Name	Address	Lat	Lon
Cahaba Heights Elementary School	4401 Dolly Ridge Rd	33.4521	-86.7378
Liberty Park Elementary School	17051 Liberty Parkway	33.4785	-86.6720
Liberty Park Middle School	17035 Liberty Parkway	33.4785	-86.6720
Pizitz Middle School	2020 Pizitz Dr	33.4207	-86.7952
Primrose School	1800 Urban Center Parkway	33.4813	-86.7017
Vestavia Hills Elementary Central	1289 Montgomery Hwy	33.4273	-86.7899
Vestavia Hills Elementary East	2105 Tyson Dr	33.4489	-86.7871
Vestavia Hills Elementary West	1965 Merryvale Rd	33.4330	-86.7899
Vestavia Hills High School	2235 Lime Rock Rd	33.4195	-86.7802

Map 4-15. Schools

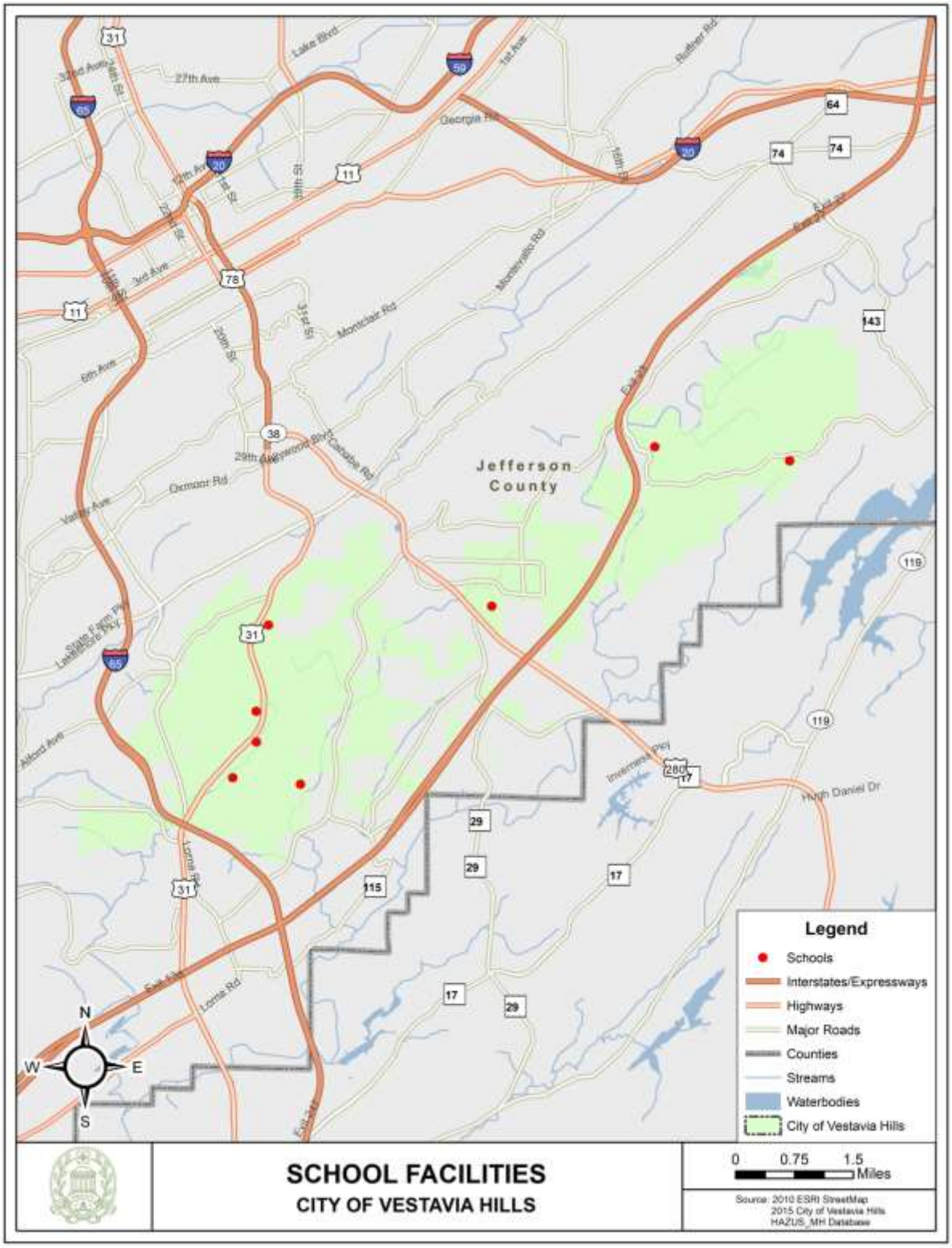


Table 4-8. Hospital and Elderly Care Facilities

Name	Description	Address	Zip Code	Lat	Lon
Alabama Baptist Childrens Home	Residential Facility	2681 Rocky Ridge Ln	35216	33.4039	-86.7646
Cahaba Ridge Retirement	Retirement/nursing home	3090 Healthy Way	35243	33.4268	-86.7385
Chateau Vestavia Independent	Retirement/nursing home	2401 Columbiana Rd	35216	33.4311	-86.8107
Columbia Cottage		3776 Crosshaven Dr		33.4689	-86.7318
Town Village Senior Living		2382 Dolly Ridge Rd		33.4231	-86.7734

Map 4-16. Hospital and Elderly Care Facilities

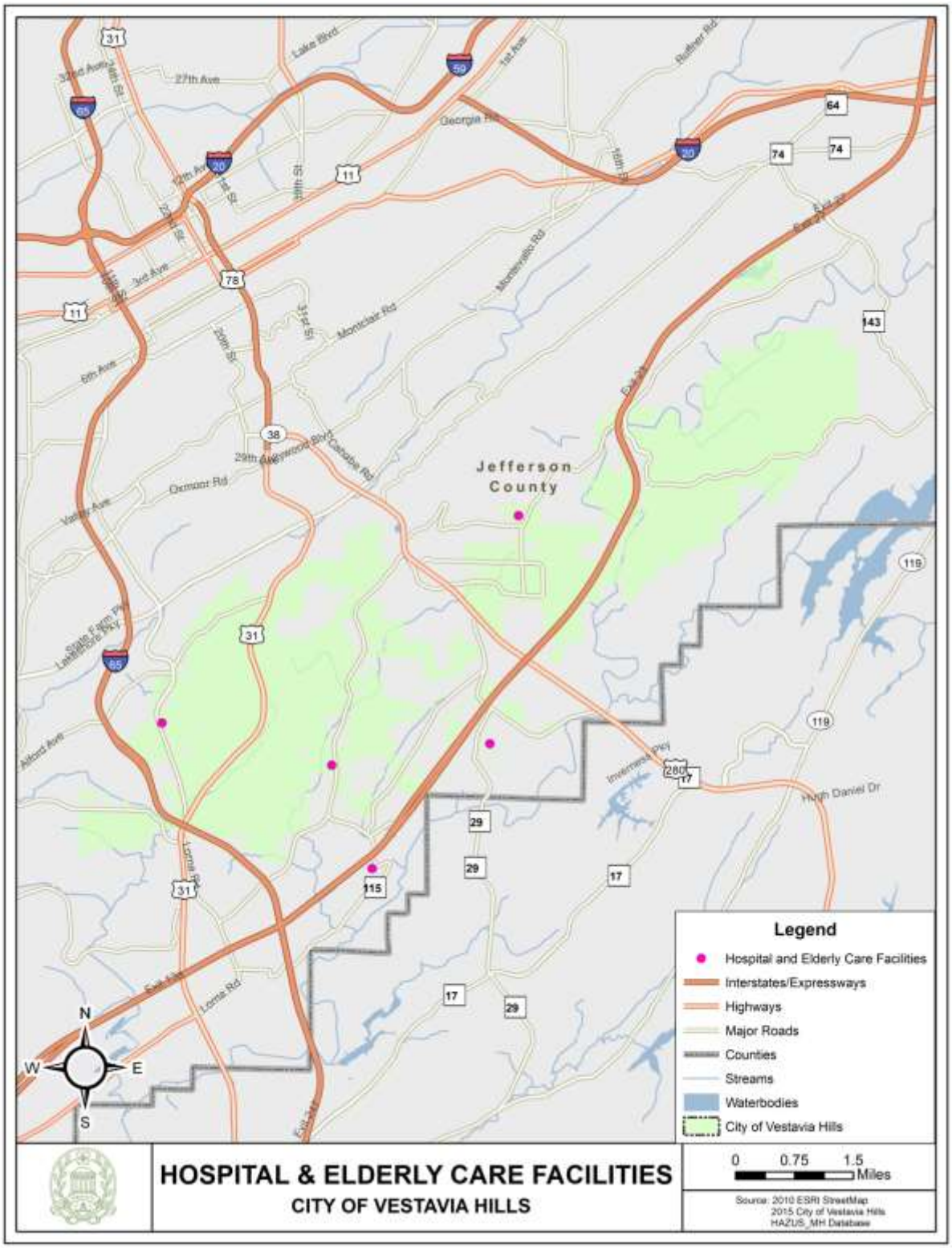


Table 4-9. Utilities

Name	Address	Facility Type	Lat	Lon
APCO Substation	635 Tremont Dr	Power	33.4482	-86.7882
Power Substation	3013 Massey Rd	Power	33.4205	-86.8015
Power Substation	1436 Montgomery Hwy	Power	33.4207	-86.8001
Power Substation	2400 Rocky Ridge Rd	Power	33.4141	-86.7746
Sewage Treatment Plant	13059 Liberty Parkway	Sewer	33.4751	-86.6894
Water Tower	646 Gary Mac Dr	Water	33.4121	-86.8302
Water Tower	1656 Panorama Dr	Water	33.4140	-86.7917

Map 4-17. Utility Facilities

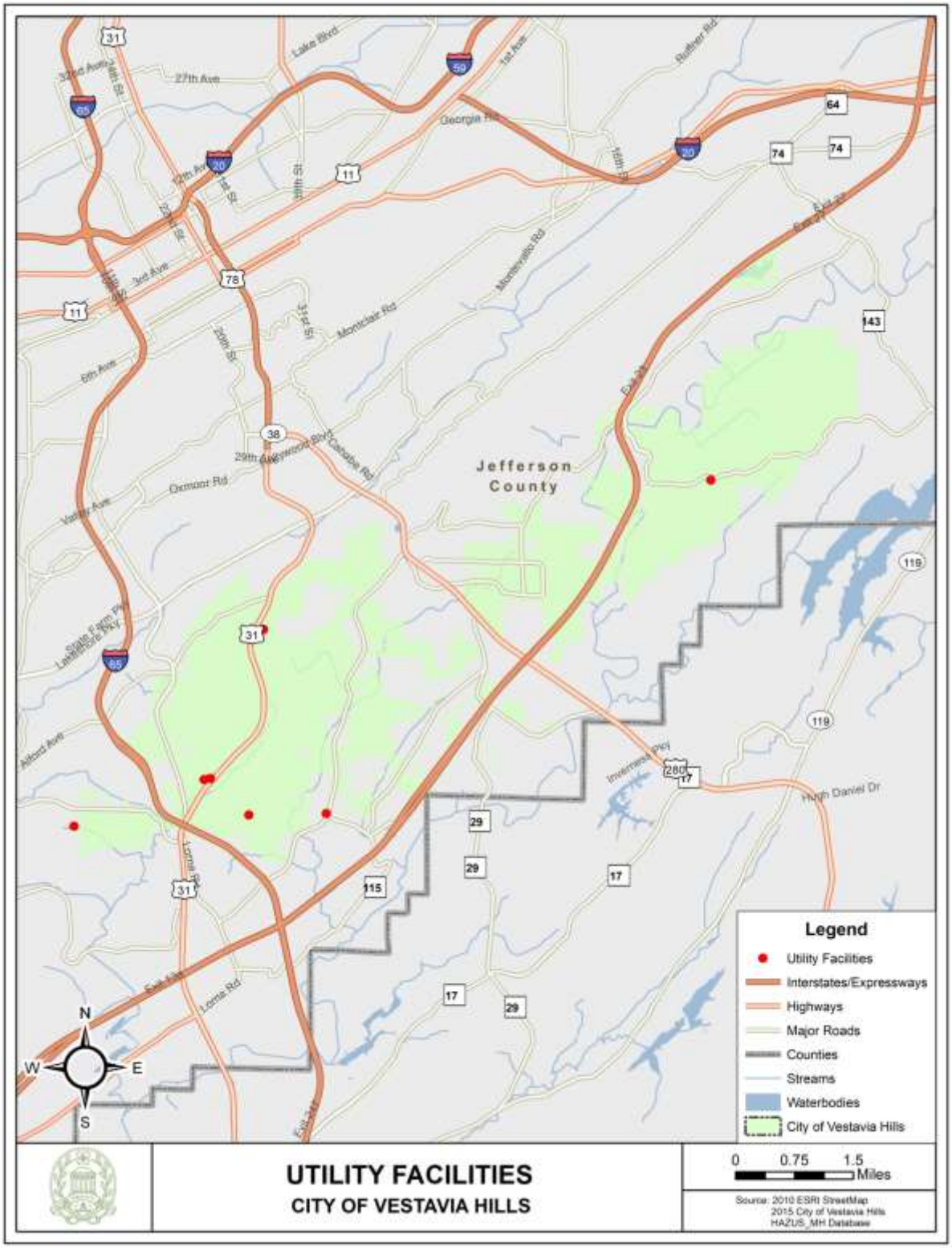


Table 4-10. Communication Facilities

Name	Address	Callsign	Lat	Lon
Alabama Gas Corporation	2501 Aspen Cove Drive	WQGN457	33.4254	-86.7641
Alabama Gas Corporation	1012 Firewood Circle	WQJQ837	33.4664	-86.7176
AT&T Substation	1474 Montgomery Hwy		33.4168	-86.8030
AT&T Substation	3203 Ridgley Dr		33.4552	-86.7304
Briarwood Presbyterian Church	2200 Briarwood Way	WPNJ983	33.4168	-86.7604
Cell Tower	1386 Montgomery Hwy		33.4255	-86.7952
Cell Tower	2645 Hackberry Rd		33.4148	-86.8093
Falcon Direct Inc	2600 Vestavia Dr	WQHG753	33.4625	-86.7690
FCI 900, INC.	2679 Hackberry Road	WQHT805	33.4153	-86.8083
Slappey Communications	4260 Cahaba Heights Rd		33.4536	-86.7351

Map 4-18. Communication Facilities

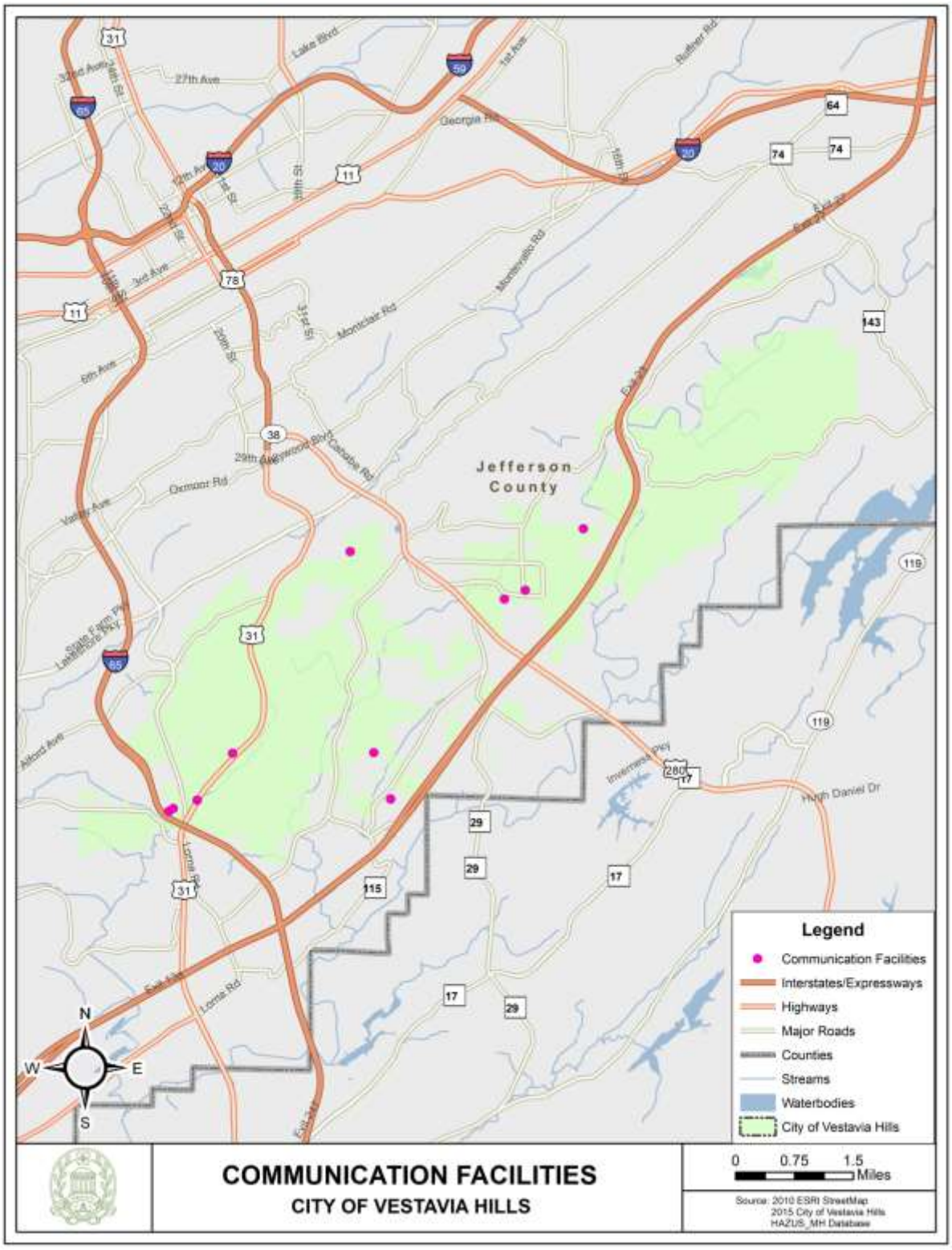
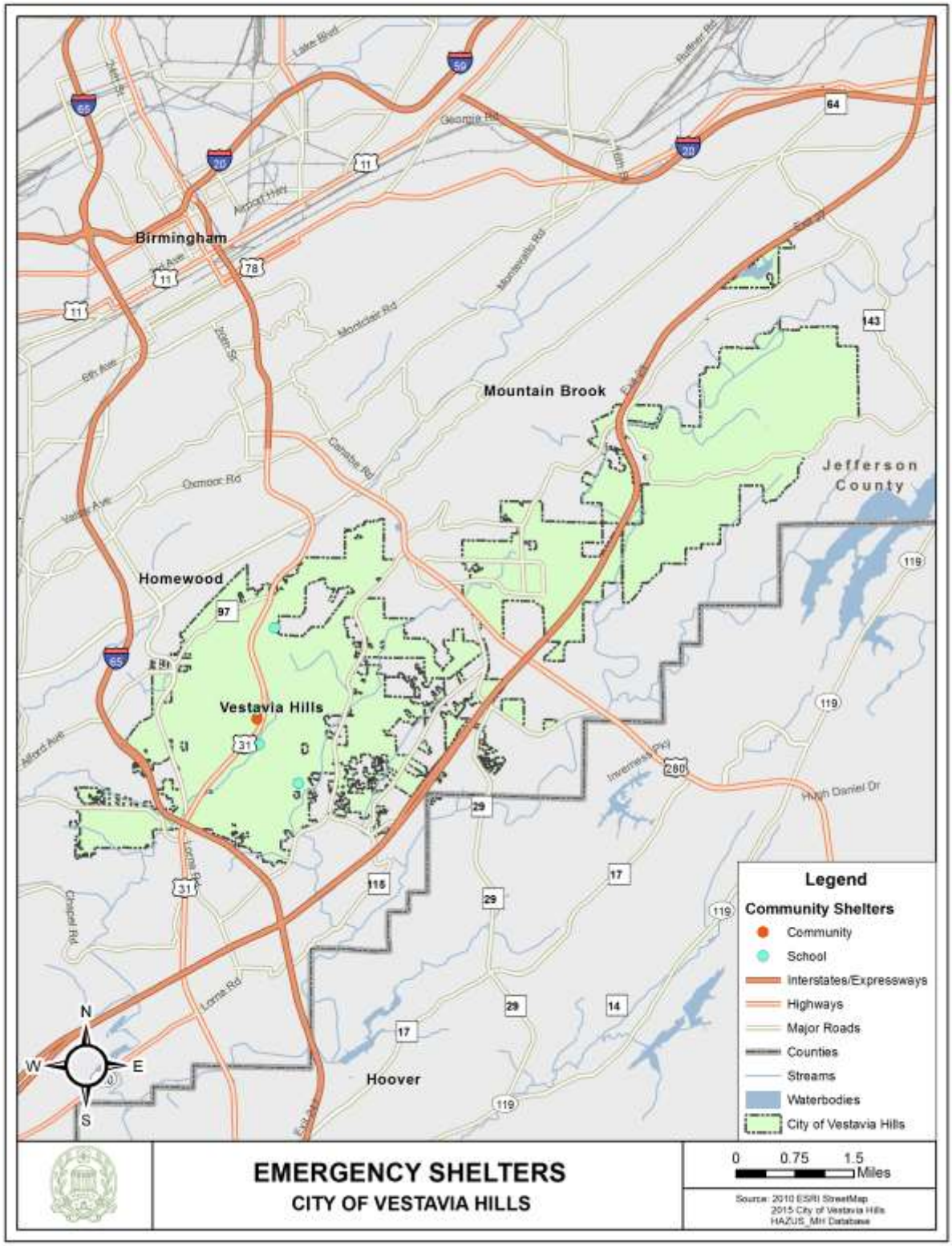


Table 4-11. Emergency Shelters

Name	Address	Zip Code
Vestavia Civic Center	1973 Merryvale Rd.	35216
Vestavia Hills Elementary Central	1289 Montgomery Hwy	35216
Vestavia Hills Elementary East	2109 Tyson Drive	35216
Vestavia Hills Elementary West	1965 Merryvale Road	35216
Vestavia Hills High School	2235 Lime Rock Rd.	35216

Map 4-19. Emergency Shelters



As previously stated, critical or essential facilities are crucial following a flood event to provide assistance and needed services to the public. It is important that these facilities are able to operate fully before, during, and after a flood hazard event. Table 4-12 contains an inventory of primary critical facilities and the expected damage from a 100-year flood event generated from the HAZUS model.

Table 4-12. Expected Damage to Essential Facilities from a 100-Year Flood Event

Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	2	0	0	0
Hospitals	1	0	0	0
Police Stations	2	0	0	0
Schools	27	1	0	1

In addition to the above damage estimates above, the HAZUS model indicates that all available hospital beds remain available following the modeled 100-year return period flood event.

It is important to note that HAZUS-generated structure counts, such as those in the above table, and values are approximate; however, the estimates from HAZUS are useful for prioritizing mitigation measures by place, since the relative values of existing and future populations, building inventories and values, and rates of exposure are considered reasonable for these purposes.

Local Economy

Flood damage to homes and property, city infrastructure and local business create vulnerabilities to the local economy. Businesses without utilities may not be able to function; creating loss in income for the owner and community. Damaged buildings and infrastructure will require costly repair or replacement claims to property owners, insurance companies and municipal governments. Impacts due to transportation during flood events can also cause vulnerabilities to the local economy. Transportation routes can be closed for short periods of time while flood waters are present and for longer periods of time if the roads have sustained damaged from the flooding.

The HAZUS model defines the economic losses as building-related losses only. The building-related losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated cost to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of damage sustained during a flood. Business interruption losses also include the temporary living expenses for the people displaced from their homes because of the flood. This section focuses on the business interruption losses.

HAZUS estimates the total economic loss for the 100-year flood event scenario is $132.85 million, which represents 7.8% of the total replacement value of the scenario buildings. Of this total, $370,000 or 0.3% of losses are categorized as business interruption losses. Table 4-13 below provides a summary of the economic losses associated with the building damage, both direct building losses and building interruption losses.

Table 4-13. Building-Related Economic Loss Estimates (millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	46.88	16.56	1.57	1.35	66.35
	Content	27.42	29.87	2.73	5.45	65.48
	Inventory	0.00	0.30	0.33	0.02	0.65
	Subtotal	**74.30**	**46.73**	**4.63**	**6.81**	**132.47**
Business Interruption						
	Income	0.00	0.13	0.00	0.01	0.14
	Relocation	0.03	0.03	0.00	0.00	0.06
	Rental Income	0.01	0.02	0.00	0.00	0.03
	Wage	0.00	0.12	0.00	0.03	0.16
	Subtotal	**0.04**	**0.30**	**0.00**	**0.04**	**0.37**
All	**Total**	**74.34**	**47.02**	**4.63**	**6.85**	**132.85**

Buildings

Many public and private buildings within the flood prone areas are subject to inundation during flood events. Older building infrastructure is especially vulnerable to damage in flood prone areas because they may have been constructed before flood ordinances required specific building construction criteria to prevent flood damage.

Within the risk assessment study area, there are an estimated 29,047 buildings with a total replacement value (excluding contents) of $12.4 billion (2010 dollars). Over 90% of the buildings are categorized as residential housing with a replacement value of $10.0 billion (81.28% of the total building value).

HAZUS estimates that approximately $1.7 billion or 13.8% of the aggregate total building replacement value is at risk during the 100-year return period flood scenario.

The relative distribution of the value with respect to the overall occupancies generated by HAZUS for the modeled scenario is listed below in Table 4-14.

Table 4-14. Building Exposure by Occupancy Type for the 100-year Flood Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,333,469	78.1%
Commercial	307,865	18.0%
Industrial	30,407	1.8%
Agricultural	1,922	0.1%
Religion	21,628	1.3%
Government	87	0.0%
Education	12,848	0.8%
Total	**1,708,226**	**100.00%**

As shown in Table 4-13, building losses are the primary component in the total economic loss. The total building losses are $132.47 million. The residential occupancies make up 56.1% of the total building loss value, while commercial occupancies make up only 35.3% of the total building loss value.

HAZUS estimates that about 146 buildings will be at least moderately damaged during the 100-year return period flood event. This is over 16% of the total number of buildings in the scenario. In addition, HAZUS estimates 20 buildings will be completely destroyed. Table 4-15 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4-16 summarizes the expected damage by general building type.

Table 4-15. Expected Building Damage by Occupancy

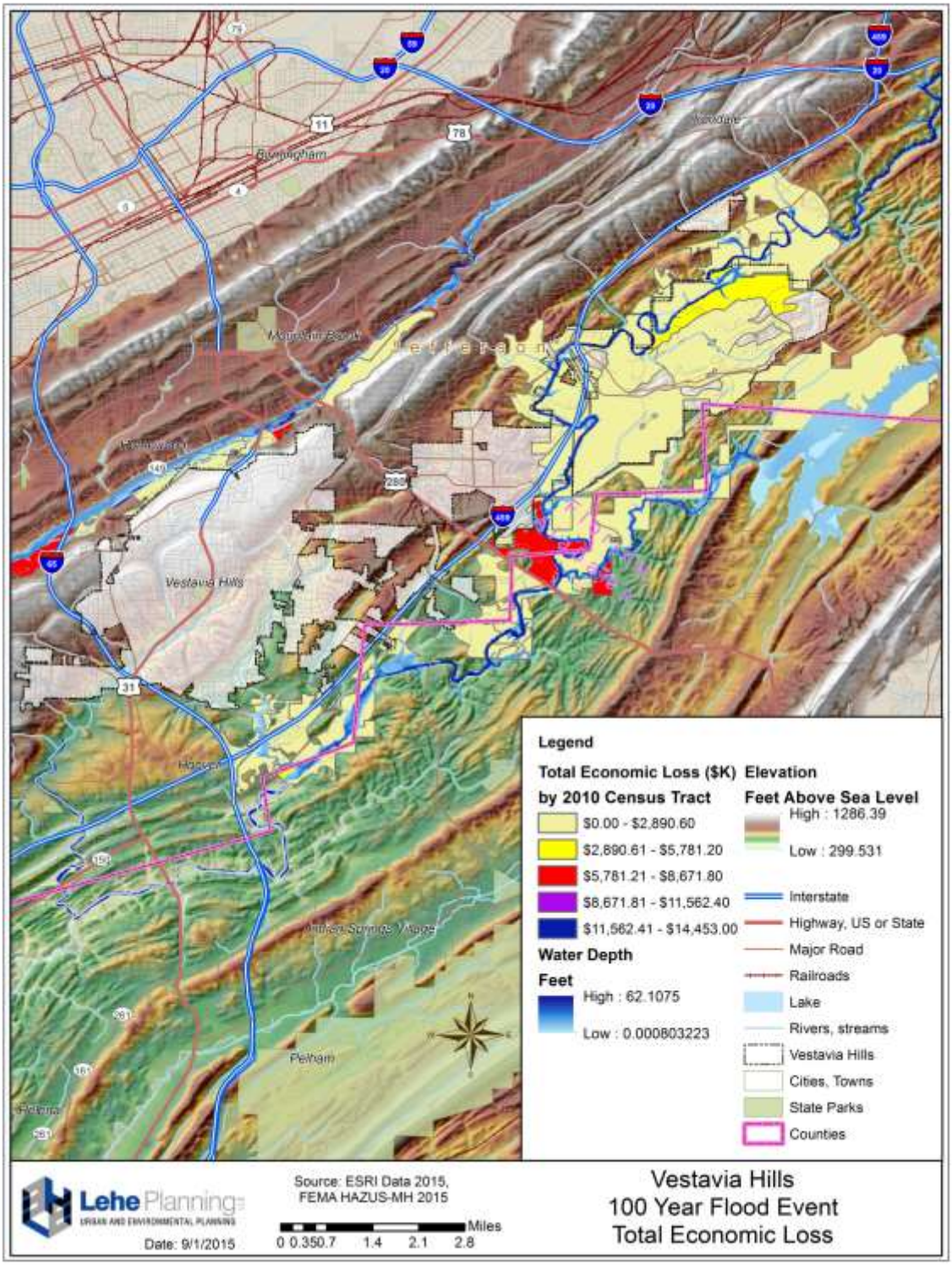
	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	1	50.00	0	0.00	1	50.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	2	1.39	25	17.36	20	13.89	77	53.47	20	13.89
Total	**0**		**2**		**26**		**20**		**78**		**20**	

Table 4-16. Expected Building Damage by Building Type

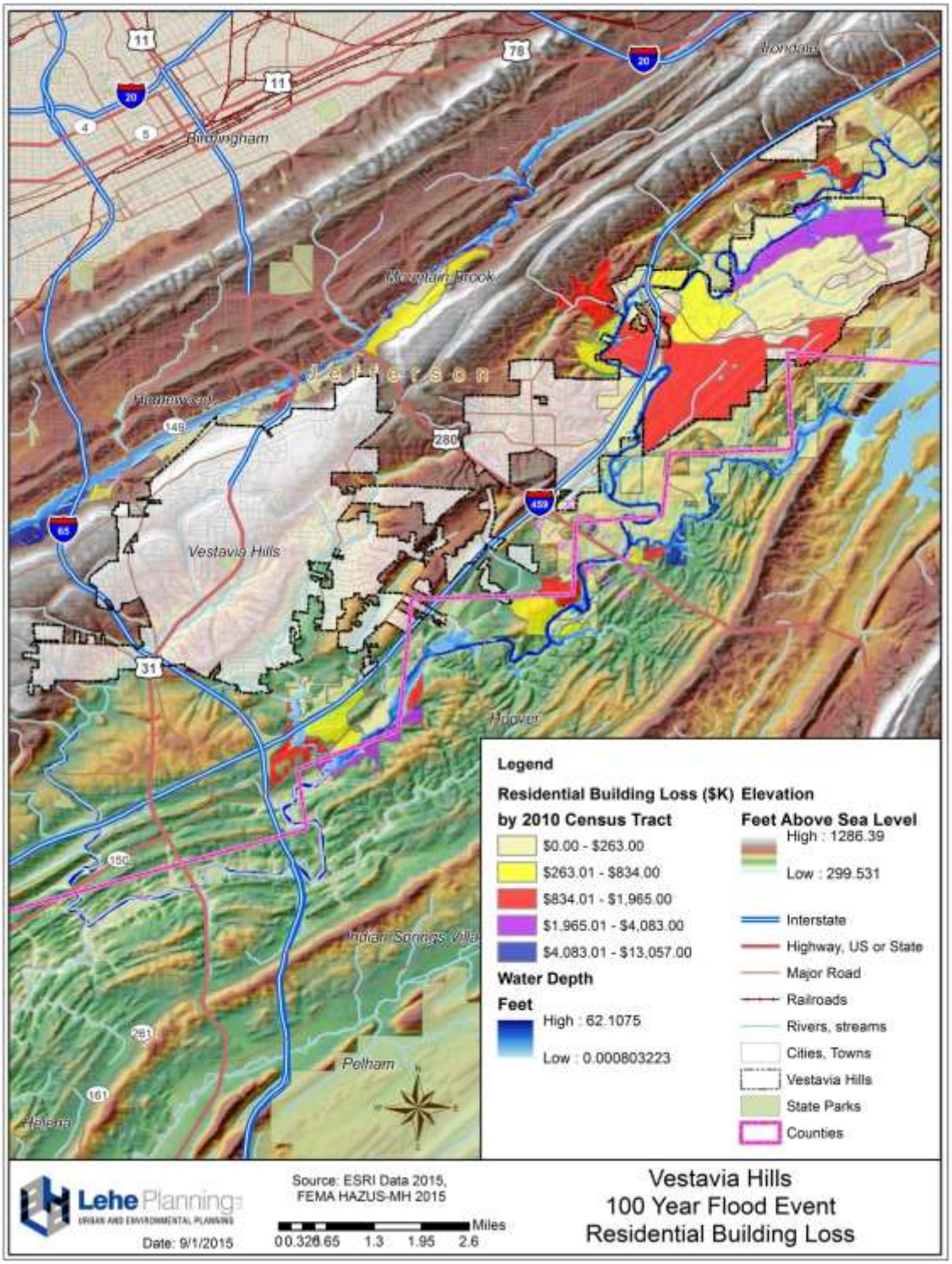
	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Manufactured Home	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	0	0.00	0	0.00	1	50.00	0	0.00	1	50.00	0	0.00
Steel	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	0	0.00	2	1.41	24	16.90	20	14.08	76	53.52	20	14.08

Graphical representations of the HAZUS results (economic loss, residential loss, and displaced population) for the modeled 100-year flood event scenario are shown in Maps 4-20 through 4-22, which follow.

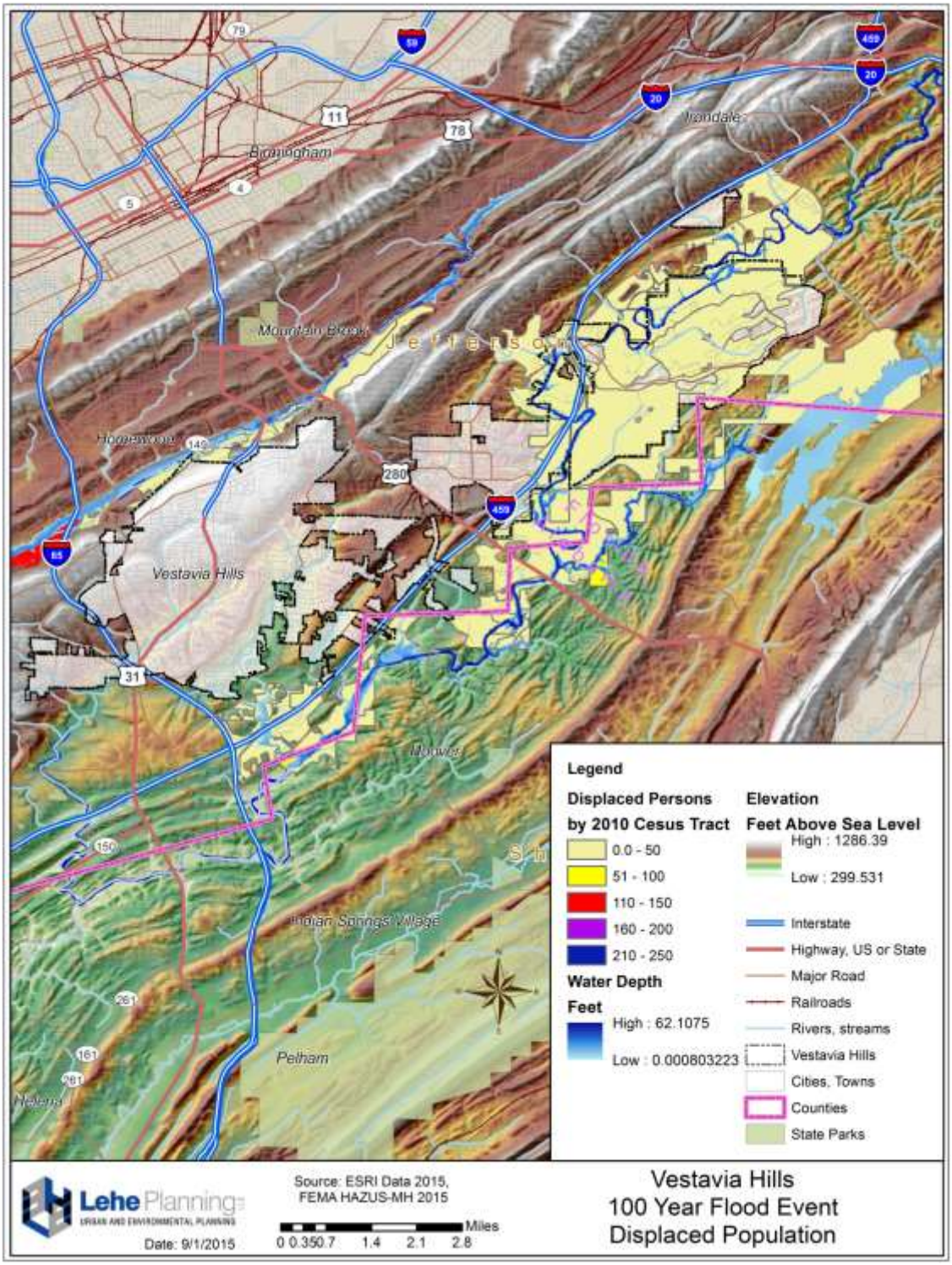
Map 4-20. Total Economic Loss from the 100-Year Flood Event



Map 4-21. Total Residential Building Loss from the 100-Year Flood Event



Map 4-22. Displaced Population from the 100-Year Flood Event



4.3.3 Historical Damage

Based on National Flood Insurance Program (NFIP) data obtained from the Alabama Office of Water Resources, the City of Vestavia Hills has 99 flood insurance policies held by residential and non-residential properties with a total insurance in force value of $33,346,000, as of May 31, 2017. The closed amount of paid losses to date is $1,386,887 from 22 claims. Table 4-17 summarizes the policies and claims by building type, and Table 4-18 summarizes the policies and claims by insurance zone.

Table 4-17. Flood Insurance Claims by Occupancy as of 05/31/17

Building Type	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
Single Family	62	$37,902	$17,127,100	10	$78,312.05	$8,935.00
2-4 Family	0	$0	$0	0	$0.00	$0.00
All Other Residential	5	$4,682	$1,240,000	0	$0.00	$0.00
Non Residential	32	$82,546	$14,978,900	12	$1,308,575.31	$39,079.21
Total	99	$125,130	$33,346,000	22	$1,386,887.00	$48,014.00

Source: FEMA NFIP/Alabama Office of Water Resources

Table 4-18. Flood Insurance Claims by Insurance Zone as of 05/31/17, City of Vestavia Hills

Insurance Zone	Policies in Force	Premium	Insurance in Force	Number of Closed Paid Losses	$ of Closed Paid Losses	Adjustment Expense
A01-30 & AE Zones	30	$67,611	$10,444,400	9	$1,118,497.80	$30,537.24
A Zones	11	$15,965	$2,025,800	4	$29,705.37	$4,020.00
AO Zones	0	$0	$0	0	$0.00	$0.00
AH Zones	0	$0	$0	0	$0.00	$0.00
AR Zones	0	$0	$0	0	$0.00	$0.00
A99 Zones	0	$0	$0	0	$0.00	$0.00
V01-30 & VE Zones	0	$0	$0	0	$0.00	$0.00
V Zones	0	$0	$0	0	$0.00	$0.00
D Zones	0	$0	$0	0	$0.00	$0.00
B, C & X Zones						
Standard	10	$12,304	$2,910,800	3	$190,077.51	$8,541.97
Preferred	48	$29,250	$17,965,000	5	$48,438.18	$4,845.00
Total	99	$125,130	$33,346,000	21	$1,386,717.00	$47,943.00

Source: FEMA NFIP/Alabama Office of Water Resources

As shown in Table 4-18 above, the majority of the flood insurance claims come from properties within mapped A01-30 & AE Zones. It is interesting to note that a significant number of claims come from B, C, & X Zones that are areas designated as those of less frequent flood occurrence.

Repetitive loss properties account for over 25% of the total paid claims to date. According to the information from the National Flood Insurance Program (NFIP) provided by the Alabama Office of Water Resources, all of the current repetitive loss buildings were constructed prior to the adoption of the initial FIRM (Flood Insurance Rate Map) for the community. The number of losses and claims are summarized in Table 4-19 below.

Table 4-19. Community Repetitive Losses, City of Vestavia Hills

	Special Flood Hazard Areas			
	AE, A1-30, AO, AH, A	VE, V1-30, V	B, C, X	Total
RL Buildings (Total)	2	0	1	4
RL Buildings (Insured)	0	0	0	0
RL Losses (Total)	4	0	2	8
RL Losses (Insured)	0	0		0
RL Payments (Total)	$320,915.65	$0.00	$30,806.51	$364,828.42
Buildings	$304,954.01	$0.00	$24,457.54	$342,517.81
Contents	$15,961.64	$0.00	$6,348.97	$22,310.61
RL Payments (Insured)	$0.00	$0.00	$0.00	$0.00
Buildings	$0.00	$0.00	$0.00	$0.00
Contents	$0.00	$0.00	$0.00	$0.00

Source: FEMA NFIP/Alabama Office of Water Resources

4.3.4 Areas in the Floodplain that Provide Natural Functions

The Special Flood Hazard Area (SFHA) covers 1,777 acres within the City of Vestavia Hills. Much of the floodplain has been previously developed; however, portions remain undeveloped. Using the USGS National Land Cover Database 2011 and the FEMA National Flood Hazard Layer, an estimated 1,169 acres (65.8%) of the Special Flood Hazard Area (SFHA) remain undeveloped and provide natural and beneficial functions (Map 4-23). These areas can be more effective at controlling or attenuating flooding as well as less expensive over the long term than traditional manmade flood control structures. Alteration of these areas within the floodplain can have an adverse impact on the magnitude and extent of flooding. Natural and beneficial functions of floodplains include the following:

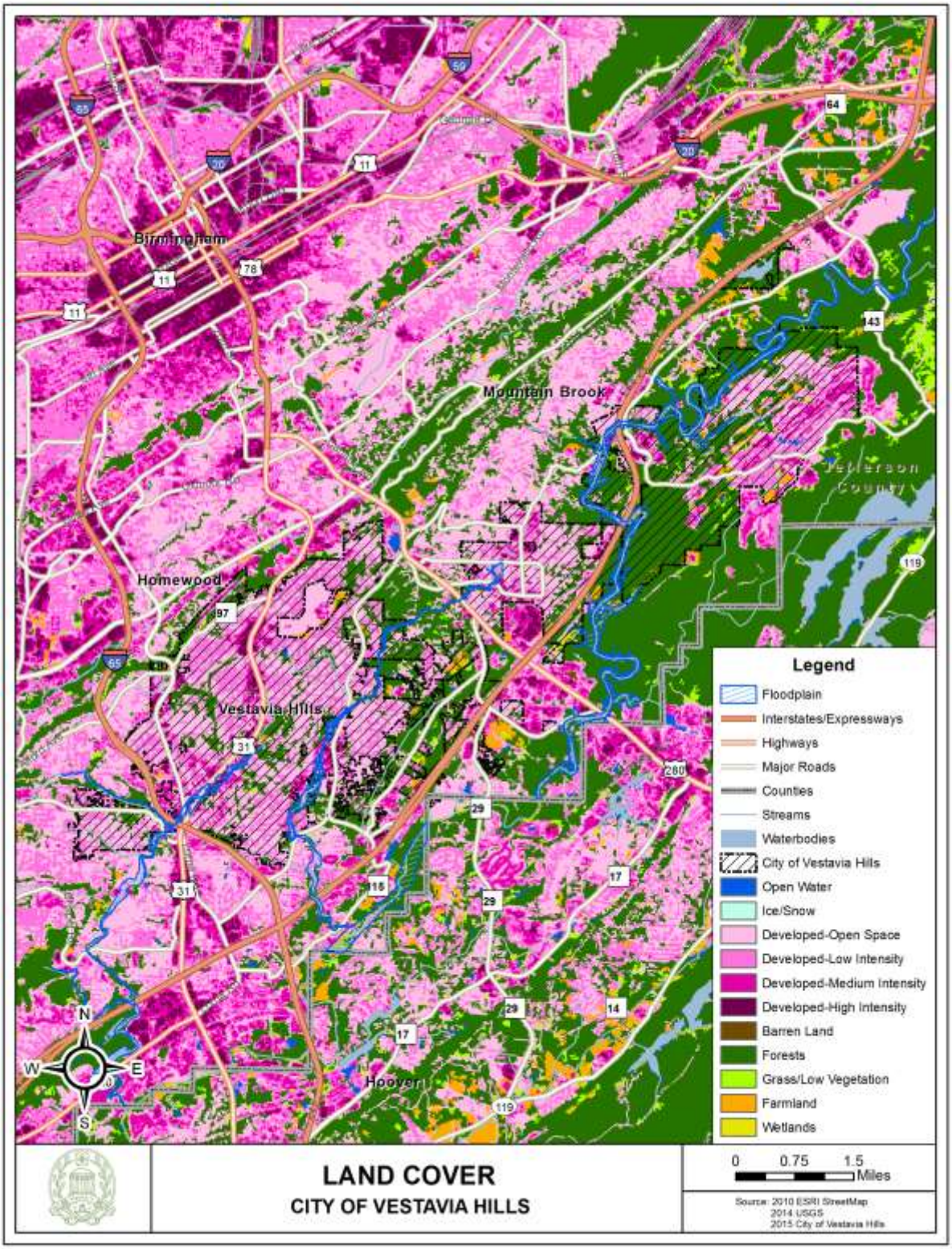
- **Water Resources**
  - *Natural Flood and Erosion Control*
    - Provide flood storage and conveyance
    - Reduce flood velocities
    - Reduce peak flows
    - Reduce sedimentation

- *Water Quality Maintenance*
  - Filter nutrients and impurities from runoff
  - Process organic wastes
  - Moderate temperature fluctuations
- *Groundwater Recharge*
  - Promote infiltration and aquifer recharge
  - Reduce frequency and duration of low surface flows

- **Biological Resources**
  - *Biological Productivity*
    - Promote vegetative growth through rich alluvial soils
    - Maintain biodiversity
    - Maintain integrity of ecosystems
  - *Fish and Wildlife Habitats*
    - Provide breeding and feeding grounds
    - Create and enhance waterfowl habitat
    - Protect habitats for rare and endangered species

Source: A Unified National Program for Floodplain Management, FEMA-248 (1994)

Map 4-23. Land Cover within the Floodplain



4.3.5 Future Development and Population Trends

The HAZUS model provided estimated losses to critical facilities and building-related losses from the 100-year return period flood event, based on current population and inventory values. Future development and population trends may alter the City's vulnerability due to flooding and types of impacts to expect.

Future Development

A review of the Vision Plan for Vestavia Hills, 2011, US-31 Corridor Redevelopment Plan, 2012, the Cahaba Heights Plan Update, 2015, and the City of Vestavia Hills Comprehensive Plan 2004-2025, adopted 2004 identified areas of future development. In addition, each of these plans specifically addresses development within the floodway and floodplain.

The US-31 Corridor Redevelopment Plan focuses on the commercial corridor along US Highway 31 within the City. Although almost entirely developed, this renewal plan promotes targeted redevelopment of the underutilized areas with emphasis on greenways and re-establishing the floodplain along Patton Creek. Although the density and imperviousness of the projected redevelopment along this corridor is expected to increase, the use of green infrastructure and current stormwater design standards may help offset any adverse hydrologic effects since first developed over 40 years ago.

The Cahaba Heights Plan Update is an amendment to the prior Cahaba Heights Community Plan drafted in 2008. Like the previous plan, this plan focuses on one specific area within the City, Cahaba Heights. The major watercourse in this area is Little Shades Creek. Concepts identified in this plan include creating a pedestrian-friendly village center, mixed-use development, higher density development, flood mitigation, and sustainable infrastructure. This plan recommends commencing immediately engineering studies to address stormwater management. These studies should identify current issues and recommend strategies to help mitigate flooding while planning for future, higher density development in the area.

Meadowlawn Park completed construction in early 2017 in the Cahaba Heights area within Vestavia Hills. Project components included the restoration of Little Shades Creek, the addition of a floodplain bench to improve floodplain storage, and the creation of a wetland in the former channel that also serves to mitigate flows during large storm events. The park is located on four residential lots that previously experienced multiple flood losses. The passive park not only will be an amenity for the community, but it provides flood mitigation, both from a property acquisition perspective as well as a flood control standpoint.

The Vision Plan for Vestavia Hills and the City of Vestavia Hills Comprehensive Plan 2004-2025 were comprehensive City economic development plans that provide details on anticipated growth areas. The US-31 Corridor Redevelopment Plan and the Cahaba Heights Plan Update provides specific details for each of those areas addressed, but the overall concepts and growth areas discussed in the City's Vision Plan provide the framework for how these specific area plans fit into the city-wide picture.

The Vision Plan for Vestavia Hills and the City of Vestavia Hills Comprehensive Plan 2004-2025 identify the following areas as commercial areas with growth potential:

- US-31 corridor
- Cahaba Heights (Cahaba Heights Road, Dolly Ridge Road, Pump House Road, and Pipe Line Road)
- Patchwork Farms
- Liberty Park
- Acton Road
- Rocky Ridge Road
- Columbiana Road

Residential growth areas are also identified in the City of Vestavia Hills Comprehensive Plan 2004-2025. With little undeveloped land remaining in the city, with the exception of Liberty Park, residential growth areas are sparse. Much of the residential growth will come from mixed-use development within the commercial areas listed above as well as continued infill within the city. The residential growth areas specified in the plan and known at this time are as follows:

- Liberty Park
- Acton Road/Altadena Valley
- Patchwork Farms

Population Trends

New growth and expansion areas are needed as population increases. Growth in the City of Vestavia Hills outpaced that of the State's growth from 2000 to 2010, by almost 32%. Growth rates from 1990 to 2000 for the City of Vestavia Hills were more than double the State growth, with 10.1% for the State and 23.9% for the City. The annexation of Cahaba Heights in 2002 is estimated to have contributed approximately 50% of the population growth from 2000 to 2010 (Cahaba Heights population in the 2000 census was 5,203). Table 4-20 depicts population growth trends from 1990 to 2010 based on U.S. Census Bureau statistics.

Since 2010, the Center for Business and Economic Research at the University of Alabama estimates relatively stagnant population growth in Vestavia Hills (0.2% change, 2010-2014). The Birmingham-Hoover Metropolitan Statistical Area is expected to grow 16.6% by 2040. An alternative approach to estimate future population growth utilizes the census information from 1990 through 2010 for Vestavia Hills and Cahaba Heights census-designated place. This method estimates a 6% increase in population between 2010 and 2014. Based on this, it is expected that Vestavia Hills population will continue to increase over this period. Tables 4-21 through 4-22 are from the Center for Business and Economic Research at the University of Alabama and provide current and projected population growth trends for the study region.

Table 4-20. Historic Growth Trends

	1990	2000	Number Change (1990-2000)	Percent Change (1990-2000)	2010	Number Change (2000-2010)	Percent Change (2000-2010)
Alabama	4,040,389	4,447,100	406,711	10.1%	4,779,736	332,636	7.5%
Vestavia Hills city	19,749	24,476	4,727	23.9%	34,033	9,557	39.1%
Cahaba Heights CDP	4,778	5,203	425	8.9%	-	-	-

Source: U. S. Census Bureau, 2010

Table 4-21. 2010 to 2015 Population Estimates

	April 1, 2010		Population Estimates (as of July 1)			Change, 2010-2015	
	Census	Est. Base	2010	2013	2015	Number	Percent
Alabama	4,779,736	4,780,127	4,785,161	4,830,533	4,858,979	78,852	1.6
Vestavia Hills city	34,033	34,107	34,089	33,997	34,174	67	0.2

Source: U.S. Census Bureau, Population Division, and Center for Business and Economic Research, University of Alabama, July 2015.

Table 4-22. 2000-2010 Population and 2015-2040 Projections

MSA	Census		Projection				Change 2010-2040	
	2000	2010	2015	2020	2030	2040	Number	Percent
Alabama	4,447,100	4,779,736	4,855,847	4,940,438	5,110,968	5,288,583	508,847	10.6
Birmingham-Hoover	1,052,238	1,128,047	1,144,942	1,167,297	1,209,177	1,246,782	118,735	10.5

Note: These projections are driven by population change between Census 2000 and Census 2010 as well as changes between Census 2010 and April 1, 2015 Population Estimate. Recent data on births and deaths from the Alabama Department of Public Health are used to derive birth and death rates for the state and each county. County projections are summed to their respective metropolitan areas. Projections were revised in 2016 based on trends in population and development from 2010 to 2015.

Source: U.S. Census Bureau and Center for Business and Economic Research, University of Alabama, August 2016.

4.3.6 Future Flooding Conditions

With an increasing population and continued development within the City, changes to the flooding conditions can be expected. Based on the population trends shown in Table 4-22, the population of the City of Vestavia Hills is expected to continually grow and increase in population. With the increase in population, development will continue to expand to provide housing, commercial, and government facilities (schools, police, fire, etc.) to keep up with the ever-increasing demand.

The population increase will increase the pressure to develop or redevelop properties within floodplains and other less desirable sites. Future development within the floodplain could

potentially have an adverse effect on flooding due to loss of floodplain storage, increased flows, and higher velocities. Moreover, the more developed each watershed becomes, the greater likelihood for increases in flows; consequently, higher flood elevations and more frequent flooding can be expected. Developing these sites without causing adverse hydrologic impacts to the watershed and receiving water is possible; however this will require significant planning and engineering to ensure both upstream and downstream properties are unaffected by the development.

Chapter 5 – Mitigation Strategy

5.1 Floodplain Management Goals

5.1.1. Purpose and Basis for Goals

The Vision

The goals that guide this Mitigation Strategy for floodplain management have been developed to help achieve the City's long-range vision for flood disaster resistance and community resiliency. Ultimately, the City aims to achieve active resistance to the threats of flooding and related natural hazards to human life and property through publicly-supported mitigation actions with proven results. The City embraces a long-term commitment to reduce the exposure and risks to flooding and related hazards within its jurisdiction. The City plans to activate all of its available resources through cooperative governmental and private sector initiatives, augmenting public knowledge and awareness, and enhancing local mitigation capabilities to maximize community resiliency.

Consistency with Adopted County Plan

The vision and goals of this plan are fully consistent with the vision statement and goals set forth in the 2014 Jefferson County Multi-Hazard Mitigation Plan, which has been adopted by the City of Vestavia Hills. The first five goals mirror those of the Jefferson County plan, and the sixth Emergency Services Goal supplements the County goals.

5.1.2. Goals for Floodplain Management

To attain its vision, the City of Vestavia Hills hereby establishes the following goals to guide its floodplain management activities:

1. **Preventive Goal.** Manage the development of land and buildings to minimize risks of loss due to flooding and related natural hazards. Protect structures and their occupants and contents from the damaging effects of such hazards.

2. **Property Protection Goal.** Protect structures and their occupants and contents from the damaging effects of flooding and related natural hazards.

3. **Public Education and Awareness Goal.** Educate and inform the public about the risks of flooding and related natural hazards and the techniques available to reduce threats to life and property.

4. **Natural Resources Protection Goal.** Preserve and restore the beneficial functions of floodplains and the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.

5. **Structural Projects Goal.** Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of flooding and related natural hazards, where found to be feasible, cost effective, and environmentally suitable.

6. **Emergency Services Goal.** Improve the efficiency, timing, and effectiveness of response and recovery efforts for flooding and related natural disasters.

5.2 Review of Floodplain Management Activities

5.2.1 Review of Current CRS Floodplain Management Activities

As part of the planning process, an assessment was conducted to identify potential credits for current flood plain management activities under the Community Rating System (CRS) Program. Upon application to the CRS Program, a CRS Verification Visit will be conducted by the Insurance Services Office, Inc. (ISO), which will issue a Verification Report that documents the points that can be credited for the City's initial entry into the CRS Program. Usually, a community will enter the CRS as a class 9 community.

A summary of these findings with estimated credit points for each of the current activities are organized according to the goals of this plan, as follows:

1. **Preventive Activities.**

- Activity 310 – Elevation Certificates: The Building Official maintains elevation certificates for new and substantially improved buildings. (38 points)
- Activity 320 – Map Information Service: Credit is provided for furnishing inquirers with basic flood zone information from the community's latest Flood Insurance Rate Map. To receive credit, the service must be publicized annually and records must be maintained. (30 points)
- Activity 430 – Higher Regulatory Standards: Credit is provided for enforcing regulations that require freeboard for new and substantial improvement construction, cumulative substantial improvement, and local drainage protection. Credit is also provided for the enforcement of building codes. (177 points)
- Activity 440 – Flood Data Maintenance: Credit is provided for maintaining and using overlay maps in the day to day management of the floodplain.

Credit is also provided for maintaining copies of all previous FIRMs. (100 points)

- Activity 450 – Stormwater Management: The community enforces regulations for stormwater management, soil and erosion control. (84 points)

2. **Property Protection Activities**

   - Activity 520 – Acquisition and Relocation: Credit is provided for acquiring and relocating 4 buildings from the community's regulatory floodplain. (12 points)

3. **Public Education and Awareness Activities**

   - No credit.

4. **Natural Resources Protection Activities**

   - Activity 420 – Open Space Preservation: Credit is provided for preserving approximately 5 percent of the Special Flood Hazard Area as open space. (70 points)

5. **Structural Projects Activities**

   - No credit.

6. **Emergency Services Activities**

   - No credit.

5.2.2 Review Criteria

STAPLEE Review

In addition to the current activities, which have been carried forward to the Action Plan, a range of other possible activities have been reviewed for effectiveness in preventing or reducing the severity of the problems identified in *Chapter 4. - Risk Assessment*. With the exception of certain activities that are clearly not feasible or inappropriate, all of the remaining activities described here have been evaluated for possible inclusion in the Action Plan. These include a wide range of possible activities to assure all potential alternatives have been considered.

The pros and cons of each activity have been evaluated by applying the STAPLEE method, the same method applied to the evaluation of mitigation measures in the County plan. The STAPLEE method examines social, technical, administrative, political, legal, environmental, and economic considerations and provides a ready method for rating and prioritizing each mitigation activity. To perform this evaluation,

each measure must respond to many of the questions presented below for each of the areas of consideration:

Social Considerations.

- *Environmental justice.* Will the proposed measure be socially equitable to minority, disadvantaged, and special needs populations, such as the elderly and handicapped?
- *Neighborhood impact.* Will the measure disrupt established neighborhoods or improve quality of life for affected neighborhoods?
- *Community support.* Is the measure consistent with community values? Will the affected community support the measure?
- *Impact on social and cultural resources.* Does the measure adversely affect valued local resources or enhance those resources?

Technical Considerations.

- *Technical feasibility.* Is the proposal technically possible? Are there technical issues that remain? Does the measure effectively solve the problem or create new problems? Are there secondary impacts that might be considered? Have professional experts been consulted?

Administrative Considerations.

- *Staffing.* Does the City have adequate staff resources and expertise to implement the measure? Will additional staff, training, or consultants be necessary? Can local funds support staffing demands? Will the measure overburden existing staff loads?
- *Maintenance.* Does the City have the capabilities to maintain the proposed project once it is completed? Are staff, funds, and facilities available for long-term project maintenance?
- *Timing.* Can the measure be implemented in a timely manner? Are the timeframes for implementation reasonable?

Political Considerations.

- *Political support.* Do the Mayor and City Council support the proposed measure? Does the public support the measure? Do stakeholders support the measure? What advocates might facilitate implementation of the proposal?

Legal Considerations.

- *Legal authority.* Does the City have the legal authority to implement the measure? What are the legal consequences of taking action to implement the measure as opposed to an alternative action or taking no action? Will new legislation be required?

Environmental Considerations.

- *National Environmental Policy Act (NEPA).* Will the measure be consistent with Federal NEPA criteria? How will the measure affect environmental resources, such as land, water, air, wildlife, vegetation, historic properties, archaeological sites, etc.? Can potentially adverse impacts be sufficiently mitigated through reasonable methods?

- *State and local environmental regulations.* Will the measure be in compliance with State and local environmental laws, such as flood plain management regulations, water quality standards, and wetlands protection criteria?

- *Environmental conservation goals.* Will the proposal advance the overall environmental goals and objectives of the community?

Economic Considerations.

- *Availability of funds.* Will the measure require Federal or other outside funding sources? Are local funds available? Can in-kind services reduce local obligations? What is the projected availability of required funds during the timeframe for implementation? Where funding is not apparently available, should the project still be considered but at a lower priority?

- *Benefits to be derived from the proposed measure.* Will the measure likely reduce dollar losses from property damages in the event of a hazard? To what degree?

- *Costs.* Are the costs reasonable in relation to the likely benefits? Do economic benefits to the community outweigh estimated project costs? What cost reduction alternatives might be available?

- *Economic feasibility.* Have the costs and benefits of the preferred measure been compared against other alternatives? What is the economic impact of the no-action alternative? Is this the most economically effective solution?

- *Impact on local economy.* Will the proposed measure improve local economic activities? What impact might the measure have on the tax base?

- *Economic development goals.* Will the proposal advance the overall economic goals and objectives of the community?

The STAPLEE method of evaluation also facilitates the prioritization of measures. If a measure under consideration is found to be financially feasible and has high ratings within other areas of consideration, it might be given a higher priority for implementation than measures that fell lower in the ratings. Moreover, a general economic evaluation can be performed as part of the STAPLEE method, as described above. Weighing potential economic benefits to reducing damages against costs make it possible to select among competing projects.

Especially important to the selection process is availability of funds through local, State, Federal, and private resources. Potential FEMA Hazard Mitigation Assistance (HMA) grant programs, such as FEMA's Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Grant Program (PDM), and the Flood Mitigation Assistance (FMA) Program are sometimes available to help fund eligible projects. As new sources of funding become available through the HMA grant programs, or other sources, the priorities for implementation of select projects may need to be reevaluated.

Another consideration for evaluating alternative mitigation measures is the capability of the City to implement the measures. Appendix D "Community Mitigation Capabilities Assessment" examines select capability measures.

5.2.3 Community Mitigation Action Program of the County Plan

The activities listed in this section are those related to the mitigation of flooding and related hazards that are included in the *City of Vestavia Hills Community Action Program* in the 2014 Jefferson County Multi-Hazard Mitigation Plan that has been adopted by the Vestavia Hills City Council. All of these activities have been considered for inclusion in the Floodplain Management Action Plan. Published as Part 2 "Community Action Programs" of the 2014 plan, the City's action program the "Action Items" to be implemented over the five year planning cycle between 2014 and 2019. For each measure, the action program identifies the hazards addressed, the priority, timeline, lead responsibility for implementation, estimated cost, and funding source.

1. General: All Hazards
Public Education and Outreach Activities

- Emergency preparedness education programs for schools.
- Drills, exercises in homes, workplaces, classrooms, etc.
- Everbridge Emergency Alert Notifications.
- Hazard "safety fairs."
- Hazard conferences, seminars.
- Preparedness handbooks, brochures. Distribution of severe weather guides, homeowner's retrofit guide, etc.
- Regular newspaper articles.

- Direct mailings.
- Use of social media.

2. Hazard Specific: Flooding

- Incorporate flood mitigation in local planning.
- Form partnerships to support floodplain management.
- Limit or restrict development in floodplain areas.
- Adopt and enforce building codes and development standards.
- Improve storm water management planning.
- Adopt policies to reduce storm water runoff.
- Improve flood risk assessment.
- Join or improve compliance with NFIP.
- Manage the floodplain beyond minimum requirements.
- Participate in the CRS.
- Establish local funding mechanisms for flood mitigation.
- Remove existing structures from flood hazard areas.
- Improve storm water drainage system capacity.
- Conduct regular maintenance of drainage systems and flood control structures.
- Elevate or retrofit structures and utilities.
- Floodproof residential and non-residential structures.
- Protect infrastructure.
- Protect critical facilities.
- Construct flood control measures.
- Protect and restore natural flood mitigation features.
- Preserve floodplains as open space.
- Increase awareness of flood risk and safety.
- Educate property owners about flood mitigation techniques.

3. Multiple Hazards

- Assess community risk.
- Map community risk.
- Prevent development in hazard areas.
- Adopt development regulations in hazard areas.
- Limit density in hazard areas.
- Integrate mitigation into local planning.
- Strengthen land use regulations.
- Adopt and enforce building codes.
- Create local funding mechanisms for hazard mitigation.
- Incentivize hazard mitigation.
- Monitor mitigation plan implementation.
- Protect structures.

- Protect infrastructure and critical facilities.
- Increase hazard education and risk awareness.
- Improve household disaster preparedness.
- Promote private mitigation efforts.

5.2.4 Discussion of Alternative Mitigation Activities

The Floodplain Management Planning Committee (FMPC) reviewed the current activities that could be credited under the Community Rating System (CRS) Program (see section 5.2.1 above), the activities endorsed by the City of Vestavia Hills in its Community Action Program, adopted as a component of the 2014 Jefferson County, Alabama, Multi-Hazard Mitigation Plan and further evaluated a full range of alternative mitigation activities presented in this section. All of these potential mitigation activities were summarized and presented as an exercise completed by members of the FMPC and discussed at their November 21, 2017, meeting. The results of this exercise can be found in Appendix G "Alternative Mitigation Measures Exercise." The alternatives considered for inclusion in the Floodplain Management Action Program have been grouped according to the six goal areas, noted below. These activities have been evaluated according to the STAPLEE method for appropriateness, taking into account the pros and cons of each potential mitigation activity. Further, the City's funding and implementation capabilities have been carefully considered. A discussion of the evaluation results follows.

1. Preventive Activities

Existing Preventive Activities.

The City has a range of planning and regulatory tools available to manage development and reduce future flood losses, as discussed below. The City Planner and City Clerk/Zoning Official have primary responsibility for maintaining and enforcing these tools, with the support of the Engineering Department.

The City has a longstanding record of active comprehensive planning. As discussed in Section 4.3.5 "Future Development and Population Trends," comprehensive plans adopted by the City over the past decades intend to manage future growth and development throughout the City, thereby reducing future flood losses.

As described in Appendix D "Mitigation Capabilities Assessment," the City adopted the Vestavia Hills Comprehensive Master Plan 2004-2025 on June 21, 2004. The overall purpose of this plan is to guide decisions and actions that can influence future growth and land development. The plan also addresses the flood hazard and its impacts. The 2004 Plan began a continuous and active planning process with major additions to the Plan as recently as 2017.

The City administers the 2015 International Code Series of building and technical codes that establish minimum design and construction standards for all aspects of building construction. The codes are enforced through residential and commercial permitting systems and are integrated with other development controls, including floodplain management controls, through permitting systems and interdepartmental review processes.

Central to land use and development control is the Vestavia Hills Zoning Ordinance. The Zoning Ordinance lays out district land use, dimensional standards, and other development criteria in accordance with a zoning map of the land use districts. In turn, the comprehensive plan guides the mapping of zoning district. The Vestavia Hills Subdivision Regulations, work in concert with the Zoning Ordinance and other development controls to ensure minimum design and construction standard be met for major subdivisions, and the regulations set out the procedures for platting lots.

The Flood Damage Prevention Ordinance follows the model provisions recommended by the State NFIP Coordinator but exceeds the minimums required for participation in the NFIP. An estimated CRS Credit for 177 points is available for higher regulatory standards. Credit can be given for enforcing regulations that require a one foot freeboard (elevation) construction within the floodplain. Other points can be credited for cumulative substantial improvement provisions, local drainage protection, and the enforcement of building codes.

The FMPC considered many preventive options and determined that the City's floodplain management ordinance could be amended to include additional higher regulatory standards to further reduce potential flood losses. Among other revisions that might be considered are higher regulatory standards to require additional freeboard (building elevation above the flood elevation), limiting fill in the floodway, restricting outdoor storage of materials in the floodplain, and a prohibition against septic tanks in the floodplain. Given the extents of the flood risks identified in Chapter 4 "Risk Assessment" and projected City growth, a review of all of the development controls discussed in this section would assure a more integrated program of floodplain management.

2. Property Protection Activities

As noted in Appendix G, the FMPC considered various property protection activities. Of those activities, additional property acquisitions or relocations of flood-prone building were considered feasible.

3. Public Education and Outreach Activities

Public outreach activities are low cost and popular. The FMPC offers full support of such efforts, which is reflected in the Floodplain Management Action Plan in Section 4.3.

4. Natural Resource Protection Activities

A range of natural resource protection activities were considered including zoning and subdivision controls to require open space or establish larger lot size minimums in the floodplains.

5. Structural Projects Activities

The City recognizes the benefits of comprehensive drainage system maintenance to reduce flood losses and would consider additional measures to improve maintenance. Among new measures is a program of regular channel inspections and debris removal.

6. Emergency Services Activities

The Jefferson County EMA has primary responsibility county-wide for emergency response to flooding and other natural disasters. Although it is not well maintained, the EMA has a system of automated gages to monitor and forecast flood threats. The City would consider an in-house system that facilitates emergency response.

5.3 Floodplain Management Action Plan

This section presents the Floodplain Management Action Plan recommended by the Floodplain Management Planning Committee and adopted by the Vestavia Hills City Council. This Action Plan is the culmination of the planning process and schedules implementation of the listed measures over the next five year planning cycle ending on December 31, 2022. The Action Plan is continually reviewed for progress towards implementation and may be updated and amended from time-to-time, in accordance with Chapter 6 “Plan Maintenance Procedures.”

The following key explains the components of the Action Plan:

Key

- *“Mitigation Actions by Goal Area and Objective.”* Each mitigation action has been grouped according to the six long-term planning goals. Within each goal area, the actions have been organized according to plan objectives.
- *“Implementation Responsibility.”* This action plan assigns lead responsibility for implementation to a specific department or agency or position within the organization.
- *“Timeframe for Completion.”* Timeframes are *Short-Range* (less than 2 years), *Mid-Range* (2-3years), *Long-Range* (more than 3 years) or *Ongoing*.

- *"Funding Source(s)." P*otential funding sources are identified. FEMA Hazard Mitigation Assistance (HMA) grant programs, where noted, include the Hazard Mitigation Grant Program (HMGP), the Pre-Disaster Mitigation (PDM) grant, and Flood Mitigation Assistance (FMA) grants. These are possible funding sources but are subject to final eligibility determination, including, among other eligibility criteria, a positive benefit/cost analysis and the availability of funds.
- *"Priority." Priorities are High, Medium, and Low.*
- *"TBD"* is to be determined.

Table 5-1. 2018-2023 Floodplain Management Action Plan

#	Mitigation Actions by Goal Area and Objective	Implementation Responsibility	Timeframe for Completion	Funding Source	Priority
1	***Goal for Prevention.*** ***Manage the development of land and buildings to minimize risks of loss due to flooding and related natural hazards. Protect structures and their occupants and contents from the damaging effects of such hazards.***				
1.1	**Elevation Certificates.** Maintain FEMA Elevation Certificates for buildings in the floodplain.				
1.1.1	Continue to maintain FEMA Elevation Certificates for all new construction, substantial improvements, and additions to existing buildings in the floodplain.	Building Safety and Engineering Department	Ongoing	Existing City funds	High
1.1.2	Maintain FEMA elevation certificates for all existing "post-FIRM" buildings constructed since the City entered the NFIP.	Building Safety and Engineering Department	Ongoing	Existing City funds	Low
1.2	**Floodplain Mapping.** Keep accurate and current floodplain maps and data used for regulatory purposes.				
1.2.1	Develop new flood elevations, floodway delineations, and other regulatory flood hazard data for areas not mapped in detail by the most recent NFIP Flood Insurance Study (FIS).	Engineering Department	Ongoing	TBD	Medium
1.3	**Higher Regulatory Standards.** Amend the City's Flood Damage Prevention Ordinance to establish new regulatory standards that exceed the NFIP minimums that are effectively administered by qualified City staff.				
1.3.1	Consider a requirement for additional freeboard of more than one foot for minimum building elevation and flood protection.	Building Safety and Engineering Department	Mid-Range	Existing City funds	Medium
1.3.2	Consider a prohibition on all new buildings and substantial improvements and additions to existing buildings in the floodway.	Building Safety and Engineering Department	Mid-Range	Existing City funds	Medium
1.3.3	Consider a prohibition on septic tanks in the flood plain.	Building Safety and Engineering Department	Mid-Range	Existing City funds	Medium
1.3.4	Consider a requirement for foundations to be designed by a licensed engineer.	Building Safety and Engineering Department	Mid-Range	Existing City funds	Medium
1.3.5	Consider lowering the threshold for substantial improvements to less than 50% of the building value requires full compliance with floodplain management ordinance.	Building Safety and Engineering Department	Mid-Range	Existing City funds	Medium

#	Mitigation Actions by Goal Area and Objective	Implementation Responsibility	Timeframe for Completion	Funding Source	Priority
1.3.6	Consider a requirement that improvements, modifications, and additions to existing buildings are counted cumulatively for at least 5 to 10 years.	Building Safety and Engineering Department	Mid-Range	Existing City funds	Medium
1.3.7	Consider protection of critical facilities (police, fire, public utilities, schools, medical, etc.) to the 500 year flood elevation.	Building Safety and Engineering Department	Mid-Range	Existing City funds	Medium
1.3.8	Consider a requirement for compensatory storage for fill.	Building Safety and Engineering Department	Mid-Range	Existing City funds	Medium
1.3.9	Consider a prohibition on outdoor storage of hazardous materials.	Building Safety and Engineering Department	Mid-Range	Existing City funds	Medium
1.3.10	Consider a requirement for elevation of hazardous materials storage indoors.	Building Safety and Engineering Department	Mid-Range	Existing City funds	Medium
1.3.11	Continue to maintain a Certified Floodplain Manager (CFM) on staff for effective ordinance administration.	Engineering Department	Ongoing	Existing City funds	High
1.4	**Flood Data Maintenance.** Maintain essential field data for floodplain management.				
1.4.1	Maintain elevation reference marks.	Public Works and Engineering Department	Ongoing	Existing City funds	Low
1.5	**Stormwater Management.** Effectively manage stormwater to maintain water quality and minimize flooding.				
1.5.1	Increase stormwater management standards (design storm and size of development) for the regulation of new development to ensure that post-development peak runoff is no worse than pre-development conditions	Engineering Department	Mid-Range	Existing City funds	High
1.5.2	Enact regulations to require the implementation of low impact development (LID) techniques to minimize the need for more traditional stormwater management controls (pipes, channels, and detention).	Engineering Department	Long-Range	Existing City funds	Low
1.5.3	Continue to regulate new construction to protect or improve water quality.	Engineering Department	Ongoing	Existing City funds	High
2	***Property Protection Goal.*** ***Protect structures and their occupants and contents from the damaging effects of flooding and related natural hazards.***				

#	Mitigation Actions by Goal Area and Objective	Implementation Responsibility	Timeframe for Completion	Funding Source	Priority
2.1	**Acquisition and Relocation.** Remove flood-threatened buildings from high risk flood locations.				
2.1.1	Acquire and demolish flood-prone buildings and maintain the property as permanent open space, where feasible.	Engineering Department	Long-Range	FEMA HMA Grants	Low
2.1.2	Relocate flood-prone buildings so that they are out of the floodplain, where feasible.	Engineering Department	Long-Range	FEMA HMA Grants	Low
2.2	**Flood Protection.** Take measures to permanently protect existing flood-prone properties from flood damage on a building-by-building basis.				
2.2.1	Retrofit existing non-residential flood-prone buildings by flood proofing.	Engineering Department	Long-Range	FEMA HMA Grants	Low
2.2.2	Protect existing flood-prone buildings by elevation above flood levels.	Engineering Department	Long-Range	FEMA HMA Grants	Low
2.3	**Flood Insurance Promotion.** Promote the purchase of flood insurance, especially for high risk properties in the flood plain.				
2.3.1	Perform a flood insurance coverage assessment of the City's current level of coverage and identify shortcomings.	Finance and Engineering Department	Long-Range	TBD	Low
2.3.2	Prepare and implement a coverage improvement plan under the direction of a committee of local lenders and insurance agents.	Finance and Engineering Department	Long-Range	TBD	Low
3	***Public Education and Awareness Goal.*** ***Educate and inform the public about the risks of flooding and related natural hazards and the techniques available to reduce threats to life and property.***				
3.1	**Map Information Service.** Provide flood map information to the public.				
3.1.1	Continue to provide Flood Insurance Rate Map (FIRM) information to people who inquire and publicize this service.	Building Safety and Engineering Department	Ongoing	Existing City funds	High
3.2	**Outreach Projects.** Regularly perform public outreach and education programs to inform the public of flood risks and mitigation alternatives.				
3.2.1	Send information about the flood hazard, flood insurance, flood protection measures, and/or the natural and beneficial functions of floodplains to residents.	Communications Specialist	Ongoing	Existing City funds	Medium
3.3	**Hazard Disclosure.** Take steps to inform the public of flood hazards.				
3.3.1	Encourage real estate agents to advise potential purchasers of flood-prone property about the flood hazard.	Building Safety and Engineering Department	Ongoing	Existing City funds	High
3.4	**Flood Protection Information.** Distribute flood protection information to the general public.				

#	Mitigation Actions by Goal Area and Objective	Implementation Responsibility	Timeframe for Completion	Funding Source	Priority
3.4.1	Maintain publications and reference materials in the City's public library.	Communications Specialist and Engineering Department	Ongoing	Existing City funds	High
3.4.2	Create a webpage on the City's website to disseminate flood protection information to the public.	Engineering Department	Mid-Range	TBD	Medium
3.5	**Flood Protection Assistance.** Provide technical guidance for protection of buildings from flood damage.				
3.5.1	Give inquiring property owners technical advice on how to protect their buildings from flooding, and publicize this service.	Building Safety and Engineering Department	Ongoing	Existing City funds	Medium
4	***Natural Resources Protection Goal.* Preserve and restore the beneficial functions of floodplains and the natural environment to promote sustainable community development that balances the constraints of nature with the social and economic demands of the community.**				
4.1	**Open Space Preservation.** Preserve open space to restore the natural functions of the flood plain, where feasible.				
4.1.1	Preserve City-owned floodplain lands as permanent open space, kept free from development through deed restrictions.	City Attorney and Engineering Department	Ongoing	Existing City funds	High
4.1.2	To the extent possible, maintain or restore City-owned flood plains to their natural condition.	Parks and Recreation Department	Ongoing	Existing City funds	High
4.1.3	Provide zoning and subdivision incentives to set aside flood plains as permanent open space in new developments. Enforce provisions for clustering and conservation subdivisions.	City Planner	Ongoing	Existing City funds	High
4.1.4	Restrict subdivision of flood plain lands to 5 or more acres.	City Planner	Mid-Range	Existing City funds	Medium
5	***Structural Projects Goal.* Apply engineered structural modifications to natural systems and public infrastructure to reduce the potentially damaging impacts of flooding and related natural hazards, where found to be feasible, cost effective, and environmentally suitable.**				
5.1	**Drainage System Maintenance.** Maintain natural and manmade drainage systems to effectively discharge stormwater and reduce flooding.				
5.1.1	Conduct regular inspections and maintenance of all channels and conveyance facilities and remove debris as needed.	Public Works	Ongoing	Existing City funds	High

#	Mitigation Actions by Goal Area and Objective	Implementation Responsibility	Timeframe for Completion	Funding Source	Priority
5.1.2	Regularly inspect all detention and retention facilities constructed pursuant to the City's stormwater management regulations and all city-owned facilities to ensure proper functioning.	Public Works	Ongoing	Existing City funds	High
5.1.3	Continue to maintain a comprehensive GIS inventory of the conveyance system and storage basins.	Engineering Department	Ongoing	TBD	Medium
5.1.4	Establish an annual capital improvements programming process for drainage system improvements.	Finance and Engineering Department	Ongoing	Existing City funds	High
5.1.5	Enforce no stream dumping regulations.	Police Department	Ongoing	Existing City funds	High
5.2	**Flood Protection.** Implement structural improvements where deemed effective to reduce flooding.				
5.2.1	Continue to perform engineering studies that evaluate the feasibility of structural flood controls.	Engineering Department	Ongoing	Existing City funds/FEMA HMA Grants	Medium
5.2.2	Protect existing floodplain development by structural projects, where deemed feasible.	Engineering Department	Ongoing	FEMA HMA Grants	High
6	***Emergency Services Goal.*** ***Improve the efficiency, timing, and effectiveness of response and recovery efforts for flooding and related natural disasters.***				
6.1	**Flood Warning and Response.** Apply advanced technological systems to monitor flood threats and warn the public.				
6.1.1	Establish an automated flood threat recognition and forecasting system to identify impending floods.	Engineering Department and Fire Department	Long-Range	TBD	Low
6.1.2	Establish methods for early flood warnings to the public.	Engineering and Fire Departments and Jefferson County EMA	Long-Range	Existing City funds	Medium
6.1.3	Develop a detailed flood response operations plan keyed to flood forecasts for City Council adoption.	Engineering and Fire Departments and Jefferson County EMA	Mid-Range	TBD	Medium
6.1.4	Coordinate flood warning and response activities with critical facilities operators.	Engineering and Fire Departments and Jefferson County EMA	Ongoing	Existing City funds	High

Chapter 6 – Plan Maintenance Procedures

6.1 Scope and Purposes of Procedures

This chapter addresses the procedures for plan maintenance that ensure the 2017 City of Vestavia Hills Floodplain Management Plan ("Plan") remains a dynamic and effective document. These procedures, which have been developed in accordance with the currently effective National Flood Insurance Program CRS Coordinator's Manual (2017 Edition), establish a useful and ongoing planning process that is continuously monitored, evaluated, and updated to reflect changing conditions. This chapter describes how the adopted Plan will be implemented, reviewed, and updated, and provides procedures that, at minimum, provide for an annual review and a five-year update.

6.2 Plan Implementation Responsibilities

The City of Vestavia Hills' Engineering Department, under the direction of the City Engineer, assumes responsibility for overseeing the implementation and maintenance of this Plan. The City Engineer, who also serves as the City's Floodplain Administrator, serves as Floodplain Management Planning Committee ("FMPC") Chair. Plan implementation, however, is a combined effort among all FMPC members and all individuals representing agencies responsible for implementation of identified mitigation measures in the Action Plan. Those individuals and the entire membership of the FMPC should assume active roles throughout the ongoing plan implementation cycle.

To maintain a dynamic and useful Plan, the FMPC will remain an active component of the ongoing planning process throughout the five-year planning cycle. The FMPC may, at its own discretion, create subcommittees to oversee and evaluate plan implementation.

6.3 Plan Monitoring and Ongoing Review

The FMPC's ongoing review process should continually monitor the current status of the mitigation measures scheduled for implementation. The FMPC will conduct quarterly meetings. Ongoing progress reports should be reported to the FMPC by the agencies assigned implementation responsibilities for specific mitigation measures. Progress reports should include the following information:

- Actions that have been undertaken to implement the scheduled mitigation measure, such as, obtaining funding, permits, approvals or other resources to begin implementation;
- Mitigation measures that have been completed, including public involvement activities;
- Revisions to the priority, timeline, responsibility, or funding source of a measure and cause for such revisions or additional information or analysis that has been developed that would modify the mitigation measure assignment, as initially adopted in the plan; and
- Measures that the City no longer intends to implement and justification for cancellation.

6.4 Annual Evaluation Report

As a part of its ongoing implementation program, the City will perform an annual evaluation of the Floodplain Management Plan, which is also required for certification in the CRS program. The City will develop an Annual Evaluation Report with support from the Planning Committee. The report will evaluate the City's progress towards achieving the Plan's goals and objectives and carrying out the measures presented in the Action Plan. Some potential questions by the FMPC during its annual review may address the following concerns:

- Are there any new potential flood hazards that have developed and were not addressed in the Plan?
- Have any flood disasters occurred that are not included in the Plan?
- Are there additional mitigation ideas that need to be incorporated into the Plan?
- What projects or other measures have been initiated, completed, deferred, or deleted?
- Are there any changes in local capabilities to carry out mitigation measures?
- Have funding levels to support mitigation actions either increased or decreased, including new opportunities for funding through FEMA Hazard Mitigation Assistance grant programs?

Reporting the implementation progress of the Action Plan and the FMPC's findings and recommendations annually is a minimum requirement. It not only reports on implementation progress, but also provides a framework for monitoring the Plan's effectiveness. The Annual Evaluation Report of the FMPC will be submitted to the City Council and made available to media outlets and the public for review and comment.

6.5 Plan Amendments

The ongoing review process may require adjustments to the selection of mitigation measures, priorities, timelines, lead responsibilities, and funding sources scheduled in the Action Plan. Annual adjustments should be made to the Action Plan, as needed, to reflect current implementation progress, priorities, capabilities, and funding resources. Moreover, goals, objectives, and mitigation actions may likewise need to be revised from year-to-year. In the event modifications to the Action Plan are warranted as a result of the annual review or other conditions, the FMPC will oversee and approve all amendments to the Plan by majority vote of a quorum of FMPC members. Conditions that might warrant amendments to this plan would include, but not be limited to, special opportunities for funding and response to a flood disaster.

6.6 Plan Evaluation following a Flood Disaster

Immediately following a significant flooding disaster event having a substantial impact on any part of the City, the FMPC will conduct or oversee an analysis of the event to evaluate the responsiveness of the Plan. An assessment of the event should examine the direct and indirect damages, response and recovery costs (economic impacts) and the location, type, and extents of the damages. The findings of the assessment should determine any new mitigation initiatives that should be incorporated into this Plan to avoid similar losses from future hazard events. The results of the assessment will be provided to City Council and the public for review. These results may also provide useful information when considering new mitigation initiatives as an amendment to the existing Action Plan.

6.7 Five-Year Plan Update

This Plan's adoption, by resolution of the City of Vestavia Hills City Council (Appendix F – "Adopting Resolution"), marks the beginning of the five-year planning cycle until the next major plan update becomes due.

The Plan must be updated at least every five years in accordance with the most current version of the CRS Coordinator's Manual (Activity 510 Floodplain Management Planning). The update will follow the CRS Ten-Step Planning Process to include a review of any new plans, studies, or reports, as well as any revised directives or goals for the City. The flood hazard risk profiles and vulnerability assessments will be updated to reflect best available data and information. The hazard assessments will account for any additional repetitive flood loss properties, impacts of completed flood mitigation projects, increased development in the floodplain, major floods or disasters and any other change in flooding conditions.

The Action Plan will be reviewed and revised to account for completed, changed, or removed mitigation goals, objectives, and mitigation measures. While the FMPC's membership may change, the committee will continue to be involved in the planning process for the plan update. Public meetings will be conducted and media releases will

be organized. The City Council will adopt the updated plan and publish it for public distribution.

Appendix A
Resolution Establishing the Planning Process

RESOLUTION NUMBER 5052

A RESOLUTION (1) TO RECOGNIZE THE TEN-STEP PLANNING PROCESS FOR THE PREPARATION OF THE 2018 CITY OF VESTAVIA HILLS FLOODPLAIN MANAGEMENT PLAN ("PLAN'), CONSISTENT WITH ACTIVITY 510 OF THE COMMUNITY RATING SYSTEM COORDINATOR'S MANUAL, 2017 EDITION; (2) TO CONFIRM THE MEMBERSHIP OF A FLOODPLAIN MANAGEMENT PLANNING COMMITTEE ("PLANNING COMMITTEE") APPOINTED BY THE CITY MANAGER TO OVERSEE THE PREPARATION OF THE PLAN; (3) TO RECOGNIZE THE CITY ENGINEER AND FLOODPLAIN ADMINISTRATOR AS CHAIR OF THE PLANNING COMMITTEE; (4) TO AUTHORIZE THE STAFF OF THE CITY'S DEPARTMENT OF ENGINEERING TO PROVIDE STAFF SUPPORT TO THE PLANNING COMMITTEE; AND (5) TO COMPLETE THE PLAN WITHIN THE PERIOD OF PERFORMANCE ENDING ON SEPTEMBER 30, 2018, AS REQUIRED BY THE FEMA FLOOD MITIGATION ASSISTANCE ("FMA") GRANT AWARDED TO THE CITY FOR PREPARING THE PLAN.

WHEREAS, the City of Vestavia Hills had been awarded a FEMA Flood Mitigation Assistance grant on October 14, 2014, to fund the preparation of the 2018 Plan; and,

WHEREAS, the ten-step planning process for the preparation of the plan is hereby recognized in accordance with activity 510 of the Community Rating System Coordinator's Manual, 2017 edition; and,

WHEREAS, the following individuals are hereby appointed as members of the Floodplain Management Planning Committee, which is hereby created to oversee the preparation of the plan:

- Keith Blanton, Building Official
- Christopher Brady, Floodplain Manager & City Engineer
- Brian Davis, Public Services
- Jeff Downes, City Manager
- Conrad Garrison, City Planner
- Scott Key, Fire Marshal; and

WHEREAS, the Floodplain Administrator, Mr. Christopher Brady, City Engineer, is hereby recognized as Chair of the Planning Committee; and,

WHEREAS, City staff from the Engineering Department are hereby authorized to provide staff support to the Planning Committee under the direction of the Chair; and,

WHEREAS, the Planning Committee is hereby directed to complete the plan within the period of performance ending on September 30, 2018, as required by the FMA grant conditions, and continue to guide implementation of the plan.

NOW THEREFORE, BE IT RESOLVED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF VESTAVIA HILLS, ALABAMA, AS FOLLOWS:

1. The following individuals are hereby appointed as members of the Floodplain Management Planning Committee, which is hereby created to oversee the preparation of the plan:
    - Keith Blanton, Building Official
    - Christopher Brady, Floodplain Manager & City Engineer
    - Brian Davis, Public Services
    - Jeff Downes, City Manager
    - Conrad Garrison, City Planner
    - Scott Key, Fire Marshal; and
2. Christopher Brady, Foodplain Manager and City Engineer is hereby recognized as the Chair of the Planning Committee; and
3. City staff from the Engineering Department are hereby authorized to provide staff support to the Planning Committee under the direction of the Chair; and
4. The Planning Committee is hereby directed to complete the plan within the period of performance ending on September 30, 2018, as required by the FMA grant conditions, and continue to guide implementation of the plan; and
5. This Resolution Number 5052 shall become effective immediately upon adoption and approval.

APPROVED and ADOPTED this the 14th day of May, 2018.

Ashley C. Curry

Ashley C. Curry
Mayor

ATTESTED BY:

Rebecca Leavings
City Clerk

Appendix B
Hazard Profile Data

App. B – Hazard Profile Data

1.0 Records of Previous Occurrences of Hazard Events

This appendix contains the detailed records of previous occurrences of hazard events reported in Section 4.3 “Previous Occurrence,” for events reported by the National Climatic Data Center. In addition, records of Presidential Disaster Declarations are included in this appendix.

Past Occurrences of Flooding

Table B-1. City of Vestavia Hills Flash Flooding Events, 1995-2018

Mag: Magnitude **Dth:** Deaths **Inj:** Injuries **PrD:** Property Damage **CrD:** Crop Damage

Location	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
COUNTYWIDE	9/22/2002	3:00	Flash Flood		0	0	5.800M	0.00K
COUNTYWIDE	5/7/2003	15:45	Flash Flood		0	0	1.000B	0.00K
COUNTYWIDE	9/16/2004	10:45	Flash Flood		0	0	500.00K	0.00K
VESTAVIA HILLS	6/29/2004	18:20	Flash Flood		0	0	8.00K	0.00K
VESTAVIA HILLS	7/21/2005	15:28	Flash Flood		0	0	3.00K	0.00K
CAHABA HGTS	6/27/2011	15:00	Flash Flood		0	0	0.00K	0.00K
CAHABA HGTS	6/27/2011	15:23	Flash Flood		0	0	5.00K	0.00K
CAHABA HGTS	7/31/2012	7:15	Flash Flood		0	0	0.00K	0.00K
CAHABA HGTS	7/11/2017	15:10	Flash Flood		0	0	0.00K	0.00K
VESTAVIA HILLS	7/26/2017	10:45	Flash Flood		0	0	0.00K	0.00K
Totals:					**0**	**0**	**1.006B**	**0.00K**

Source: National Climatic Data Center

Table B-2. City of Vestavia Hills Flooding Events, 1995-2018

Mag: Magnitude **Dth:** Deaths **Inj:** Injuries **PrD:** Property Damage **CrD:** Crop Damage

Location	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
JEFFERSON CO.	3/7/1996	8:00	Flood		0	0	200.00K	0.00K
JEFFERSON CO.	5/6/2003	14:00	Flood		0	0	0.00K	0.00K
JEFFERSON CO.	5/7/2003	15:00	Flood		0	0	0.00K	0.00K
JEFFERSON CO.	5/18/2003	5:45	Flood		0	0	0.00K	0.00K
JEFFERSON CO.	4/1/2005	0:00	Flood		0	0	0.00K	0.00K
VESTAVIA HILLS	9/5/2011	18:45	Flood		0	0	0.00K	0.00K
Totals:					**0**	**0**	**220.00K**	**0.00K**

Source: National Climatic Data Center

Past Occurrences of Hurricanes

Table B-3. City of Vestavia Hills Hurricane and Tropical Storm Events, 1995-2018

Mag: Magnitude **Dth:** Deaths **Inj:** Injuries **PrD:** Property Damage **CrD:** Crop Damage

Location	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
JEFFERSON CO.	7/10/2005	17:00	Tropical Storm		0	0	400.00K	0.00K
JEFFERSON CO.	8/29/2005	17:00	Tropical Storm		0	0	6.000M	0.00K
JEFFERSON CO.	8/23/2008	12:00	Tropical Depression		0	0	10.00K	0.00K
JEFFERSON CO.	11/9/2009	14:00	Tropical Depression		0	0	3.00K	0.00K
JEFFERSON CO.	10/8/2017	05:00	Tropical Storm		0	0	3.00K	0.00K
Totals:					**0**	**0**	**6.413M**	**0.00K**

Source: National Climatic Data Center

Presidential Disaster Declarations

Table B-4. History of Jefferson County Flood Hazard Related Events with Presidential Disaster Declarations

Federal Disaster Declaration	Incident Period	Declared Date	Description
DR-109	February 27, 1961	February 27, 1961	Floods
DR-285	April 9, 1970	April 9, 1970	Heavy Rains, Tornadoes, Flooding
DR-388	May 29, 1973	May 29, 1973	Severe Storms, Flooding
DR-458	March 14, 1975	March 14, 1975	Severe Storms, Flooding
DR-532	April 9, 1977	April 9, 1977	Severe Storms, Flooding
DR-578	April 18, 1979	April 18, 1979	Storms, Wind, Flooding
DR-638	April 10, 1981	April 10, 1981	Severe Storms, Tornadoes, Flooding
DR-695	December 2, 1983 to December 6, 1983	December 13, 1983	Severe Storms, Flooding, Tornadoes
DR-856	February 3, 1990 to February 16, 1990	February 17, 1990	Flooding, Severe Storm, Tornado
DR-1070	October 4, 1995 to October 8, 1995	October 4, 1995	Hurricane Opal
DR-1214	April 8, 1998 to April 20, 1998	April 9, 1998	Tornadoes and Severe Thunderstorms
DR-1322	March 10, 2000 to March 11, 2000	March 17, 2000	Severe Storms And Flooding
DR-1352	December 16, 2000 to December 22, 2000	December 18, 2000	Tornadoes
DR-1362	February 16, 2001 to February 17, 2001	March 5, 2001	Severe Storms & Flooding
DR-1399	November 24, 2001 to November 25, 2001	December 7, 2001	Severe Storms and Tornadoes
DR-1442	November 5, 2002 to November 12, 2002	November 14, 2002	Severe Storms and Tornadoes
DR-1466	May 5, 2003 to May 30, 2003	May 12, 2003	Severe Storms, Tornadoes and Flooding
DR-1549	September 13, 2004 to September 30, 2004	September 15, 2004	Hurricane Ivan
DR-1593	July 10, 2005 to July 16, 2005	July 10, 2005	Hurricane Dennis
DR-1605	August 29, 2005 to September 26, 2005	August 29, 2005	Hurricane Katrina

Federal Disaster Declaration	Incident Period	Declared Date	Description
DR-1687	March 1, 2007	March 3, 2007	Severe Storms and Tornadoes
DR-3292	August 29, 2008 to September 3, 2008	August 30, 2008	Hurricane Gustav
DR-1836	April 10, 2009 to April 13, 2009	May 8, 2009	Severe Storms, Flooding, Tornadoes, and Straight-line Winds
DR-1971	April 15, 2011 to May 31, 2011	April 28, 2011	Severe Storms, Tornadoes, Straight-line Winds, and Flooding
DR-4052	January 22, 2012 to January 23, 2012	February 1, 2012	Severe Storms, Tornadoes, Straight-Line Winds, and Flooding
DR-4176	April28, 2014 to May 5, 2014	May 2, 2014	Severe Storms, Tornadoes, Straight Line Winds, and Flooding

Appendix C
Risk Assessment Data

App. C – Risk Assessment Data

1.0 Summary of Vulnerability and Impacts

Table C-1 summarizes the City of Vestavia Hills' vulnerability to flooding and other natural hazards. This table is an abridged version, based upon the comparable Table 5-49 found in the 2009 Jefferson County Multi-Hazard Mitigation Plan, as amended in 2011. Table C-1 includes a summary of all hazards identified in Section 4.2 of this plan. Community impacts include the following descriptions and measurements:

Location. Location measures the geographic extent of the identified hazard in one of three ways, as follows:

1) *Community-wide* - the entire geographic area is affected;
2) *Partial* - a significant portion of the community is affected; or
3) *Minimal* - a negligible area is affected.

Probability. Probability measures the likelihood of the hazard occurring within the community, based on historical incidence. The scale for frequency runs as follows:

1) *Very high* - annually;
2) *High* - every two to three years;
3) *Moderate* - every three to ten years;
4) *Low* - every ten years; or
5) *Very low* - rare.

Extent. Extent measures the severity of the hazard and its potential to cause casualties, business losses, and damage to structures. The scale utilized runs as follows:

1) *Devastating* - the potential for devastating casualties, business losses, and structure damage;
2) *Significant* - the potential for some casualties and significant, but less than devastating, business losses and structure damage;
3) *Moderate* – moderate potential for economic losses and structure damage; or
4) *Slight* – slight or minimal potential for economic losses and structure damage

Exposure. Exposure measures the percentage of structures within the community, including buildings, critical facilities, and infrastructure lifelines, that are exposed to the hazard. The classifications are defined as follows:

1) *High* - includes more than approximately 25 percent of the structures;
2) *Medium* - includes 10 percent to 25 percent of the structures; or
3) *Low* - includes less than 10 percent of the structures.

Damage Potential. Damage potential measures the damage that can be expected should an event take place. The classifications are defined as follows:

1) *High* - a hazard could damage more than 5 percent of the structures in a community;
2) *Medium* - a hazard could damage between 1 and 5 percent of the structures in a community; or
3) *Low* - a hazard could damage less than 1 percent of the structures in a community.

Table C-1. Summary of Hazards and Community Impacts

Hazard	Community Impacts			Impacts to Vulnerable Community Buildings, Critical Facilities, and Infrastructure	
	Location (Geographic Extent of Hazard in the Community)	**Probability** (Frequency of Hazard Occurrence in the Community)	**Extent** (Magnitude of Severity of Hazard in the Event of Occurrence)	**Level of Exposure** (Degree of Structures Exposed to the Hazard)	**Level of Damage Potential** (Percentage of Likely Damage to Exposed Structures)
Floods	Partial	Moderate	Moderate	Low	Low
Dam/Levee Failures	Minimal	Very Low	Slight	Low	Low
Sinkholes (Land Subsidence)	Community-wide	Low	Slight	Low	Low
Tornadoes	Community-wide	Moderate	Devastating	High	Medium
Severe Storms	Community-wide	Very High	Moderate	High	Low
Hurricanes	Community-wide	Low	Moderate	High	Low
Winter Storms/Freezes	Community-wide	Moderate	Moderate	High	Low
Drought/Heat Waves	Community-wide	High	Slight	High	Low
Wildfires	Minimal	Very Low	Slight	Low	Low
Landslides	Partial	Low	Slight	Low	Low
Earthquakes	Community-wide	Very Low	Significant	High	Low

Source: 2009 Jefferson County Multi-Hazard Mitigation Plan, as amended in 2011

2.0 HAZUS-MH: Flood Event Report

FEMA's HAZUS-MH risk assessment software was used to estimate losses due to flooding for the City of Vestavia Hills study area. The results of the modeled flood scenario are included in the following Flood Event Summary Report generated from HAZUS-MH, which have been integrated into this plan in Chapter 4. Risk Assessment.

Hazus-MH: Flood Event Report

Region Name: Vestavia Hills Flood Scenario

Flood Scenario: Vestavia Hills 2

Print Date: Thursday, August 27, 2015

Disclaimer:
This version of Hazus utilizes 2010 Census Data.
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Alabama

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is 57 square miles and contains 2,256 census blocks. The region contains over 34 thousand households and has a total population of 79,506 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 29,047 buildings in the region with a total building replacement value (excluding contents) of 12,354 million dollars (2010 dollars). Approximately 90.21% of the buildings (and 81.28% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 29,047 buildings in the region which have an aggregate total replacement value of 12,354 million (2010 dollars). Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	10,042,216	81.3%
Commercial	1,748,006	14.1%
Industrial	255,813	2.1%
Agricultural	24,006	0.2%
Religion	189,201	1.5%
Government	34,731	0.3%
Education	60,512	0.5%
Total	**12,354,485**	**100.00%**

Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,333,469	78.1%
Commercial	307,865	18.0%
Industrial	30,407	1.8%
Agricultural	1,922	0.1%
Religion	21,628	1.3%
Government	87	0.0%
Education	12,848	0.8%
Total	**1,708,226**	**100.00%**

Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 497 beds.
There are 27 schools, 2 fire stations, 2 police stations and no emergency operation centers.

Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Vestavia Hills Flood Scenario
Scenario Name:	Vestavia Hills 2
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Building Damage

General Building Stock Damage

Hazus estimates that about 146 buildings will be at least moderately damaged. This is over 16% of the total number of buildings in the scenario. There are an estimated 20 buildings that will be completely destroyed. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		Substantially	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Commercial	0	0.00	0	0.00	1	50.00	0	0.00	1	50.00	0	0.00
Education	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Government	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Industrial	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Religion	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Residential	0	0.00	2	1.39	25	17.36	20	13.89	77	53.47	20	13.89
Total	**0**		**2**		**26**		**20**		**78**		**20**	

Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		Substantially	
	Count	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Concrete	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
ManufHousing	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	0	0.00	0	0.00	1	50.00	0	0.00	1	50.00	0	0.00
Steel	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	0	0.00	2	1.41	24	16.90	20	14.08	76	53.52	20	14.08

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 497 hospital beds available for use. On the day of the scenario flood event, the model estimates that 497 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Fire Stations	2	0	0	0
Hospitals	1	0	0	0
Police Stations	2	0	0	0
Schools	27	1	0	1

If this report displays all zeros or is blank, two possibilities can explain this.

(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

Analysis has not been performed for this Scenario.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 380 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 820 people (out of a total population of 79,506) will seek temporary shelter in public shelters.

Economic Loss

The total economic loss estimated for the flood is 132.85 million dollars, which represents 7.78 % of the total replacement value of the scenario buildings.

Building-Related Losses

The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 132.47 million dollars. 0% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 55.96% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	46.88	16.56	1.57	1.35	66.35
	Content	27.42	29.87	2.73	5.45	65.48
	Inventory	0.00	0.30	0.33	0.02	0.65
	Subtotal	**74.30**	**46.73**	**4.63**	**6.81**	**132.47**
Business Interruption						
	Income	0.00	0.13	0.00	0.01	0.14
	Relocation	0.03	0.03	0.00	0.00	0.06
	Rental Income	0.01	0.02	0.00	0.00	0.03
	Wage	0.00	0.12	0.00	0.03	0.16
	Subtotal	**0.04**	**0.30**	**0.00**	**0.04**	**0.37**
ALL	**Total**	**74.34**	**47.02**	**4.63**	**6.85**	**132.85**

Appendix A: County Listing for the Region

Alabama

- Jefferson

Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Alabama				
Jefferson	79,506	10,042,216	2,312,269	12,354,485
Total	**79,506**	**10,042,216**	**2,312,269**	**12,354,485**
Total Study Region	**79,506**	**10,042,216**	**2,312,269**	**12,354,485**

Appendix D
Mitigation Capabilities Assessment

App. D – Mitigation Capabilities Assessment

1.0 Summary of Findings

The City of Vestavia Hills has exceptional capabilities for implementation of a full range of mitigation activities. This finding is based upon the five measures of capability identified below:

1. Planning and Regulatory Tools.

- *Hazard mitigation planning.* The City has a record of experience in hazard mitigation planning. It has been an active participant on the Jefferson County Hazard Mitigation Planning Committee since it was first created in 2003. They participated in the planning processes for the initial 2004 plan and the 2009 update and adopted both editions of the plan. Most recently the City again participated in the 2014 plan update and adopted the 2014 Jefferson County Multi-Hazard Mitigation Plan. This plan includes a Community Action Program of mitigation measures that respond to flooding and related natural hazards, in addition to other natural and manmade and technological hazards.

- *Comprehensive planning.* The Vestavia Hills Comprehensive Master Plan 2004-2025 was first adopted by the City Planning and Zoning Commission and City Council on June 21, 2004. This plan guides city officials and residents in their decisions and actions, which may affect the city's future growth and development. Among other development factors considered the 2004 Plan addresses the threats of flooding to existing properties and limitations on future land development within floodplains. It likewise recognizes opportunities to preserve the natural and beneficial functions of floodplains for stormwater management, wetlands and wildlife conservation, open space protection for recreational use and public enjoyment.

  Less than five years later, the Planning and Zoning Commission amended the Comprehensive Plan by adopting the Cahaba Heights Community Plan on November 13, 2008 as an extension to the 2004 Plan. It is an area-specific plan that addresses issues and concerns that are unique to the Cahaba Heights community. Among other concerns, the 2008 Community Plan examines the vulnerabilities of homes within the Meadowlawn Drive area to flooding. The January 2015 Cahaba Heights Village Plan and the March 2017 Blue Lake Area Study further refined the Cahaba Heights Plan.

The October 2012 US-31 Corridor Redevelopment Plan assessed the commercial redevelopment potential of frontage properties along a major thoroughfare. Many businesses lie within this principal commercial center, parts of which are characterized by repetitive flooding incidents within the Patton Creek floodplain. As recently as July 2017, several inches of rain within a very short period caused severe flash flooding. This mid-afternoon flood resulted in significant property damage, cars swept away, water rescues, and the closing of several streets. The Redevelopment Plan calls for the establishment of a greenway as a flood hazard mitigation measure.

- *Zoning Ordinance.* The current Zoning Ordinance of the City of Vestavia Hills was adopted on December 13, 2010, with amendments enacted in 2012 and 2016. It is, for the most part, a conventional zoning ordinance, which regulates land uses and development standards by district. Floodplain management provisions are included in a separate ordinance. The City Planner administers and enforces the zoning ordinance under the direction of the City Clerk/Zoning Official.

- *Subdivision Regulations.* The City Planner administers the City of Vestavia Hills Subdivision Regulations, which set forth platting requirements and design and construction standards that include standards for drainage improvements.

- *Building Codes.* The City enforces the International Building Code, 2015 edition through the Building Safety division of the Fire Department.

- *Erosion and Sedimentation Control Ordinance.* The City Engineer administers the City's regulations for erosion and sedimentation control, stormwater discharge, and drainage improvements.

- *Floodplain Management Ordinance.* The City Engineer administers the Flood Damage Prevention Ordinance. This ordinance is based upon the model recommended by the Alabama State Floodplain Administrator. It includes a freeboard of one foot, and some higher regulatory standards have been added to the model.

2. GIS Resources.

The City maintains GIS data and software by trained GIS technicians and provides full access for use by City staff.

Flood hazard maps and data are maintained in GIS, in addition to a complete inventory of other essential City attributes.

3. Staffing and Administrative Resources.

The City operates under a council-manager form of government in which the City Manager serves as the chief administrative official responsible for the management of day-to-day operations. The Mayor/Council President presides over the City Council comprised of four other members. The Council is the policy making body.

The City Manager oversees the operations of eight departments, as follows: Finance, City Clerk, Police, Fire, Public Services, Library, Information Technology, and Garage.

4. Fiscal Resources.

City fiscal resources are extremely sound. Boasting a AAA Moody's credit rating, the FY "18 budget proposes a $38.6 million budget. Annual revenues are projected to increase as a result of positive economic growth.

The City maintains eligibility for FEMA's Hazard Mitigation Assistance (HMA) grants and had been awarded community safe room funds under the Hazard Mitigation Grant Program (HMGP) and successfully completed that project. It had previously applied for HMGP funds to elevate select homes subject to flooding but withdrew its application. It attempted a second application to buy out flood prone homes but did not meet the required repetitive loss requirement of the grant program.

5. Public Education and Outreach Programs.

The City maintains an open and interactive municipal government with many opportunities for public education, outreach, and involvement. Among other public involvement opportunities, such as public meetings, media releases, boards and committee representation, the City encourages interaction through its comprehensive website at http://vhal.org/ and its Action Center app at http://vhal.org/government/action-center/launch-action-center/ .

6. Insurance Services Office (ISO) Ratings.

Ratings are established by the Insurance Services Office on a scale of 1 (highest rating) though 10. The Public Protection Classification (PPC) rates the effectiveness of a municipality's fire-protection services, and the Building Code Effectiveness Grading Schedule (BCEGS) program, rates the building codes in effect and how those codes are enforced.

- PPC rating = 2
- BCGES rating for one and two family dwellings = 4
- BCGES rating for all other construction = 2

In addition to the above ratings, the ISO administers the option Community Rating System (CRS) Program of the National Flood Insurance Program (NFIP) participants is a class 10, and communities may enter the optional CRS Program as a class 9. As of the end of 2017, the City had not yet entered the CRS Program. Until it does become a CRS community, the City remains a class 10 community.

Appendix E
Committee Meeting Documentation

App. E - Committee Meeting Documentation

1.0 Meeting Agendas and Sign-in Sheets

This section documents the FMPC's meeting activities during the drafting phase of this plan, including who was involved in these meetings. Included here are the meeting agendas and sign-in sheets.

Kick-off Meeting
2015 City of Vestavia Hills Floodplain Management Plan
Vestavia Hills City Hall
513 Montgomery Hwy
Vestavia Hills, AL 35216

Tuesday, March 10, 2015
10:30 AM – 11:30 AM

I. Call to Order

II. Welcome and Opening Remarks

III. Review Draft Sections

A. Chapter 2 Community Profile
B. Chapter 3, part I Risk Assessment: Flood Hazard Profile
C. Appendix B – Hazard Profile Data

IV. Meeting Schedule

V. Coordination with Jefferson County Multi-Hazard Mitigation Plan

VI. Questions and Answers

VII. Other Business

VIII. Adjourn

No sign-in sheet for the kick-off meeting

FMP Meeting
2015 City of Vestavia Hills Floodplain Management Plan
Vestavia Hills City Hall
513 Montgomery Hwy
Vestavia Hills, AL 35216

Tuesday, July 28, 2015
10:30 AM – 11:30 AM

I. Call to Order

II. Welcome and Opening Remarks

III. Review Draft Sections

A. Chapter 2 Community Profile
B. Chapter 4, Part I: Risk Assessment: Flood Hazard Profile
C. Appendix B – Hazard Profile Data

IV. Meeting Schedule

V. Coordination with Jefferson County Multi-Hazard Mitigation Plan

VI. Questions and Answers

VII. Other Business

VIII. Adjourn

Vestavia Hills Floodplain Management Plan Meeting

July 28, 2015

Name	Title/Organization	Email Address	Phone Number
[illegible]	[illegible]	[illegible]	[illegible]
Brad Griffin	City Planner, Vestavia Hills	bgriffin@vhal.org	978-0125
Keith Blanton	City of Vestavia Hills	kblanton@vhal.org	978-0125
Scott Key	City of Vestavia Hills	skey@vhal.org	978-0128
Lori Beth Kearley	City of Vestavia Hills	lbkearley@vhal.org	978-0336
Rebecca Leavings	COLN	rleavings@vhal.org	205-978-0124
[illegible]	[illegible]	[illegible]	[illegible]
William Thomas	School Engineer	WTHOMAS@SCHOOL.COM	323-6166
Jim Leslie	[illegible]	[illegible]	[illegible]

FMP Meeting
2015 City of Vestavia Hills Floodplain Management Plan
Vestavia Hills City Hall
513 Montgomery Hwy
Vestavia Hills, AL 35216

Tuesday, September 29, 2015
10:30 AM – 11:30 AM

I. Call to Order

II. Welcome and Opening Remarks

III. Review Draft Sections

A. Chapter 4, Part II: Assessing the Problem
B. Appendix C – Risk Assessment Data

IV. Meeting Schedule

V. Questions and Answers

VI. Other Business

VII. Adjourn

Vestavia Hills Floodplain Management Plan Meeting

September 29, 2015

Name	Jurisdiction/Organization	Email Address	Phone Number
Conrad Cox	VH Planner		
Christopher Brady	VH - City Engineer		
William Thomas	School Engineer	wthomas@scbe.com	205 323-6166
Wendy Appelius	VH - GIS	wappelius@vhal.org	205-978-0101
Jim Lehe	Lehe Planning	jlehe@lehepl anning.com	978-3633

FMP Committee Meeting
2017 City of Vestavia Hills Floodplain Management Plan

Executive Conference Room, Vestavia Hills City Hall
1032 Montgomery Hwy
Vestavia Hills, AL 35216

Tuesday, November 21, 2017
10:00 AM – 11:00 AM

I. Call to Order

II. Plan Status

III. Review Draft Sections

A. 2017 Update of 2015 Chapter 4 Risk Assessment
B. Chapter 5A Mitigation Strategy
C. Appendix D Mitigation Capabilities Assessment

IV. Alternative Mitigation Measures Exercise

V. Community Event

VI. Questions and Answers

VII. Other Business

VIII. Adjourn

Vestavia Hills Floodplain Management Plan Meeting

November 21, 2017

Name	Jurisdiction/Organization	Email Address	Phone Number
Christopher Brady	City of Vestavia Hills	cbrady@vhal.org	978-0150
Conrad Garrison	" " "	Cgarrison@vhal.org	978-0179
Keith Blanton	City of Vestavia Hills	kblanton@vhal.org	978-0105
Scott Key	City of Vestavia Hills	skey@vhal.org	(205) 978-0218
Lori Beth Kearley	" "	lbkearley@vhal.org	978-0236
Jeff Downes	"	jdownes@vhal.org	978 0195
Wendy Dickerson	"	wdickerson@vhal.org	978-0101
Jena Leleh	Leleh Planning	jeleleh@lelehplanning.com	978-3657
William Thomas	School Engineering	WThomas@school.com	323-6166

FMP Committee Meeting
2018 City of Vestavia Hills Floodplain Management Plan

Executive Conference Room, Vestavia Hills City Hall
1032 Montgomery Hwy
Vestavia Hills, AL 35216

Tuesday, May 1, 2018
10:30 AM – 12:00 PM

I. Call to Order

II. Opening Remarks

III. Review Draft Sections

a. Remaining Sections of Chapter 5 Mitigation Strategy
b. App. G Alternative Mitigation Measures Exercise
c. Chapter 3 Planning Process

IV. Next Steps:

a. Complete remaining sections: Chapter 3 Planning Process, Appendix E Committee Meeting Documentation, and Appendix L Community Involvement Documentation
b. Prepare final plan document
c. Present plan at public meeting
d. Plan Adoption by City Council

V. Questions and Answers

VI. Other Business

VII. Adjourn

Vestavia Hills Floodplain Management Plan Meeting

May 1, 2018

Name	Jurisdiction/Organization	Email Address	Phone Number
Christopher Brady	City of Vestavia Hills, City Engineer	cbrady@vhal.org	978-0150
Jeff Downes	City of V.H.	jdownes@vhal.org	978-0195
Rebecca Leavings	COVN	rleavings@vhal.org	978-0184
Conrad Garrison	CVIT	Cgarrison@vhal.org	978-0179
Keith Blanton	City of V.H.	Kblanton@vhal.org	978-0125 ext 2
Scott Key, Fire Marshal	City of Vestavia Hills	skey@vhal.org	978-0218
WILLIAM THOMAS	SCHOEL ENG.	WTHOMAS@SCHOEL.com	323-6166
Lori Beth Kearley	City of Vestavia Hills	lbkearley@vhal.org	978-0236
Jim Leke	Leke Plan	jleke@lekeplan.com	978-3633

Appendix F
Community Involvement Documentation

App. F - Community Involvement Documentation

1.0 Documentation

This Appendix includes the following documentation of community involvement activities and opportunities:

- An image of the plan website: http://vestavia.floodplainmanagementplan.com/
- Sign in sheet documenting attendance at the May 21, 2018 community meeting
- Minutes of community meeting
- An image of the community meeting flyers and brochures
- Community Survey form
- Community Survey responses
- An image of the Vestavia Hills website with link to download the survey form and view the responses

Figure F-1 Image of website http://vestavia.floodplainmanagementplan.com/

City of Vestavia Hills 2018 Floodplain Management Plan

Goals of FMP

The City of Vestavia Hills is committed to creating and maintaining a flood-resistant community. The development of a Floodplain Management Plan (FMP) will help the City mitigate against the potential impacts of flooding. The Plan will provide an overall strategy, measures, and projects that aim to reduce the risk of flooding in the city. The following benefits are expected:

- Identification of existing and future flood-related hazards;
- Development of mitigation measures and activities related to flooding;
- Continuity with land use and comprehensive planning programs;
- Education for residents and property owners regarding flood loss reduction measures and natural function of floodplains;
- Increased understanding and support for activities and projects; and
- Participation in the Community Rating System (CRS).

Community Rating System

The Community Rating System (CRS) encourages communities to create flood management plans and develop flood mitigation activities beyond that which is required by the National Flood Insurance Program (NFIP). Communities participating in the CRS receive reduced flood insurance premium rates and become eligible for other Federal assistance programs.

In order for a community to receive credit under the CRS, it must address the three goals and follow a 10-step planning process. Goals of the CRS:

1. Reduce flood damage to insurable property;
2. Strengthen and support the insurance aspects of the NFIP, and
3. Encourage a comprehensive approach to floodplain management.

Floodplain Management Planning Committee

The Floodplain Management Planning Committee (Planning Committee), in conjunction with the project partners, ensure that the FMP's goals and objectives are consistent with citywide programs and activities. The Planning Committee is comprised of experts from various departments addressing the following categories:

- Preventive measures;
- Property protection;
- Natural resource protection;
- Emergency services;
- Structural flood control projects; and
- Public information.

FMPC Meeting Schedule. The FMPC meets five times throughout the development of the 2017 Plan at Vestavia Hills City Hall, as announced here:

Kickoff Meeting: Tuesday, March 10, 2015
10:30 am to 11:30 am

Click here for Agenda and Slide Presentation.

Meeting #2: Tuesday, July 28, 2015
10:30 am - 11:30 am

Community Meetings

Public awareness and understanding of the FMP's purpose is critical to the success of the overall plan. During the planning process, project partners will conduct two public meetings. The public meeting schedule will be posted soon and advertised accordingly.

Community Meeting Schedule

A Public event for community participation in the preparation of the 2018 Vestavia Hills Floodplain Management Plan will be held on May 21, 2018 at 6:00 pm in the Executive Conference Room of City Hall located at 1032 Montgomery Highway, Vestavia Hills, AL 35216. Click here for Agenda.

The 2018 Vestavia Hills Floodplain Management Plan

The plan elements listed below, with a hyperlink, are presented here for public review and comment, as they are completed. Please review the plan as it is drafted and send us your comments and suggestions.

Complete Draft Plan Document with Appendices
(large file)

Figure F-2. Sign-in Sheet for May 21, 2018 Community Meeting

Vestavia Hills Floodplain Management Plan
Public Input Meeting
May 21, 2018

Name	Address	Email Address	Phone Number
Wendy Dickerson	1032 Montgomery Hwy	wdickerson@vhal.org	978-0101
George Pierce	1023 Greenbury Rd.	gpierce@vhal.org	890-4152
Christopher Brady	3204 Tanbrae Dr.	cbrady3204@gmail.com	978-0150
William Thomas	1001 22nd St. S. BHM, AL 35205	wthomas@schoel.com	323-6166
Brian Gilham	1032 Montgomery Hwy	BGilham@vhal.org	978-0194
Marvin Green	2615 Alta Vista Circle Vestavia Hills 35243	MGreen@VHAL.ORG	296-6546
Jason Hardin	1032 Montgomery Hwy	JHardin@VHAL.ORG	978-0114
Johnny Evans	1032 Montgomery Hwy	JEvans@VHAL.ORG	978-0123
Melvin Turner III	1032 Montgomery Hwy	mturner@vhal.org	978-0128
Katherine McRae	3944 River View Dr.	Katherine@lilipadbham.com	516-2588

Vestavia Hills Floodplain Management Plan
Public Input Meeting
May 21, 2018

Name	Address	Email Address	Phone Number
Jeff Downes	1032 Merty Hwy 35216	jdownes@vhal.org	205.908 9354
Kimberly Cook	4487 Galen Wy, Vestavia 35242	kcook@vhal.org	205.807.0503
Rusty Weaver	4903 Reynolds Lane	rweaver@vhal.org	205-957-7427
Paul Head	2120 Fox Valley Cir 35216	phead@vhal.org	490-3477
PATRICK H. BOONE	2415 VESTAVIA DRIVE 35216	patrickboone@bellsouth.net	324-2018
Chris Williams	1742 Wentworth Dr. 36106	chris@riceadvisory.com	334-303-2136
Randall Haddock	622 47th St. S., Bham	RandyH@cahabariversociety.org	205 903 7020

Figure F-3. Minutes of Community Meeting

2018 City of Vestavia Hills Floodplain Management Plan
Community Involvement Meeting
Vestavia Hills City Hall
Executive Conference Room
1032 Montgomery Hwy
Vestavia Hills, AL 35216

May 21, 2018
6:00 PM

1. Welcome and Opening Remarks
    a. Jeff Downes, City Manager, introduced Planning process
    b. Christopher Brady, City Engineer, provided overview and purpose of plan and introduction to presentation
2. Presentation – William Thomas, Schoel Engineering
    a. Concerns of flooding within the City
    b. Purpose of plan
        i. Flood mitigation activities
        ii. Resources for Floodplain Management
        iii. FEMA CRS Program credit
    c. 10-Step Planning Process
    d. Action Plan
    e. Review and Comments
        i. Vestavia.floodplainmanagementplan.com
        ii. Vhal.org/departments/public-services/engineering
    f. Contact information
3. Questions and Answers
    a. Mrs. Cook asked about public comment period, notification and committee members. Recommended posting to Vestavia Listens for convenient input.

        RESPONSE: The public comment period is open as of this meeting and is currently posted to close on June 5. This will be notified through social media, on City's website, mentioned in Vestavia Voice article, and as announced during City's public meetings. Committee members have consisted of City Manager, City Engineer/Floodplain Manager, City Planner, Chief Building Official, Fire Marshal, Public Services Director, with contributing efforts by key City staff including City Clerk, GIS, and others. The City, as of May 22, posted comment form to Vestavia Listens for input from residents and business owners.

    b. Mr. Pierce recommended extending public comment period to allow additional input.

        RESPONSE: We will consider extending announced comment closing period beyond June 5. We will consider any comments received for incorporation of final planning documents.

F-4. Image of Community Meeting flyers and brochures

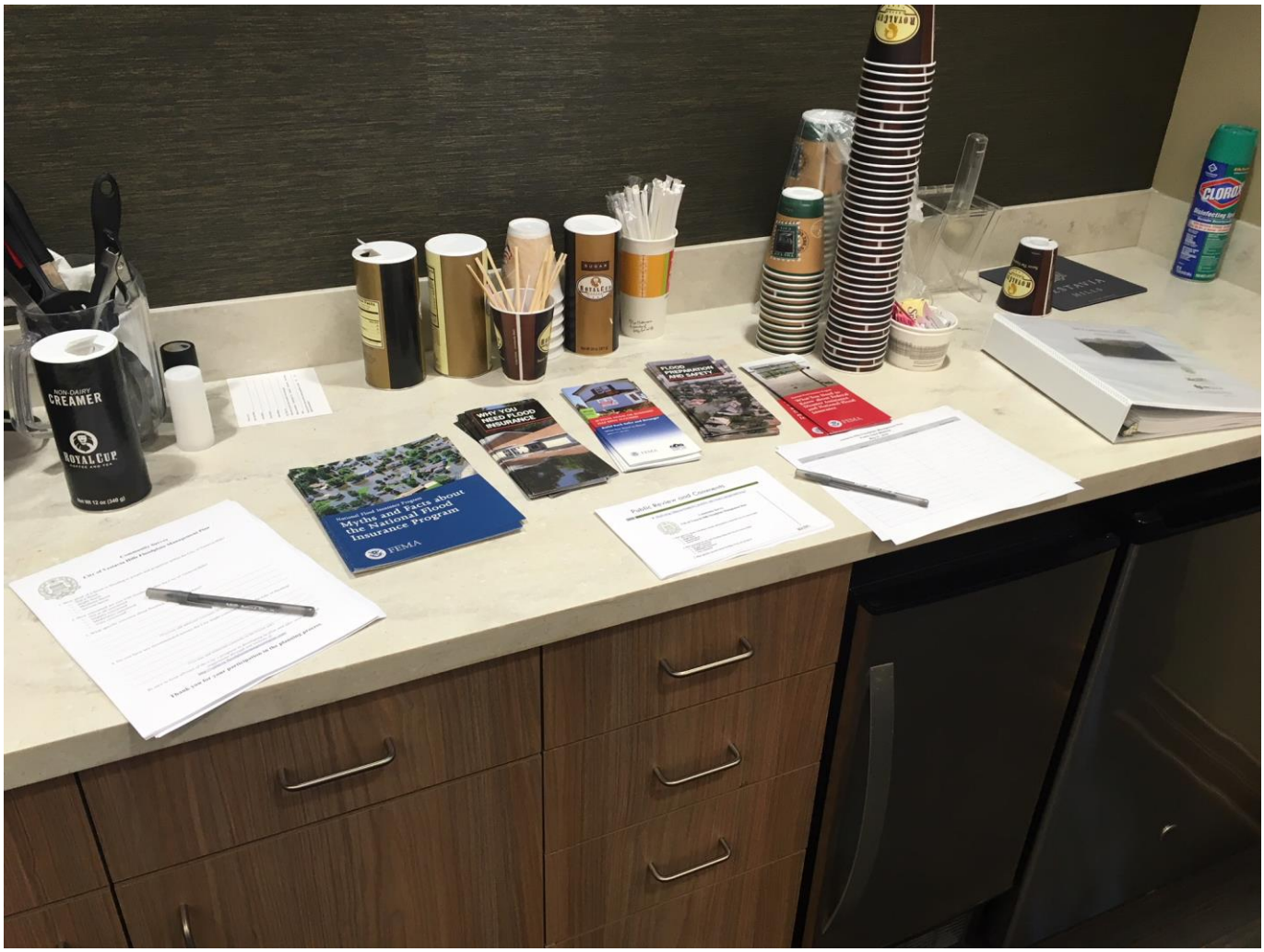


Figure F-5. Community Survey Form

Community Survey

City of Vestavia Hills Floodplain Management Plan

1. How great of a threat is flooding to people and properties within the City of Vestavia Hills?
   - Not a threat
   - Slight threat
   - Moderate threat
   - Serious threat

2. How concerned are you with flooding within the City of Vestavia Hills?
   - Not at all concerned
   - Slightly concerned
   - Moderately concerned
   - Very concerned

3. What specific concerns about flooding, if any, do you have?

_____

_____

_____

(You may add additional comments on the reverse side).

4. Do you have any recommended actions the City might consider to reduce the risks of flooding?

_____

_____

_____

(You may add additional comments on the reverse side).

Be sure to keep abreast of the City's progress in developing its plan and offer your ideas and suggestions through our website at:
http://vestavia.floodplainmanagementplan.com/

Thank you for your participation in the planning process.

Figure F-6 Community Survey Responses

Vestavia Hills Listens

Floodplain Management Plan Survey

Summary Of Responses

As of June 7, 2018, 1:29 PM, this forum had:

Attendees: 29
Responses: 8
Minutes of Public Comment: 24

This topic started on May 21, 2018, 7:13 PM.
This topic ended on June 7, 2018, 1:27 PM.

How great of a threat is flooding to people and properties within the City of Vestavia Hills?

	%	Count
Slight threat	62.5%	5
Moderate threat	25.0%	2
Serious threat	12.5%	1

How concerned are you with flooding within the City of Vestavia Hills?

	%	Count
Slightly concerned	62.5%	5
Moderately concerned	25.0%	2
Very concerned	12.5%	1

What specific concerns about flooding, if any, do you have?

Answered	6
Skipped	2

Do you have any recommended actions the City might consider to reduce the risks of flooding?

Answered	5
Skipped	3

Individual Responses

matt churnock inside Area West of Rocky Ridge (registered) May 22, 2018, 1:54 PM

How great of a threat is flooding to people and properties within the City of Vestavia Hills?
Slight threat

How concerned are you with flooding within the City of Vestavia Hills?
Slightly concerned

What specific concerns about flooding, if any, do you have?
that the poorly maintained city infrastructure and legacy systems do not have the proper capacity to handle storm water runoff a current levels. I have experienced property damage from lack of City attention and would hope that before additional regulations are placed on the public the City would maintain it's own system to these standards.

Do you have any recommended actions the City might consider to reduce the risks of flooding?
install curb and gutter, fix the road profiles, remove debris from spillways, maintain storm water system,

Name not shown inside Cahaba Heights (registered) May 23, 2018, 5:00 PM

How great of a threat is flooding to people and properties within the City of Vestavia Hills?
Slight threat

How concerned are you with flooding within the City of Vestavia Hills?
Slightly concerned

What specific concerns about flooding, if any, do you have?
I live in Cahaba Heights in an area that has flooded before but it happens very rarely, so I am not overly concerned with the actual flooding. My concern is more with the cost of flood insurance and things the City can do to reduce my premiums.

Do you have any recommended actions the City might consider to reduce the risks of flooding?
I highly suggest that the City join the NFIP's Community Rating System (CRS) and perform as many creditable activities as possible in order to receive a higher class rating and, subsequently, a higher premium reduction for its citizens.

Jessica Bishop inside Area West of Rocky Ridge (registered) May 24, 2018, 1:48 PM

How great of a threat is flooding to people and properties within the City of Vestavia Hills?
Slight threat

How concerned are you with flooding within the City of Vestavia Hills?
Slightly concerned

What specific concerns about flooding, if any, do you have?
My concerns are specific to the shopping center near Vestavia Bowl on Hwy 31. This area is prone to flooding, but the flooding only occurs when the area receives a lot of rain in a vey short amount of time, indicating that this is a drainage issue more than anything. The Floodplain Management Plan mentions purchasing structures in flood prone areas and maintaining the land as "permanent open space." I am not sure if this is in reference to the buildings near Vestavia bowl or if this is more targeted towards the land around the old Altadena Country Club, but either way it seems that it would be in the city's favor to do everything in its power to improve drainage and infrastructure to a point that the land is usable, otherwise the land is not generating tax dollars. Even land in a flood zone could be used for baseball/softball fields, or parks, etc. "Permanent open space" is concerning depending on how much land the city is planning to put in this classification. The plan does not elaborate on specific plans to improve the drainage, or elevate areas in flood prone areas. Seeing specific plans for improving drainage and infrastructure in certain flood prone areas would be beneficial.

Do you have any recommended actions the City might consider to reduce the risks of flooding?
The area off Highway 31 between I-65 and Vestavia Bowl has been an eye-sore and topic of negative conversation for Vestavia residents for quite sometime. This area is also prone to flooding which may indeed be part of the reason this area currently looks so bad. It seems that the Floodplain Management Plan could also be used to help improve the establishment in this area as well. For example: Patton Creek runs parallel to Highway 31 behind the Chucky-Cheese/ Vestavia Bowl shopping center. This creek could be enlarged and a drainage pond added to improve flooding issues. A retail "river-walk" shopping center could then be built along Patton Creek replacing much of the outdated, run-down establishments currently along this stretch of highway 31. The "front" of the commercial development would face towards Patton Creek and away from Highway 31 on a more elevated piece of land. The parking would stretch the length of the establishment along highway 31. The shop owners would have entrance access on both the parking lot side of the building and the river-walk side of the building allowing customers easy access to the stores on rainy days and a nice manicured river-walk environment for nice weather. Imagine something similar to the Riverwalk in San Antonio or Bridgestreet in Huntsville. Outdoor seating, maybe live local music on the weekends, playground/splash pad for children, etc. I imagine more mom and pop stores and restaurants similar to downtown Homewood or Mountain Brook rather than big box stores. This idea offers a solution to the drainage concerns in this area, but also provides a solution for the need for new, exciting establishments to attract people to Vestavia ultimately increasing tax dollars.

Name not available (unclaimed) June 1, 2018, 12:52 AM

How great of a threat is flooding to people and properties within the City of Vestavia Hills?
Serious threat

How concerned are you with flooding within the City of Vestavia Hills?
Very concerned

What specific concerns about flooding, if any, do you have?
We live in the area behind Wald Park and travel 31 many times a day. When it floods it is a total disaster. With each flood, I believe structures, roads and byways deteriorate more and more. And with each flood, I feel there is more clean up and the flooding gets worse. In a city such as Vestavia, surly, there has to be a solution. Flooding continues to make lower 31 look worse and worse and frankly it is an embarrassment.

Do you have any recommended actions the City might consider to reduce the risks of flooding?
Take some type of action. But as much thought into this as the city has paying for plans through the years that never get developed. I understand hands are tied at times but surly with our leadership and engineers, this great city can come up with a solution. I honestly do not know what the solution is but to build up and put the money into making firm foundations. It will only benefit our city in the long run.

Name not available (unclaimed) June 4, 2018, 3:53 PM

How great of a threat is flooding to people and properties within the City of Vestavia Hills?
Moderate threat

How concerned are you with flooding within the City of Vestavia Hills?
Moderately concerned

What specific concerns about flooding, if any, do you have?
No response

Do you have any recommended actions the City might consider to reduce the risks of flooding?
No response

Carolyn Baker inside Area West of Rocky Ridge (registered) June 5, 2018, 7:43 AM

How great of a threat is flooding to people and properties within the City of Vestavia Hills?
Moderate threat

How concerned are you with flooding within the City of Vestavia Hills?
Moderately concerned

What specific concerns about flooding, if any, do you have?
In addition to the theat to business and motorists, it leaves such a mess. For examples, dumpsters floating away.

Do you have any recommended actions the City might consider to reduce the risks of flooding?
No response

David Butler inside Area West of Rocky Ridge (registered) June 5, 2018, 2:05 PM

How great of a threat is flooding to people and properties within the City of Vestavia Hills?
Slight threat

How concerned are you with flooding within the City of Vestavia Hills?
Slightly concerned

What specific concerns about flooding, if any, do you have?
I am concerned that there has not been more emphasis on low-impact development, which would reduce the volume and velocity of storm water before flooding becomes a greater issue. Despite the explosive growth and renewed momentum for home-building, there have been precious few projects that implement many of the standards that are common around the country. Additionally, the flooding is indicative of other issues that have environmental implications. I am disappointed that our community views our creeks and rivers first as a conduit for diverting water, and then, sometimes as a natural resource that we should be mindful of protecting.

Do you have any recommended actions the City might consider to reduce the risks of flooding?
I would like to see the city do a better job of enforcing the current regulations, making storm water funding a priority, strongly enforcing litter ordinances which might reduce clogging in the storm water collection systems, and incentivizing low impact development for future projects.

Name not shown inside Liberty Park (unverified) June 5, 2018, 4:35 PM

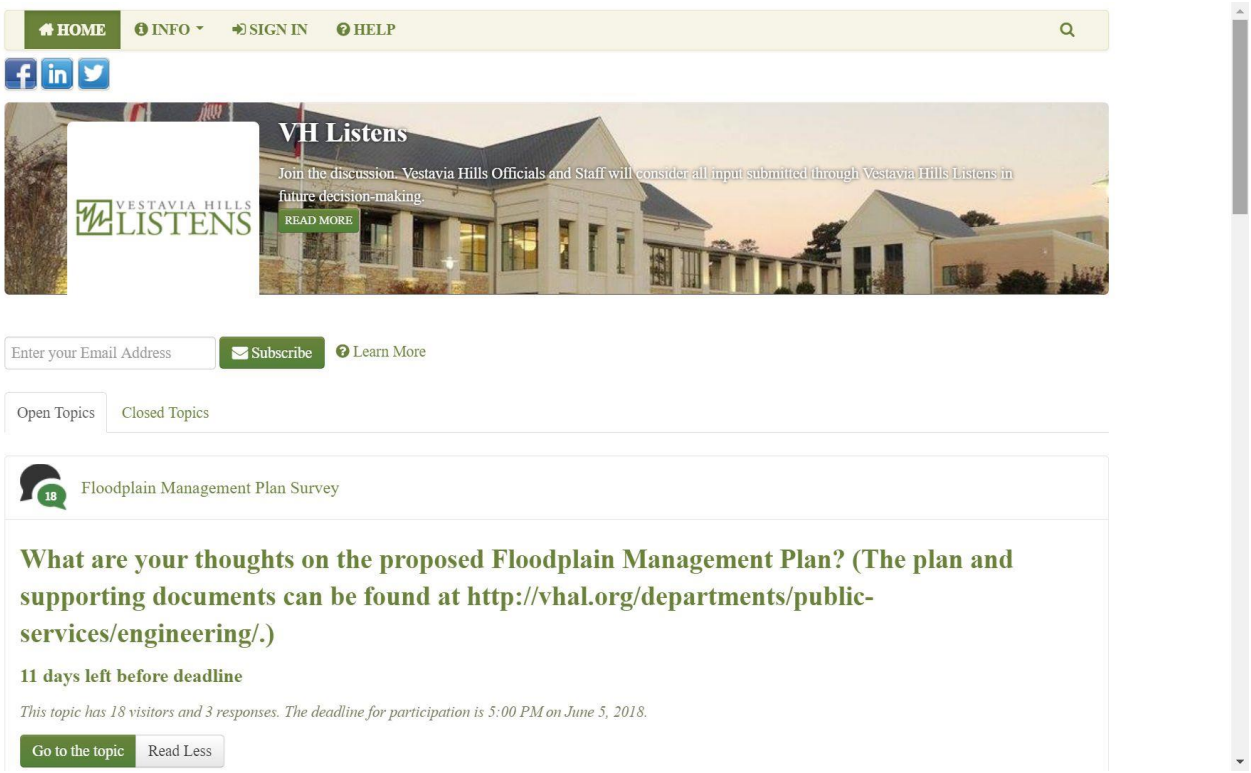
How great of a threat is flooding to people and properties within the City of Vestavia Hills?
Slight threat

How concerned are you with flooding within the City of Vestavia Hills?
Slightly concerned

What specific concerns about flooding, if any, do you have?
No response

Do you have any recommended actions the City might consider to reduce the risks of flooding?
No response

Figure F-7. An image of the Vestavia Hills website with link to download the survey form and view the responses



Appendix G
Alternative Mitigation Measures Exercise

Alternative Mitigation Measures Exercise
2017 Vestavia Hills Floodplain Management Plan

Summary of Results from X Responses

- If no respondents suggested the measure should be eliminated from further consideration, it is not highlighted.
- If only one respondent suggested the measure should be eliminated from further consideration, it is highlighted in yellow.
- If two respondents suggested the measure should be eliminated from further consideration, it is highlighted in pink.
- If three or more respondents suggested the measure should be eliminated from further consideration, it is highlighted in red.
- *Respondent comments are noted in italics and underlined.*

Instructions. The purpose of this exercise is to **narrow down the mitigation measures to be considered for the City's Five Year Action Plan** component of the 2017 Floodplain Management Plan. **Take into consideration the City's capabilities** to carry out flood hazard mitigation measures **and the STAPLEE approach** (Social, Technical, Administrative, Political, Legal, Economic, and Environmental considerations discussed in chapter 5). Given these considerations, please **review the alternative mitigation measures** described in this exercise. These measures have been grouped according to six categories that match the plan's goals.
Please **eliminate those measures that are not appropriate and should not be further considered** for the Five-Year Action Plan, by marking through them. At this step in the planning process, we are paring down the alternatives. The final selection of measures to be included in the Action Plan will be the next step. These activities have been identified in the CRS Coordinator's Manual, but **the Action Plan can also consider activities that are not creditable under the CRS Program.** Provide any comments or other suggested activities you might have in the space provided at the end of this exercise.

1. **Preventive activities** keep flood problems from getting worse through planning, permitting, and regulatory tools.

   Activity 310 Elevation Certificates
   - Maintain FEMA elevation certificates for only new or substantially-improved buildings in the floodplain.
   - Maintain FEMA elevation certificates for all new or substantially-improved buildings and existing "post-FIRM" buildings constructed after the effective date of the City's first FIRM.
   - Maintain FEMA elevation certificates for all new or substantially-improved buildings and all existing "pre-FIRM" and "post-FIRM" buildings constructed in the floodplain.

   Comments: Utilize most reasonable option given ability, acquire information.

Potentially cost prohibitive to retroactively acquire.

Activity 410 Floodplain Mapping

- Develop new flood elevations, floodway delineations, and other regulatory flood hazard data for areas not mapped in detail by the most recent NFIP Flood Insurance Study (FIS).
- Develop studies and maps that apply higher standards than the FEMA criteria.
- Establish a higher floodway standard.

Comments: Potential consideration, but likely counted as negative impact to pre-firm structures.

Activity 430 Higher Regulatory Standards

- Require additional freeboard than one foot for minimum building elevation and flood proofing
- Prohibit flood proofing and require flood protection by elevation only.
- Prohibit fill in the floodway.
- Prohibit septic tanks in the flood plain.
- Require foundations to be designed by a licensed engineer.
- Lower the threshold for substantial improvements to less than 50% of the building value requires full compliance with floodplain management ordinance.
- Require that improvements, modifications, and additions to existing buildings are counted cumulatively for at least 10 years.
- Protect critical facilities (police, fire, public utilities, schools, medical, etc.) to the 500 year flood elevation.
- Require compensatory storage for fill.
- Prohibit outdoor storage of materials in the floodplain.
- Require elevation of hazardous materials storage indoors.
- Maintain Certified Floodplain Managers (CFM) on staff for ordinance administration.

Comments: Currently do some of these, considering impacts on others.

Activity 440 Flood Data Maintenance

- Maintain elevation reference marks.

Comments: Need to review feasibility.

Activity 450 Stormwater Management

- Increase stormwater management standards (design storm and size of development) for the regulation of new development to ensure that post-development peak runoff is no worse than pre-development conditions.

- Enact regulations to require the implementation of low impact development (LID) techniques to minimize the need for more traditional stormwater management controls (pipes, channels, and detention).
- Regulate new construction to protect or improve water quality.

Comments: Already in progress. New stormwater permitting proposal for 2018 will address these.

2. **Property protection** activities are measures taken to permanently protect property from flood damage on a building-by-building basis.

Activity 520 Acquisition and Relocation

- Acquire and demolish flood-prone buildings and maintain the property as permanent open space
- Relocate flood-prone buildings so that they are out of the floodplain.

Comments: Funding limitations. Have acquired flood-prone properties at Meadowlawn, Altadena, McCallum Park, and others.

Activity 530 Flood Protection

- Retrofit existing non-residential flood-prone buildings by flood proofing.
- Protect existing flood-prone buildings by elevation above flood levels.

Comments: Based on availability of grant funding.

Activity 370 Flood Insurance Promotion

- Perform a flood insurance coverage assessment of the City's current level of coverage and identify shortcomings.
- Prepare and implement a coverage improvement plan under the direction of a committee of local lenders and insurance agents.

Comments: Would consider.

3. **Public information** activities advise people about the flood hazard, encourage the purchase of flood insurance, and provide information about ways to reduce flood damage. These activities also generate data needed by insurance agents for accurate flood insurance rating. They generally serve all members of the community.

Activity 320 Map Information Service

- Provide Flood Insurance Rate Map (FIRM) information to people who inquire, and publicize this service.

Comments: Link to City's website. Already provide.

Activity 330 Outreach Projects

- Send information about the flood hazard, flood insurance, flood protection measures, and/or the natural and beneficial functions of floodplains to residents.

Comments: Would consider.

Activity 340 Hazard Disclosure

- Encourage real estate agents to advise potential purchasers of flood-prone property about the flood hazard.

Comments: Already do.

Activity 350 Flood Protection Information

- Maintain publications and reference materials at public libraries.
- Create a webpage to disseminate flood protection information to the public.

Comments: Would consider.

Activity 360 Flood Protection Assistance

- Give inquiring property owners technical advice on how to protect their buildings from flooding, and publicize this service.

Comments: Refer owners where to obtain that information. Develop technical sheet handout.

4. **Natural resource protection** activities preserve or restore natural areas or the natural functions of floodplain and watershed areas. They are implemented by a variety of agencies, primarily parks, recreation, or conservation agencies or organizations.

Activity 420 Open Space Preservation

- Preserve City-owned floodplain lands as permanent open space, kept free from development through deed restrictions.
- To the extent possible, maintain or restore City-owned flood plains to their natural condition.
- Provide zoning and subdivision incentives to set aside flood plains as permanent open space in new developments. Consider provisions for clustering and conservation subdivisions.
- Restrict subdivision of flood plain lands to 5 or more acres.

Comments: Already do.

5. **Structural projects** provide flood damage protection by maintaining drainage systems, retrofitting existing buildings to prevent flood damage, and constructing flood control and drainage improvement projects.

Activity 540 Drainage System Maintenance

- Conduct regular inspections and maintenance of all channels and conveyance facilities and remove debris as needed.
- Regularly inspect all detention and retention facilities constructed pursuant to the City's stormwater management regulations and all city-owned facilities to ensure proper functioning.
- Maintain a comprehensive GIS inventory of the conveyance system and storage basins.
- Establish an annual capital improvements programming process for drainage system improvements.
- Enact and publicize no stream dumping regulations.

Comments:

Activity 530 Flood Protection

- Perform engineering studies that evaluate the feasibility of structural flood controls.
- Protect existing floodplain development by structural projects, where deemed feasible.

Comments:

6. **Emergency services** measures protect life and property during a flood, through flood warning and response programs during an emergency to minimize its impact. These measures are usually the responsibility of local emergency management staff and the owners or operators of critical facilities.

Activity 610 Flood Warning and Response

- Establish an automated flood threat recognition and forecasting system to identify impending floods.
- Establish methods for early flood warnings to the public.
- Develop a detailed flood response operations plan keyed to flood forecasts for City Council adoption.
- Coordinate flood warning and response activities with critical facilities operators.

Comments:

Additional Comments and Other Suggested Measures to Consider:

Appendix H
Adopting Resolution

RESOLUTION NUMBER 5081

A RESOLUTION TO ADOPT THE 2018 CITY OF VESTAVIA HILLS FLOODPLAIN MANAGEMENT PLAN

WHEREAS, the National Flood Insurance Program (NFIP) makes federally-supported flood insurance available for purchase to property owners and renters in communities that maintain minimum regulatory requirements for development in regulatory flood zones; and,

WHEREAS, the Community Rating System (CRS) reduces flood insurance premiums 5% for each improvement in CRS Class - from Class 9 through Class 1 - for NFIP policy holders in those CRS communities that do more than implement the minimum NFIP regulatory requirements: and,

WHEREAS, the City of Vestavia Hills desires to participate in the CRS Program and, in so doing, provide NFIP insurance premium reductions to policy holders; and,

WHEREAS, the Federal Emergency Management Agency (FEMA) awarded a planning grant funded through the FEMA Flood Mitigation Assistance (FMA) grant program to the City of Vestavia Hills to partially fund the preparation of the 2018 City of Vestavia Hills Floodplain Management Plan (Plan); a copy of said plan is marked as Exhibit A attached to and incorporated into this Resolution Number 5081 as though written fully therein; and,

WHEREAS, the City of Vestavia Hills Floodplain Management Planning Committee directed the completion of the Plan, which assesses the risks of flooding and guides the City's ongoing flood hazard mitigation activities and participation in the NFIP and CRS; and,

WHEREAS, the Floodplain Management Planning Committee recommends that the Plan be adopted by the City Council: and

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF VESTAVIA HILLS that the 2018 City of Vestavia Hills Floodplain Management Plan is hereby adopted and immediately made effective.

BE IT FURTHER RESOLVED that a copy of this resolution shall be maintained in the Office of the Clerk of the City of Vestavia Hills.

ADOPTED this the 27th day of August, 2018.

Rusty Weaver
Mayor Pro-Tem

Attested:

Rebecca Leavings
City Clerk