Lexington County, SC
Floodplain Management Plan

August 2017

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EXECUTIVE SUMMARY

The purpose of this Floodplain Management Plan is to reduce or eliminate risk to people and property from flood hazards. Every community faces different hazards and every community has different resources to draw upon in combating problems along with different interests that influence the solutions to those problems. Because there are many ways to deal with flood hazards and many agencies that can help, there is no one solution for managing or mitigating their effects. Planning is one of the best ways to develop a customized program that will mitigate the impacts of flood hazards while taking into account the unique character of a community. The plan provides a framework for all interested parties to work together and reach consensus on how to move forward. A well-prepared Floodplain Management Plan will ensure that all possible activities are reviewed and implemented so that the problem is addressed by the most appropriate and efficient solutions. It can also ensure that activities are coordinated with each other and with other goals and activities, preventing conflicts and reducing the costs of implementing each individual activity.

Lexington County followed the planning process prescribed by the Federal Emergency Management Agency (FEMA), and this plan was developed under the guidance of a Floodplain Management Planning Committee (FMPC) comprised of representatives of County Departments, citizens and other stakeholders. The FMPC conducted a risk assessment that identified and profiled flood hazards that pose a risk to the County, assessed the County's vulnerability to these hazards, and examined the capabilities in place to mitigate them. The flood hazards profiled in this plan include:

- Dam/Levee Failure
- Flood: 100-/500-year
- Flood: Stormwater/Localized Flooding
- Hurricane and Tropical Storm

This plan identifies activities that can be undertaken to reduce safety hazards, health hazards, and property damage caused by floods. Based on the risk assessment developed for each of the flood hazards identified above, the FMPC identified goals and objectives for reducing the County's vulnerability to the hazards. The goals and objectives are summarized as follows:

Goal 1 – Minimize the impact of future development by employing watershed-based approaches that balance environmental, economic and engineering considerations.

Objective 1.1: Maintain and enforce regulations to protect and restore wetlands and ecological functions for long-term environmental, economic and recreational values.

Objective 1.2: Pursue stormwater management approaches and techniques that reduce runoff, improve water quality, and protect public health.

Objective 1.3: Preserve and maintain open space in flood prone areas to reduce flood damage to buildings and to provide recreational benefits.

Objective 1.4: Continue to protect wetlands and environmentally sensitive areas from encroachment of development by requiring buffers and other setback mechanisms.

Goal 2 – Reduce vulnerability and exposure to flood hazards in order to protect the health, safety and welfare of residents and visitors.

Objective 2.1: Advise the community of the safety and health precautions to implement before, during, and after a flood.

Objective 2.2: Publish the locations (roads and intersections) which often flood after heavy rain events or major storms.

Objective 2.3: Educate everyone on the benefits of improved water quality and associated habitat.

Objective 2.4: Identify the location of vulnerable populations to aid in emergency evacuations.

Objective 2.5: Conduct site investigations, research exposure and hazard data, and evaluate proposed modifications to repair and mitigate stormwater management problems.

Goal 3 – Reduce damage to all development, including repetitively flooded buildings, through flood resilient strategies and measures.

Objective 3.1: Prioritize capital improvement projects to address areas where poor drainage causes substantial flooding.

Objective 3.2: Encourage development outside the special flood hazard area (1%-annual-chance flood).

Objective 3.3: Use the most effective approaches to protect buildings from flood damage, including elevation, acquisition, and other retrofitting techniques where appropriate.

Objective 3.4: Encourage property owners to assume an appropriate level of responsibility for their own protection, including the purchase of flood insurance.

Goal 4 – Encourage property owners, through education and outreach measures, to protect their homes and businesses from flood damage.

Objective 4.1: Educate property owners, including repetitive loss properties, on FEMA grant programs and other methods in order to mitigate possible flood damage.

Objective 4.2: Provide current flood-proofing and retrofitting information to property owners.

Objective 4.3: Effectively communicate flood risk to residents, businesses, contractors, realtors and prospective buyers.

Objective 4.4: Enhance community web pages to provide comprehensive flood protection and flood preparedness information.

To meet the identified goals, this plan recommends 22 mitigation actions, which are summarized in the table that follows. Note: Item number does not indicate an order of priority.

Action Item No.	Action	Related to Goal	Address Current Development	Address Future Development	Continued Compliance with NFIP	Mitigation Category
1	Designate October of each year as Flood Awareness Month.	2, 4			✓	Prevention, Property Protection
2	Create public information brochure on hazards associated with flooding.	2, 4	✓		✓	Public Information & Outreach, Property Protection
3	Coordinate with adjacent counties on channel improvements within the watershed.	1, 3	✓	✓	✓	Property Protection
4	Create a stormwater utility within the County.	1, 2, 3	✓	✓		Prevention
5	Coordinate with South Carolina Department of Transportation to improve or replace structurally deficient bridges.	2, 3	✓			Property Protection
6	Evaluate all critical facilities within the floodplain for flood protection.	1, 2, 3	✓		✓	Structural Projects, Property Protection
7	Create outreach materials for private dam owners to educate on regular maintenance and inspection needs.	2, 4	✓			Structural Projects, Property Protection
8	Enforce “no dumping” regulations in streams and channels, and provide outreach to property owners on regulations.	2, 4	✓		✓	Structural Projects, Property Protection
9	Create outreach materials to encourage property owners to remove debris from top of stream banks.	2, 4	✓		✓	Structural Projects, Property Protection
10	Identify all stormwater and drainage piping on private property.	1, 2, 3	✓			Prevention, Property Protection
11	Promote grant funding to target repetitive loss property owners to mitigate against future flooding.	2, 3, 4	✓			Public Information & Outreach, Property Protection
12	Inspect drainage site “hot spots” before and after heavy rain events.	2, 3	✓			Property Protection
13	Restrict development in the floodway to promote open space.	1, 2, 3	✓	✓	✓	Prevention
14	Create a capital improvement program.	1, 2, 3	✓		✓	Property Protection
15	Improve culvert at US-1 / Kmart area to resolve flooding issues.	2, 3	✓	✓	✓	Structural Projects, Property Protection
16	Improve drainage in the Whitehall subdivision to resolve flooding issues.	2, 3	✓	✓	✓	Structural Projects, Property Protection
17	Improve drainage in the Lloydswood subdivision to resolve flooding issues.	2, 3	✓	✓	✓	Structural Projects, Property Protection
18	Improve drainage at Rawls Creek area to resolve flooding issues by conducting annual inspection and maintenance.	2, 3	✓	✓	✓	Structural Projects, Property Protection

Action Item No.	Action	Related to Goal	Address Current Development	Address Future Development	Continued Compliance with NFIP	Mitigation Category
19	Improve drainage at 6-mile Creek area to resolve flooding issues by conducting annual inspection and maintenance.	2, 3	✓	✓	✓	Structural Projects, Property Protection
20	Improve drainage in the Kinley Creek area to resolve flooding issues and conduct annual inspection and maintenance.	2, 3	✓	✓	✓	Structural Projects, Property Protection
21	Add additional flood gauges in the Kinley Creek area.	1, 2	✓	✓	✓	Emergency Services
22	Consider implementation of setbacks from navigable waters to protect the natural and beneficial functions of the floodplain.	1, 2, 3		✓	✓	Natural Resource Protection

The following table provides the 10-step CRS planning credit activity checklist and the section/page number within this plan that describes the completion of each planning step in more detail.

CRS Planning Credit Activity Checklist

CRS Step	Section/Page
1. Organize to prepare the plan.	
a. Involvement of office responsible for community planning	Section 2.1
b. Planning committee of department staff	Section 2.1 / Table 2.2
c. Process formally created by the community's governing board	Section 2.2.1 / Appendix A
2. Involve the public.	
a. Planning process conducted through a planning committee	Section 2.1 / Table 2.1 / Appendix A
b. Public meetings held at the beginning of the planning process	Section 2.2.1 / Table 2.5 / Appendix A
c. Public meeting held on draft plan	Section 2.2.1 / Table 2.5 / Appendix A
d. Other public information activities to encourage input	Section 2.2.1 / Table 2.6 / Appendix A
3. Coordinate with other agencies.	
a. Review of existing studies and plans	Section 2.2.1
b. Coordinating with communities and other agencies	Section 2.2.1 / Appendix A
4. Assess the hazard.	
a. Plan includes an assessment of the flood hazard with:	Sections 5.1 – 5.5 / Section 6.3
(1) A map of known flood hazards	Figures 5.11 – 5.13, 6.2 – 6.35
(2) A description of known flood hazards	Sections 5.1 – 5.4 / Section 6.3
(3) A discussion of past floods	Sections 5.1 – 5.4
b. Plan includes assessment of less frequent floods	Sections 5.1 & 6.3.1
c. Plan includes assessment of areas likely to flood	Section 5.5
d. The plan describes other natural hazards	----
5. Assess the problem.	
a. Summary of each hazard identified in the hazard assessment and their community impact	Section 6.3
b. Description of the impact of the hazards on:	
(1) Life, safety, health, procedures for warning and evacuation	Sections 5.1 – 5.4 / 6.2.3
(2) Public health including health hazards to floodwaters/mold	Section 5.3.5
(3) Critical facilities and infrastructure	Sections 6.2.2 & 6.3.3
(4) The community's economy and tax base	Section 3.4
(5) Number and type of affected buildings	Section 6.2.1
c. Review of all damaged buildings/flood insurance claims	Section 6.3.3
d. Areas that provide natural floodplain functions	Section 3.3
e. Development/Redevelopment/Population Trends	Section 3.8
f. Impact of future flooding conditions outlined in Step 4, item c	Section 5.5
6. Set goals.	Section 8.2
7. Review possible activities.	
a. Preventive activities	Section 8.3 / Appendix B
b. Floodplain Management Regulatory/current & future conditions	Section 8.3 / Appendix B
c. Property protection activities	Section 8.3 / Appendix B

CRS Step	Section/Page
d. Natural resource protection activities	Section 8.3 / Appendix B
e. Emergency services activities	Section 8.3 / Appendix B
f. Structural projects	Section 8.3 / Appendix B
g. Public information activities	Section 8.3 / Appendix B
8. Draft an action plan.	
a. Actions must be prioritized	Section 8.3.1
(1) Recommendations for activities from two of the six categories	---
(2) Recommendations for activities from three of the six categories	---
(3) Recommendations for activities from four of the six categories	---
(4) Recommendations for activities from five of the six categories	Section 8.4
b. Post-disaster mitigation policies and procedures	Sections 8.1.2
c. Action items for mitigation of other hazards	---
9. Adopt the plan.	Section 9
10. Implement, evaluate and revise.	
a. Procedures to monitor and recommend revisions	Sections 10.1 – 10.3
b. Same planning committee or successor committee that qualifies under Section 511.a.2 (a) does the evaluation	Section 10.1.2

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1 INTRODUCTION

Chapter 1 provides an introduction to the Lexington County, SC Floodplain Management Plan. It consists of the following subsections:

- 1.1 Background
- 1.2 Purpose and Authority
- 1.3 Scope
- 1.4 Organization of the Plan

1.1 Background

Each year in the United States, natural disasters take the lives of hundreds of people and injure thousands more. Nationwide, taxpayers pay billions of dollars annually to help communities, organizations, businesses, and individuals recover from disasters. These monies only partially reflect the true cost of disasters, because additional expenses incurred by insurance companies and non-governmental organizations are not reimbursed by tax dollars. Many natural disasters are predictable, and much of the damage caused by these events can be reduced or even eliminated.

As defined by FEMA, "hazard mitigation" means any sustained action taken to reduce or eliminate the long-term risk to life and property from a hazard event. Hazard mitigation planning is the process through which hazards are identified, likely impacts determined, mitigation goals set, and appropriate mitigation strategies determined, prioritized, and implemented.

Lexington County currently participates in the National Flood Insurance Program's (NFIP) Community Rating System (CRS), and qualifies for a Class 8 Rating. The CRS recognizes and encourages community floodplain management activities that exceed the minimum standards. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that (1) reduce flood losses, (2) facilitate accurate insurance ratings, and (3) promote the awareness of flood insurance.

1.2 Purpose and Authority

The purpose of this plan is to identify, assess and mitigate risk to better protect the people and property of Lexington County from the effects of natural and man-made flood hazards. This plan documents the flood hazard mitigation planning process and identifies relevant hazards and strategies the County will use to decrease vulnerability and increase resiliency and sustainability. This plan demonstrates the County's commitment to reducing risks from identified hazards and serves as a tool to help decision-makers direct mitigation activities and resources.

This Plan was developed in a joint and cooperative venture by members of a Floodplain Management Planning Committee (FMPC) which included representatives of County departments, regional government, citizens and other stakeholders. This Plan will ensure the County's continued eligibility for federal disaster assistance including the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program (HMGP), Pre-Disaster Mitigation Program (PDM), and the Flood Mitigation Assistance Program (FMA). This Plan has been prepared in compliance with Section 322 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act or the Act), 42 U.S.C. 5165, enacted under Section 104 of the Disaster Mitigation Act of 2000, (DMA 2000) Public Law 106-390 of October 30, 2000, as implemented at CFR 201.6 and 201.7 dated October 2007.

1.3 Scope

This document comprises a Floodplain Management Plan for Lexington County, SC. This Plan assesses flood risk for Lexington County Unincorporated Areas only and does not include incorporated municipalities.

1.4 Organization of the Plan

The Lexington County Floodplain Management Plan is organized as follows:

- Chapter 1 – Introduction
- Chapter 2 – Planning Process
- Chapter 3 – Community Profile
- Chapter 4 – Hazard Identification
- Chapter 5 – Hazard Profiles
- Chapter 6 – Vulnerability Assessment
- Chapter 7 – Capability Assessment
- Chapter 8 – Mitigation Strategy
- Chapter 9 – Plan Adoption
- Chapter 10 – Plan Maintenance
- Appendix A – Planning Process Documentation
- Appendix B – Mitigation Strategy
- Appendix C – References

2 PLANNING PROCESS

Requirement §201.6(b): An open public involvement process is essential to the development of an effective plan. In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:
1) An opportunity for the public to comment on the plan during the drafting stage and prior to plan approval;
2) An opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia, and other private and nonprofit interests to be involved in the planning process; and
3) Review and incorporation, if appropriate, of existing plans, studies, reports, and technical information.
Requirement §201.6(c)(1): The plan shall include the following:
1) Documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

Chapter 2 provides an overview of the planning process used to develop the Lexington County Floodplain Management Plan. It consists of the following subsections:

- 2.1 Local Government Participation
- 2.2 The 10-Step Planning Process

This Floodplain Management Plan was developed under the guidance of a Floodplain Management Planning Committee (FMPC). Information in this plan will be used to help guide and coordinate mitigation activities and decisions for local land use policy in the future. Proactive mitigation planning will help reduce the cost of disaster response and recovery to communities and their residents by protecting critical community facilities, reducing liability exposure, and minimizing overall community impacts and disruptions. This plan identifies mitigation activities that can be undertaken to reduce safety hazards, health hazards, and property damage caused by floods.

2.1 Local Government Participation

The DMA planning regulations and guidance stress that each local government seeking FEMA approval of their mitigation plan must participate in the planning effort in the following ways:

- Participate in the process as part of the FMPC;
- Detail where within the planning area the risk differs from that facing the entire area;
- Identify potential mitigation actions; and
- Formally adopt the plan.

For the Lexington County FMPC, “participation” meant the following:

- Providing facilities for meetings;
- Attending and participating in the FMPC meetings;
- Collecting and providing requested data (as available);
- Managing administrative details;
- Making decisions on plan process and content;
- Identifying mitigation actions for the plan;
- Reviewing and providing comments on plan drafts;
- Informing the public, local officials, and other interested parties about the planning process and providing opportunity for them to comment on the plan;
- Coordinating, and participating in the public input process; and
- Coordinating the formal adoption of the plan by the local governing body.

The FMPC met all of the above participation requirements. The Committee's representatives included representatives of County Departments; citizens and other stakeholders. Robbie Derrick, a professional planner in the Community Development Department, oversaw the development of this plan as a member of the FMPC. An approved resolution by the Lexington County Council forming the FMPC is included in Appendix A – Planning Process Documentation. The participants comprising the Lexington County FMPC included the following:

- Sheri Armstrong – Lexington County Stormwater/Public Works
- Jim Barker – Lexington County Public Works
- Susan Cutter – HVRI, University of South Carolina
- Bo Davenport – Lexington County Emergency Manager
- Robbie Derrick – Lexington County Community Development
- Joanne Fineburg – Resident, Coldstream HOA
- Mark Fuge – Resident, Pineglen Subdivision
- Guillermo Espinosa – Central Midlands Council of Governments
- Millie Massey – Resident, Cert Committee
- Chris Stone – Lexington County Floodplain Manager

To support the FMPC, a working group comprised of the following members provided additional documentation and expertise.

- Wrenn Barrett – Lexington County Public Works
- Jeff McNesby – Lexington County Public Works
- Alan Rickenbaker – Lexington County GIS
- Phil Yarborough – Lexington County Council

Table 2.1 details the FMPC meeting dates and the FMPC members in attendance. A more detailed summary of FMPC meeting dates including topics discussed and meeting locations follows in Table 2.4. During the planning process, the FMPC members communicated through face-to-face meetings, email and telephone conversations. Draft documents were posted on the Lexington County website so that the FMPC members could easily access and review them. Although all FMPC members could not be present at every meeting, coordination was ongoing throughout the entire planning process through emails and phone conversations and by direct contact with the Lexington County Public Works Department.

Table 2.1 – FMPC Meeting Attendance Record

Member Name	Affiliation	Meeting Date				
		11/29/16	03/15/17	05/17/17	07/25/17	08/17/17
Sheri Armstrong	Lexington County SW/PW	X	X	X	X	X
Jim Barker	Lexington County Public Works	X	X	X		
Susan Cutter	HVRI / University of SC	X				
Bo Davenport	Lexington Co. Emergency Manager	X*				
Robbie Derrick	Lexington Co. Community Dev.	X	X	X*	X	
Joanne Fineburg	Resident, Coldstream HOA		X	X		X
Mark Fuge	Resident, Pineglen Subdivision	X	X		X	X
Melanie Gall	HVRI / University of SC	X				
Guillermo Espinosa	Central Midlands Council of Gov.				X	X
Millie Massey	Resident, Cert Committee	X			X	
Chris Stone	Lexington Co. Floodplain Manager	X	X	X	X	X

*Did not sign in

Note: Melanie Gall was replaced by Guillermo Espinosa following the first FMPC meeting

Based on the area of expertise of each representative participating on the FMPC, Table 2.2 demonstrates each member's expertise in the six mitigation categories (Prevention, Property Protection, Natural Resource Protection, Emergency Services, Structural Flood Control Projects and Public Information). The Lexington County Community Development and Planning & GIS Department are responsible for community land use and comprehensive planning and were active participants on the FMPC and provided planning data and information to support development of the plan.

Table 2.2 – Staff Capability with Six Mitigation Categories

Community Department/Office	Prevention	Property Protection	Natural Resource Protection	Emergency Services	Structural Flood Control	Public Information
Emergency Management	✓			✓		✓
Community Development	✓	✓	✓		✓	✓
Public Works & Stormwater Management	✓	✓	✓		✓	✓
GIS						✓

Appendix A provides additional documentation of the planning process that was implemented during the development of this FMP.

2.2 The 10-Step Planning Process

The planning process for preparing the Lexington County Floodplain Management Plan was based on DMA planning requirements and FEMA's associated guidance. This guidance is structured around a four-phase process:

1) Planning Process;
2) Risk Assessment;
3) Mitigation Strategy; and
4) Plan Maintenance.

Into this process, the County integrated a more detailed 10-step planning process used for FEMA's CRS and Flood Mitigation Assistance programs. Thus, the modified 10-step process used for this plan meets the requirements of six major programs: FEMA's Hazard Mitigation Grant Program; Pre-Disaster Mitigation Program; Community Rating System; Flood Mitigation Assistance Program; Severe Repetitive Loss Program; and new flood control projects authorized by the U.S. Army Corps of Engineers.

Table 2.3 shows how the 10-step CRS planning process aligns with the four phases of hazard mitigation planning pursuant to the Disaster Mitigation Act of 2000.

Table 2.3 – Mitigation Planning and CRS 10-Step Process Reference Table

DMA Process	CRS Process
Phase I – Planning Process	
§201.6(c)(1)	Step 1. Organize to Prepare the Plan
§201.6(b)(1)	Step 2. Involve the Public
§201.6(b)(2) & (3)	Step 3. Coordinate
Phase II – Risk Assessment	
§201.6(c)(2)(i)	Step 4. Assess the Hazard
§201.6(c)(2)(ii) & (iii)	Step 5. Assess the Problem
Phase III – Mitigation Strategy	
§201.6(c)(3)(i)	Step 6. Set Goals
§201.6(c)(3)(ii)	Step 7. Review Possible Activities
§201.6(c)(3)(iii)	Step 8. Draft an Action Plan

DMA Process	CRS Process
Phase IV – Plan Maintenance	
§201.6(c)(5)	Step 9. Adopt the Plan
§201.6(c)(4)	Step 10. Implement, Evaluate and Revise the Plan

2.2.1 Phase 1 – Planning Process

Planning Step 1: Organize to Prepare the Plan

In alignment with the commitment to participate in the DMA planning process and the CRS, community officials worked to establish the framework and organization for development of the plan. An initial meeting was held with key community representatives to discuss the organizational aspects of the plan development process.

At the beginning of this planning process, Lexington County passed a resolution establishing the planning process and the FMPC. A signed resolution forming the FMPC is included in Appendix A – Planning Process Documentation.

Invitations to participate on the FMPC were extended to County and Town officials, citizens, and federal, state, and local stakeholders that might have an interest in participating in the planning process. The full list of initial invitees is included in Appendix A. The following local stakeholders were invited to provide technical information and to participate on the FMPC:

Neighboring Communities
Richland County Emergency Management
Calhoun County Emergency Management
Orangeburg County Emergency Management
Newberry County Emergency Management
Aiken County Emergency Management
Saluda County Emergency Management
Cayce
West Columbia
Lexington
South Congaree
Springdale
Batesburg-Leesville
Gaston

State and Federal Government
FEMA Region IV
USGS
ISO/CRS
U.S. Army Corps of Engineers
Congaree National Park
State Flood Mitigation Program
South Carolina Scenic Rivers Program
Lexington Conservation District

Educational Institutions
University of South Carolina

Other Stakeholder Representatives
American Red Cross

Nature Conservancy
United Way
The State Media Company
Lexington County Chronicle
The Columbia Star

The formal FMPC meetings followed the 10 CRS Planning Steps. Meeting agendas, minutes and sign-in sheets for the FMPC meetings are included in Appendix A – Planning Process Documentation. The meeting dates and topics discussed are summarized below in Table 2.4. All FMPC meetings were open to the public.

Table 2.4 – Summary of FMPC Meeting Dates

Meeting Type	Meeting Topic	Meeting Date/ Time	Meeting Location
FMPC #1	1) Introduction to DMA and CRS planning process	November 29, 2016 6:00 – 7:00 p.m.	Lexington County Fire Services Training Building 436 Ball Park Road, Lexington, SC
	2) Organize resources: the role of the FMPC, planning for public involvement, and coordinating with other agencies and stakeholders		
FMPC #2	1) Review/discussion of Flood Risk Assessment (Assess the Hazard)	March 15, 2017 4:00 – 6:00 p.m.	Lexington County Fire Services Training Building
	2) Develop Plan Goals		
FMPC #3	1) Review/discussion of Vulnerability Assessment (Assess the Problem)	May 17, 2017 4:00 – 6:00 p.m.	Lexington County Fire Services Training Building
FMPC #4	1) Develop Capability Assessment	July 24, 2017 4:00 – 6:00 p.m.	Lexington County Administration Building 2nd Floor
	2) Develop Mitigation Strategy		
FMPC #5	1) Review "Draft" Plan	August 17, 2017 4:00 – 5:30 p.m.	Town of Lexington Municipal Complex
	2) Solicit comments and feedback from the FMPC		

Planning Step 2: Involve the Public

The first public meeting to introduce and explain the planning process was held on January 17, 2017. A second and final public meeting to review the entire Draft Plan was held on August 17, 2017. As documented in Appendix A, a public notice was posted in the Columbia Daily News and the County Facebook page prior to both public meetings inviting members of the public to attend. The public meeting dates and topics discussed are summarized below in Table 2.5.

Table 2.5 – Summary of Public Meeting Dates

Meeting Type	Meeting Topic	Meeting Date/Time	Meeting Locations
Public Meeting #1	1) Introduction to DMA, CRS and the planning process	January 17, 2017 5:30 – 7:00 p.m.	Town of Lexington Municipal Complex 11 Maiden Lane Lexington, SC
	2) Introduction to hazard identification		

Meeting Type	Meeting Topic	Meeting Date/Time	Meeting Locations
Public Meeting #2	1) Review "Draft" Plan 2) Solicit comments and feedback from the public	August 17, 2017 6:00 – 7:00 p.m.	Town of Lexington Municipal Complex

Involving the Public beyond Attending Public Meetings

Early discussions with the FMPC established the initial plan for public involvement. The FMPC agreed to an approach using established public information mechanisms and resources within the County. Public involvement activities for this plan included press releases, stakeholder and public meetings, and the collection of public and stakeholder comments on the draft plan.

The FMPC found 10 different ways to involve the public beyond attending public meetings. Documentation to support the additional public outreach efforts can be found in Appendix A – Planning Process Documentation. The public outreach activities beyond the formal public meetings are summarized below in Table 2.6.

Table 2.6 – Public Outreach Efforts

Location		Event/Message	Date
1	WISTV 10 NBC	WISTV 10 NBC news coverage of public meeting	January 2017
2	WACH FOX 57	WACH FOX 57 news coverage of public meeting	January 2017
3	Columbia Daily News	Newspaper article advertised first public meeting and explained Floodplain Management Plan	January 2017
4	Batesburg-Leesville Times	Newspaper article advertised first public meeting and explained Floodplain Management Plan	January 2017
5	Lexington County Facebook Page	Public Meeting advertised and floodplain management explained	January 2017
6	South Carolina Public Radio	Public radio story on the floodplain management survey and how it could lead to financial benefits for residents	May 2017
7	WLTX TV News & website	News story on Floodplain Management Plan, request for input, draft announcement, and public meeting invitation	July 2017
8	Lexington County website & Facebook Page	Draft HIRA posted for public review and comments	June 2017
9	Lexington County website	Draft plan posted for public review and comments	August 2017
10	Public Works Department Office	Hard copy of draft plan available for review	August 2017
11	WIS 10 NBC	Final public meeting advertised on TV news	August 2017

The public survey which requested public input into the Floodplain Management Plan planning process and the identification of mitigation activities to lessen the risk and impact of future flood hazard events is shown in Figure 2.1 on the following page. Lexington County placed the survey on its website and Facebook page and distributed it at the public Kickoff meeting. A total of 38 responses were received. Some of the notable findings include that 87% of respondents said they were at least somewhat concerned about flooding impacting their community, yet 76% do not have flood insurance for their home and another 11% were unsure if they have insurance. Additionally, 37% said they were unsure if their home is located in a FEMA floodplain. Finally, survey results reveal that it would be most effective to provide information to residents via email, social media, the Lexington County website, or television. Survey respondents also offered a number of suggestions for steps that Lexington County could take to reduce flood risk. The most commonly shared concerns were related to stormwater flooding, and many respondents recommended drainage improvements and other stormwater management solutions as potential mitigation strategies. The FMPC took these responses into consideration when developing mitigation actions.

A copy of the complete survey is presented in Appendix A along with a full summary of the results.

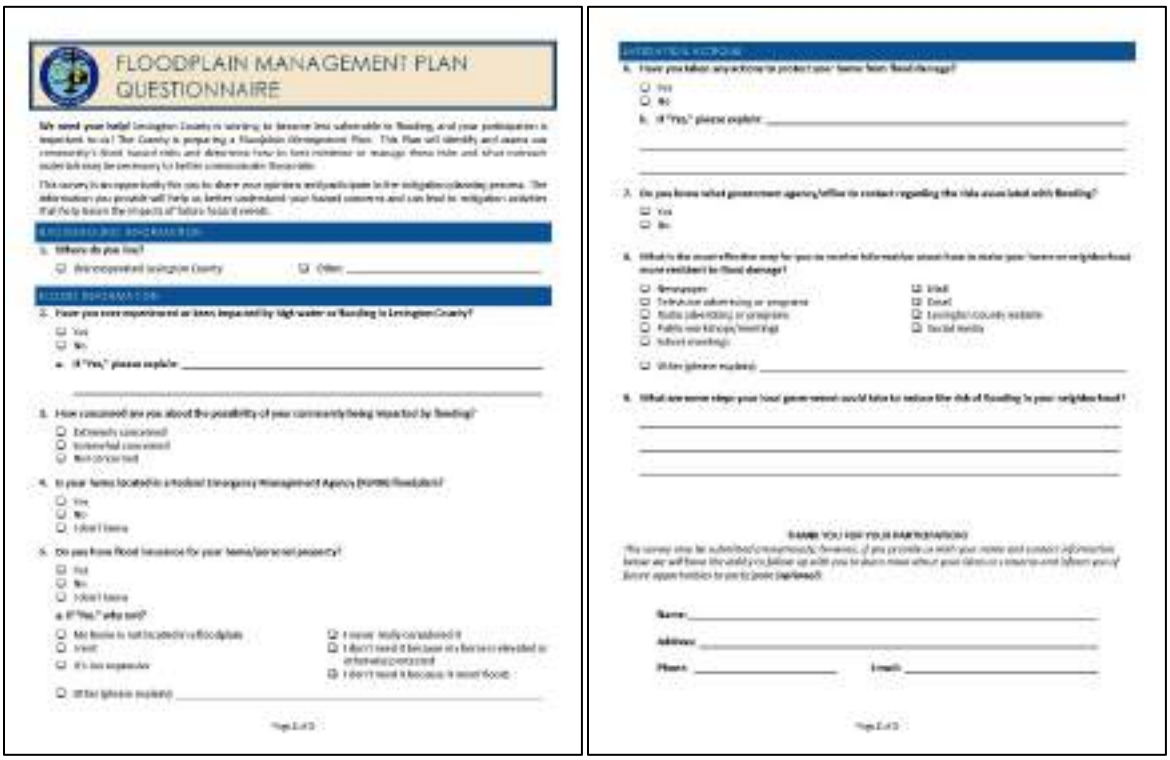

FLOODPLAIN MANAGEMENT PLAN QUESTIONNAIRE

Figure 2.1 – Public Survey

Planning Step 3: Coordinate

Early in the planning process, the FMPC determined that the risk assessment, mitigation strategy development, and plan approval would be greatly enhanced by inviting other local, state and federal agencies and organizations to participate in the process. A detailed list of agency coordination is provided above under Planning Step 1: Organize to Prepare the Plan.

Coordination involved sending these stakeholders coordination letters and/or emails informing them on how to participate in the plan development process. The list of stakeholders and an example coordination email is provided in Appendix A – Planning Process Documentation. These groups and agencies were also solicited asking for their assistance (did they have documentation to support the planning process). The FMPC contacted the following agencies and organizations with specific data requests and a request for their input into the planning process:

- ISO/FEMA
  - Repetitive Loss Data
  - BCEGS Classification
- U.S. Army Corps of Engineers
  - Dam Inventory
  - Levee Inventory
- South Carolina Department of Natural Resources
  - Natural Hazards Risk Data
- South Carolina Department of Health and Environmental Control
  - Dam Inventory

Coordination with Other Community Planning Efforts and Hazard Mitigation Activities

Coordination with other community planning efforts is essential to the success of this plan. Mitigation planning involves identifying existing policies, tools, and actions that will reduce a community's risk and vulnerability to hazards. Integrating existing planning efforts and mitigation policies and action strategies into this plan establishes a credible and comprehensive plan that ties into and supports other community programs. The development of this plan incorporated information from the following existing plans, studies, reports, and initiatives as well as other relevant data from neighboring communities and other jurisdictions.

- Lexington County Comprehensive Plan (Ordinance #99-1)
  - Used to identify growth and development goals and objectives for the County
- Lexington County Stormwater Management Ordinance 06-10
  - Used to develop the capability assessment and the mitigation strategy
- Lexington County Code of Ordinances
  - Used to develop the capability assessment and the mitigation strategy
- Lexington County Land Development Manual, 2008
  - Used to develop the capability assessment and the mitigation strategy
- Lexington County, SC and Incorporated Areas Flood Insurance Study, Preliminary October 2015
  - Used to identify flooding sources and SFHAs within the County. The SFHAs were used to prepare the 100-/500-year flooding vulnerability assessment.
- Central Midlands Hazard Mitigation Plan, 2016 Update
  - Used to identify previously profiled hazards and to capture relevant information to be included in the FMP. Also used to identify existing mitigation actions.
- Lexington Stormwater Consortium Annual Report, 2014
  - Used to develop capability assessment and develop the mitigation strategy
- South Carolina Dam Failure Emergency Response Plan, 2016
  - Use to develop the HIRA and to develop the mitigation strategy
- Central Midlands Council of Governments Demographic Research Report
  - Used to identify growth trends and population projections
- Kinley Creek Watershed Stormwater Management Study, 2015
  - Used to develop mitigation strategy
- South Carolina Hazard Mitigation Plan, 2013
  - Used to identify flood hazards

These and other documents were reviewed and considered, as appropriate, during the collection of data to support Planning Steps 4 and 5, which include the hazard identification, vulnerability assessment, and capability assessment. Data from these plans and ordinances were incorporated into the risk assessment and hazard vulnerability sections of the plan as appropriate. The data was also used in determining the capability of the County in being able to implement certain mitigation strategies. The Capability Assessment can be found in Chapter 7 – Capability Assessment.

2.2.2 Phase II – Risk Assessment

Planning Steps 4 and 5: Identify/Assess the Hazard and Assess the Problem

The FMPC completed a comprehensive effort to identify, document, and profile all hazards that have, or could have, an impact on the planning area. Data collection worksheets were developed and used in this effort to aid in determining hazards and vulnerabilities and where the risk varies across the planning area. Geographic information systems (GIS) were used to display, analyze, and quantify hazards and

vulnerabilities. A draft of the risk and vulnerability assessment was posted on the Lexington County website for FMPC and public review and comment.

The FMPC also conducted a capability assessment to review and document the planning area's current capabilities to mitigate risk from and vulnerability to hazards. By collecting information about existing government programs, policies, regulations, ordinances, and emergency plans, the FMPC could assess those activities and measures already in place that contribute to mitigating some of the risks and vulnerabilities identified. A more detailed description of the risk assessment process and the results are included in Chapter 4 – Hazard Identification, Chapter 5 – Hazard Profiles, and Chapter 6 – Vulnerability Assessment.

2.2.3 Phase III – Mitigation Strategy

Planning Steps 6 and 7: Set Goals and Review Possible Activities
Amec Foster Wheeler facilitated brainstorming and discussion sessions with the FMPC that described the purpose and process of developing planning goals, a comprehensive range of mitigation alternatives, and a method of selecting and defending recommended mitigation actions using a series of selection criteria. This information is included in Chapter 8 - Mitigation Strategy.

Planning Step 8: Draft an Action Plan
A complete first draft of the plan was prepared based on input from the FMPC regarding the draft risk assessment and the goals and activities identified in Planning Steps 6 and 7. This complete draft was posted for FMPC and public review and comment on the Lexington County website. Other agencies were invited to comment on this draft as well. FMPC, public and agency comments were integrated into the final draft for FEMA Region IV to review and approve, contingent upon final adoption by the governing body of Lexington County.

2.2.4 Phase IV – Plan Maintenance

Planning Step 9: Adopt the Plan
In order to secure buy-in and officially implement the plan, the plan was reviewed and adopted by the governing body of Lexington County on the resolution date included in Chapter 10 – Plan Adoption.

Planning Step 10: Implement, Evaluate and Revise the Plan
Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. Up to this point in the planning process, all FMPC efforts have been directed at researching data, coordinating input from participating entities, and developing appropriate mitigation actions. Chapter 11 – Plan Maintenance provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. Chapter 11 also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement.

3 COMMUNITY PROFILE

Chapter 3 provides a general overview of Lexington County. It consists of the following subsections:

- 3.1 Overview of the Community
- 3.2 Geography and Climate
- 3.3 Cultural, Historic and Natural Resources
- 3.4 Economy
- 3.5 Housing
- 3.6 Land Use
- 3.7 Population and Demographics
- 3.8 Growth and Development Trends

3.1 Overview of the Community

Lexington County is located in the Midlands of South Carolina and is one of the fastest growing areas in the state, with a 1.7% annual growth rate from 2000 to 2010. Lexington County is surrounded by Richland County to the east, Orangeburg and Calhoun Counties to the southeast, Aiken County to the southwest, Saluda County to the west, and Newberry County to the northwest. Lexington County comprises a total area of 758 square miles, of which 7.8% is water. According to American Community Survey 5-Year Estimates for 2011-2015, the 2015 population was 273,843.

The county seat is Lexington, which is also the largest town in the county. Lexington County is also home to the City of West Columbia as well as parts of the Cities of Cayce and Columbia, both of which straddle Lexington and Richland Counties. Lexington County is part of the Columbia, SC Metropolitan Statistical Area.

Figure 3.1 reflects Lexington County's location within South Carolina and in relation to the surrounding counties. Figure 3.2 provides a base map for the County showing the incorporated municipalities' limits and the major roadways through the county.

3.2 Geography and Climate

Lexington straddles the fall line, which divides the state into the piedmont and the coastal plain. The average elevation in the County is 392 feet above sea level. Nearly 7.8% of Lexington County's area is surface water area, primarily due to the presence of Lake Murray, which is the largest body of water in the County. As defined by the United States Geological Survey (USGS), the United States is divided and sub-divided into successively smaller hydrologic units. Each hydrologic unit is identified by a unique hydrologic unit code (HUC). As of 2010 there are six levels of hierarchy, represented by hydrologic unit codes from 2 to 12 digits long. Lexington County spans 8 HUC-10 watersheds of three major river basins: the Cane Creek-Broad River watershed in the Broad River basin, the Clouds Creek, Lake Murray-Saluda River, Twelvemile Creek-Saluda River, Congaree Creek, and Cedar Creek-Congaree River watersheds in the Saluda River basin, and the Upper North Fork Edisto River and Middle North Fork Edisto River watersheds in the Edisto River basin. Figure 3.3 illustrates the HUC-8 watersheds and drainage features in and around Lexington County.

The average summer high temperature in Lexington County is 90.4°F, and the average winter low temperature is 33°F. Annually, Lexington County averages 46.6 inches of rainfall and 0.96 inches of snowfall. The County averages 70.9 precipitation days (the number of days with precipitation over 0.01 inch) annually.

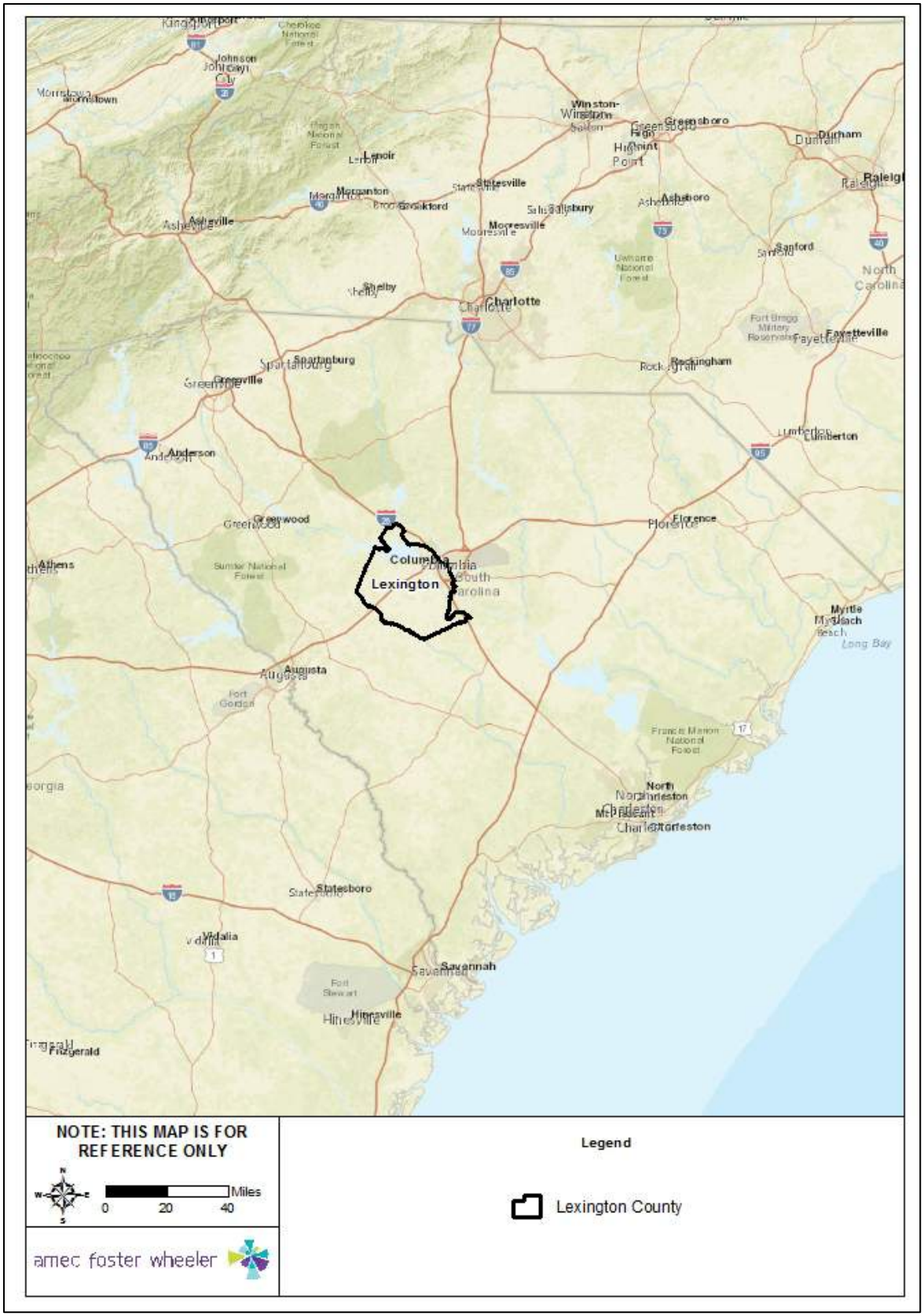


Figure 3.1 – Location Map

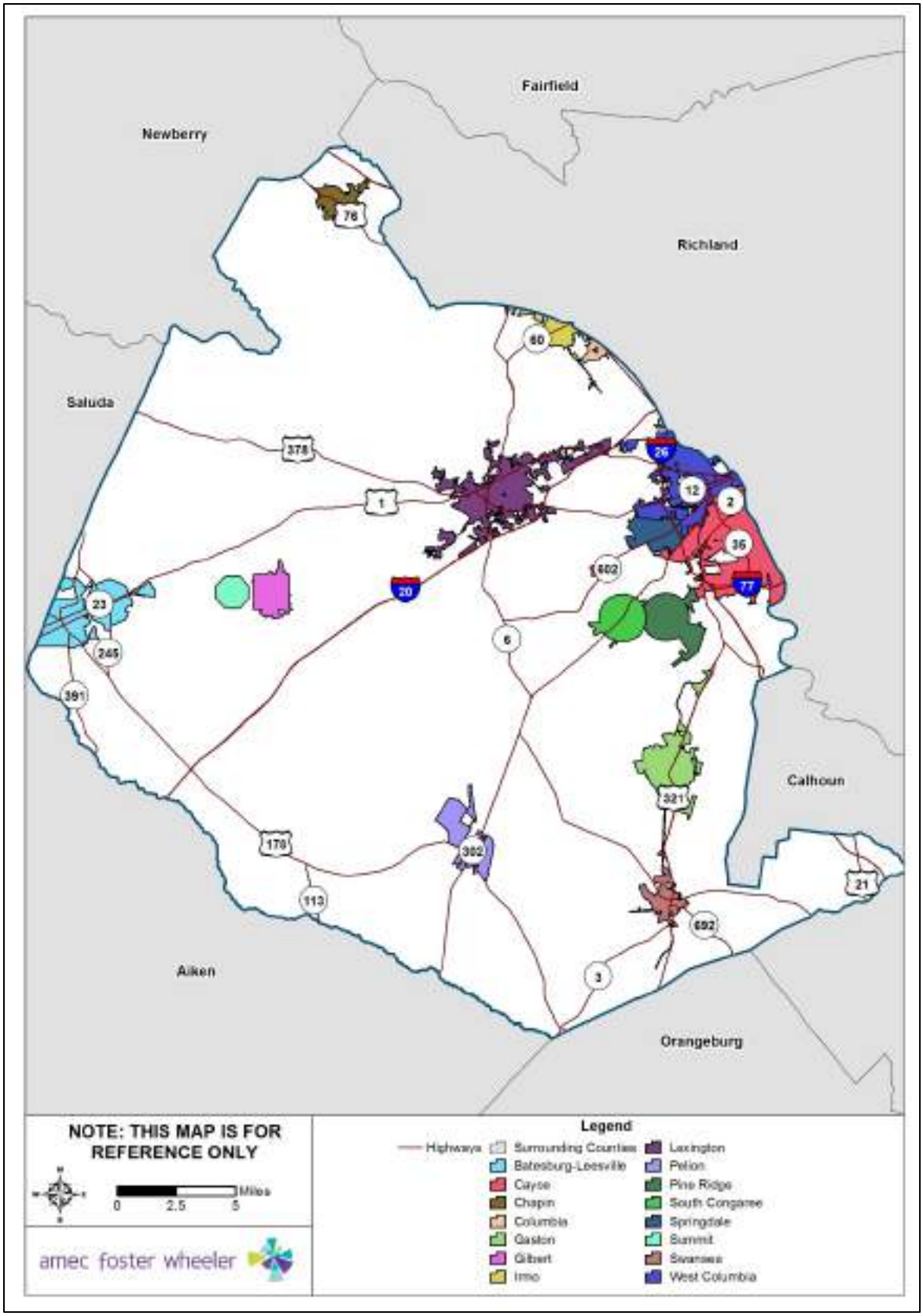


Figure 3.2 – Base Map

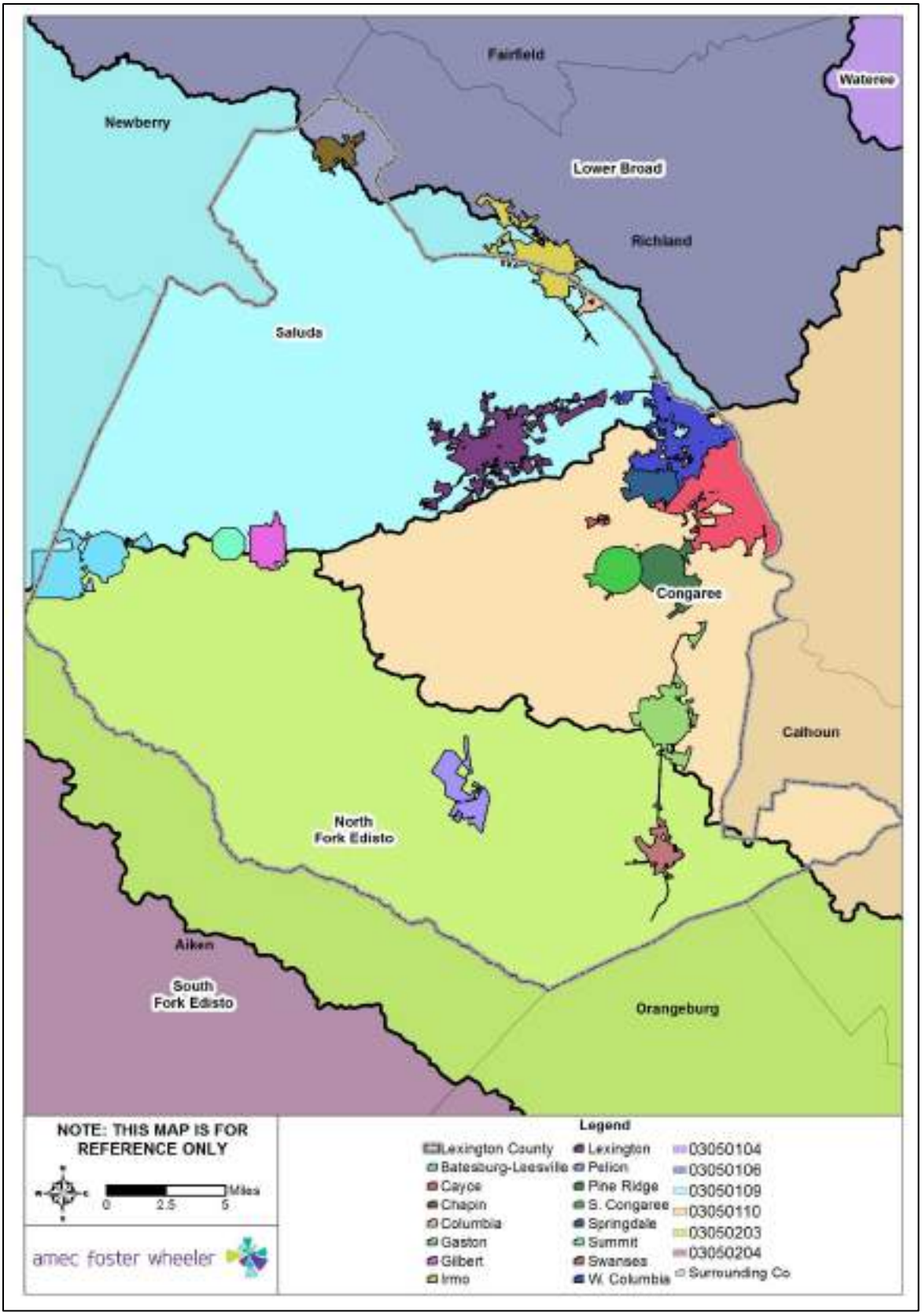


Figure 3.3 – HUC-8 Drainage Basins

3.3 Cultural, Historic and Natural Resources

Historic Resources

Lexington County was first established in 1785 and was named after the Battle of Lexington of the Revolutionary War. The County has 65 sites listed in the National Park Service's National Register of Historic Places, including 6 historic districts, the latter of which together encompass 1,976 acres and 89 buildings. Listing on the National Register signifies that these structures and districts have been determined to be worthy of preservation for their historical values including their relevance to significant historic events, their relation to specific people, or their architecture or engineering.

Cultural Resources

Lexington County is home to many cultural resources, including the South Carolina State Farmer's Market, the Central Carolina Community Foundation, the Lexington County Library, and the Lexington County Museum. Additionally the University of South Carolina is located nearby in Columbia, along with Allen University, Benedict College, Columbia International University, and Columbia College.

Natural Features and Resources

Parks, Preserves, and Conservation

According to the South Carolina Forestry Commission, Lexington County was between 56-65% forested as of 2006. Historically, natural woodlands in the County consist of predominantly longleaf pine, though shortleaf pine, loblolly pine, oak, gum, and poplar are also present.

The South Carolina Department of Natural Resources preserves and maintains several areas of land in Lexington County, including several Wildlife Management Areas to the west of Lake Murray, Peachtree Rock Heritage Preserve and Shealy's Pond Heritage Preserve in southcentral Lexington County, and Congaree Creek Heritage Preserve in northeastern Lexington County. These Wildlife Management Areas and Heritage Preserves play a critical role in the conservation of fish, wildlife, and other natural resources while also serving as space for recreation and environmental education.

Water Bodies and Floodplains

Lake Murray, which is the third largest lake in the State by volume and fourth largest by surface area, is located in Lexington County. The County also contains the Saluda River and borders the Broad River, Congaree River, and North Fork Edisto River.

Wetlands

The National Wetlands Inventory shows freshwater forested and shrub wetlands throughout Lexington County, particularly along the Congaree Creek and its tributaries, Black Creek, and North Fork Edisto River. Lexington County requires water quality buffers for streams, shorelines, and wetlands. The County's wetland buffer requirement is 50 feet, measured from the edge of a delineated wetland area.

Natural and Beneficial Wetland Functions: The benefits of wetlands are hard to overestimate. They provide critical habitat for many plant and animal species that could not survive in other habitats. They are also critical for water management as they absorb and store vast quantities of storm water, helping reduce floods and recharge aquifers. Not only do wetlands store water like sponges, they also filter and clean water as well, absorbing toxins and other pollutants.

Threatened and Endangered Species

The U.S. Fish and Wildlife Service maintains a regular listing of threatened species, endangered species, species of concern, and candidate species for counties across the United States. Lexington County has 5

species that are listed with the U.S. Fish and Wildlife Services. Table 3.1 below shows the species identified as threatened, endangered, or other classification in Lexington County.

Table 3.1 – Threatened and Endangered Species

Group	Common Name	Scientific Name	Federal Status
Birds	Bald eagle	*Haliaeetus leucocephalus*	Recovery
Birds	Red-cockaded woodpecker	*Picoides borealis*	Endangered
Birds	Wood stork	*Mycteria americana*	Threatened
Clams	Carolina heelsplitter	*Lasmigona decorata*	Endangered
Flowering Plants	Smooth coneflower	*Echinacea laevigata*	Endangered

Source: U.S. Fish & Wildlife Service (https://ecos.fws.gov/ecp0/reports/species-by-current-range-county?fips=45063)

3.4 Economy

According to the U.S. Census Bureau, the median household income for Lexington County from 2011-2015 was $53,857. 14.2% of the population is living below the poverty level. Table 3.2 shows employment and unemployment rates along with industry employment by major classification for the County. Major employers for Lexington County are listed in Table 3.3.

Table 3.2 – Employment and Occupation Statistics for Lexington County

Employment Status	Percentage
Employed	61.1
Unemployed	5.0
Not in Labor Force	33.7
Occupation	
Management, business, science and arts	36.6
Service	15.4
Sales and office	30.0
Natural resources, construction and maintenance	10.6
Production, transportation and material moving	11.4

Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates

Table 3.3 – Major Employers in Lexington County, SC

Corporation/Organization	Service/Product by SIC Code	# of Employees
Lexington Medical Center	Healthcare	4,376
SCANA / SCANA Corporation	Utilities	3,873
Michelin Tire Corp	Tire Manufacturing	2,040
Amick Farms	Manufacturing	1,700
Amazon.com	Retail Trade	1,200

Source: Lexington County Economic Development Department

According to the Central Midlands Hazard Mitigation Plan, the Columbia metro area is a major hub of economic activity and growth in the region. The Lexington County Economic Development Department promotes business growth in the County and develops, manages, and markets office and industrial real estate in the County. Per the Department's website, it maintains strong ties to the South Carolina Department of Commerce, utility suppliers, the commercial/industrial real estate community, workforce training providers, financial institutions and many other service providers. The Department lists among its partners in economic development Apprenticeship Carolina, Central SC Alliance, Engenuity SC, Midlands Education & Business Alliance, Midlands Technical College, Midlands Workforce Development Board, Ready SC, River Alliance, SC Manufacturing Extension Partnership, SC Department of Commerce, and University of SC Technology Incubator.

3.5 Housing

According to the 2011-2015 American Community Survey 5-Year Estimates, there are 117,446 housing units in Lexington County, of which 90.8% are occupied. Of these occupied units, 73.6% are owner-occupied and 26.4% are renter-occupied. This lower percentage of renter-occupied units (compared to 36.1% across the U.S.) suggests a lower than average level of social vulnerability on this metric. However, of these renters, 39.8% are paying more than 35% of their household income in rent, which indicates financial vulnerability.

The housing mix in Lexington County is fairly homogenous; 65.5% of units are single-family detached units, and 20.0% are mobile homes. 80.3% of owner-occupied housing are single-family detached units and 16.6% are mobile homes. Renter-occupied housing is more evenly split between single-family homes, apartments, and mobile homes.

The majority of householders moved into their current homes in the last 17 years; 38.9% moved in between 2000 and 2009, and 27.4% moved in between 2010 and 2014. Householders of 5.2% of occupied housing units do not have access to a vehicle, which suggests these residents may have difficulty in the event of an evacuation and would require alternate transportation.

3.6 Population and Demographics

Lexington County had 262,391 residents at the time of the 2010 U.S. Census and an estimated population of 273,843 in 2015. As of 2015, the Lexington County average population density is 391.8 persons per square mile, which is much higher than the state average density of 162 persons per square mile. Table 3.4 provides demographic profile data from the 2015 American Community Survey 5-Year Estimates.

Table 3.4 – Lexington County Demographic Profile Data, 2015

Demographic	Lexington County
Gender/Age	
Male	48.8%
Female	51.2%
Median Age (years)	38.5
Under 5 Years	6.2%
65 Years and Over	13.7%
Race/Ethnicity (One Race)	
White	79.9%
Black or African American	14.5%
Asian	1.6%
American Indian/Alaska Native	0.3%
Other Race	1.4%
Hispanic or Latino[1]	5.7%
Education	
High School Graduate or Higher	89.7%
Bachelor's Degree or Higher	29.2%

Source: U.S. Census Bureau, 2011-2015 American Community Survey 5-Year Estimates
[1]Hispanics may be of any race, so also are included in applicable race categories.

The Social Vulnerability Index (SoVI) is a tool developed by researchers at the University of South Carolina to assess variation in social vulnerability and determine where there is uneven capacity for preparedness, response, and recovery to natural hazards and disasters. The index examines 29 socioeconomic variables that contribute to a community's ability to prepare for, respond to, and recover from hazards. The primary explanatory variables assessed in SoVI are wealth, race and social status, elderly residents, Hispanic

ethnicity and residents without health insurance, special needs individuals, service industry employment, Native American populations, and gender.

According to the SoVI 2010-2014 data, Lexington County has a relatively low social vulnerability compared to the United States as a whole and to the rest of South Carolina. These comparative scores are shown in Figure 3.4 on the following page. It should be noted that SoVI data averages vulnerability across the entire County, and the "Low" rating should not be taken as an indication that there is not social vulnerability within the County. There may be variation within the County with localized areas of higher than average levels of vulnerability in some metrics. Similarly, the County may have high social vulnerability in some metrics balanced out by lower vulnerability in others. For this reason, it is important to consider the factors that contribute to social vulnerability, mentioned above.

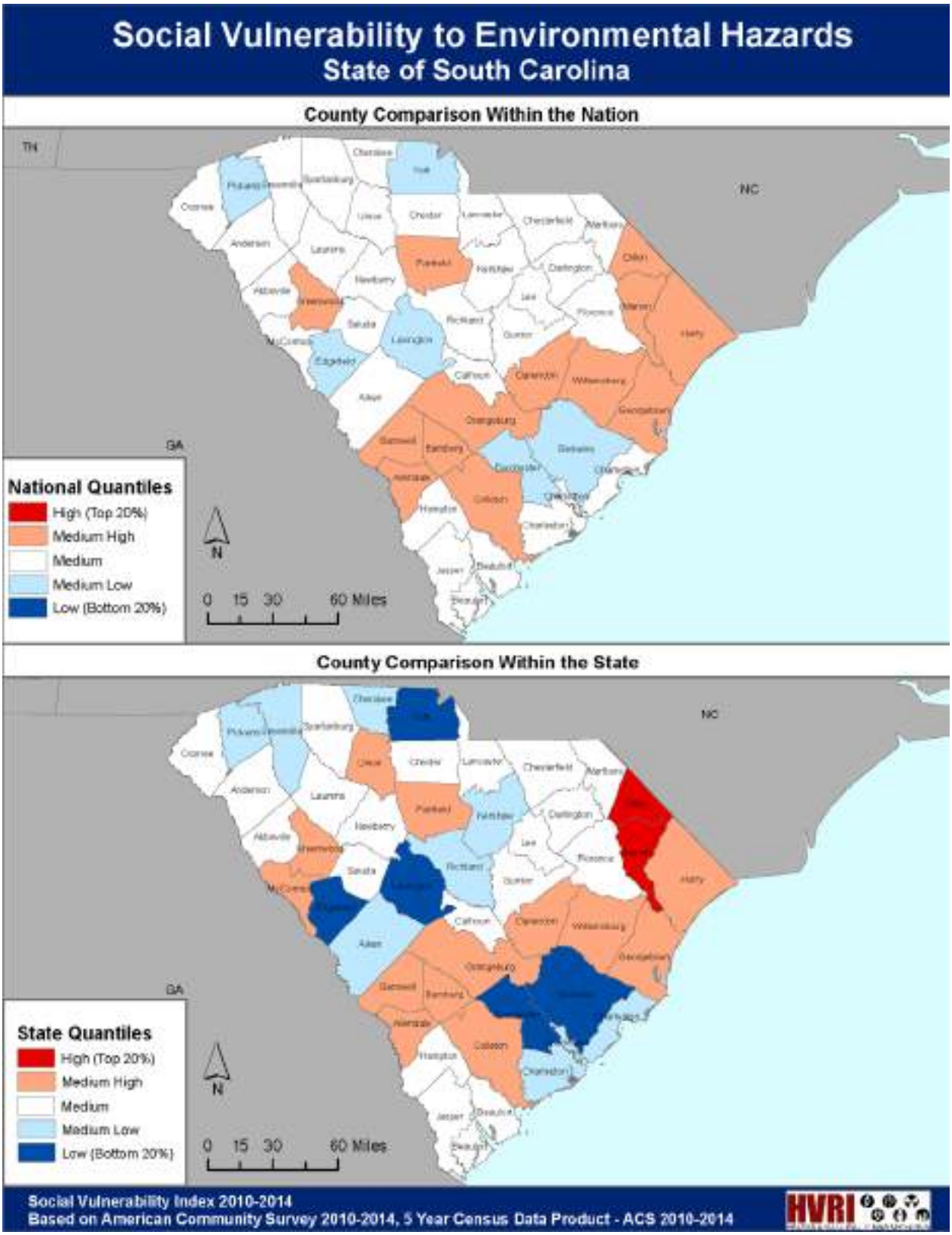


Figure 3.4 – SoVI for South Carolina Counties

3.7 Land Use

Rather than developing a traditional comprehensive plan and future land use map, Lexington County uses their zoning ordinance to guide future growth. In the absence of a future land use map, the County does not have a specific picture of how it should be developed in the future. However, the County's officially adopted Comprehensive Plan, which is a set of goals and objectives intended to inform all growth and development decisions made in the County, supplements the zoning ordinance and identifies certain areas in which to either manage or encourage growth. Lexington County's Planning Areas are shown in Figure 3.5 on the following page.

The Comprehensive Plan mentions growth management in relation to the following areas and objectives:

- To limit or discourage sprawl around the Columbia Metropolitan Area;
- To protect the Pelion Corporate Airport and Columbia Metropolitan Airport with land use limitations in surrounding areas;
- To preserve the rural character of the Southern and Western Planning Areas; and
- To preserve the environmental, tourism, and recreational qualities of Lake Murray;

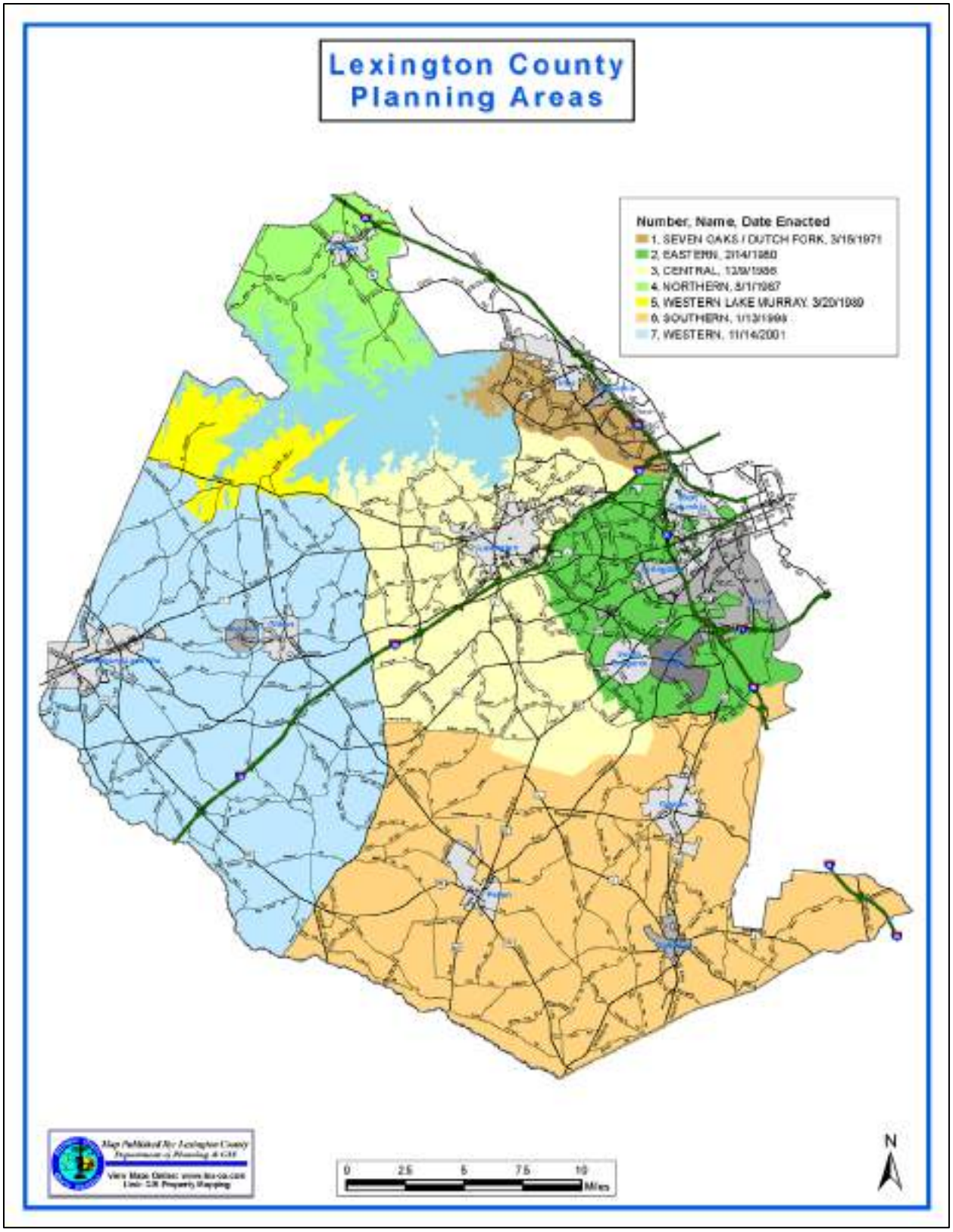
Conversely, the Comprehensive Plan supports increased growth in the Dutch Fork Planning Area.

In addition to these goals, the County's zoning ordinance directs future growth. Lexington County uses a combination of districts and road classifications to determine the zoning for any given parcel. The most intense development is allowed in the Dutch Fork Planning area, near the capital region. A zoning map for the unincorporated County is shown in Figure 3.6.

The National Land Cover Database summarizes existing land cover across the U.S. and is a useful resource to distinguish between developed and undeveloped land. Figure 3.7 shows land cover in Lexington County as of 2011 and Table 3.5 summarizes the acreage in each land cover category. Though less than 20% of the land in the County is developed, much of that development is clustered in the central and eastern parts of the County around the Capital region. This concentration of development equates to a concentration of impervious surface, which means stormwater runoff is likely to contribute to flooding issues in these areas.

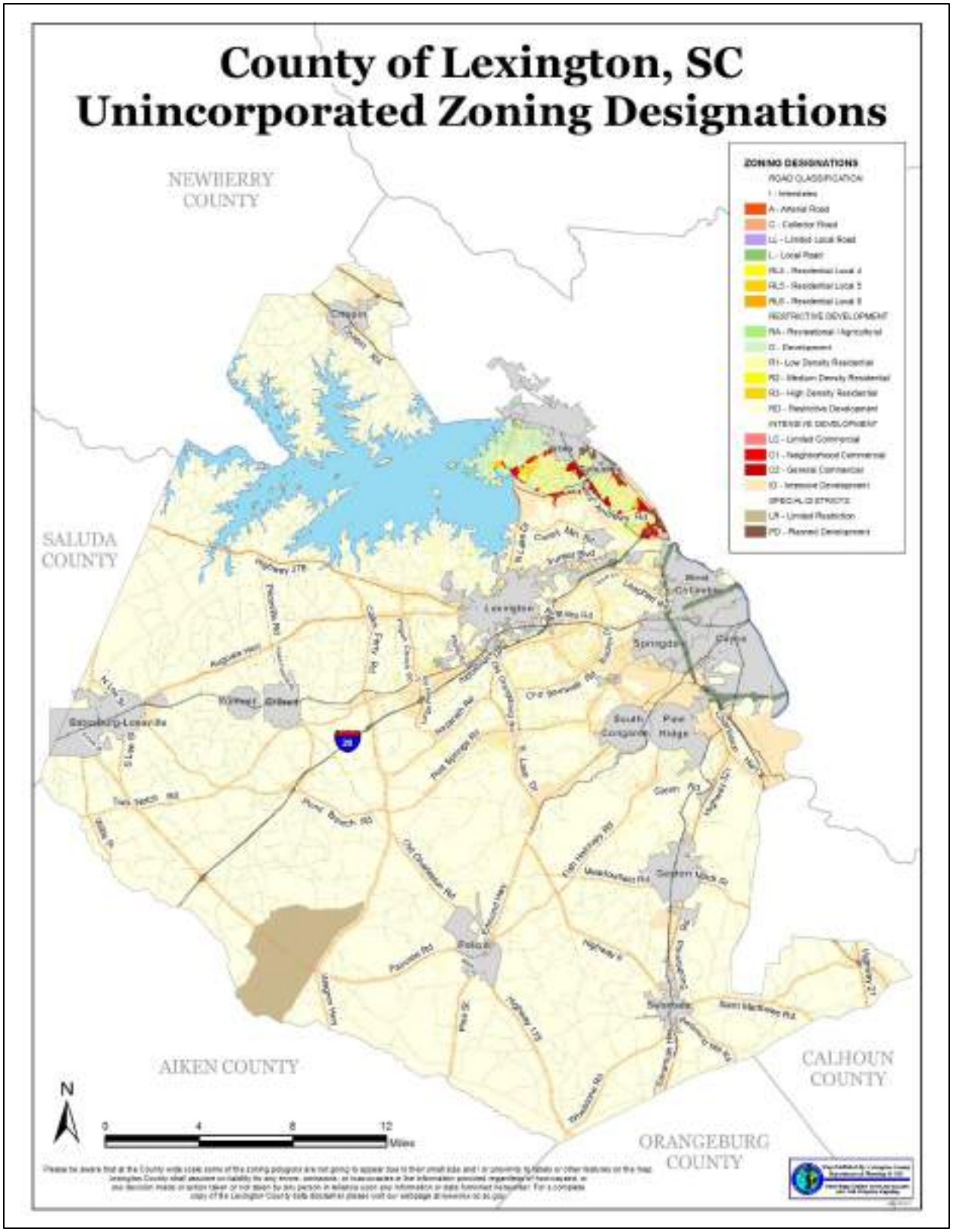
Table 3.5 – Land Cover in Lexington County

Type	Acreage	Percent Total
Open Water	38,318.04	7.09%
Developed, Open Space	46,314.82	9.55%
Developed, Low Intensity	32,098.82	6.62%
Developed, Medium Intensity	12,327.40	2.54%
Developed, High Intensity	3,945.31	0.81%
Barren Land (Rock/Sand/Clay)	4,082.34	0.84%
Deciduous Forest	48,714.65	10.04%
Evergreen Forest	93,696.97	19.31%
Mixed Forest	11,438.63	2.36%
Shrub/Scrub	40,752.52	8.40%
Grassland/Herbaceous	45,723.41	9.43%
Pasture/Hay	32,560.09	6.71%
Cultivated Crops	37,340.43	7.70%
Woody Wetlands	35,638.16	7.35%
Emergent Herbaceous Wetlands	2,168.42	0.45%
Total	**485,120**	**100%**



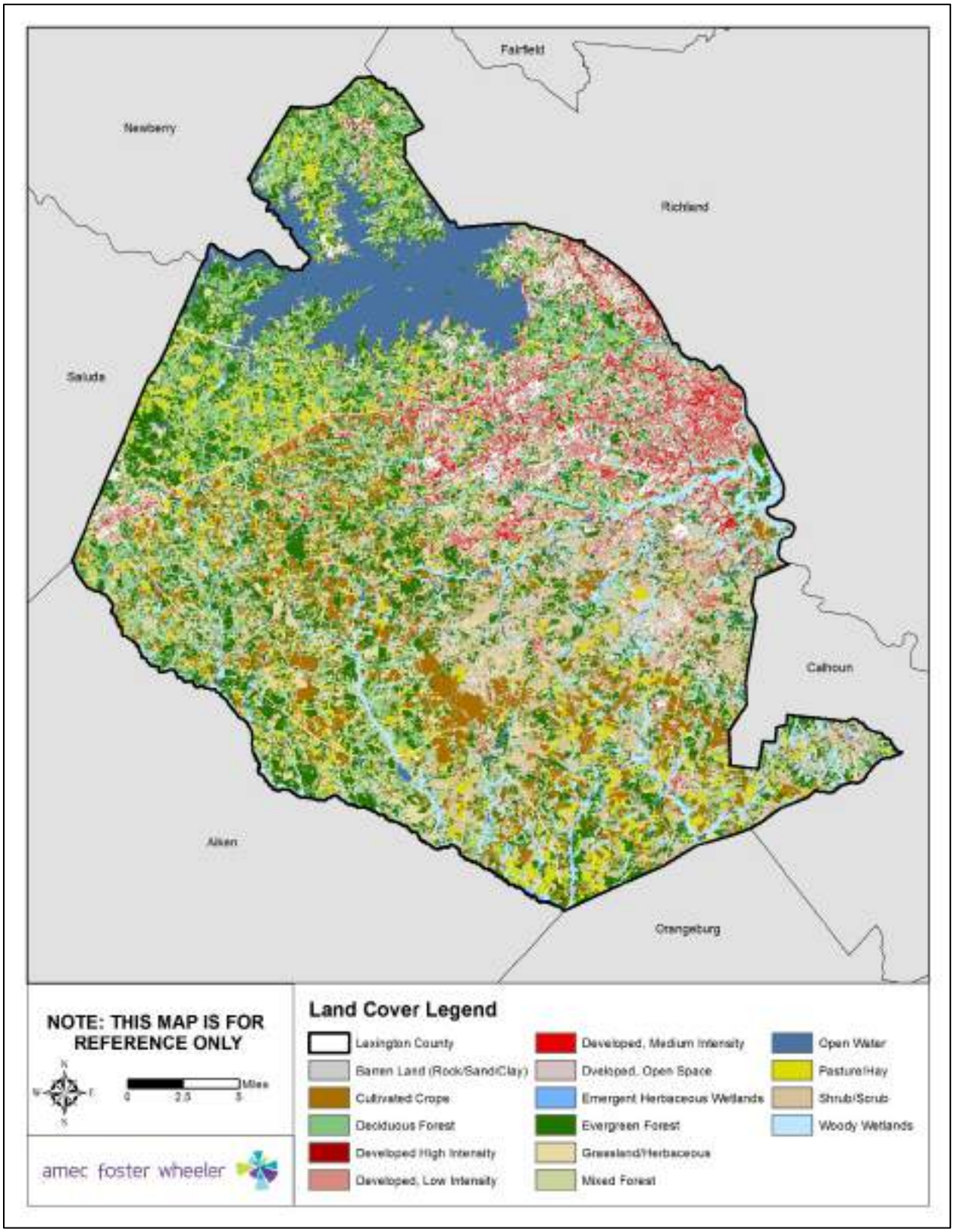
Source: Lexington County Department of Planning and GIS

Figure 3.5 – Lexington County Planning Areas



Source: Lexington County Department of Planning & GIS

Figure 3.6 – Lexington County Zoning Map

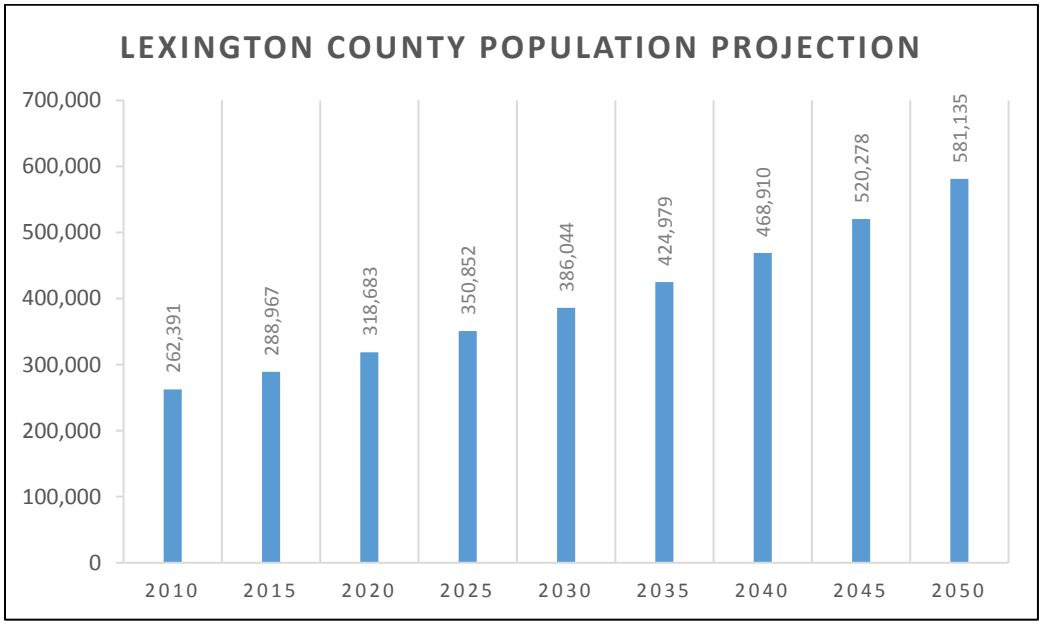


Source: National Land Cover Database 2011

Figure 3.7 – Land Cover in Lexington County

3.8 Growth and Development Trends

According to the Central Midlands Council of Governments (CMCOG) Demographic Research Report, Lexington County has been the fastest growing county in the region since 2010. From 2010 to 2015, the County grew at a rate of 4.4%. Additionally, Lexington County is expected to increase its 2010 population by 82.4% by 2050.



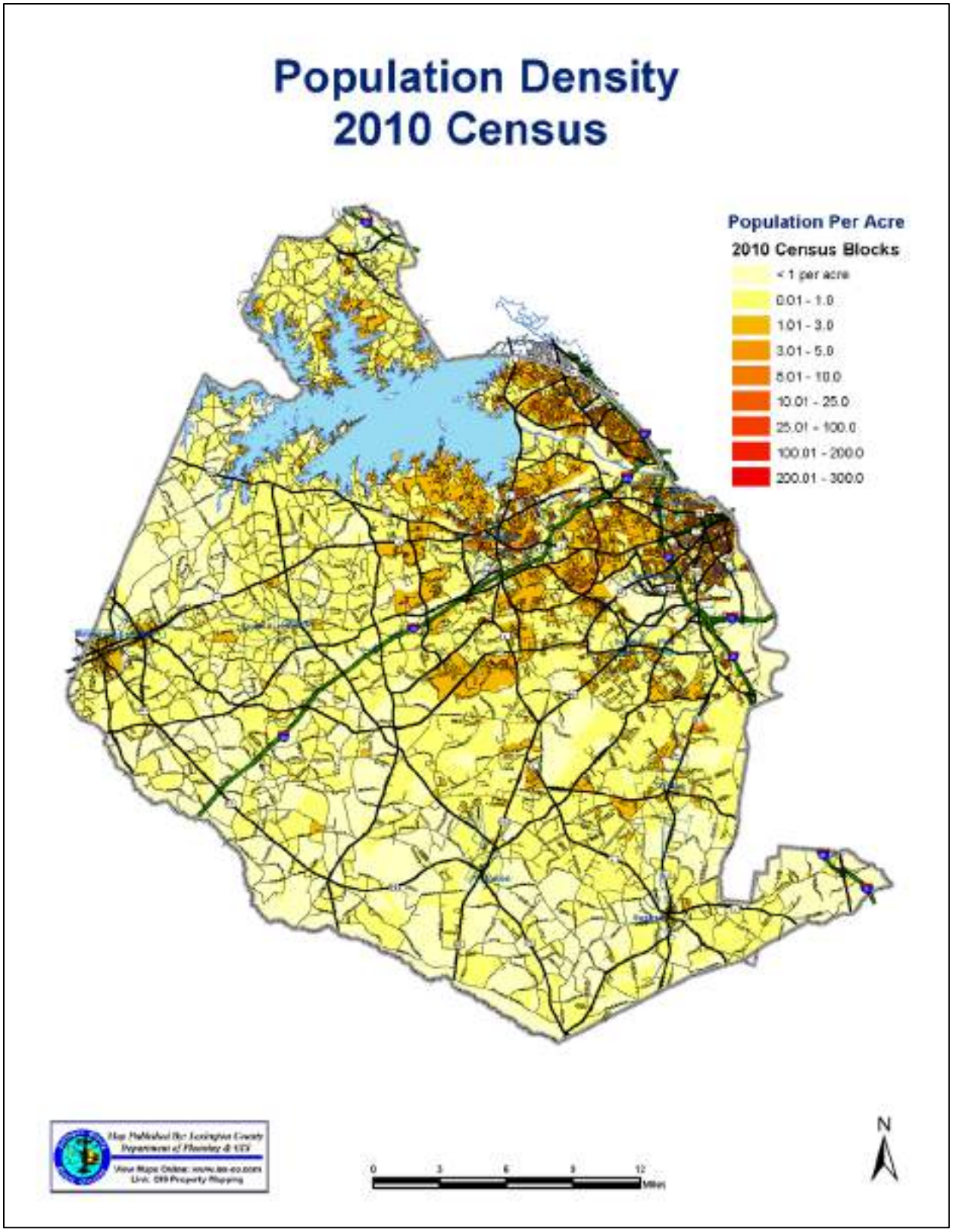
Source: Central Midlands Council of Governments

Figure 3.8 – Population Projections for Lexington County

The Comprehensive Plan goals, discussed above, suggest that most future development will occur around the Columbia Metropolitan Area, where development pressure is highest due to proximity to the state capital. These areas are already the most developed in the County. Figure 3.9 is a population density map from 2010, which shows that as of the 2010 Census, the most densely populated areas in the County were those around Columbia, West Columbia, Cayce, and Lexington.

The goals of the Comprehensive Plan indicate a continuation of this development pattern. Therefore, most future growth will likely occur within the Saluda River Basin and Congaree River Basin. These conclusions are further supported by the trends in recent growth evident in the issuance of building permits. Figure 3.10 through Figure 3.13 show residential building permits issued annually as mapped by the Lexington County Planning & GIS Department. These maps show a pattern of steady development of new site built housing around Lake Murray and north of Interstate 20, primarily within the Saluda watershed, with additional clusters of new housing development south of Red Bank and west of South Congaree in the Congaree watershed. Additionally, there is a steady increase in manufactured housing in the southern portion of the County in the Congaree and North Fork Edisto River watersheds. The Saluda and Congaree watersheds will also likely experience continued development pressure due to growth driven by the state capital, Columbia.

Redevelopment is not occurring to any significant degree in the County because there is still substantial potential for expansion into greenfield locations and the County has few restrictions or disincentives on new greenfield development.



Source: Lexington County Planning & GIS Department

Figure 3.9 – Lexington County Population Density, 2010

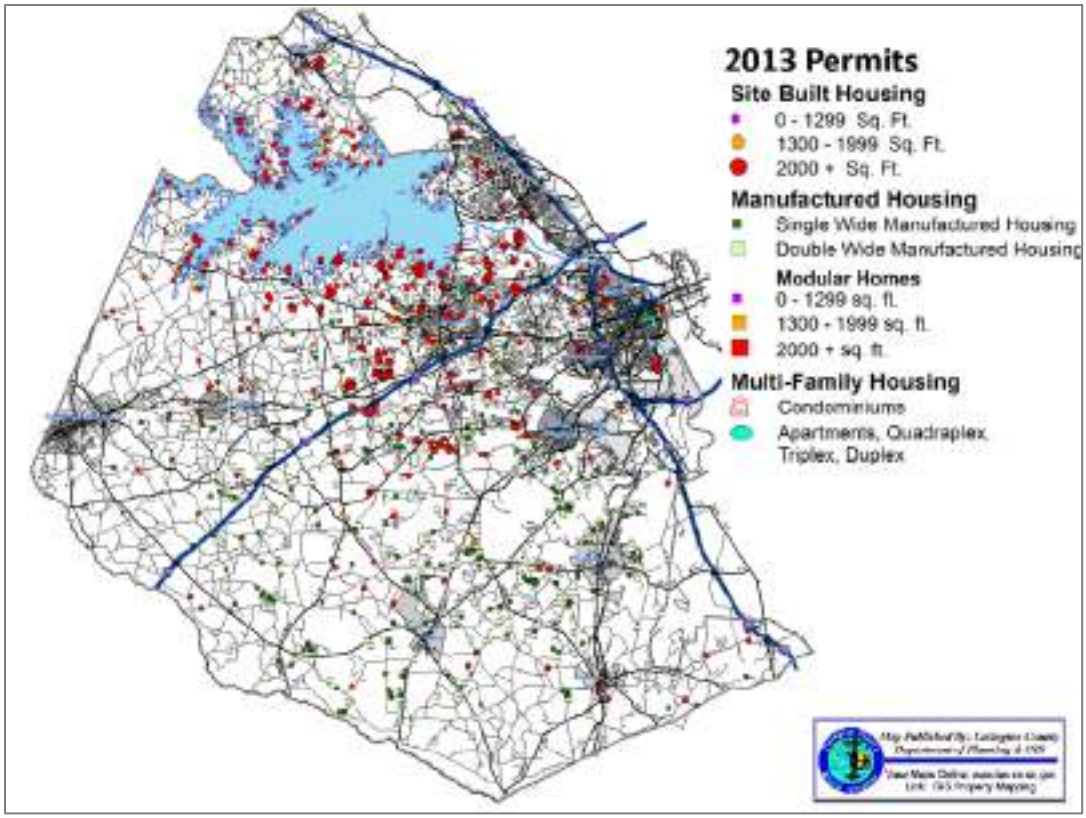


Figure 3.10 – Residential Building Permits Issued, 2013

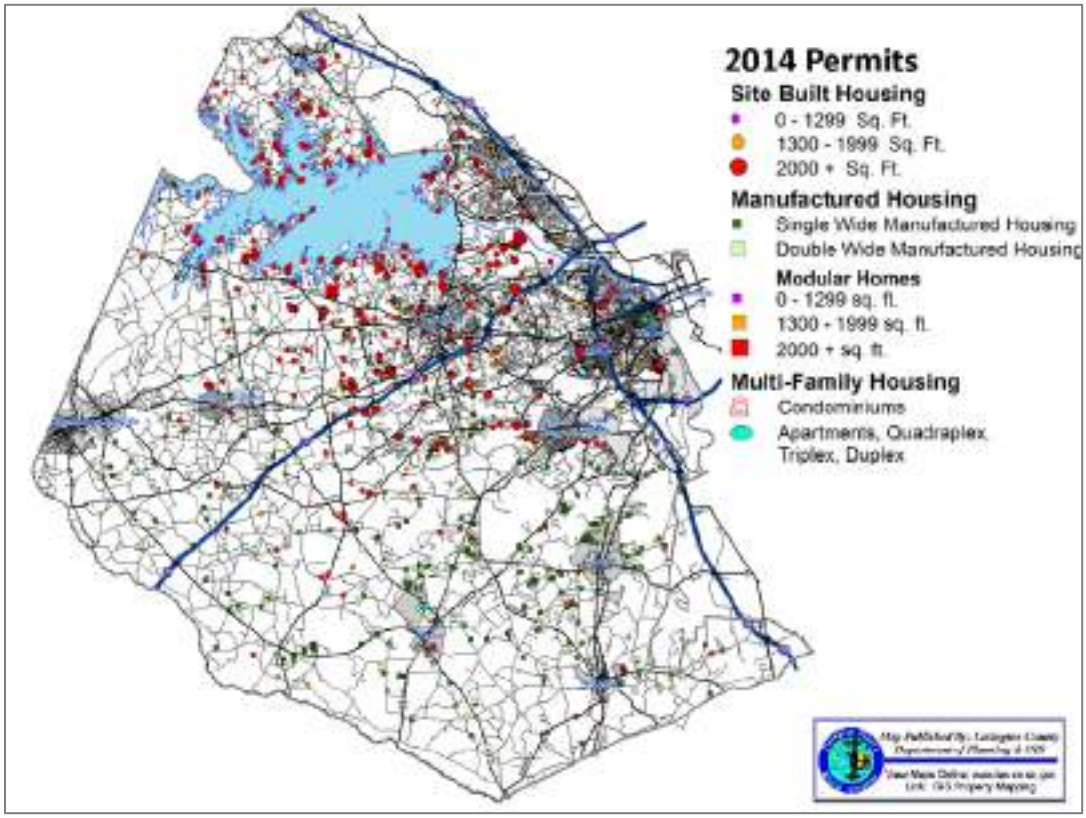


Figure 3.11 – Residential Building Permits Issued, 2014

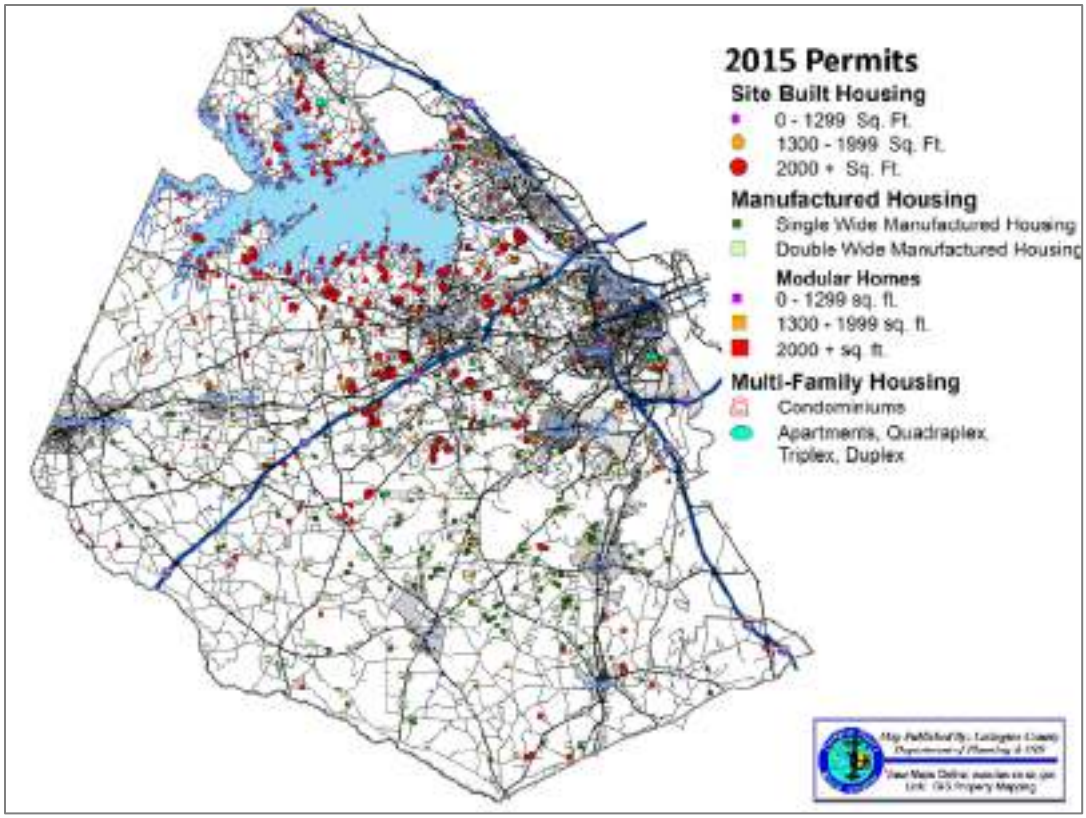


Figure 3.12 – Residential Building Permits Issued, 2015

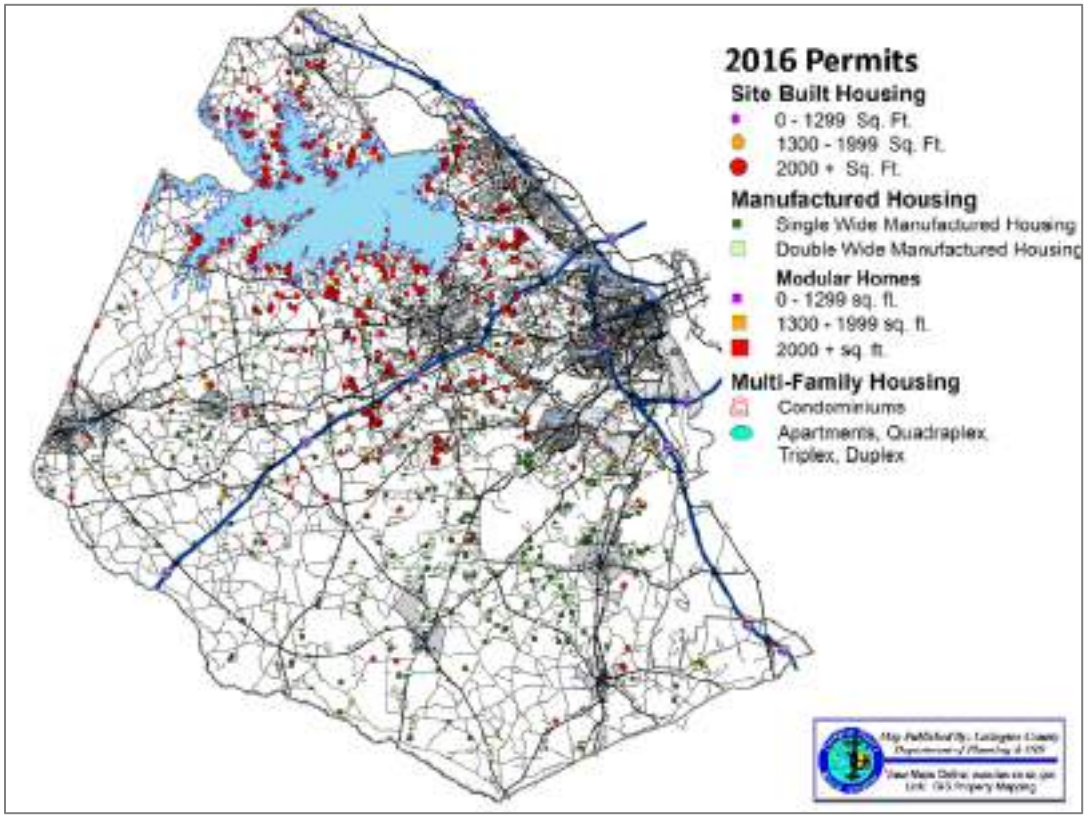


Figure 3.13 – Residential Building Permits Issued, 2016

4 HAZARD IDENTIFICATION

44 CFR Subsection D §201.6(c)(2): [The plan shall include] A risk assessment that provides the factual basis for activities proposed in the strategy to reduce losses from identified hazards. Local risk assessments must provide sufficient information to enable the jurisdiction to identify and prioritize appropriate mitigation actions to reduce losses from identified hazards.

Chapter 4 identifies the flood hazards that may affect Lexington County, SC Unincorporated Areas. This chapter also describes the Risk Assessment process for the development of the Lexington County Floodplain Management Plan. It describes how the FMPC met the following requirements from the 10-step planning process:

- Planning Step 4: Assess the Hazard
- Planning Step 5: Assess the Problem

As defined by FEMA, risk is a combination of hazard, vulnerability, and exposure. "It is the impact that a hazard would have on people, services, facilities, and structures in a community and refers to the likelihood of a hazard event resulting in an adverse condition that causes injury or damage."

The flood risk assessment covers the entire geographical area of Lexington County, SC Unincorporated Areas. The risk assessment process identifies and profiles relevant hazards and assesses the exposure of lives, property, and infrastructure to these hazards. The process allows for a better understanding of a jurisdiction's potential risk to natural hazards and provides a framework for developing and prioritizing mitigation actions to reduce risk from future hazard events. This risk assessment followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (FEMA 386-2, 2002), which breaks the assessment down to a four-step process:

Data collected through this process has been incorporated into the following sections of this chapter:

- **Chapter 4: Hazard Identification** identifies the natural and man-made hazards that threaten the planning area.
- **Chapter 5**: **Hazard Profiles** discusses the threat to the planning area and describes previous occurrences of hazard events and the likelihood of future occurrences.
- **Chapter 6: Vulnerability Assessment** assesses the planning area's exposure to the hazards; considering assets at risk, critical facilities, and future development trends.
- **Chapter 7: Capability Assessment** inventories existing mitigation activities and policies, regulations, and plans that pertain to mitigation and can affect net vulnerability.

Using existing flood hazard data and input gained through the planning meetings, the FMPC conducted a hazard identification study to determine and agree upon a list of natural flood hazards that could affect Lexington County. Flood hazard data from FEMA, South Carolina Emergency Management Division (SCEMD), National Oceanic and Atmospheric Administration (NOAA), and many other sources were examined to assess the significance of these hazards to the planning area. Significance was measured in general terms and focused on key criteria such as frequency and resulting damage, which includes deaths and injuries, as well as property and economic damage.

In order to identify hazards for this plan, the FMPC researched past severe weather reports that impacted the planning area. NOAA's National Centers for Environmental Information (NCEI) [formerly National Climatic Data Center (NCDC)], has been tracking severe weather related to flooding since 1996. Their Storm Events Database contains an archive of destructive storm or weather data and information which includes local, intense and damaging events. NCEI receives storm data from the National Weather Service (NWS). The NWS receives their information from a variety of sources, which include but are not limited to: county, state and federal emergency management officials, local law enforcement officials, SkyWarn spotters, NWS damage surveys, newspaper clipping services, the insurance industry and the general public, among others. This database contains 67 flood related events that occurred in Lexington County between January 1996 and November 2016. Table 4.1 below summarizes these events.

Table 4.1 – Lexington County NCEI Storm Events

Type	# of Events	Property Damage	Crop Damage	Deaths (Direct)	Injuries (Direct)
Flash Flood	47	$16,750,000	$1,870,000	0	0
Flood	11	$19,300	$300	0	0
Heavy Rain	9	$10,000	$0	0	0
Hurricane (Typhoon)	0	0	0	0	0
Tropical Depression	0	0	0	0	0
Tropical Storm	0	0	0	0	0
Total:	**67**	**$16,779,300**	**$1,870,300**	**0**	**0**

Source: National Climatic Data Center Storm Events Database, March 2017
Note: Values include the entirety of Lexington County including incorporated areas

The FMPC supplemented NCDC data with data from SHELDUS™ (Spatial Hazard Events and Losses Database for the United States). SHELDUS is a county-level data set for the United States and covers natural hazards such thunderstorms, hurricanes, floods, wildfires, and tornados as well as perils such as flash floods, heavy rainfall, etc. The database contains information on the date of an event, affected location (county and state) and the direct losses caused by the event (property and crop losses, injuries, and fatalities) from 1960 to present.

SHELDUS Version 15.2 was launched on November 17, 2016. Losses for multi-county events are distributed equally across counties with the exception of fatalities and injuries. If details on the location of fatalities and injuries are provided in the original data, SHELDUS will reflect it. SHELDUS contains information on 35 flood-related events that occurred in Lexington County between January 1960 and December 2015. Table 4.2 summarizes these events.

Table 4.2 – Lexington County SHELDUS Records for Flood

Type	# of Events	Property Damage	Crop Damage	Injuries	Fatalities
Flooding	35	$18,029,759.41	$3,285,218.46	6	2

Source: Hazards & Vulnerability Research Institute (2017). The Spatial Hazard Events and Losses Database for the United States, Version 15.2 [Online Database]. Columbia, SC: University of South Carolina. Available from http://hvri.geog.sc.edu/SHELDUS/
Note: Losses have been adjusted for inflation to 2015 dollars.

The FMPC also researched past flood related events that resulted in a federal major disaster declaration in the planning area for Lexington County to assist in identify flood hazards. Table 4.3 displays flood related major disaster declarations in Lexington County. This table reflects the vulnerability and historic patterns of flood hazards for the County.

Table 4.3 – Flood Related Major Disaster Declarations in Lexington County

Declaration #	Date	Event Details
DR-4241	October, 2015	Severe Storms and Flooding

Declaration #	Date	Event Details
DR-1566	October, 2004	Tropical Storm Frances
DR-1299	September, 1999	Hurricane Floyd

Source: FEMA, March 2017

Table 4.4 on the following page documents the decisions made by the FMPC as it relates to the hazards that were to be identified, analyzed, and addressed through the development of this plan. This table examines whether or not the hazard was included in the 2013 State of South Carolina Hazard Mitigation Plan as well as the 2016 Hazard Mitigation Plan for the Central Midlands Region of South Carolina. This table summarizes those hazards that were identified for inclusion as well as those that were not identified and the reasoning for the decision.

Table 4.4 – Summary of Flood Hazard Evaluation

Flood Hazard	Included in 2013 State Plan?	Included in 2016 HMP?	Identified as a Significant hazard to be included in the Lexington County FMP?
Dam/Levee Failure	Yes	Yes	Yes
Hurricane and Tropical Storm	Yes	Yes	Yes
Flood: 100-/500-yr	Yes	Yes	Yes
Flood: Localized Stormwater	Yes	No	Yes

5 HAZARD PROFILES

Requirement §201.6(c)(2)(i): [The risk assessment shall include a] description of the…location and extent of all natural hazards that can affect the jurisdiction. The plan shall include information on previous occurrences of hazard events and on the probability of future hazard events.

The hazards identified in Chapter 4 – Hazard Identification, are profiled individually in this chapter. It consists of the following subsections:

- 5.1 Dam/Levee Failure
- 5.2 Hurricane and Tropical Storm
- 5.3 Flood: 100-/500-year
- 5.4 Flood: Localized Stormwater

Each hazard is profiled in the following format:

Hazard Description

This section provides a description of the hazard followed by details specific to the planning area.

Location and Spatial Extent

This section includes information on the hazard extent, seasonal patterns, speed of onset/duration, magnitude and any secondary effects.

Past Occurrences

This section contains information on historical events, including the extent or location of the hazard within or near the planning area.

Probability of Future Occurrence

This section gauges the likelihood of future occurrences based on past events and existing data. The frequency is determined by dividing the number of events observed by the number of years on record and multiplying by 100. This provides the percent chance of the event happening in any given year (e.g. 10 hurricanes or tropical storms over a 30-year period equates to a 33 percent chance of experiencing a hurricane or tropical storm in any given year). The likelihood of future occurrences is categorized into one of the classifications as follows:

- ***Highly Likely*** – 100 percent chance of occurrence within the next year
- ***Likely*** – Between 11 and 99 percent chance of occurrence within the next year (recurrence interval of 10 years or less)
- ***Possible*** – Between 1 and 10 percent chance of occurrence within the next year (recurrence interval of 11 to 100 years)
- ***Unlikely*** – Less than 1 percent chance of occurrence within the next 100 years (recurrence interval of greater than every 100 years)

Consequence Analysis

This section examines the effects of the hazard on people, first responders, continuity of operations, built environment, economy and natural environment.

Hazards determined to be of high or medium significance were characterized as priority hazards that required further evaluation in Chapter 6 Vulnerability Assessment. Significance was determined by frequency of the hazard and resulting damage, including deaths/injuries and property, crop and economic damage. Hazards occurring infrequently or having little to no impact on the planning area were determined to be of low significance and not considered a priority hazard. These criteria allowed the FMPC to prioritize hazards of greatest significance and focus resources where they are most needed.

Climate Change

Climate change refers to a change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forces such as modulations of the solar cycles, volcanic eruptions, and persistent anthropogenic changes in the composition of the atmosphere or in land use (IPCC, 2014). Climate change is a natural occurrence in which the earth has warmed and cooled periodically over geologic time. The recent and rapid warming of the earth over the past century has been cause for concern, as this warming is due to the accumulation of human-caused greenhouse gases, such as CO_2, in the atmosphere (IPCC, 2007). This warming is occurring almost everywhere in the world which suggests a global cause rather than changes in localized weather patterns.

Since 1901, the average surface temperature across the contiguous 48 states has risen at an average rate of 0.14°F per decade. Average temperatures have risen more quickly since the late 1970s (0.29 to 0.46°F per decade since 1979). Eight of the top 10 warmest years on record for the contiguous 48 states have occurred since 1998, and 2012 and 2015 were the two warmest years on record.

Worldwide, 2015 was the warmest year on record and 2006–2015 was the warmest decade on record since thermometer-based observations began. Global average surface temperature has risen at an average rate of 0.15°F per decade since 1901, similar to the rate of warming within the contiguous 48 states. Since the late 1970s, however, the United States has warmed faster than the global rate.

Figure 5.1, based on data from NOAA and prepared by the EPA, shows how annual average air temperatures have changed in different parts of the United States since 1901.

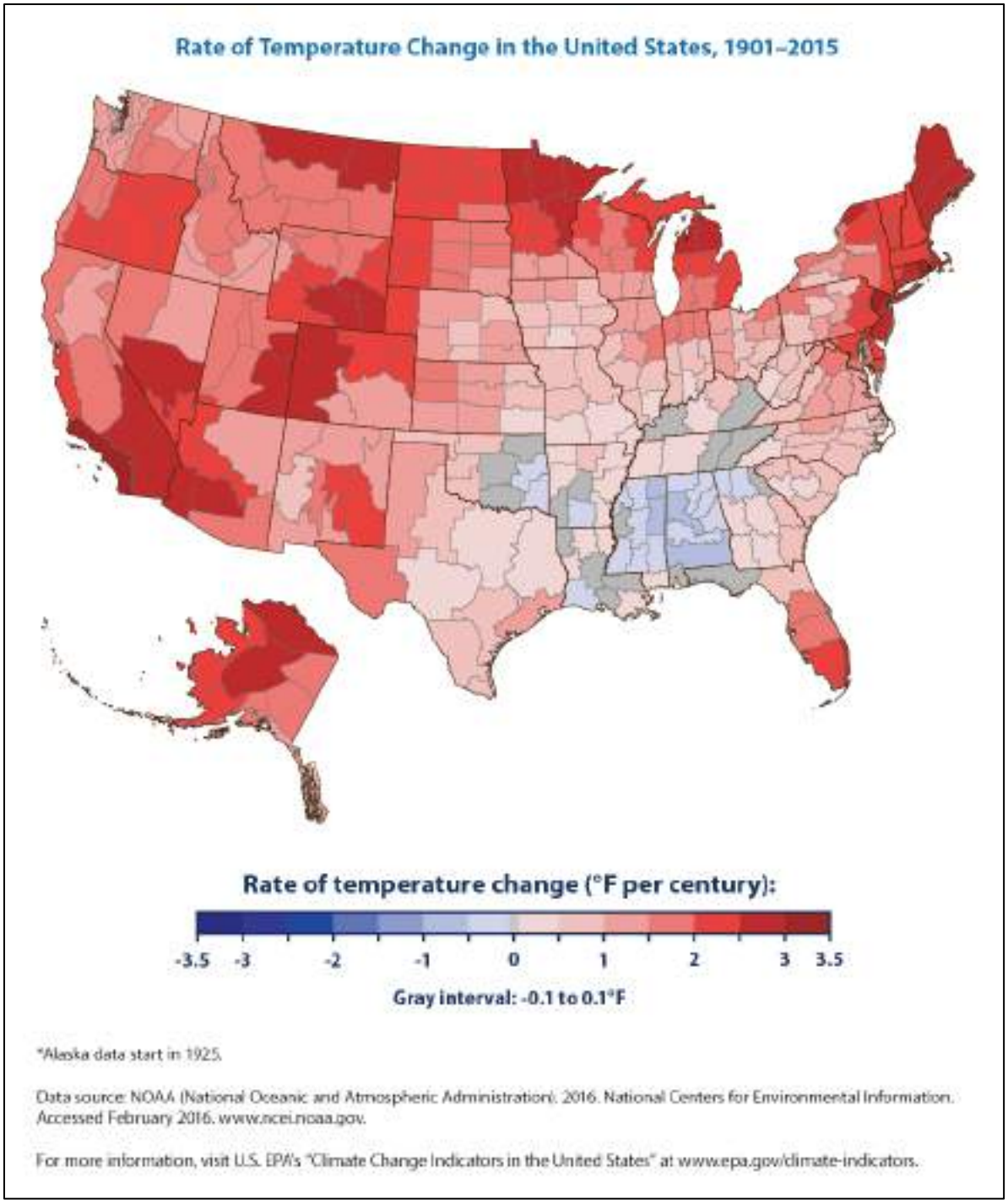
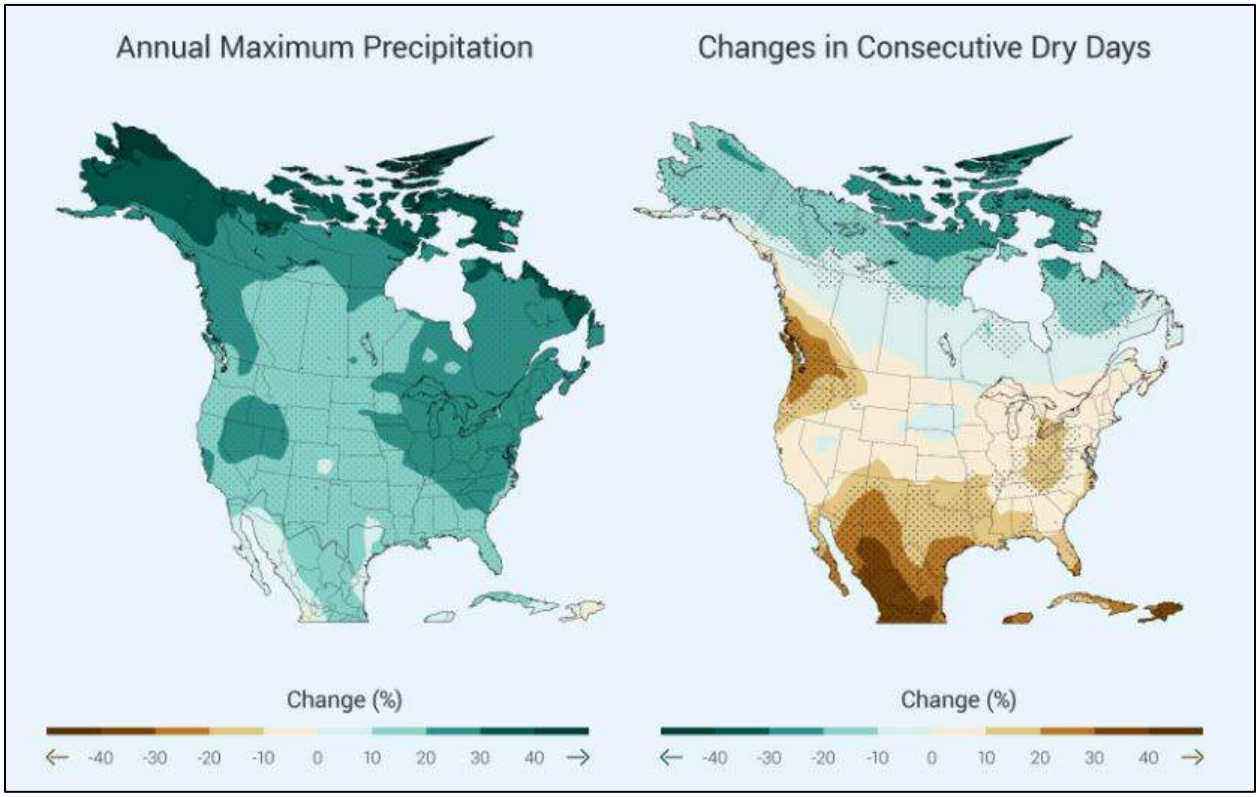


Figure 5.1 – Rate of Temperature Change in the United States

As shown in the figure above, some parts of the United States have experienced more warming than others. The North, the West, and Alaska have seen temperatures increase the most, while some parts of the Southeast have experienced little change. Not all of these regional trends are statistically significant, however.

Under current climate change models, changes in global temperatures, hydrologic cycles, and storm frequency and intensity are expected to continue. Current science projects that the southeastern United States could experience a general increase in average temperatures anywhere from 4.5°F to 9°F in the coming century (Karl et al, 111). With continued high emissions, annual maximum precipitation and consecutive dry days are expected to increase in the southeastern U.S. in 2070-2099 compared to 1971-2000, as shown in Figure 5.2, below. Drought is also expected to increase over most of the southern U.S. Rainfall may also increase as a result of increased hurricane activity. The overall number of hurricanes is projected to decline slightly, but the number of strong storms (Category 4 and 5) is expected to increase. Additionally, hurricane precipitation rates are expected to increase by up to 20%. The combination of higher temperatures and increased incidence of drought along with increased heavy precipitation events suggests that the likelihood of flood events may increase as a result of climate change.



Source: National Climate Assessment, 2014

Figure 5.2 – Precipitation Change Projections

5.1 Dam/Levee Failure

5.1.1 Hazard Description

Dam Failure

A dam is a barrier constructed across a watercourse that stores, controls, or diverts water. Dams are usually constructed of earth, rock, or concrete. The water impounded behind a dam is referred to as the reservoir and is measured in acre-feet. One acre-foot is the volume of water that covers one acre of land to a depth of one foot. Dams can benefit farm land, provide recreation areas, generate electrical power, and help control erosion and flooding issues.

A dam failure is the collapse or breach of a dam that causes downstream flooding. Dam failures may be caused by natural events, human-caused events, or a combination. Due to the lack of advance warning, failures resulting from natural events, such as hurricanes, earthquakes, or landslides, may be particularly severe. Prolonged rainfall and subsequent flooding is the most common cause of dam failure.

Dam failures usually occur when the spillway capacity is inadequate and water overtops the dam or when internal erosion in dam foundation occurs (also known as piping). If internal erosion or overtopping cause a full structural breach, a high-velocity, debris-laden wall of water is released and rushes downstream, damaging or destroying anything in its path. Overtopping is the primary cause of earthen dam failure in the United States.

Dam failures can result from any one or a combination of the following:

- Prolonged periods of rainfall and flooding;
- Inadequate spillway capacity, resulting in excess overtopping flows;
- Internal erosion caused by embankment or foundation leakage or piping;
- Improper maintenance, including failure to remove trees, repair internal seepage problems, replace lost material from the cross-section of the dam and abutments, or maintain gates, valves, and other operational components;
- Improper design, including the use of improper construction materials and construction practices;
- Negligent operation, including the failure to remove or open gates or valves during high flow periods;
- Failure of upstream dams on the same waterway; and
- High winds, which can cause significant wave action and result in substantial erosion.

Water released by a failed dam generates tremendous energy and can cause a flood that is catastrophic to life and property. A catastrophic dam failure could challenge local response capabilities and require evacuations to save lives. Impacts to life safety will depend on the warning time and the resources available to notify and evacuate the public. Major casualties and loss of life could result, as well as water quality and health issues. Potentially catastrophic effects to roads, bridges, and homes are also of major concern. Associated water quality and health concerns could also be issues. Factors that influence the potential severity of a full or partial dam failure are the amount of water impounded; the density, type, and value of development and infrastructure located downstream; and the speed of failure.

Each state has definitions and methods to determine the hazard potential of a dam. In South Carolina, unless exempted by law, dams regulated by the South Carolina Department of Health and Environmental Control (DHEC) are classified based on size and hazards, and must meet one of the following criteria: 25 feet in height; impounds 50 acre-feet or more of water; or classified as a high-hazard dam, regardless of

size. The height of a dam is from the highest point on the crest of the dam to the lowest point on the downstream toe, and the storage capacity is the volume impounded at the elevation of the highest point on the crest of the dam.

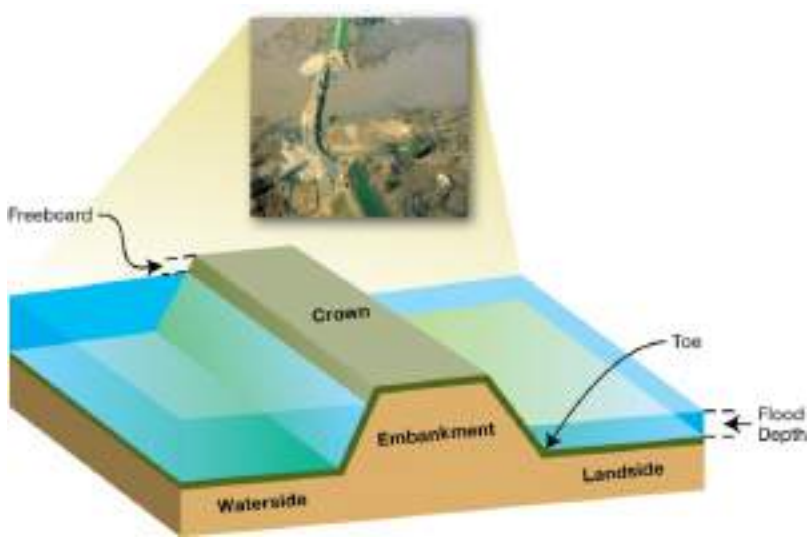
Hazard classification applies to potential loss of human life or property damage in the event of a failure or improper operation of the dam or connected works:

1. High-hazard (C1) – Failure will likely cause loss of life or serious damage to infrastructure.
2. Significant-Hazard (C2) – Failure will not likely cause loss of life but may damage infrastructure.
3. Low-hazard (C3) – Failure may cause limited property damage.

Levee Failure

FEMA defines a levee as "a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water in order to reduce the risk from temporary flooding." Levee systems consist of levees, floodwalls, and associated structures, such as closure and drainage devices, which are constructed and operated in accordance with sound engineering practices. Levees often have "interior drainage" systems that work in conjunction with the levees to take water from the landward side to the water side. An interior drainage system may include culverts, canals, ditches, storm sewers, and/or pumps.

Levees and floodwalls are constructed from the earth, compacted soil or artificial materials, such as concrete or steel. To protect against erosion and scouring, earthen levees can be covered with grass and gravel or hard surfaces like stone, asphalt, or concrete. Levees and floodwalls are typically built parallel to a waterway, most often a river, in order to reduce the risk of flooding to the area behind it. Figure 5.3 below shows the components of a typical levee.



Source: FEMA, What is a Levee Fact Sheet, August 2011

Figure 5.3 – Components of a Typical Levee

Levees provide strong flood protection, but they are not failsafe. Levees are designed to protect against a specific flood level and could be overtopped during severe weather events. Levees reduce, not eliminate, the risk to individuals and structures behind them. A levee system failure or overtopping can create severe flooding and high water velocities. It is important to remember that no levee provides protection from events for which it was not designed, and proper operation and maintenance are necessary to reduce the probability of failure.

Erosion

Dams and levees are susceptible to several types of external erosion. The slopes of any embankment can become eroded from rain runoff or by embankment overtopping, which can reduce the level of protection the dam or levee provides, depending on the extent of the erosion. Dams and levees can also experience erosion under high water conditions, in which wave action can form terraces along the length of embankment slopes, causing the embankment to cave. Regular channel flows can also cause erosion and bank caving, which can result in levee failure if it is not detected and mitigated through bank stabilization.

Internal erosion can also occur and undermine the stability of dams and levees. Internal erosion can take a variety of forms, including leaks and flows within the embankment foundation, piping and seepage below the embankment, internal instability, the formation of sinkholes, saturation failure, and biologic activity undermining the integrity of the embankment.

In all of these cases, erosion can cause dams and levees to fail if it is not identified and remediated. For that reason, it is important to establish frequent monitoring and regular maintenance of these structures.

5.1.2 Location and Spatial Extent

Table 5.1 provides details for 104 dams identified in the National Inventory of Dams (NID) that are located within Lexington County. NID does not report hazard classifications for individual dams.

Table 5.1 – National Inventory of Dams for Lexington County

Dam Name	NIDID	Height (ft)	NID Storage (acre-feet)	Owner Type
Areharts Pond Dam	SC01366	28	90	Private
Basil Mack Dam	SC02767	29.8	60	Private
Batesburg Reservoir Dam	SC01180	30	402	Local Government
Brown Dam	SC01369	21	79	Private
Calmont Pond Dam	SC01574	17	73	Private
Carolina Living Dam	SC02408	15	66	Private
Chapin Park Dam	SC01368	24	72	Private
Clayton Rawl Farms Dam	SC00183	17	86	Private
Covington Lakes Sub Dam	SC02401	37	1,450	Private
Dixon Pond Dam	SC01367	27	76	Private
Farming Creek Dam	SC02751	17	80	Private
Gantts Pond Dam	SC01372	28	68	Private
Gibson's Pond Dam	SC00169	15	240	Local Government
Granger Pond Dam	SC02092	13	57	Private
Guignard Pond Dam	SC01349	17	109	Private
Hollow Ck Watershed Dam 1	SC02403	23	92	Local Government
Jeff Hunt Dam	SC00150	26	550	Private
Koons Pond Dam	SC01348	10	82	Private
Lake Princton Dam	SC02410	8	80	Private
Lake Quail Valley Dam	SC01183	25	400	Private
Lexington Mill Pond Dam	SC00143	20	440	Private
Lower Quail Hollow Dam	SC02260	25	50	Private
Mallard Lakes Dam #2	SC02404	29	25	Private
Phillips/Blankenship Dam	SC00214	10	58	Private
Saluda	SC00224	234	2,200,000	Public Utility
Saluda Dike	SC00224	18	2,200,000	Public Utility
Saluda Spillway	SC00224	32	2,200,000	Public Utility

Dam Name	NIDID	Height (ft)	NID Storage (acre-feet)	Owner Type
Saxe-Gotha Millpond Dam	SC00142	20	250	Private
SCNONAME 32001	SC00141	28	697	Private
SCNONAME 32004	SC00144	16	267	Private
SCNONAME 32005	SC00145	18	410	Private
SCNONAME 32007	SC00147	17	410	Private
SCNONAME 32008	SC00148	14	359	Local Government
SCNONAME 32009	SC00149	13	342	Private
SCNONAME 32011	SC00151	12	224	Private
SCNONAME 32012	SC00152	11	132	Private
SCNONAME 32013	SC00153	12	72	Private
SCNONAME 32015	SC00155	12	204	Local Government
SCNONAME 32016	SC00156	16	160	Private
SCNONAME 32017	SC00157	17	132	Private
SCNONAME 32018	SC00158	13	84	Private
SCNONAME 32019	SC00159	13	76	Private
SCNONAME 32022	SC00162	15	108	Private
SCNONAME 32023	SC00163	12	99	Private
SCNONAME 32025	SC00164	14	64	Private
SCNONAME 32026	SC00165	29	228	Private
SCNONAME 32028	SC00167	12	239	Private
SCNONAME 32030	SC00160	17	220	Private
SCNONAME 32031	SC00170	18	269	Private
SCNONAME 32033	SC00172	24	592	Private
SCNONAME 32034	SC00173	20	149	Private
SCNONAME 32035	SC00174	15	179	Private
SCNONAME 32036	SC00175	26	80	Private
SCNONAME 32037	SC00176	17	101	Private
SCNONAME 32039	SC00178	11	97	Private
SCNONAME 32040	SC00179	18	91	Private
SCNONAME 32043	SC00181	15	58	Private
SCNONAME 32044	SC01353	13	55	Private
SCNONAME 32045	SC00182	11	90	Private
SCNONAME 32049	SC00185	13	72	Private
SCNONAME 32050	SC00186	18	145	Private
SCNONAME 32052	SC00188	22	151	Private
SCNONAME 32053	SC00189	14	88	Private
SCNONAME 32054	SC00190	11	154	Private
SCNONAME 32055	SC00191	13	167	Private
SCNONAME 32056	SC00192	11	54	Private
SCNONAME 32057	SC00193	19	225	Private
SCNONAME 32059	SC00195	13	78	Private
SCNONAME 32061	SC00197	17	273	Private
SCNONAME 32062	SC00198	19	151	Private
SCNONAME 32063	SC01363	16	68	Private
SCNONAME 32064	SC00199	20	83	Private
SCNONAME 32065	SC00200	21	125	Private
SCNONAME 32066	SC00201	16	53	Private
SCNONAME 32067	SC00202	13	78	Private

Dam Name	NIDID	Height (ft)	NID Storage (acre-feet)	Owner Type
SCNONAME 32069	SC00204	17	61	Private
SCNONAME 32070	SC00205	13	77	Private
SCNONAME 32071	SC01359	31	282	Private
SCNONAME 32073	SC00206	12	60	Private
SCNONAME 32073	SC00207	26	205	Private
SCNONAME 32076	SC00209	25	120	Private
SCNONAME 32077	SC00210	15	68	Private
SCNONAME 32079	SC00212	17	157	Private
SCNONAME 32080	SC00213	12	96	Private
SCNONAME 32086	SC00217	17	1,100	Private
SCNONAME 32087	SC00218	28	345	Private
SCNONAME 32088	SC00219	25	197	Private
SCNONAME 32089	SC00220	15	56	Private
SCNONAME 32091	SC01360	21	91	Private
SCNONAME 32092	SC00223	15.1	250	Private
SCNONAME 32093	SC01355	15	77	Private
Thelma & John Culler Dam	SC01354	14	72	Private
SCNONAME 32095	SC01361	23	93	Private
SCNONAME 32099	SC01365	20	57	Private
SCNONAME 32100	SC01362	12	270	Private
SCNONAME 32101	SC01352	20	77.6	Private
SCNONAME 32102	SC01356	18	68	Private
SCNONAME 32103	SC01358	23	157	Private
SCNONAME 32104	SC01357	17	117	Private
Barr Pond Dam	SC01364	22	60	Private
Upper Golden Hills Dam	SC02607	28.8	35	Private
Upper Quail Hollow Dam	SC02261	35	67	Private
Whitehall Dam #1	SC01614	22	50	Private
Whitehall Dam #2	SC02402	17	50	Private

Source: National Inventory of Dams, March 2017

The South Carolina Department of Health and Environmental Control (SC DHEC) also maintains a list of dams throughout the state, and identifies 113 dams in Lexington County: 83 low hazard, 15 significant hazard, and 15 high hazard. Additionally, there are three high hazard dams in surrounding Aiden, Saluda, and Richland Counties that have inundation areas which extend into Lexington County. These dams are listed in Table 5.2 below. Dam names and hazard classification standards are not consistent across federal and state databases. As a result, the list of SC DHEC dams below does not directly correspond to the NID database listing for the County.

Table 5.2 – High Hazard Dams with Inundation Areas affecting Lexington County

Name	Class	Hazard Level	County
Whitehall Dam #1	C1	High	Lexington
Whitehall Dam #2	C1	High	Lexington
Florence T Hall Dam	S1	High	Aiken
Fricks Pond Dam	C1	High	Saluda
Swansea Lake Dam	C1	High	Lexington
Batesburg Reservoir Dam	C1	High	Lexington
Lake Quail Valley Dam	C1	High	Lexington

Little Coldstream Dam	C1	High	Lexington
Nursery Hill Dam	C1	High	Lexington
Lower Quail Hollow Dam	C1	High	Lexington
Upper Quail Hollow Dam	C1	High	Lexington
Harbison Structure 9	C1	High	Lexington
Whiteford Lake Dam	S1	High	Lexington
Brady Porth Dam	S1	High	Lexington
Whisperlake Dam	S1	High	Lexington
Lexington Old Mill Pond Dam	C1	High	Lexington
Saxe-Gotha Millpond Dam	C1	High	Lexington
Harbison New Town Lake	C1	High	Richland

Source: SC DHEC, 2017

In addition to the above list, the Lake Murray dam, owned and maintained by SCE&G, poses a substantial flood hazard to Lexington County in the event of failure or overtopping.

Significant and high hazard dams identified by SC DHEC are shown in Figure 5.4 on the following page.

Dam inundation areas for all high and significant hazard dams are shown in Figure 5.5 through Figure 5.8 on the following pages. This data is provided by the SC Department of Health and Environmental Control's Dams and Inundations web viewer. Inundation areas shown in the web viewer were modeled using SIMS Enhanced, SIMS Basic, and GeoDam Breach models.

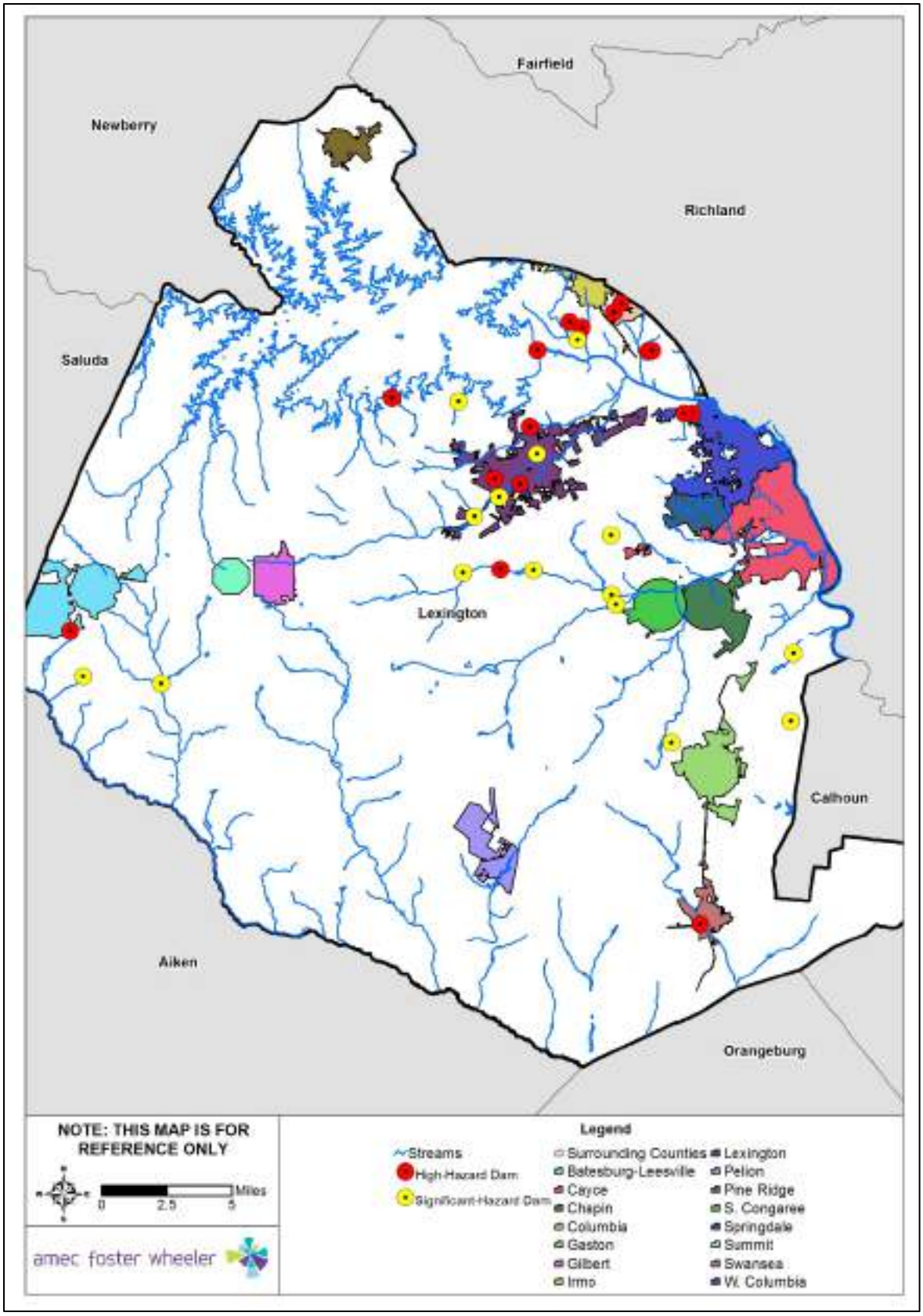
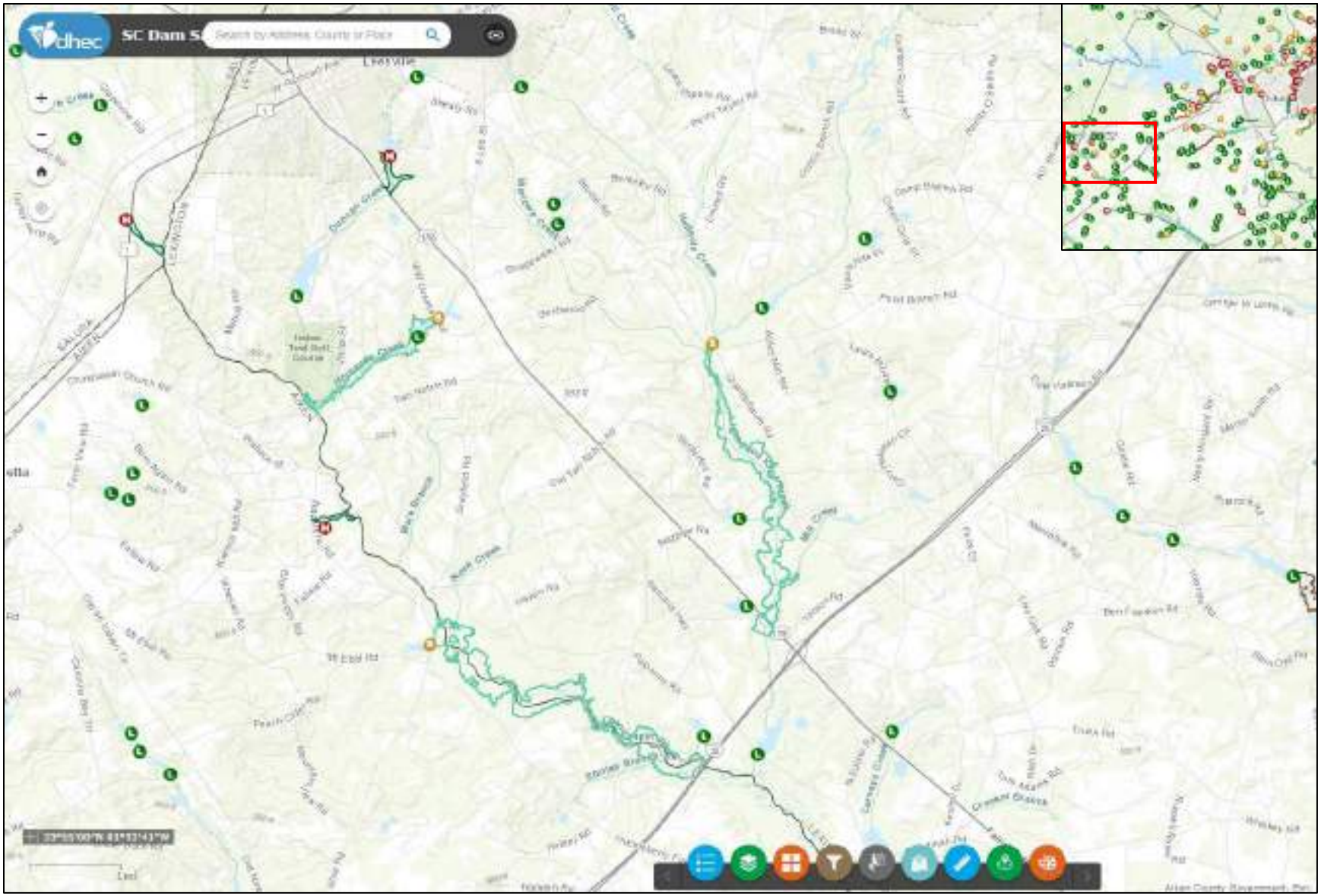
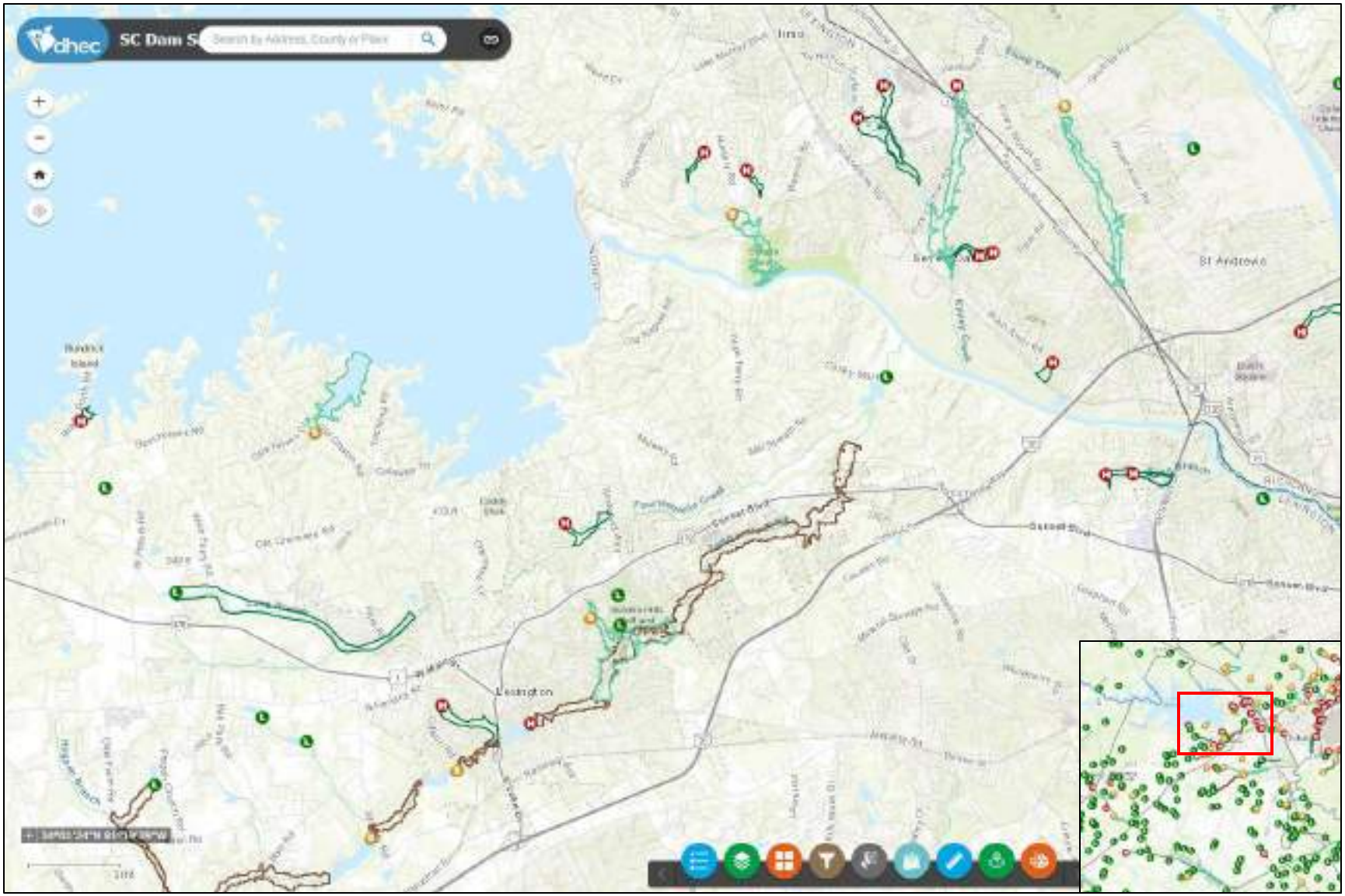


Figure 5.4 – Significant and High Hazard Dams in Lexington County



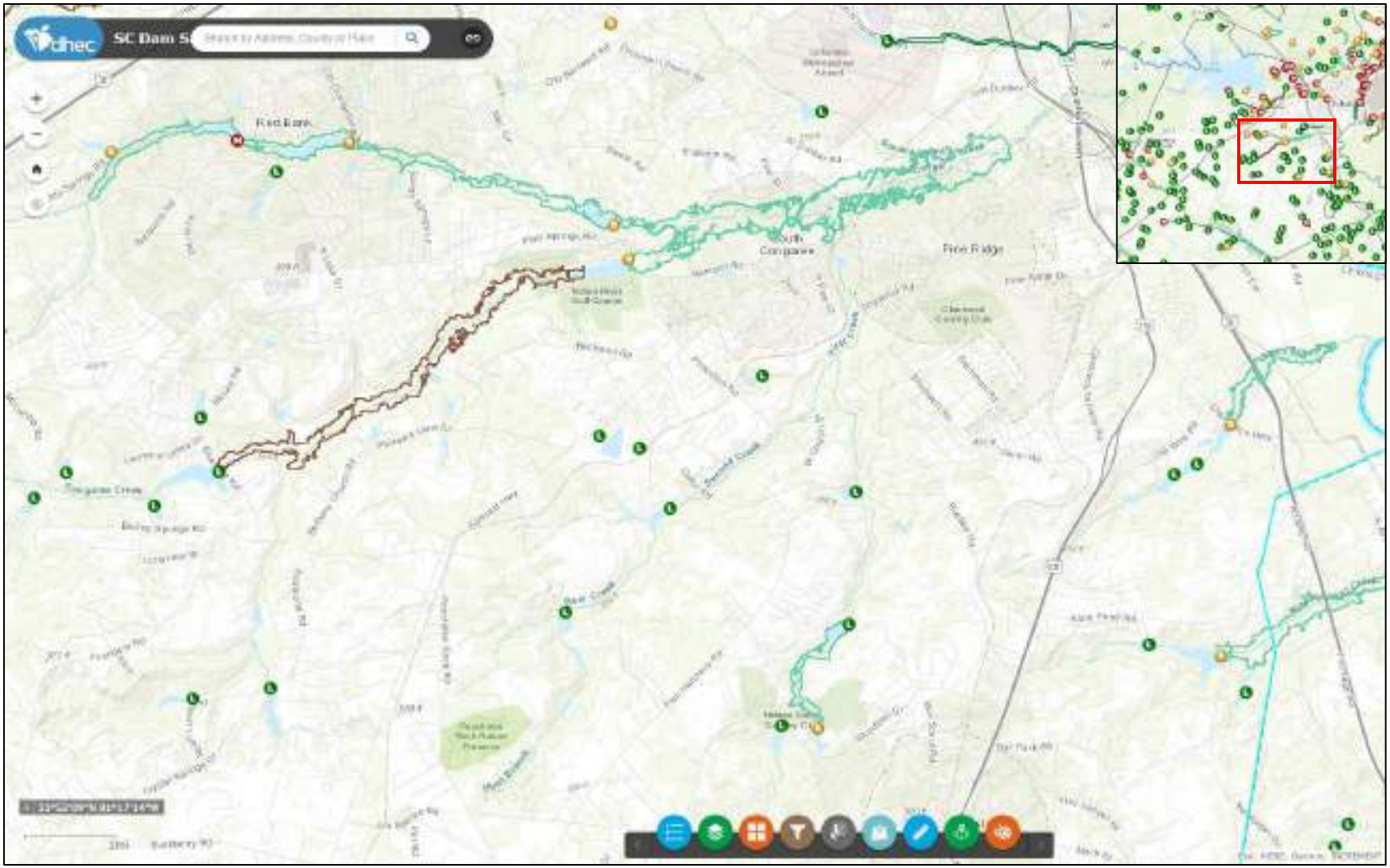
Source: SC DHEC, 2017

Figure 5.5 – Dam Inundation Areas, Area 1



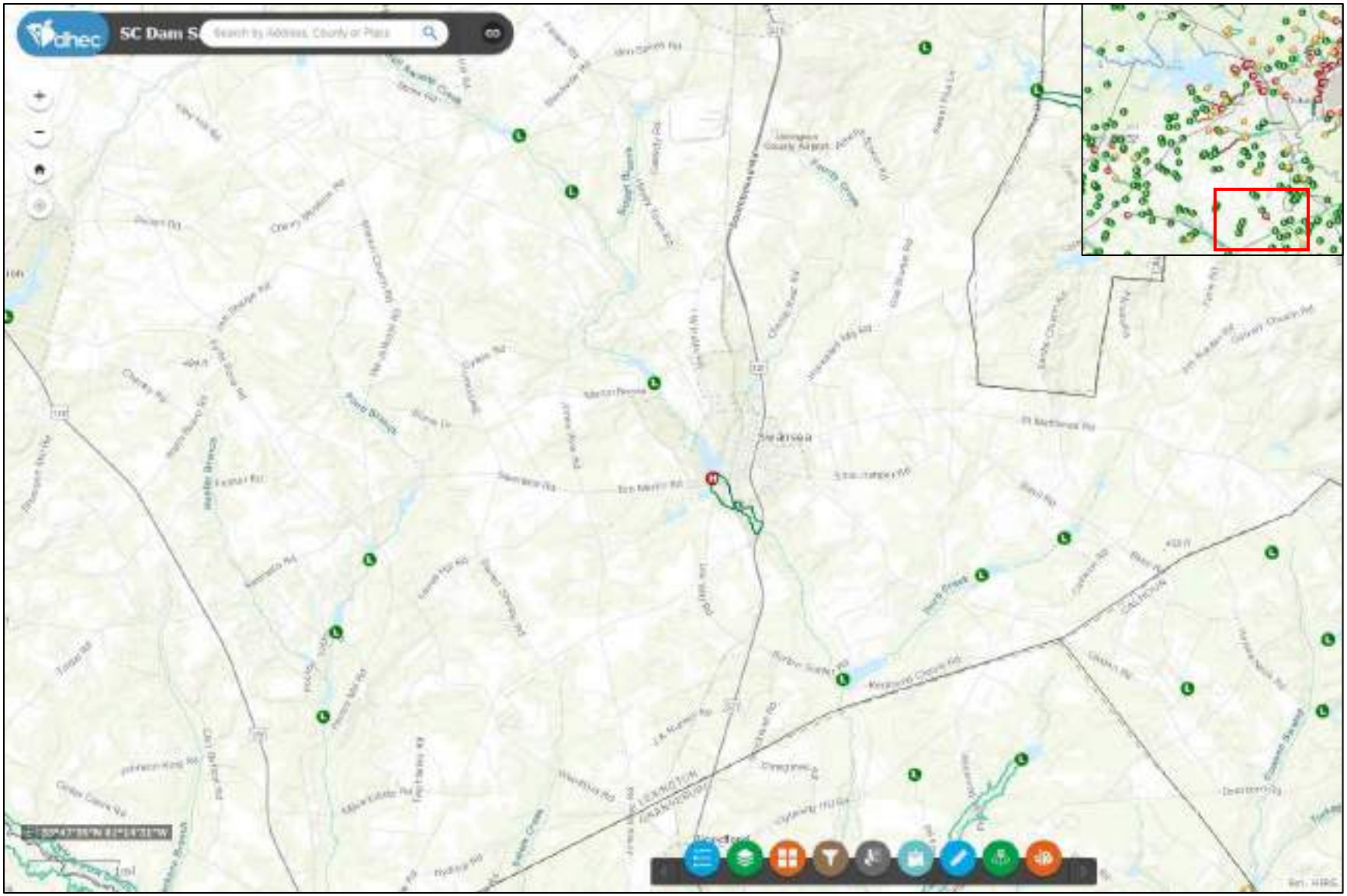
Source: SC DHEC, 2017

Figure 5.6 – Dam Inundation Areas, Area 2



Source: SC DHEC, 2017

Figure 5.7 – Dam Inundation Areas, Area 3



Source: SC DHEC, 2017

Figure 5.8 – Dam Inundation Areas, Area 4

The National Levee Database (NLD), developed by the U.S. Army Corps of Engineers, contains levee system inspection and evaluation information for the NFIP. The NLD is a dynamic database with ongoing efforts to add levee data from federal agencies, states, and tribes. Currently, there are no levees located in Lexington County that are included in the U.S. Army Corps of Engineers NLD.

According to the FEMA Flood Insurance Study for Lexington County, SC and Incorporated Areas dated Preliminary October 30, 2015, a levee exists along the east bank of the Congaree River that provides Richland County with some degree of protection against flooding, but none for Lexington County. FEMA specifies that all levees must meet the criteria of NFIP regulations Section 65.10 to be considered a safe flood protection structure. The criteria used to evaluate protection against the 1-percent-annual-chance flood are 1) adequate design, including freeboard, 2) structural stability, and 3) proper operation and maintenance. It has been determined that the levee along the Congaree River does not meet these requirements. Therefore, since the levee does not meet all of the requirements, the levee cannot be certified as providing protection against the 1-percent-annual-chance flood.

5.1.3 Past Occurrences

Table 5.3 lists those dams in Lexington County that failed during the October 2015 flood event and provides information on the status of each dam's inspection and repair. During this event, one high hazard dam, two significant hazard dams, and one low hazard dam failed or was breached.

Table 5.3 – Dam Failures in Lexington County Resulting from October 2015 Floods

Dam Name	Class	Dam Number	Status
Lexington Old Mill Pond Dam	C1	D0958	Inspection & Potential Enforcement
Gibson's Pond Dam	C2	D0959	Engineer Engaged
Thelma & John Culler Dam	C3	D1009	Inspection & Potential Enforcement
Barr Lake Dam	C2	D1717	Application Under Review

Sources: SC Department of Health and Environmental Control, March 2017.

Additionally, after the October 2015 floods, DHEC and the U.S. Army Corps of Engineers proactively assessed all high-hazard (Class 1), significant-hazard (Class 2), and some low-hazard (Class 3) dams statewide as a precaution and identified 192 dams that required inspection by a professional engineer and potential maintenance or repairs. Another 75 dams were issued emergency orders for repair. Table 5.4 lists those dams in Lexington County that were identified through these processes.

Table 5.4 – Dams Requiring Inspection and Repair in Lexington County

Dam Name	Class	Dam Number	Emergency Order Issued
Thelma & John Culler Dam	C3	D 1009	N
SCNONAME 32052 DAM	C3	D 0945	N
Silver Lake Dam	C2	D 0986	N
Lexington Acres Pond Dam	C2	D 0993	N
Barr Pond Dam	C3	D 1042	N
Lower Quail Hollow Dam	C1	D 2260	N
Brady Porth Dam	S1	D 4339	N
Barr Lake Dam	C2	D 1717	Y
Gibson's Pond Dam	C2	D 0959	Y
Lexington Old Mill Pond Dam	C1	D 0958	Y
Moragne Pond Dam	C3	D 0969	Y
Wilbur and Marg Corley Dam	C3	D 0957	Y

Source: SC Department of Health and Environmental Control, March 2017.

Table 5.5 details other known past dam failures in Lexington County.

Table 5.5 – Known Dam Failures in Lexington County, 1985-2015

Location	Date Of Occurrence	Incident Type	Hazard Class	Details
Saxe-Gotha Millpond Dam	6/27/1994	Inflow Flood - Hydrologic Event; Gate Misoperation	High	5.5 inches of rain fell in the dam's watershed, but the new owner of the dam was unaware that he needed to open the dam's gates to pass floodwaters. The dam failed suddenly at about 12:30 AM on June 28, 1994. The release caused two downstream dams, Crystal Lake Dam and Lake Pauline Dam, to also fail. When the dam breached, water overtopped and damaged slightly the road immediately downstream. Some damage to residential yards and gardens.
SCNONAME 32009	6/27/1994	Inflow Flood - Upstream Dam Failure	High	Failed after being overtopped for approximately one hour by the floodwaters resulting from the failure of Saxe-Gotha Millpond Dam. The failure occurred in the earth section of the dam, approximately halfway between the earth emergency spillway and the gates. A road immediately downstream had to be closed. Floodwaters released from the failure of this dam traveled downstream, causing the failure of Lake Pauline Dam. There was damage to yards and gardens.
SCNONAME 32028	6/27/1994	Inflow Flood - Upstream Dam Failure	High	Floodwaters from the above upstream failures overtopped and failed Lake Pauline Dam at approximately 5:30 AM on June 28, 1994. The road below the dam was closed a precaution, but it was not flooded or damaged. There was damage to yards and gardens.

Sources: National Performance of Dams Program database (npdp.standord.edu).

5.1.4 Probability of Future Occurrence

Likely – Based on historical occurrence information (5 records in 30 years), it can reasonably be assumed that significant to high hazard dams in Lexington County have a 16+% chance of this type of event occurring each year.

Climate Change and Dam Failure

Studies have been conducted to investigate the impact of climate change scenarios on dam safety. The safety of dams for the future climate can be based on an evaluation of changes in design floods and the freeboard available to accommodate an increase in flood levels. The results from the studies indicate that the design floods with the corresponding outflow floods and flood water levels will increase in the future, and this increase will affect the safety of the dams in the future. Studies concluded that the total hydrological failure probability of a dam will increase in the future climate and that the extent and depth of flood waters will increase by the future dam break scenario (Chernet, 2013).

5.1.5 Consequence Analysis

People

A person's immediate vulnerability to a dam failure is directly associated with the person's distance downstream of the dam as well as proximity to the stream carrying the floodwater from the failure. For dams that have an Emergency Action Plan (EAP), the vulnerability off loss of life for persons in their homes or on their property may be mitigated by following the EAP evacuation procedures; however, the

displaced persons may still incur sheltering costs. For persons located on the river (e.g. for recreation) the vulnerability of loss of life is significant.

A large population is vulnerable to the loss of the uses of the lake upstream of the dam following failure. Several uses are minor, such as aesthetics or recreational use. However, some lakes serve as drinking water supplies and the loss of the lake could create a public health crisis if the drinking water supply is disrupted.

First Responders
For dams that fail slowly, first responders will be impacted similarly to other events that have advance warning. For dams that fail without warning, the impact is rapid and severe, requiring rapid response to the impacts. Although the response is generally restricted to the stream below the dam, the location of impact moves rapidly downstream requiring multiple response locations.

Continuity of Operations
Unless critical infrastructure or facilities essential to the operation of government are located in the impact area of the inundation area downstream of the dam, continuity of operations will likely not be disrupted. Emergency response, emergency management and law enforcement officials may have resources stretched or overwhelmed in the failure of a large dam.

Built Environment
Vulnerability to the built environment includes damage to the dam itself and any man-made feature located within the inundation area caused by the dam failure. Downstream of the dam, vulnerability includes potential damage to homes, personal property, commercial buildings and property, and government owned buildings and property; destruction of bridge or culvert crossings; weakening of bridge supports through scour; and damage or destruction of public or private infrastructure that cross the stream such as water and sewer lines, gas lines and power lines. Water dependent structures on the lake upstream of the dam, such as docks/piers, floating structures or water intake structures, may be damaged by the rapid reduction in water level during the failure.

Economy
Economic impact from small dams is generally small and impact is often limited to dam owner and the cost of first responder activities. Large failures can disrupt the economy through displacement of workers, damage to commercial employment centers or destruction of infrastructure that impacts commercial activities or access to other economic drivers.

Natural Environment
Aquatic species within the lake will either be displaced or destroyed. The velocity of the flood wave will likely destroy riparian and instream vegetation and destroy wetland function.

Large dam failures can also cause extensive erosion throughout their inundation zones. Floods from dam failures are typically larger than those from rainfall, and their effects can also be more severe. High velocity floodwaters can scour and erode channels and/or cause sheet erosion within and adjacent to the stream. Large quantities of sediment and debris transported by floodwaters can also cause significant modifications to downstream channels. Deposition of eroded materials may choke instream habitat or disrupt riparian areas. Sediments within the lake bottom and any low oxygen water from within the lake will be dispersed, potentially causing fish kills or releasing heavy metals found in the lake sediment layers.

5.2 Hurricane and Tropical Storm

5.2.1 Hazard Description

A hurricane is a type of tropical cyclone or severe tropical storm that forms in the southern Atlantic Ocean, Caribbean Sea, Gulf of Mexico, and in the eastern Pacific Ocean. All Atlantic and Gulf of Mexico coastal areas are subject to hurricanes. The Atlantic hurricane season lasts from June to November, with the peak season from mid-August to late October.

While hurricanes pose the greatest threat to life and property, tropical storms and depressions also can be devastating. A tropical disturbance can grow to a more intense stage through an increase in sustained wind speeds. The progression of a tropical disturbance is described below.

- **Tropical Depression:** A tropical cyclone with maximum sustained winds of 38 mph (33 knots) or less.
- **Tropical Storm:** A tropical cyclone with maximum sustained winds of 39 to 73 mph (34 to 63 knots).
- **Hurricane:** A tropical cyclone with maximum sustained winds of 74 mph (64 knots) or higher. In the western North Pacific, hurricanes are called typhoons; similar storms in the Indian Ocean and South Pacific Ocean are called cyclones.
- **Major Hurricane:** A tropical cyclone with maximum sustained winds of 111 mph (96 knots) or higher, corresponding to a Category 3, 4 or 5 on the Saffir-Simpson Hurricane Wind Scale.

The Saffir-Simpson Hurricane Wind Scale classifies hurricanes by intensity into one of five categories as shown in Table 5.6. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous, however, and require preventative measures.

Table 5.6 – Saffir-Simpson Hurricane Wind Scale, 2012

Category	Wind Speed (mph)	Potential Damage
1	74-95	**Very dangerous winds will produce some damage**: Well-constructed frame homes could have damage to roof, shingles, vinyl siding, and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111-129	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130-156	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5	$\geq$ 157	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Source: National Hurricane Center/NOAA

Hurricane wind speed is often used to infer the damage potential of a hurricane, but aside from the effect wind has on storm surge, it is does not account for damage associated with flooding. Even low category storms can still pose a substantial risk of flooding. For the purpose of this plan, hurricane wind is not considered, as only hurricane impacts associated with flooding are evaluated.

Storm Surge

The greatest potential for loss of life related to a hurricane is from the storm surge. Storm surge is water that is pushed toward the shore by the force of the winds swirling around the storm. This advancing surge combines with the normal tides to create the hurricane storm tide, which can increase the mean water level to heights impacting roads, homes and other critical infrastructure. In addition, wind driven waves are superimposed on the storm tide. This rise in water level can cause severe flooding in coastal areas, particularly when the storm tide coincides with the normal high tides.

Lexington County is not at risk of experiencing storm surge due to its inland location. For that reason, storm surge will not be considered further in this plan. The primary risk hurricanes and tropical storms pose in Lexington County is the potential for flooding as a result of heavy rainfall.

Erosion

Erosion will not affect the occurrence of hurricanes and tropical storms. However, erosion of stream banks can increase the potential for flood damage that could result from hurricane and tropical storm rains.

5.2.2 Location and Spatial Extent

All Atlantic coastal areas are subject to hurricanes. While coastal areas are most directly exposed to land falling hurricanes and tropical storms, their impact can be felt hundreds of miles inland. All of Lexington County is susceptible to hurricanes and tropical storms.

5.2.3 Past Occurrences

According to NOAA's Historical Hurricane Tracks online mapper, 41 hurricanes/tropical storms have come within 50 nautical miles of Lexington County since 1851. Type and frequency are as follows in Table 5.7.

Table 5.7 – Hurricane Type & Frequency

Storm Intensity	Number of Occurrences	Rate of Occurrence
Tropical Storm	13	1 in 12.7 years
CAT I Hurricane	7	1 in 23.6 years
CAT II Hurricane	6	1 in 27.5 years
CAT III Hurricane	7	1 in 23.6 years
CAT IV Hurricane	5	1 in 33 years
CAT V Hurricane	3	1 in 55 years
TOTAL	41	1 in 4.0 years

A listing of all hurricanes/tropical storms that came within 50 nautical miles of Lexington County since 1851 is provided in Table 5.8.

Table 5.8 – Lexington County Historical Hurricane Tracks

Storm Name	Max Saffir-Simpson	Date
Unnamed 1851	H3	08/16/1851 – 08/27/1851
Unnamed 1852	H3	08/19/1852 – 08/30/1852
Unnamed 1854*	H3	09/07/1854 – 09/12/1854
Unnamed 1856	H3	08/25/1856 – 09/03/1856
Unnamed 1877*	H3	09/21/1877 – 10/05/1877

Storm Name	Max Saffir-Simpson	Date
Unnamed 1885*	TS	10/10/1885 – 10/14/1885
Unnamed 1886	H2	06/27/1886 – 07/02/1886
Unnamed 1886	H2	06/17/1886 – 06/24/1886
Unnamed 1887*	H1	10/09/1887 – 10/22/1887
Unnamed 1888	TS	09/06/1888 – 09/13/1888
Unnamed 1889	H2	09/12/1889 – 09/26/1889
Unnamed 1893*	H4	08/15/1893 – 09/02/1893
Unnamed 1893*	H3	09/18/1894 – 10/01/1984
Unnamed 1902*	TS	06/12/1902 – 06/17/1902
Unnamed 1906	H1	09/03/1906 – 09/18/1906
Unnamed 1908	TS	10/19/1908 – 10/23/1908
Unnamed 1912	TS	06/07/1912 – 06/17/1912
Unnamed 1915	H1	07/31/1915 – 08/05/1915
Unnamed 1916	H3	07/11/1916 – 07/15/1916
Unnamed 1927	TS	09/30/1927 – 10/04/1927
Unnamed 1928	H2	08/03/1928 – 08/13/1928
Unnamed 1929	H4	09/16/1929 – 10/05/1929
Unnamed 1935	H5	08/29/1935 – 09/10/1935
Unnamed 1944	H4	10/12/1944 – 10/24/1944
Unnamed 1946*	H2	10/05/1946 – 10/14/1946
Able 1952	H2	08/18/1952 – 09/03/1952
Arlene 1959*	TS	05/28/1959 – 06/02/1959
Gracie 1959	H4	09/20/1959 – 10/02/1959
Cleo 1964*	H4	08/20/1964 – 09/05/1964
Unnamed 1965*	TS	06/11/1965 – 06/18/1965
Alma 1970	H1	05/17/1970 – 05/27/1970
Agnes 1972	H1	06/14/1972 – 06/23/1972
David 1979	H5	08/25/1979 – 09/08/1979
Bob 1985	H1	07/21/1985 – 07/26/1985
Chris 1988*	TS	08/21/1988 – 08/30/1988
Hugo 1989	H5	09/10/1989 – 09/25/1989
Marco 1990*	TS	10/09/1990 – 10/13/1990
Danny 1997	H1	07/16/1997 – 07/27/1997
Helene 2000*	TS	09/15/2000 – 09/25/2000
Allison 2001	TS	07/05/2001 – 07/19/2001
Alberto 2006*	TS	07/10/2006 – 07/19/2006

Source: NOAA Historical Hurricane Tracks, 2017; *Storm track passed through Lexington County

The following details major disaster declarations in Lexington County for hurricanes and tropical storms:

Hurricane Floyd (September 9, 1999; DR-1299): Lexington County received no direct damage from the storm but hosted large number of evacuees from the coast. Hurricane Floyd revealed significant weaknesses in South Carolina's coastal evacuation plan caused by the "sudden" convergence of evacuees onto roads without a reversal of I-26 in place for many hours. This led to massive gridlock on the interstate and adjacent roads without adequate support for stranded motorists.

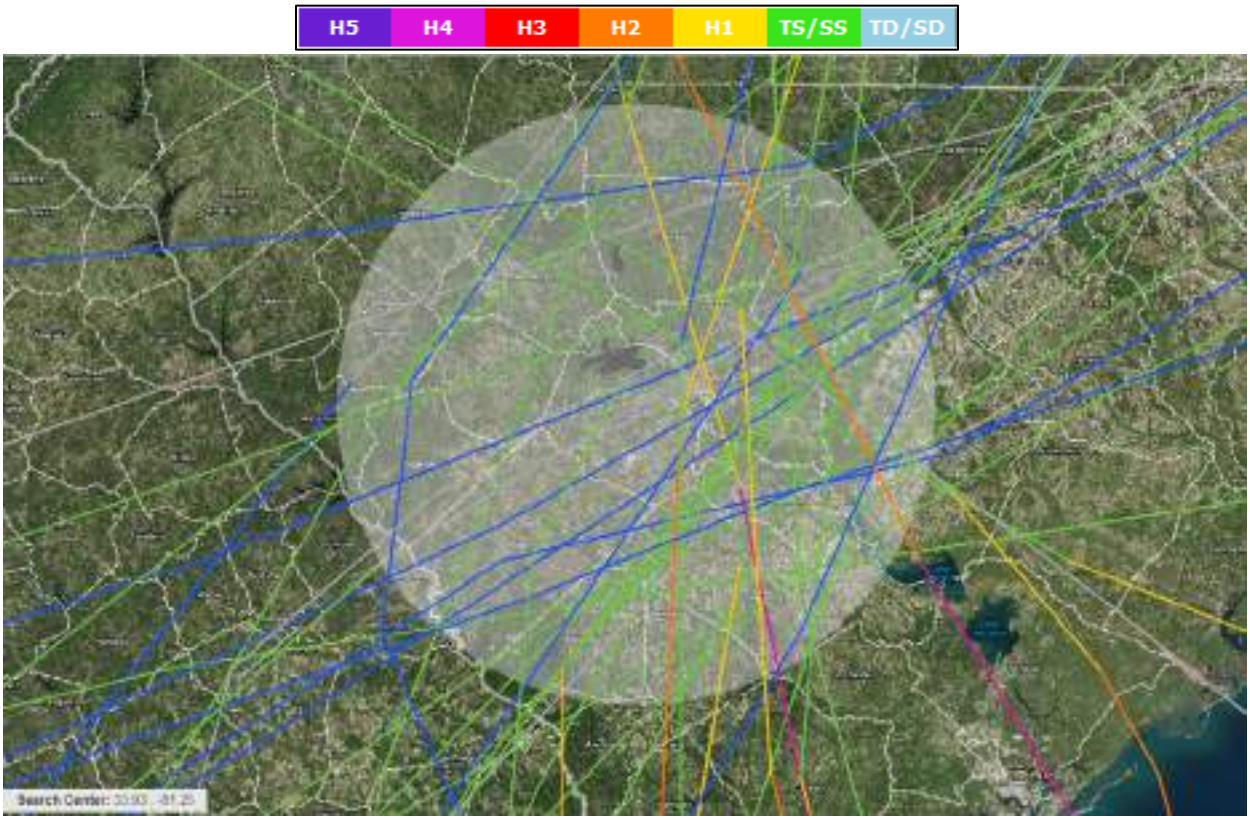
Tropical Storm Frances (September 7, 2004; DR-1566): The storm system caused high winds and caused a widespread tornado outbreak. The high winds uprooted trees and caused power outages and damaged properties—particularly mobile homes.

Tropical Storm Hermine (September 2, 2016): The storm brought heavy rain and strong winds to the region, which resulted in high water and road closures in Lexington County.

Hurricane Matthew (October 8, 2016): The storm brought Tropical Storm force winds and heavy rains to the Midlands area, resulting in flash flooding and impassable roads.

There are no hurricane or tropical storm events reported for Lexington County in the NCEI database.

Figure 5.9 illustrates past hurricane strike data for land falling hurricanes passing with 50 nautical miles of Lexington County as provided by the National Hurricane Center.



Source: NOAA/National Hurricane Center (http://coast.noaa.gov/hurricanes/#)

Figure 5.9 – Historical Hurricane Tracks (1851-2016)

5.2.4 Probability of Future Occurrence

Possible – Given the 41 hurricane and tropical storm occurrences recorded by NOAA over a period of 165 years (1851-2016), a hurricane or tropical storm affects Lexington County on average once every four years. The probability of flooding as a result of hurricane or tropical storm events is less certain due to a lack of historical data.

Climate Change and Hurricane and Tropical Storms

One of the primary factors contributing to the origin and growth of tropical storm and hurricanes systems is water temperature. Sea surface temperature may increase significantly in the main hurricane development region of the North Atlantic during the next century as well as in the Gulf of Mexico. Current research suggests these changes may result in an increase in the intensity of hurricanes in the future. Impacts on the frequency of hurricanes are less definitive, though some research suggests we may see a decrease in the overall number of hurricanes.

5.2.5 Consequence Analysis

People

Hurricanes may affect human beings in a number of ways including causing deaths, causing injury, loss of property, outbreak of diseases, mental trauma and destroying livelihoods. During a hurricane, residential, commercial, and public buildings, as well as critical infrastructure such as transportation, water, energy, and communication systems may be damaged or destroyed by several of the impacts associated with hurricanes. The wind and flooding hazards associated with hurricanes can be tremendously destructive and deadly. Power outages and flooding are likely to displace people from their homes. Furthermore, water can become polluted making it undrinkable, and if consumed, diseases and infection can be easily spread.

First Responders

First responders responding to the impacts of a tropical storm or hurricane face many risks to their health and life safety. Responders face risk of injury or death during a storm event by flooding and high winds. Personnel or families of personnel may be harmed which would limit their response capability. Downed trees, power lines and flood waters may prevent access to areas in need which prolongs response time. Furthermore, hurricanes typically impact a large area which amplifies the number of emergency responses required.

Continuity of Operations

Continuity of operations may be affected if a hurricane event damages or restricts access to a critical facility or causes a loss of power. Hurricane events typically have ample lead time to prepare for and maintain continuity of operations.

Built Environment

Hurricane flooding often results in blocked roadways. Loss of electric power, potable water, telecommunications, wastewater and other critical utilities is very possible during a hurricane. Some of this damage can be so severe that it may take days to weeks to restore.

Economy

Economic damages include property damage from wind, rain and flood, and also include intangibles such as business interruption and additional living expenses. Damage to infrastructure utilities include roads, water and power, and municipal buildings.

Natural Environment

Hurricanes can devastate wooded ecosystems and remove all the foliation from forest canopies, and they can change habitats so drastically that the indigenous animal populations suffer as a result. Secondary impacts may occur as well. For example, high winds and debris may result in damage to an above-ground fuel tank, resulting in a significant chemical spill. During a flood event, chemicals and other hazardous substances may end up contaminating local water bodies.

Though more severe in coastal areas, hurricanes and tropical storms can cause substantial erosion in inland areas. These impacts are generally experienced along the coast but can also occur in inland areas as a result of high velocity floodwaters and soil saturation.

5.3 100-/500-year

5.3.1 Hazard Description

Flooding is defined by the rising and overflowing of a body of water onto normally dry land. As defined by FEMA, a flood is a general and temporary condition of partial or complete inundation of 2 or more

acres of normally dry land area or of 2 or more properties. Flooding can result from an overflow of inland waters or an unusual accumulation or runoff of surface waters from any source.

Sources and Types of Flooding

Flooding within Lexington County can be attributed to two sources: 1) flash flooding resulting from heavy rainfall that overburdens the drainage system within the community; and 2) riverine flooding resulting from heavy and prolonged rainfall over a given watershed which causes the capacity of the main channel to be exceeded. Flooding on the larger streams results primarily from hurricanes, tropical storms and other major weather fronts, while flooding on the smaller streams is due mainly to localized thunderstorms.

The past history of flooding on the streams in Lexington County indicates that flooding may occur during any season of the year. However, floods on the larger streams, the Congaree, North Fork Edisto, and Saluda Rivers, are more likely to occur from June through October due to tropical storms and hurricanes.

Riverine Flooding: Lexington County has numerous streams and tributaries running throughout its jurisdiction that are susceptible to overflowing their banks during and following excessive precipitation events. The Congaree, Saluda, and South Edisto Rivers are most susceptible to flooding, as are areas around Lake Murray. While flash flooding caused by surface water runoff is not uncommon in the region, riverine flood events (such as the "100-year flood") will cause significantly more damage and economic disruption for the area. Lexington County floodplains have been studied and mapped by FEMA. The most recent Flood Insurance Study for Lexington County is a preliminary release dated October 30, 2015.

Flash or Rapid Flooding: Flash flooding is the result of heavy, localized rainfall, possibly from slow-moving intense thunderstorms that cause small streams and drainage systems to overflow. Flash flood hazards caused by surface water runoff are most common in urban areas, where greater population density generally leads to more impervious surface (e.g., pavement and buildings) which increases the amount of surface water generated. Flooding can occur when the capacity of the stormwater system is exceeded or if conveyance is obstructed by debris, sediment or other materials that limit the volume of drainage.

Flooding and Floodplains

The area adjacent to a channel is the floodplain, as shown in Figure 5.10. A floodplain is flat or nearly flat land adjacent to a stream or river that experiences occasional or periodic flooding. It includes the floodway, which consists of the stream channel and adjacent areas that carry flood flows, and the flood fringe, which are areas covered by the flood, but which do not experience a strong current. Floodplains are made when floodwaters exceed the capacity of the main channel or escape the channel by eroding its banks. When this occurs, sediments (including rocks and debris) are deposited that gradually build up over time to create the floor of the floodplain. Floodplains generally contain unconsolidated sediments, often extending below the bed of the stream.

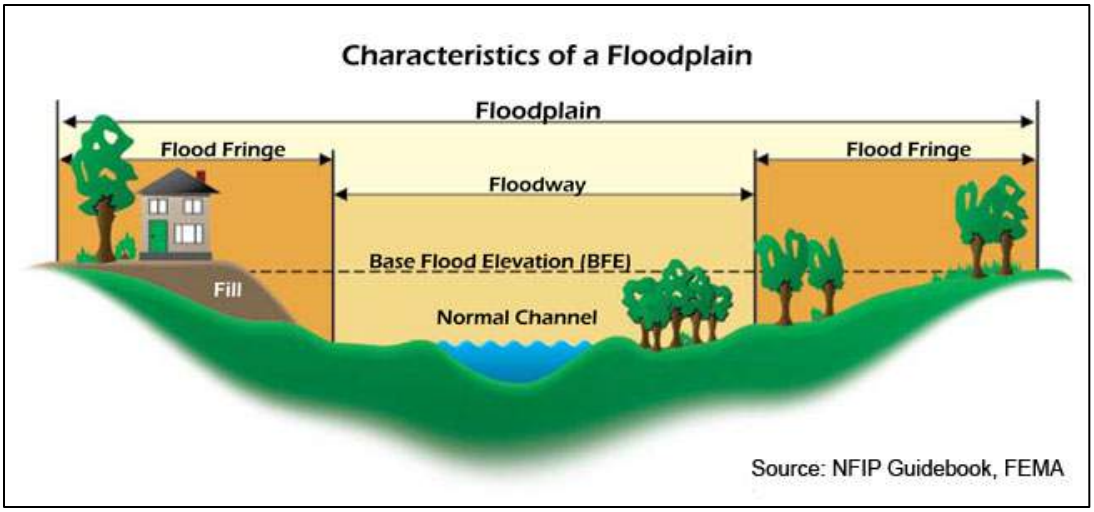


Figure 5.10 – Characteristics of a Floodplain

In its common usage, the floodplain most often refers to that area that is inundated by the 100-year flood, the flood that has a 1% chance in any given year of being equaled or exceeded. The 1%-annual-chance flood is the national minimum standard to which communities regulate their floodplains through the NFIP. The 500-year flood is the flood that has a 0.2% chance of being equaled or exceeded in any given year. The potential for flooding can change and increase through various land use changes and changes to land surface, which result in a change to the floodplain. A change in environment can create localized flooding problems inside and outside of natural floodplains by altering or confining natural drainage channels. These changes are most often created by human activity.

The 1%-annual-chance flood is used by the NFIP as the standard for floodplain management and to determine the need for flood insurance. Participation in the NFIP requires adoption and enforcement of a local floodplain management ordinance which is intended to prevent unsafe development in the floodplain, thereby reducing future flood damages. Participation in the NFIP allows for the federal government to make flood insurance available within the community as a financial protection against flood losses. Since floods of given magnitudes have an annual probability of occurrence, a known depth and velocity, and geographic limits, they are often the most predictable and manageable hazard.

Erosion

Erosion can intensify flooding by clogging waterways with sediment and preventing normal flows. As sediment builds up in stream beds, it can reduce capacity of those natural drainage features to carry floodwaters, instead forcing floodwaters out into surrounding floodplains. Erosion also occurs as a result of flooding, and suspended sediment is often deposited by floodwater, potentially increasing the amount of property damage done by a flood.

5.3.2 Location and Spatial Extent

Regulated floodplains are illustrated on inundation maps called Flood Insurance Rate Maps (FIRMs). It is the official map for a community on which FEMA has delineated both the SFHAs and the risk premium zones applicable to the community. SFHAs represent the areas subject to inundation by the 1%-annual-chance flood event. Structures located within the SFHA have a 26% chance of flooding during the life of a standard 30-year mortgage. Table 5.9 and Figure 5.11 reflect flood insurance zones identified for Lexington County using the Effective DFIRM dated February 20, 2002.

Table 5.9 – Mapped Flood Insurance Zones within Lexington County

Zone	Description	Risk Level
AE	AE Zones, also within the 100-year flood limits, are defined with BFEs that reflect the combined influence of stillwater flood elevations and wave effects less than 3 feet. The AE Zone generally extends from the landward VE zone limit to the limits of the 1%-annual-chance flood from coastal sources, or until it reaches the confluence with riverine flood sources. The AE Zones also depict the SFHA due to riverine flood sources, but instead of being subdivided into separate zones of differing BFEs with possible wave effects added, they represent the flood profile determined by hydrologic and hydraulic investigations and have no wave effects.	High
A	Areas subject to inundation by the 1% -annual-chance flood event generally determined using approximate methodologies. Because detailed hydraulic analyses have not been performed, no BFEs or flood depths are shown. Mandatory flood insurance purchase requirements and floodplain management standards apply.	High
0.2% Annual Chance (Zone X Shaded)	Moderate risk areas within the 0.2%-annual-chance floodplain, areas of 1%-annual-chance flooding where average depths are less than 1 foot, areas of 1%-annual-chance flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 1%-annual-chance flood by a levee. No BFEs or base flood depths are shown within these zones. Zone X Shaded is used on new and revised maps in place of Zone B.	Moderate to Low
Zone X (unshaded)	Minimal risk areas outside the 1%- and 0.2%-annual-chance floodplains. No BFEs or base flood depths are shown within these zones.	Moderate to Low

Source: FEMA

Table 5.10 provides a summary of acreage by flood zone according to the 2002 DFIRM for the unincorporated areas of Lexington County.

Table 5.10 – Summary of Flood Zone Acreage

Lexington County	Flood Zone Acreage				
	Zone A (100-yr)	Zone AE (100-yr)	Zone X (Shaded) (500-yr)	Zone X (Unshaded)	Total
Unincorporated Areas	20,140.3 (4.5%)	14,732.0 (3.3%)	6,370.6 (1.4%)	408,104.9 (90.8%)	449,347.8
Water Area (Lake Murray)		*34,917*			

Source: FEMA 2002 Effective DFIRM

Lake Murray is one of the largest lakes in South Carolina. It was developed in the 1920's to provide hydroelectric power to the state. The majority of the 50,000-acre surface area, some 35,000 acres, is located within Lexington County. But the lake also extends into Richland, Saluda, and Newberry Counties. The lake is fed by the Saluda River and contains more than 450 miles of shoreline.

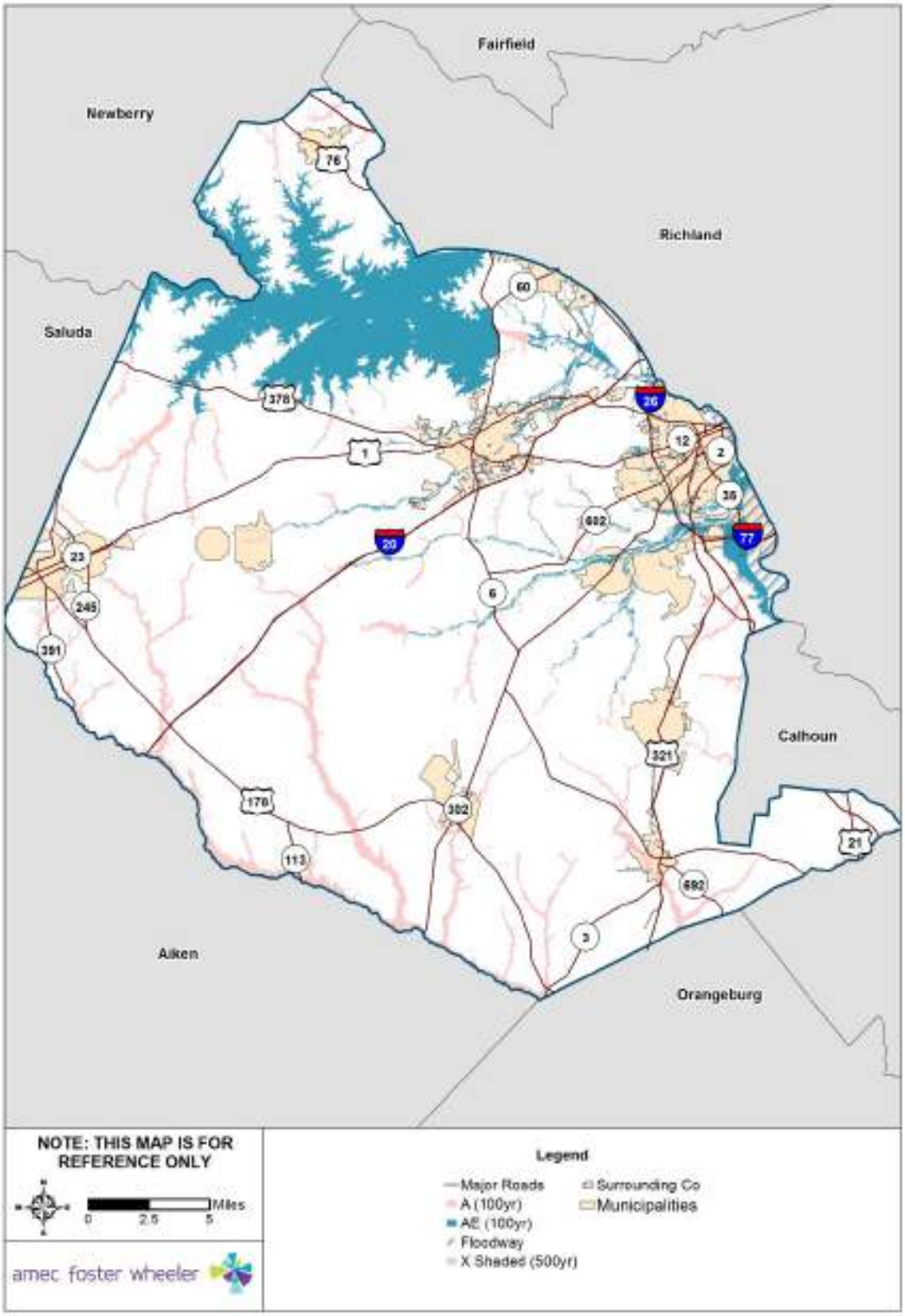


Figure 5.11 – Mapped Flood Insurance Zones for Lexington County

5.3.3 Past Occurrences

Table 5.11 shows detail for flood events recorded in NCEI since 1996 for Lexington County. There have been 58 recorded events causing over $16.7M in property damage.

Table 5.11 – NCEI Flooding Events in Lexington County

Type	# of Events	Property Damage	Crop Damage	Deaths (Direct)	Injuries (Direct)
Flash Flood	47	$16,750,000	$1,870,000	0	0
Flood	11	$19,300	$300	0	0
Total:	**58**	**$16,769,300**	**$1,870,300**	**0**	**0**

Source: NCEI, March 2017

The following provides details on select flooding events recorded in the NCEI database:

December 1, 1996 – Heavy rain led to the Middle Saluda River overflowing its banks on the afternoon of the 1st, resulting in some flooding near the towns of Cleveland and Marietta. Urban flooding occurred in the city of Spartanburg.

June 27, 2004 – One to three inches of rain fell within a two-hour period. The Fire Department reported urban flooding as several homes flooded with water over the steps and into the houses in Irmo, Piney Grove, and St. Andrews.

July 21, 2013 – Heavy rains over portions of Lexington and Richland Counties produced urban and small stream flooding with flash flooding over portions of Columbia. A local TV station reported 4.56 inches of rain in West Columbia. The National Weather Service ASOS at the Columbia Metro Airport measured 1.95 inches of rain in an hour. Urban and small stream flooding occurred around the airport.

September 4, 2015 – Scattered thunderstorms moved though the Midlands and produced some large hail, wind damage, and very intense rains that produced flash flooding. A Lake Murray site received 3.39 inches of rain between 12:50am and 1:50am, including 1.85 inches that fell in a 15-minute period.

October 4, 2015 – Heavy rain fell in the Midlands, and the Pee Dee produced flash flooding across the area. Numerous dams were breached along with numerous bridge and roadways flooded and damaged. Columbia Metro Airport ASOS measured 2.74 inches of rain over the course of 2 hours.

Table 5.12 shows detail for flooding events recorded in SHELDUS from January 1960 – December 2015. There have been 35 recorded events causing over $18M in property damage.

Table 5.12 – SHELDUS Flooding Events in Lexington County

Hazard	Year	Month	Crop Damage	Property Damage	Injuries	Fatalities
Flooding	1964	3	$ 831	$ 831	0	0
Flooding	1966	3	$ 7,951	$ 7,951	0	0
Flooding	1973	2	$ 6	$ 5,802	0	0
Flooding	1973	3	$ 33	$ 3,336	0	0
Flooding	1973	6	$ 920,475	$ 10,124	0	0
Flooding	1975	3	$ 479	$ 4,789	0	0
Flooding	1975	7	$ 61,188	$ 612	0	0
Flooding	1976	7	$ 10,414	$ 1,041	0	0
Flooding	1976	10	$ 45,277	$ 45,277	0	0
Flooding	1978	1	$ 4	$ 43,465	0	0
Flooding	1980	3	$ 3,127	$ 3,127	0	0

Hazard	Year	Month	Crop Damage	Property Damage	Injuries	Fatalities
Flooding	1980	8	$ 313	$ 3,127	0	0
Flooding	1982	1	$ 56	$ 558	0	0
Flooding	1982	4	$ -	$ 646	0	0
Flooding	1983	3	$ 2,587	$ 25,866	0	1
Flooding	1983	12	$ 31	$ 3,051	0	0
Flooding	1984	2	$ 25	$ 2,480	0	0
Flooding	1984	6	$ 5,703	$ 57,030	3	0
Flooding	1984	7	$ 25	$ 2,480	0.07	0
Flooding	1984	8	$ -	$ 3,933	0	0
Flooding	1986	8	$ 108	$ 108,128	0	1
Flooding	1987	9	$ -	$ 104,321	1	0
Flooding	1989	6	$ -	$ 19,114	0	0
Flooding	1993	1	$ 356,587	$ 17,829	0	0
Flooding	1994	6	$ -	$ 799,653	2	0
Flooding	1996	3	$ -	$ 15,106	0	0
Flooding	2008	8	$ -	$ 22,017	0	0
Flooding	2009	12	$ -	$ 8,838	0	0
Flooding	2013	5	$ -	$ 5,087	0	0
Flooding	2013	8	$ -	$ 8,139	0	0
Flooding	2015	6	$ -	$ 10,000	0	0
Flooding	2015	7	$ -	$ 12,000	0	0
Flooding	2015	9	$ -	$ 22,000	0	0
Flooding	2015	10	$ 1,870,000	$ 16,650,000	0	0
Flooding	2015	12	$ -	$ 2,000	0	0
			$ 3,285,218	**$ 18,029,759**	**6.07**	**2**

Source: Hazards & Vulnerability Research Institute (2017).
Note: Losses have been adjusted for inflation to 2015 dollars.

5.3.4 Probability of Future Occurrences

Possible – By definition, SFHAs are defined as those areas that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year. Properties located in these areas have a 26% chance of flooding over the life of a 30-year mortgage.

Areas of moderate to low flood risk are defined as those areas that will be inundated by the flood event having a 0.2% chance of being equaled or exceeded in any given year; it is not the flood that will occur once every 500 years.

Climate Change and Inland Flooding

It is likely (66-100% probability) that the frequency of heavy precipitation or the proportion of total rainfall from heavy falls will increase in the 21st century across the globe. More specifically, it is "very likely" (90-100% probability) that most areas of the United States will exhibit an increase of at least 5% in the maximum 5-day precipitation by late 21st century. The mean change in the annual number of days with rainfall over 1 inch for the Southeastern United States is 0.5 to 1.5 days. As the number of heavy rain events increase, more flooding and pooling water can be expected (Romero-Lankao, et al. 2014).

5.3.5 Consequence Analysis

People

Certain health hazards are common to flood events. While such problems are often not reported, three general types of health hazards accompany floods. The first comes from the water itself. Floodwaters carry anything that was on the ground that the upstream runoff picked up, including dirt, oil, animal waste, and lawn, farm and industrial chemicals. Pastures and areas where farm animals are kept or their wastes are stored can contribute polluted waters to the receiving streams.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e.coli and other disease causing agents.

The second type of health problem arises after most of the water has gone. Stagnant pools can become breeding grounds for mosquitoes, and wet areas of a building that have not been properly cleaned breed mold and mildew. A building that is not thoroughly cleaned becomes a health hazard, especially for small children and the elderly.

Another health hazard occurs when heating ducts in a forced air system are not properly cleaned after inundation. When the furnace or air conditioner is turned on, the sediments left in the ducts are circulated throughout the building and breathed in by the occupants. If the County's water systems lose pressure, a boil order may be issued to protect people and animals from contaminated water.

The third problem is the long-term psychological impact of having been through a flood and seeing one's home damaged and personal belongings destroyed. The cost and labor needed to repair a flood-damaged home puts a severe strain on people, especially the unprepared and uninsured. There is also a long-term problem for those who know that their homes can be flooded again. The resulting stress on floodplain residents takes its toll in the form of aggravated physical and mental health problems.

First Responders

First responders are at risk when attempting to rescue people from their homes. They are subject to the same health hazards as the public mentioned above. Flood waters may prevent access to areas in need of response or flood waters may prevent access to the critical facilities themselves which may prolong response time.

Continuity of Operations

Floods can severely disrupt normal operations, especially when there is a loss of power. For a detailed analysis of critical facilities at risk to flooding, see Chapter 6 Vulnerability Assessment.

Built Environment

Residential, commercial, and public buildings, as well as critical infrastructure such as transportation, water, energy, and communication systems may be damaged or destroyed by flood waters. For a detailed analysis of properties at risk to flooding, see Chapter 6 Vulnerability Assessment.

Economy

During floods (especially flash floods), roads, bridges, farms, houses and automobiles are destroyed. Additionally, the local government must deploy firemen, police and other emergency response personnel and equipment to help the affected area. It may take years for the affected communities to be re-built and business to return to normal.

Natural Environment
During a flood event, chemicals and other hazardous substances may end up contaminating local water bodies. Flooding kills animals and in general disrupts the ecosystem. Snakes and insects may also make their way to the flooded areas.

5.4 Localized Stormwater

5.4.1 Hazard Description

Localized stormwater flooding can occur throughout Lexington County. Localized stormwater flooding occurs when heavy, localized rainfall causes an accumulation of stormwater runoff that overburdens the stormwater drainage system. Lexington County Public Works noted inadequate drainage systems and dirt roads without any drainage infrastructure as the two primary causes of localized flooding in the County.

Localized flooding may also be caused or exacerbated by the following maintenance related issues:

Inadequate Capacity – An undersized/under capacity pipe system can cause water to back-up behind a structure which can lead to areas of ponded water and/or overtopping of banks.

Clogged Inlets – debris covering the asphalt apron and the top of grate at catch basin inlets may contribute to an inadequate flow of stormwater into the system which may cause flooding near the structure. Debris within the basin itself may also reduce the efficacy of the system by reducing the carrying capacity.

Blocked Drainage Outfalls – debris blockage or structural damage at drainage outfalls may prevent the system from discharging runoff, which may lead to a back-up of stormwater within the system.

Improper Grade – poorly graded asphalt around catch basin inlets may prevent stormwater from entering the catch basin as designed. Areas of settled asphalt may create low spots within the roadway that allow for areas of ponded water.

5.4.2 Location and Spatial Extent

Most flooding in Lexington County is caused by heavy rains escaping the banks of Yost, Rawls, and Kinley Creeks in the Irmo area. There has also been flooding in the Lloydwoods Subdivision and surrounding areas in the recent past. There is also localized flooding in the area caused by debris in drainage systems or undersized drainage systems.

The Kinley Creek watershed is a highly-developed watershed approximately 7 square miles in size, consisting of Kinley Creek and two of its tributaries, K-1 and K-2. Kinley Creek starts north of SC Highway 60, and ends in the Saluda River. This area has experienced significant changes in flood frequency over the last 60 years. Much of the current infrastructure is not properly sized to handle current rainfall/runoff events. Compounding the problem is that the development along Kinley Creek and its tributaries has resulted in little or no undeveloped floodplain remaining along most reaches. Flooding and subsequent property damage was identified as a problem as early as 1974, and has worsened as the watershed continued to be developed. Lexington County has seven repetitive loss properties in the entire county. Five of those properties are within the study area.

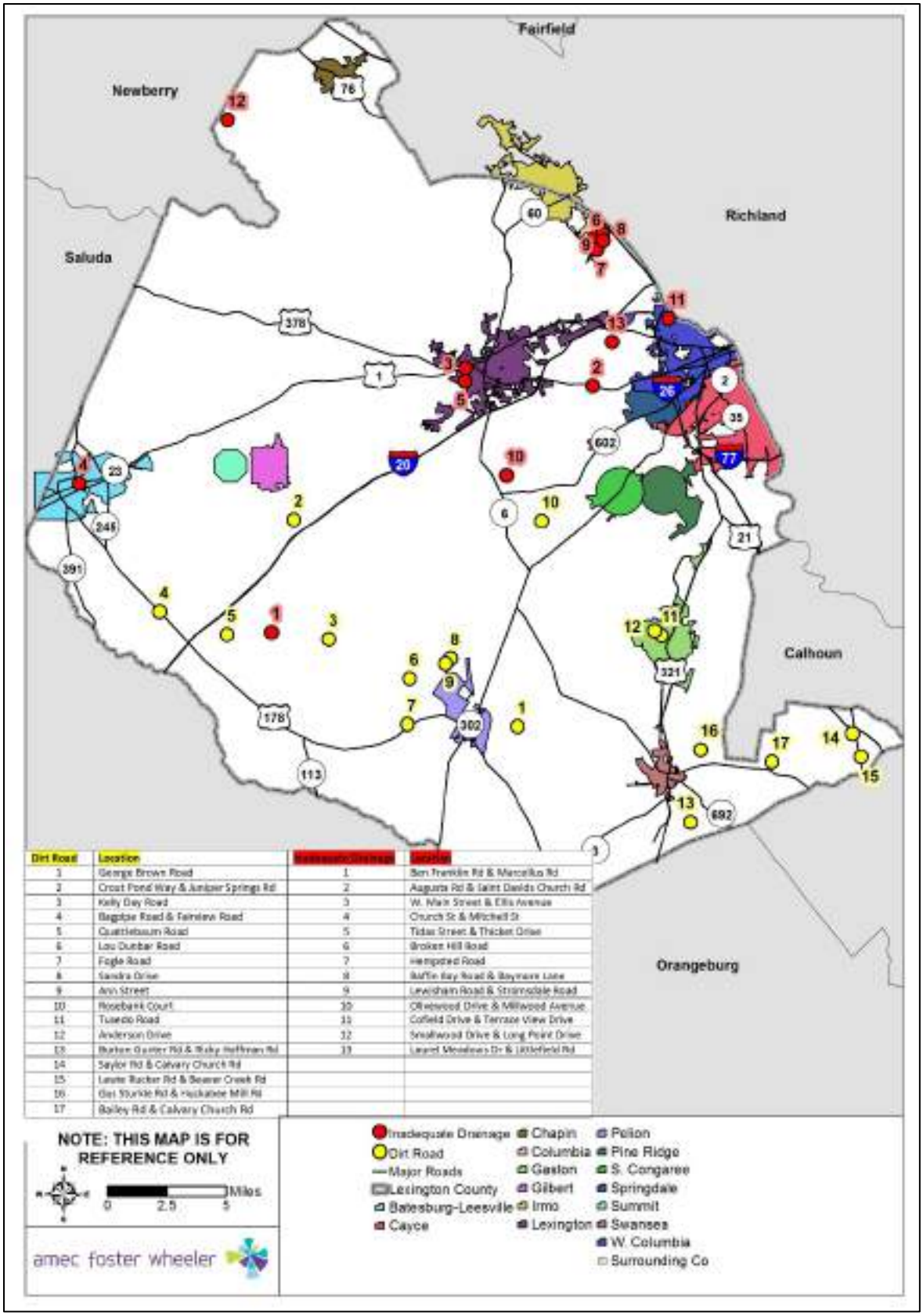
The specific areas of localized flooding identified by the Lexington County Public Works Department are listed below in Table 5.13.

Table 5.13 – Areas of Localized Flooding

Area	Street Name or Intersection	Cause of Flooding
1	Ben Franklin Road & Marcellus Road	Inadequate Drainage
2	Augusta Road & Saint Davids Church Road	Inadequate Drainage

3	W. Main Street & Ellis Avenue	Inadequate Drainage
4	Church Street & Mitchell Street	Inadequate Drainage
5	Tidas Street & Thicket Drive	Inadequate Drainage
6	Broken Hill Road	Inadequate Drainage
7	Hempsted Road	Inadequate Drainage
8	Baffin Bay Road & Baymore Lane	Inadequate Drainage
9	Lewisham Road & Stromsdale Road	Inadequate Drainage
10	Olivewood Drive & Millwood Avenue	Inadequate Drainage
11	Cofield Drive & Terrace View Drive	Inadequate Drainage
12	Smallwood Drive & Long Point Drive	Inadequate Drainage
13	Laurel Meadows Drive & Littlefield Road	Inadequate Drainage
1	George Brown Road	Dirt Road
2	Crout Pond Way & Juniper Springs Road	Dirt Road
3	Kelly Day Road	Dirt Road
4	Bagpipe Road & Fairview Road	Dirt Road
5	Quattlebaum Road	Dirt Road
6	Lou Dunbar Road	Dirt Road
7	Fogle Road	Dirt Road
8	Sandra Drive	Dirt Road
9	Ann Street	Dirt Road
10	Rosebank Court	Dirt Road
11	Tuxedo Road	Dirt Road
12	Anderson Drive	Dirt Road
13	Burton Gunter Road and Ricky Hoffman Road	Dirt Road
14	Saylor Road & Calvary Church Road	Dirt Road
15	Lewie Rucker Road & Beaver Creek Road	Dirt Road
16	Gus Sturkle Road and Huckabee Mill Road	Dirt Road
17	Bailey Road & Calvary Church Road	Dirt Road

Figure 5.12 on the following page shows these areas of localized flooding. The Public Works Department distinguished localized flooding issues as related to either inadequate drainage or dirt roads with no drainage infrastructure.



Dirt Road	Location	Inadequate Drainage	Location
1	George Brown Road	1	Ben Franklin Rd & Marcellus Rd
2	Crout Pond Way & Juniper Springs Rd	2	Augusta Rd & Saint Davids Church Rd
3	Kelly Day Road	3	W. Main Street & Ellis Avenue
4	Bagdpe Road & Fairview Road	4	Church St & Mitchell St
5	Quattlebaum Road	5	Tidas Street & Thicket Drive
6	Lou Dunbar Road	6	Broken Hill Road
7	Fogle Road	7	Hempsted Road
8	Sandra Drive	8	Baffin Bay Road & Baymore Lane
9	Ann Street	9	Lewisham Road & Stromsdale Road
10	Rosebank Court	10	Oliverwood Drive & Millwood Avenue
11	Tuxedo Road	11	Cofield Drive & Terrace View Drive
12	Anderson Drive	12	Smallwood Drive & Long Point Drive
13	Burton Gunter Rd & Ricky Hoffman Rd	13	Laurel Meadows Dr & Littlefield Rd
14	Saylor Rd & Calvary Church Rd		
15	Laura Rucker Rd & Beaver Creek Rd		
16	Gas Sturkie Rd & Huckabee Mill Rd		
17	Bailey Rd & Calvary Church Rd		

Figure 5.12 – Localized Flooding Areas

5.4.3 Past Occurrences

Table 5.14 shows detail for heavy rain events recorded in NCEI since 1996 for Lexington County. There have been nine recorded events causing $10,000 in property damage.

Table 5.14 – NCEI Flooding Events in Lexington County

Type	# of Events	Property Damage	Crop Damage	Deaths (Direct)	Injuries (Direct)
Heavy Rain	9	$10,000	$0	0	0
Total:	**9**	**$10,000**	**$0**	**0**	**0**

Source: NCEI, March 2017

The following provides details on select heavy rain events recorded in the NCEI database:

August 9, 2012 - Columbia Metropolitan Airport recorded 2.16 inches of rain in an hour. Most of the rain fell between 8:20 PM AND 9:20 PM.

August 12, 2014 - Areas of thunderstorms over the Midlands produced heavy rains that produced some street flooding. One storm also produced strong winds that took down trees and powerlines. SCHP reported road flooding on Bush River road near I-26.

September 5, 2015 - Scattered thunderstorms moved though the Midlands and produced some large hail, wind damage, and very intense rains that produced flash flooding. Heavy rain of 1.91 inches fell in a 37-minute period at the Columbia Metro Airport.

December 30, 2015 - Strong to severe thunderstorms produced wind damage along with heavy rainfall as cells trained over the same area. Rain fell in excess of 1.5 inches per hour.

5.4.4 Probability of Future Occurrence

Highly Likely – Based on historical occurrence information for heavy rain (9 records in 20 years) and flash flood (47 records in 20 years), it can reasonably be assumed that there is a 100% chance of this type of event occurring each year.

Climate Change and Inland Flooding

It is likely (66-100% probability) that the frequency of heavy precipitation or the proportion of total rainfall from heavy falls will increase in the 21st century across the globe. More specifically, it is "very likely" (90-100% probability) that most areas of the United States will exhibit an increase of at least 5% in the maximum 5-day precipitation by late 21st century. The mean change in the annual number of days with rainfall over 1 inch for the Southeastern United States is 0.5 to 1.5 days. As the number of heavy rain events increase, more flooding and pooling water can be expected (Romero-Lankao, et al. 2014).

5.4.5 Consequence Analysis

People

Certain health hazards are common to flood events. The first comes from the water itself. Floodwaters carry anything that was on the ground including dirt, oil, animal waste, and chemicals.

Floodwaters also saturate the ground, which leads to infiltration into sanitary sewer lines. When wastewater treatment plants are flooded, there is nowhere for the sewage to flow. Infiltration and lack of treatment can lead to overloaded sewer lines that can back up into low-lying areas and homes. Even when it is diluted by flood waters, raw sewage can be a breeding ground for bacteria such as e.coli and other disease causing agents.

First Responders
Flood waters may prevent access to areas in need of response or the flood may prevent access to the critical facilities themselves which may prolong response time.

Continuity of Operations
Inland flooding can disrupt normal operations if there is a loss of power. Flood waters may also prevent employee access to the campus itself or specific areas within the campus.

Built Environment
Campus buildings, as well as critical infrastructure such as transportation, water, energy, and communication systems, may be damaged by flood waters.

Economy
During a flood, the local government must deploy firemen, police and other emergency response personnel and equipment to help the affected area.

Natural Environment
When not properly managed, stormwater runoff can degrade water quality. During a flood event, chemicals and other hazardous substances may end up contaminating local water bodies. Stormwater flooding can also produce sheet flow and channelizing that results in erosion. Snakes and insects may also make their way to the flooded areas.

5.5 Assessment of Areas Likely to Flood

The following targeted areas are identified by the FMPC as areas likely to flood in the future.

Identified Area #1: 100-year SFHAs
Approximately 6.3% of Lexington County falls within the 100-year floodplain as mapped in the Effective FIRMs. Changes in floodplain development and future development within the watershed in general is likely to increase the size of the SFHAs due to an increase in impervious area and a reduction of floodplain storage area. As the SFHA expands, areas currently vulnerable to inundation from the 0.2%-annual-chance flood are those most likely to see an increase in flood risk.

Identified Area #2: Areas of Localized Stormwater Flooding
Due to the level topography of the area and the heavy precipitation resulting from thunderstorms, tropical storms, and hurricanes, it is highly likely that unmitigated properties and roads will continue to experience localized flooding. An increase in impervious surface due to future development on greenfield land could exacerbate the localized flooding issues unless measures are taken to reduce the volume of runoff.

Identified Area #3: Repetitive Loss Areas
Repetitive loss properties have a greater need for flood protection because they are proven to be at risk of flooding. Repetitive loss can be attributed to development within the 100-year floodplain as well as localized stormwater flooding. As mentioned above, both types of flooding could increase in the future if measures are not taken to mitigate the effects of development. Therefore, it is very likely that unmitigated repetitive loss properties will continue to flood in the future. Repetitive loss areas identified by the FMPC are shown in Figure 5.13. Many of these areas are clustered in the Dutch Fork Planning Area, which is in the Saluda River Basin. Not only is the Saluda River Basin likely to experience an increase in development, but the Dutch Fork Planning Area is specifically targeted for more development according to the goals of the Comprehensive Plan. As a result, the existing repetitive loss areas are likely to see an increase in flood risk, and surrounding properties facing similar flood conditions may be at risk of becoming repetitive loss properties.

Impact of Future Flooding

As discussed in Section 5.4 and Section 3.7, changes in the watershed (particularly an increase in impervious surface) can make these targeted areas even more likely to flood in the future. As noted previously, redevelopment is not occurring to any significant extent, meaning most new development is occurring on greenfield sites. Greenfield development generates a greater increase in impervious surface. Without being accompanied by mitigation and stormwater management, increases in impervious surface result in a greater flood hazard by decreasing the potential for infiltration and creating stormwater runoff. Stormwater that could have infiltrated on site becomes stormwater runoff that must be handled by other drainage systems. Runoff flows to natural drainage systems where it potentially causes flooding in the natural floodplains or to manmade drainage systems, where it can contribute to localized stormwater flooding.

As noted in Section 3.7 Growth and Development Trends and shown by the mapped locations of issued building permits, much of the development that has occurred in recent years has been around the Capital region and Lake Murray. As shown by the population density map in Section 3.8, these are already some of the most densely populated areas in the County, meaning there is already substantial development and impervious surface. These areas also experience localized stormwater flooding due to inadequate drainage, as shown in Figure 6.35 in Section 6.3 Vulnerability Assessment which illustrates the location of stormwater flooding hotspots relative to the major watersheds. Continued development pressure is also greatest in these areas, which fall in the Saluda watershed and the Congaree watershed, suggesting future flood risk in these areas will likely increase. Therefore, SFHAs, localized stormwater flooding hotspots, and repetitive loss areas within the Saluda and Congaree watersheds are the highest concern for future flooding.

Of particular concern is the impact of future flooding in the Dutch Fork Planning Area, where new development is being encouraged, according to the goals of the Comprehensive Plan. The Dutch Fork Planning Area falls primarily within the Saluda watershed. Future flooding risk will likely grow in the Dutch Fork Planning Area, where many repetitive loss areas are already clustered, because, without mitigation, new development can increase flood severity and exposure. According to the Kinley Creek Watershed Stormwater Management Study, which falls within the Dutch Fork Planning Area, existing development has left little to no unaltered floodplain in these areas, and the current infrastructure is inadequate to handle current rainfall and runoff events.

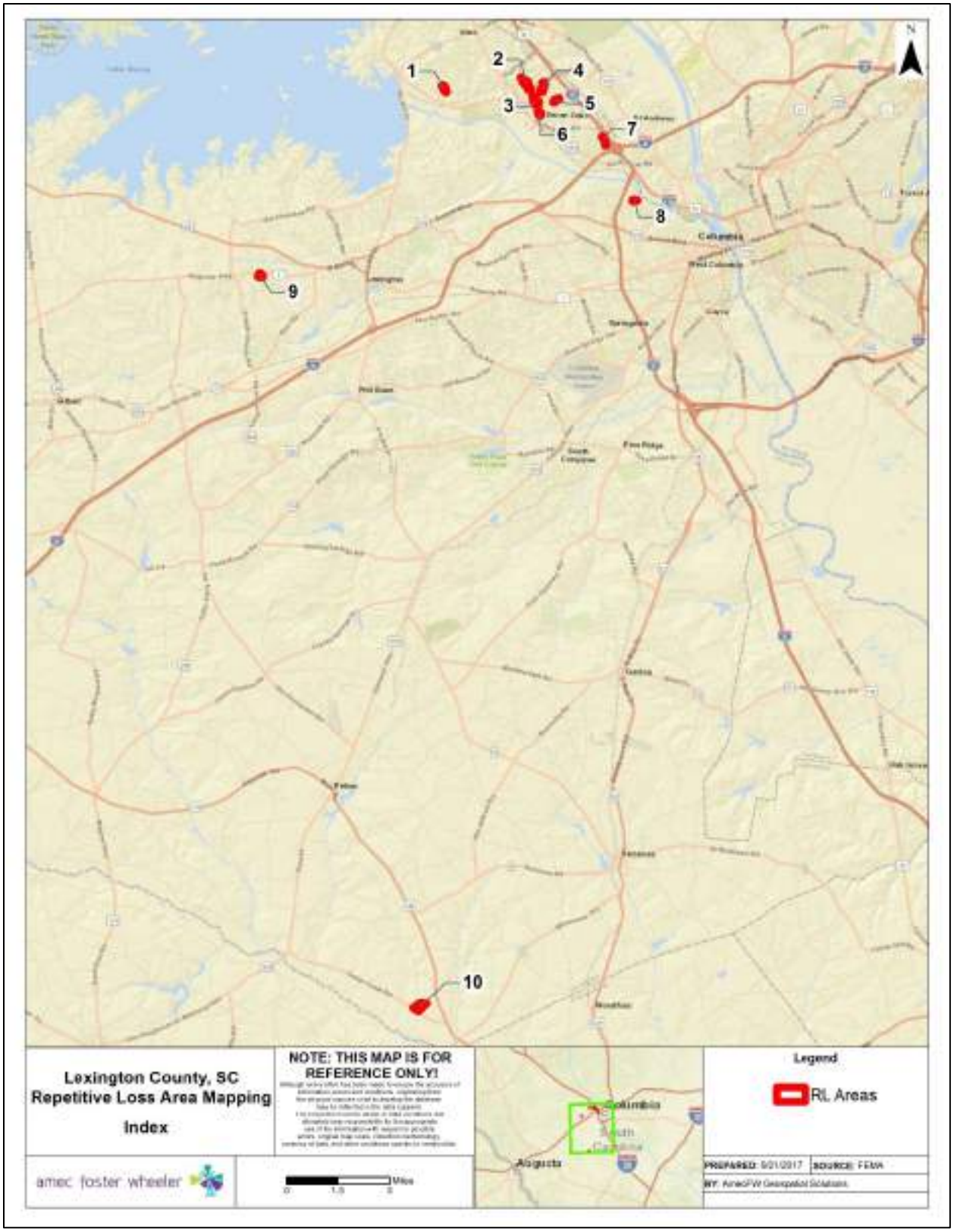


Figure 5.13 – Repetitive Loss Areas

5.6 Hazard Profile Summary

Table 5.15 summarizes the results from the hazard profiles based on input from the FMPC. For each hazard profiled in this Chapter, this table includes the likelihood of future occurrence and whether or not the hazard is a considered a priority for the County. A Vulnerability Assessment is provided in Chapter 6 for priority hazards.

Table 5.15 – Summary of Hazard Profile Results

Hazard	Likelihood of Future Occurrence	Vulnerability Assessment
Dam/Levee Failure	Likely	✓
Hurricane and Tropical Storm	Possible	✓
100-/500-year	Possible	✓
Localized Stormwater	Highly Likely	✓

*Note: Although the occurrence of a hurricane and/or tropical storm is likely in the future, coastal storm surge is ***unlikely*** to affect Lexington County. A Priority Risk Index rating is calculated for other types of flooding associated with a hurricane or tropical storm, but the vulnerability to that flooding will be covered in greater depth under the vulnerability assessment for Flood.

6 VULNERABILITY ASSESSMENT

44 CFR Subsection D §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community. Plans approved after October 1, 2008 must also address NFIP insured structures that have been repetitively damaged by floods. The plan should describe vulnerability in terms of:

A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas;

(B): An estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; and

(C): Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Chapter 6 quantifies the vulnerability of Lexington County to the priority hazards identified in Chapter 5. It consists of the following subsections:

- 6.1 Methodology
- 6.2 Asset Inventory
- 6.3 Vulnerability Assessment
- 6.4 Priority Risk Index Results

The FMPC conducted a vulnerability assessment of the hazards identified as a priority in order to assess the impact that each hazard would have on the region. The vulnerability assessment quantifies, to the extent feasible using best available data, assets at risk to natural hazards and estimates potential losses.

Vulnerability assessments followed the methodology described in the FEMA publication Understanding Your Risks—Identifying Hazards and Estimating Losses (August 2001). The vulnerability assessment first describes the total vulnerability and values at risk and then discusses vulnerability by hazard. Data used to support this assessment included the following:

- County GIS data (hazards, base layers, and assessor's data)
- Hazard layer GIS datasets from federal and state agencies
- Written descriptions of inventory and risks provided by the 2013 State Hazard Mitigation Plan and the 2016 Hazard Mitigation Plan for the Central Midlands Region
- Other existing plans and studies provided by the County

6.1 Methodology

Two distinct risk assessment methodologies were used in the formation of this vulnerability assessment. The first consists of a quantitative analysis that relies upon best available data and technology, while the second approach consists of a somewhat qualitative analysis that relies on local knowledge and rational decision making. The quantitative analysis involved the use of the most recent version of Hazards U.S. Multi-Hazard (Hazus) software, a nationally applicable standardized set of models available from FEMA for estimating potential losses from earthquakes, floods, and hurricanes.

Hazus uses a statistical approach and mathematical modeling of risk to predict a hazard's frequency of occurrence and estimated impacts based on recorded or historic damage information. The Hazus risk assessment methodology is parametric, in that distinct hazard and inventory parameters—such as wind speed and building type—were modeled to determine the impact on the built environment.

6.2 Asset Inventory

An inventory of assets within Lexington County was compiled in order to identify those properties potentially at risk to the identified hazards. Assets include elements such as buildings, property, business/industry goods, and civil infrastructure. By understanding the type and number of assets that exist and where they are located in relation to known hazard areas, the relative risk and vulnerability for such assets can be assessed.

6.2.1 Properties at Risk

Properties identified to be at risk includes all improved properties in the County. The information is detailed in Table 6.1 in terms of the number of buildings by occupancy type and total assessed value of improvements that may be exposed to the identified hazards. Building footprint data was used to provide an accurate assessment of how many buildings are located in hazard areas.

Table 6.1 – Properties at Risk

Occupancy Type	Total Number of Buildings	Total Building Value	Estimated Content Value	Total Value
Zone A				
Commercial	17	$1,206,749	$1,810,123	$3,016,872
Education	0	N/A	N/A	$0
Government	0	N/A	N/A	$0
Industrial	0	N/A	N/A	$0
Religious	0	N/A	N/A	$0
Residential	552	$26,544,463.80	$13,272,232	$39,816,696
Total	**569**	**$27,751,213**	**$15,082,355**	**$42,833,568**
Zone AE				
Commercial	73	$12,896,500	$19,344,749	$32,241,249
Education	1	$37,382	$56,073	$93,455
Government	0	N/A	N/A	$0
Industrial	0	N/A	N/A	$0
Religious	0	N/A	N/A	$0
Residential	919	$50,656,668.70	$25,328,334	$75,985,003
Total	**993**	**$63,553,168**	**$44,673,084**	**$108,319,707**
Zone X (500-yr)				
Commercial	109	$15,156,062	$22,734,093	$37,890,155
Education	0	N/A	N/A	$0
Government	0	N/A	N/A	$0
Industrial	0	N/A	N/A	$0
Religious	0	N/A	N/A	$0
Residential	3,446	$510,737,935	$255,368,967	$766,106,902
Total	**3,555**	**$525,893,997**	**$278,103,060**	**$803,997,057**
Zone X (Unshaded)				
Commercial	5,838	$876,108,980	$1,314,163,470	$2,190,272,450
Education	86	$2,722,116.30	$4,083,175	$6,805,291
Government	37	$3,009,736	$3,009,736	$6,019,472
Industrial	11	$74,223	$111,335	$185,558
Religious	106	5628500.9	$5,628,501	$11,257,002
Residential	88,911	$7,476,578,200	$3,738,223,375	$11,214,801,575
Total	**94,989**	**$8,364,121,756**	**$5,065,219,591**	**$13,429,341,347.10**

Source: Lexington County Tax Assessor Data, 2017

Note: Content value estimations are based on the FEMA Hazus methodology of estimating value as a percent of improved structure values by property type. The residential property type assumes a content replacement value equal to 50% of the building value. Agricultural, commercial, education, government, and religious property types assume a content replacement value equal to 100% of the building value. The industrial property type assumes a content replacement value equal to 150% of the building value.

6.2.2 Critical Facilities at Risk

Of significant concern with respect to any disaster event is the location of critical facilities in the planning area. Critical facilities are often defined as those essential services and facilities in a major emergency which, if damaged, would result in severe consequences to public health and safety or a facility which, if unusable or unreachable because of a major emergency, would seriously and adversely affect the health, safety, and welfare of the public. The total number of critical facilities within Lexington County is listed by type in Table 6.2 and shown in Figure 6.1.

Table 6.2 – Critical Facilities at Risk

Facility Type	Count
Airport	2
EOC	15
Fire Station	30
County Buildings	12
Hospital	12
Law Enforcement	35
School	95
Wastewater Treatment Plant	13
Water Treatment Plant	1
Total	**215**

Planning for Critical Facility Protection

Lexington County has several options to consider in planning to reduce the vulnerability of these critical facilities. Per FEMA guidance, of primary concern is the protection of essential systems and equipment in order to maintain the function of these critical facilities for community resilience during and after hazard events. One way to protect critical facilities is to ensure that electrical systems, mechanical systems, and other essential equipment is sufficiently elevated above the base flood elevation. Another option is to install dry floodproofing in order to protect these critical components from floodwaters, flood forces, and leakage. Among the components that should be considered for protection are electrical service and distribution systems; data systems; heating, ventilation, and air conditioning systems; water and wastewater systems; emergency power systems, and elevators.

Alternatively, Lexington County can consider relocating these vulnerable critical facilities to new locations outside the floodplain. However, additional protection may still be required because areas outside the 1%-annual-chance and 0.2%-annual-chance floodplain are still at low risk to flooding. According to FEMA, properties outside of high-risk flood areas account for over 20 percent of NFIP claims and one-third of disaster assistance for flooding.

The Lexington County FMPC considered these concerns in developing their mitigation strategies.

6.2.3 Life Safety, Warning, and Evacuation

All of the flood hazards profiled in Section 5 Hazard Profiles have the potential to impact life safety and the need for warning and evacuation of residents and visitors.

The National Weather Service issues weather watches, warnings and advisories for Lexington County. These warnings are disseminated via an Emergency Alert System on TV via WIS Channel 10, WLTX Channel 19, WACH Channel 57, and WOLO Channel 25; and on radio via WTCB B106.7 FM, WVOC 560 AM, WMHK 89.7 FM, and WCOS 97.5 FM / 1400 AM. While TV and radio are intended to reach both residents and visitors, Lexington County also operates a reverse 9-1-1 calling system to disseminate messages to residents who sign up with the County to receive them.

The County also has two warning siren systems in place for specific emergencies: one is in the Chapin area surrounding the V. C. Summer Nuclear Power Plant, and the other is for the area downstream of the Lake Murray Dam to signal a dam emergency or the release of usual amounts of water.

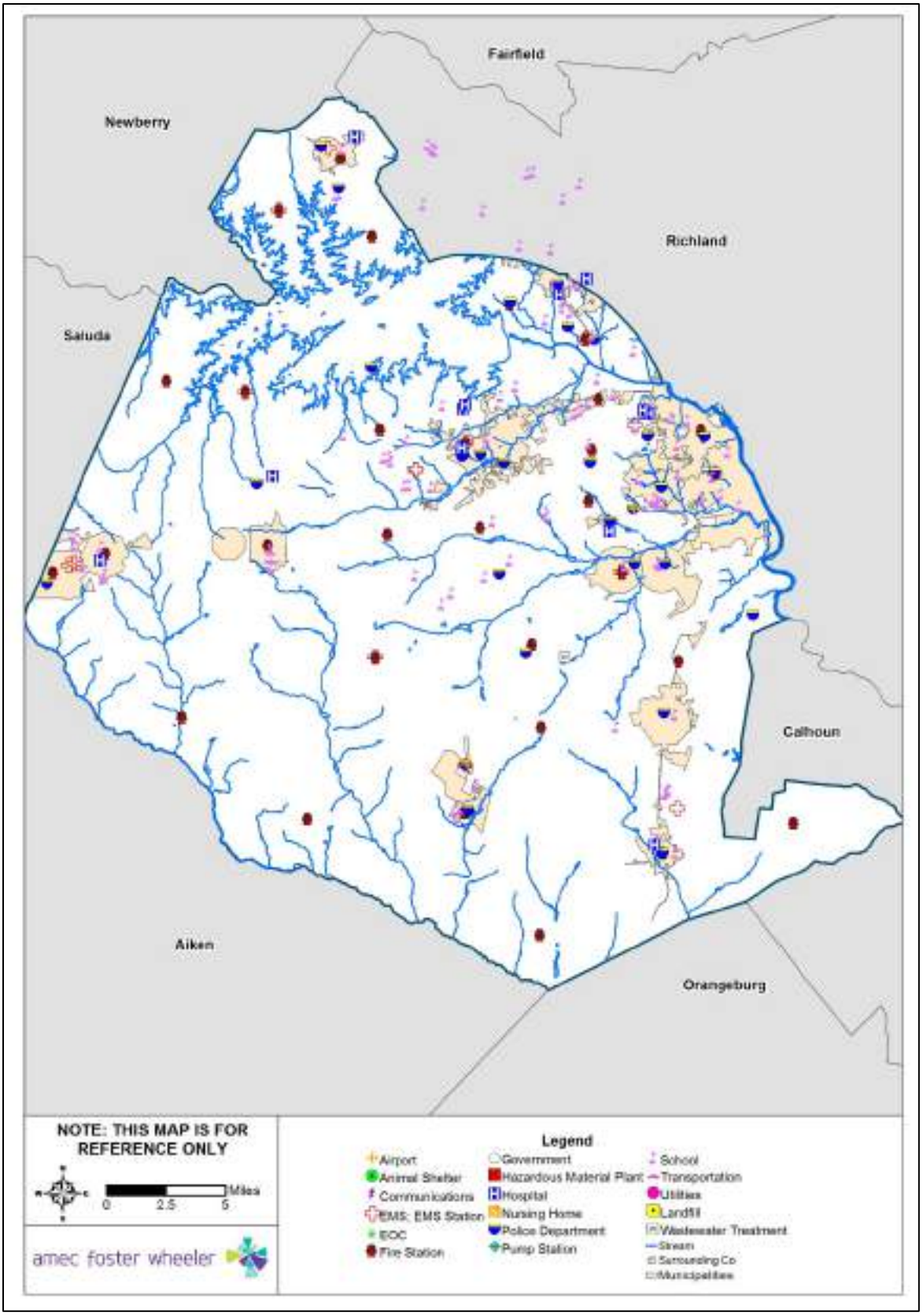


Figure 6.1 – Critical Facilities in Lexington County

6.3 Vulnerability Assessment Results

The Disaster Mitigation Act regulations require that the FMPC evaluate the risks associated with each of the hazards identified in the planning process. Vulnerability can be quantified in those instances where there is a known, identified hazard area, such as a mapped floodplain. In these instances, the numbers and types of buildings subject to the identified hazard can be counted and their values tabulated. Other information can be collected in regard to the hazard area, such as the location of critical community facilities (e.g., a fire station), historic structures, and valued natural resources (e.g., an identified wetland or endangered species habitat). Together, this information conveys the impact, or vulnerability, of that area to that hazard.

The conclusions drawn from the hazard profiling and vulnerability assessment process can be used to prioritize hazards. The Priority Risk Index (PRI) is a good practice to use when prioritizing hazards because it provides a standardized numerical value so that hazards can be compared against one another (the higher the PRI value, the greater the hazard risk). PRI values are obtained by assigning varying degrees of risk to five categories for each hazard (probability, impact, spatial extent, warning time, and duration). Each degree of risk has been assigned a value (1 to 4) and a weighting factor as summarized in Table 6.3.

Table 6.3 – Priority Risk Index

RISK ASSESSMENT CATEGORY	LEVEL	DEGREE OF RISK CRITERIA	INDEX	WEIGHT
PROBABILITY What is the likelihood of a hazard event occurring in a given year?	**UNLIKELY**	LESS THAN 1% ANNUAL PROBABILITY	**1**	**30%**
	POSSIBLE	BETWEEN 1 & 10% ANNUAL PROBABILITY	**2**	
	LIKELY	BETWEEN 10 &100% ANNUAL PROBABILITY	**3**	
	HIGHLY LIKELY	100% ANNUAL PROBABILTY	**4**	
IMPACT In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?	**MINOR**	VERY FEW INJURIES, IF ANY. ONLY MINOR PROPERTY DAMAGE & MINIMAL DISRUPTION ON QUALITY OF LIFE. TEMPORARY SHUTDOWN OF CRITICAL FACILITIES.	**1**	**30%**
	LIMITED	MINOR INJURIES ONLY. MORE THAN 10% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR > 1 DAY	**2**	
	CRITICAL	MULTIPLE DEATHS/INJURIES POSSIBLE. MORE THAN 25% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES FOR > 1 WEEK.	**3**	
	CATASTROPHIC	HIGH NUMBER OF DEATHS/INJURIES POSSIBLE. MORE THAN 50% OF PROPERTY IN AFFECTED AREA DAMAGED OR DESTROYED. COMPLETE SHUTDOWN OF CRITICAL FACILITIES > 30 DAYS.	**4**	
SPATIAL EXTENT How large of an area could be impacted by a hazard event? Are impacts localized or regional?	**NEGLIGIBLE**	LESS THAN 1% OF AREA AFFECTED	**1**	**20%**
	SMALL	BETWEEN 1 & 10% OF AREA AFFECTED	**2**	
	MODERATE	BETWEEN 10 & 50% OF AREA AFFECTED	**3**	
	LARGE	BETWEEN 50 & 100% OF AREA AFFECTED	**4**	
WARNING TIME Is there usually some lead time associated with the	**MORE THAN 24 HRS**	SELF DEFINED	**1**	**10%**
	12 TO 24 HRS	SELF DEFINED	**2**	

RISK ASSESSMENT CATEGORY	LEVEL	DEGREE OF RISK CRITERIA	INDEX	WEIGHT
hazard event? Have warning measures been implemented?	6 TO 12 HRS	SELF DEFINED	3	
	LESS THAN 6 HRS	SELF DEFINED	4	
DURATION How long does the hazard event usually last?	LESS THAN 6 HRS	SELF DEFINED	1	10%
	LESS THAN 24 HRS	SELF DEFINED	2	
	LESS THAN 1 WEEK	SELF DEFINED	3	
	MORE THAN 1 WEEK	SELF DEFINED	4	

The application of the PRI results in numerical values that allow identified hazards to be ranked against one another (the higher the PRI value, the greater the hazard risk). The sum of all five risk assessment categories equals the final PRI value, demonstrated in the equation below (the highest possible PRI value is 4.0).

PRI VALUE = [(PROBABILITY x .30) + (IMPACT x .30) + (SPATIAL EXTENT x .20) + (WARNING TIME x .10) + (DURATION x .10)]

The purpose of the PRI is to categorize and prioritize all potential hazards for planning area as high, moderate, or low risk. The summary hazard classifications generated through the use of the PRI allows for the prioritization of those high hazard risks for mitigation planning purposes.

6.3.1 Dam/Levee Failure

Probability	Impact	Spatial Extent	Warning Time	Duration
Likely	Critical	Moderate	<6 hours	<24 hours

Given the current dam inventory and historic data, a dam breach of a significant to high hazard dam is likely (16 percent annual probability) in the future. However, regular monitoring can help mitigate or prevent failures if appropriate actions are taken when it is determined a failure may be likely.

As noted in Chapter 5.1, according to the SC DHEC's Dam Inventory (inventory data received March 3, 2017), there are 15 high hazard dams, 15 significant hazard dam and 83 low hazard dams in Lexington County as well as 3 dams in neighboring counties with inundation areas that impact Lexington County. Additionally, the Lake Murray Dam, which is not listed by SC DHEC in their inventory of high hazard dams, is known to pose a high hazard for a large area of Lexington County.

High hazard dams identified by SC DHEC are summarized in the table below.

Name	Class	Hazard Level	County
Batesburg Reservoir Dam	C1	High	Lexington
Brady Porth Dam	S1	High	Lexington
Florence T Hall Dam	S1	High	Aiken
Fricks Pond Dam	C1	High	Saluda
Harbison New Town Lake	C1	High	Richland
Harbison Structure 9	C1	High	Lexington
Lake Quail Valley Dam	C1	High	Lexington
Lexington Old Mill Pond Dam	C1	High	Lexington
Little Coldstream Dam	C1	High	Lexington
Lower Quail Hollow Dam	C1	High	Lexington
Nursery Hill Dam	C1	High	Lexington
Saxe-Gotha Millpond Dam	C1	High	Lexington
Swansea Lake Dam	C1	High	Lexington
Upper Quail Hollow Dam	C1	High	Lexington
Whisperlake Dam	S1	High	Lexington
Whiteford Lake Dam	S1	High	Lexington
Whitehall Dam #1	C1	High	Lexington
Whitehall Dam #2	C1	High	Lexington

Source: SC DHEC, 2017

Maps of the dam inundation areas for the above high hazard dams as well as the Lake Murray Dam, each of which has the potential to impact Lexington County, are shown in Figure 6.2 through Figure 6.20 on the following pages. The Lake Murray Dam inundation area was assessed using a dam inundation study provided by SCANA Energy.

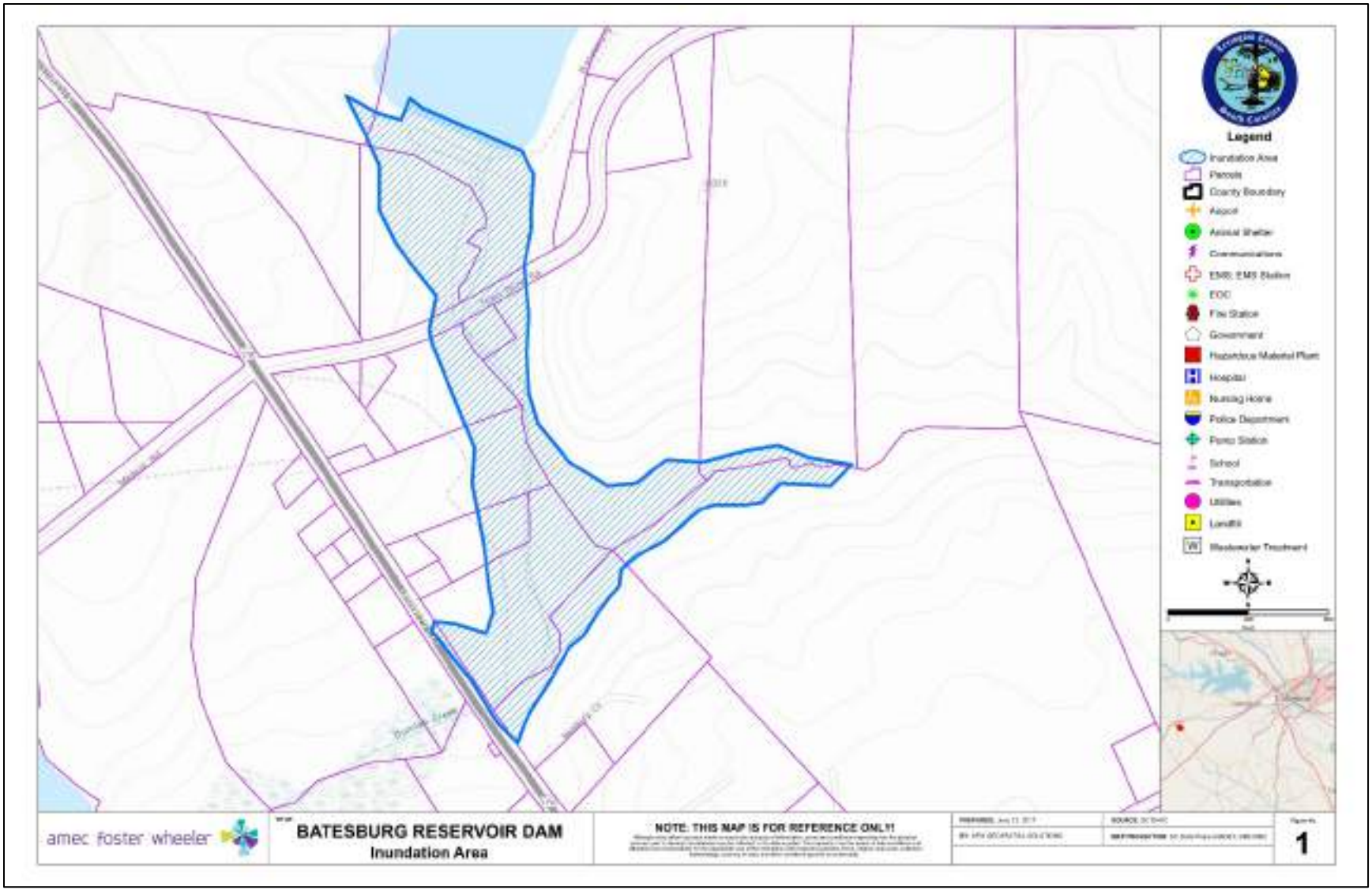


Figure 6.2 – Dam Inundation Area, Batesburg Reservoir Dam

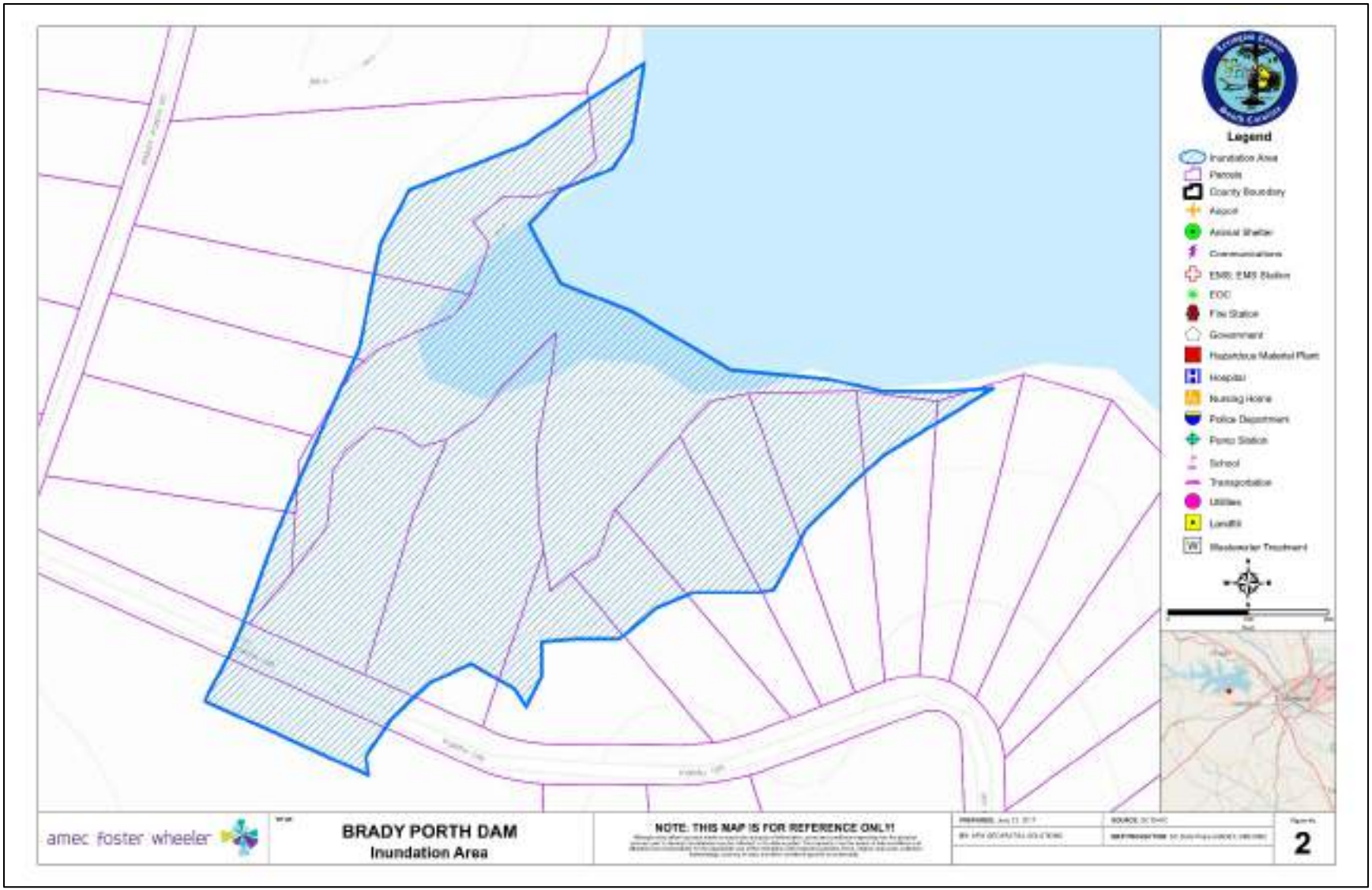


Figure 6.3 – Dam Inundation Area, Brady Porth Dam

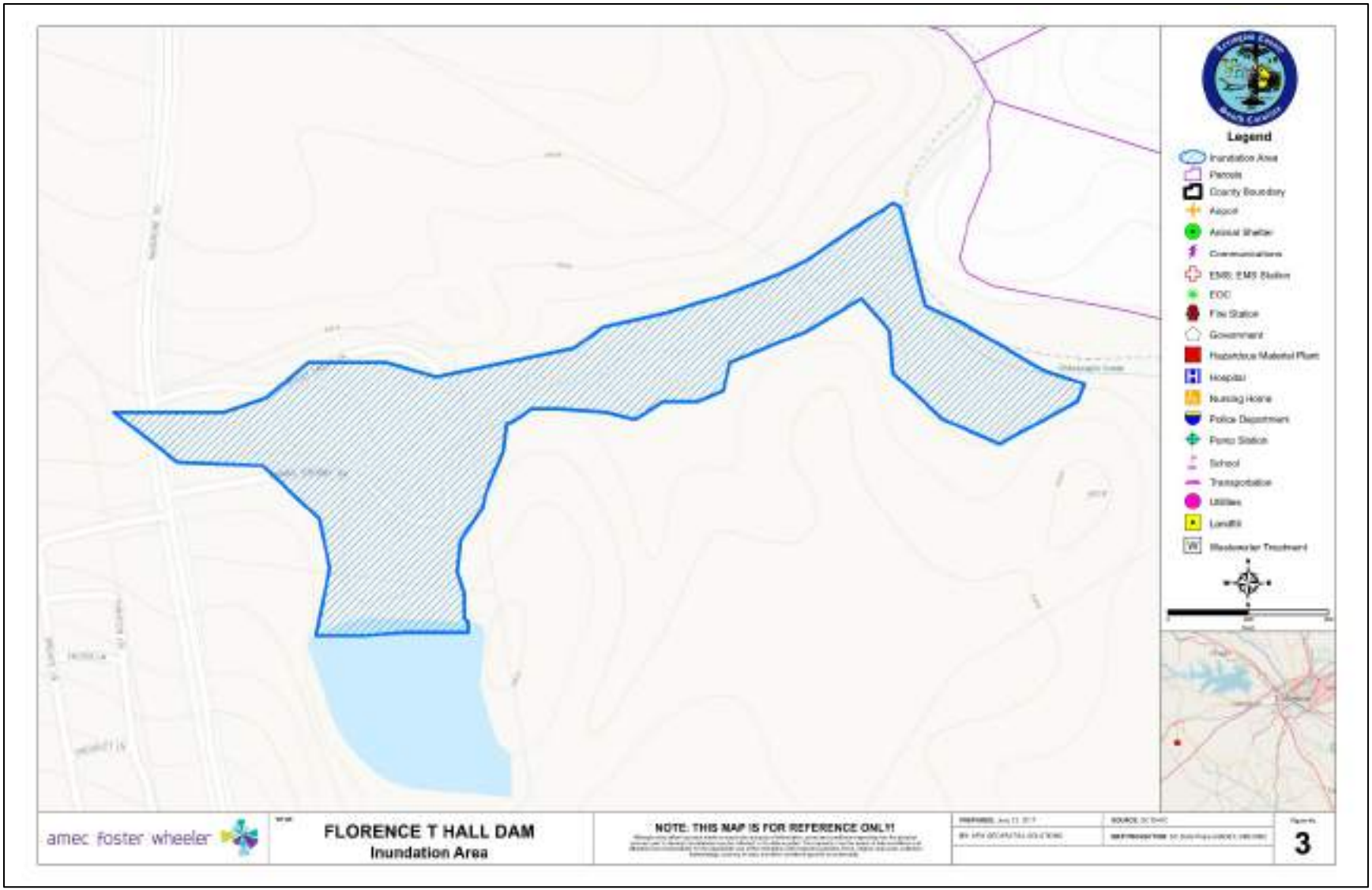


Figure 6.4 – Dam Inundation Area, Florence T Hall Dam

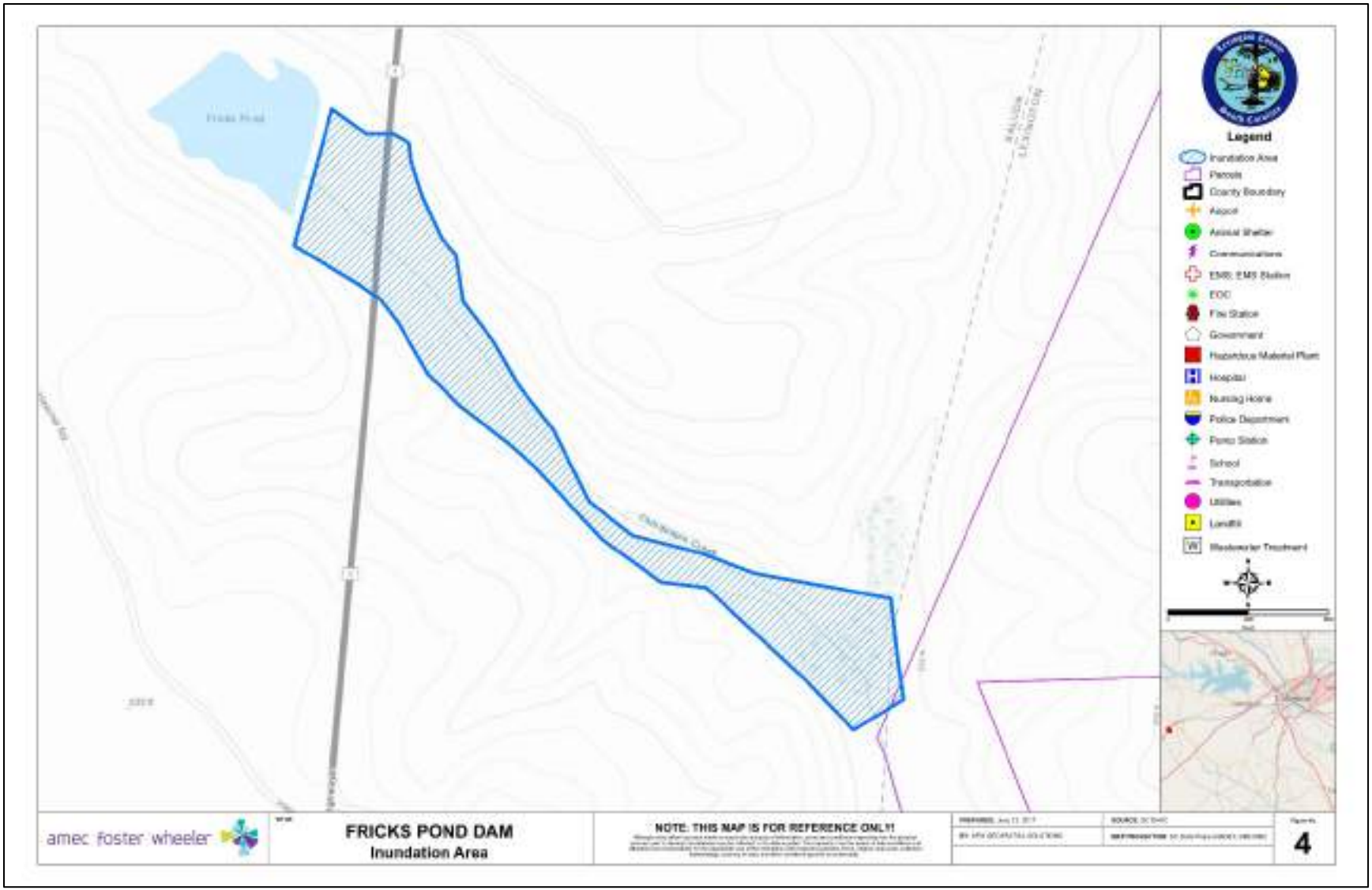


Figure 6.5 – Dam Inundation Area, Fricks Pond Dam

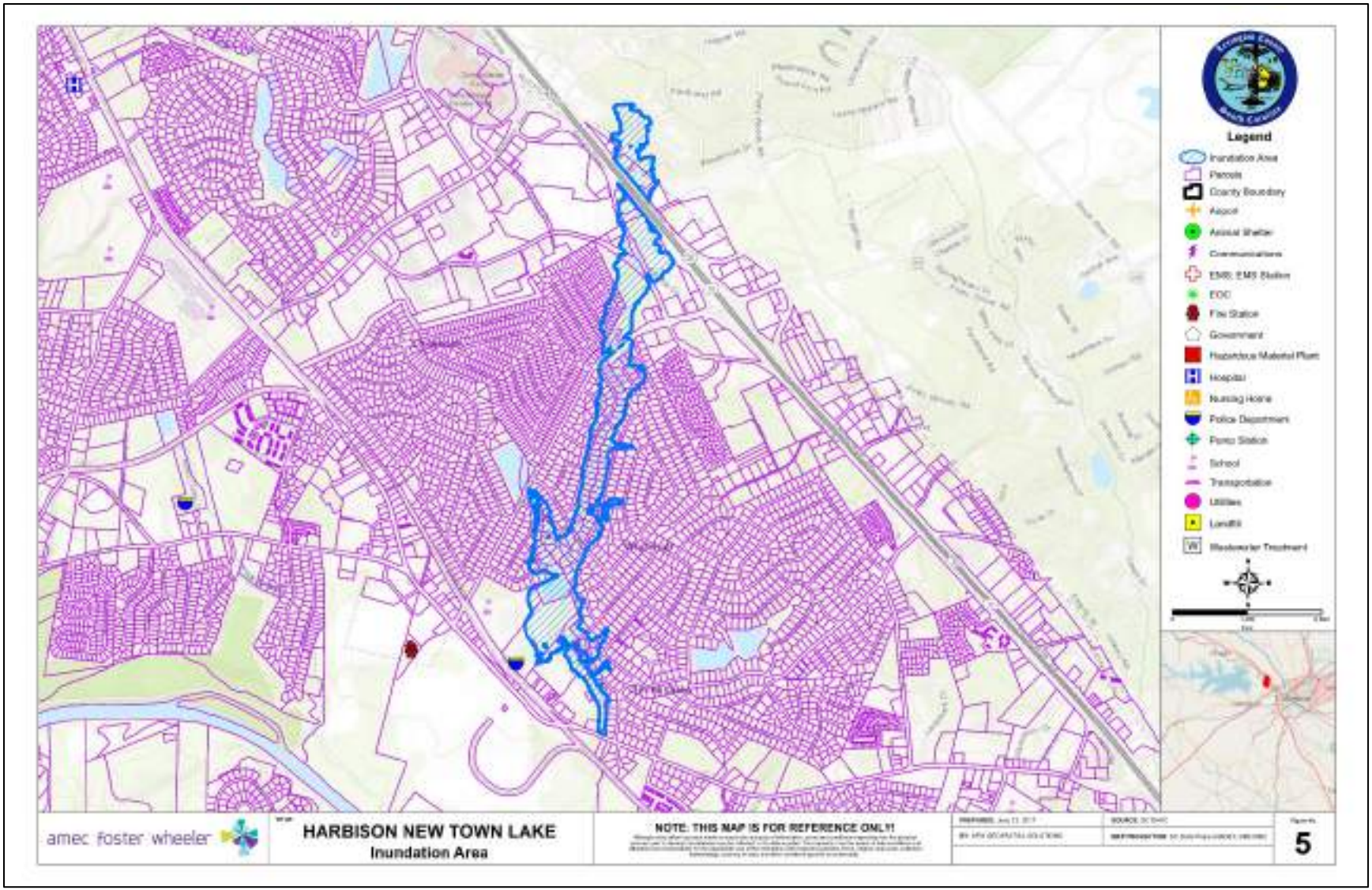


Figure 6.6 – Dam Inundation Area, Harbison New Town Lake

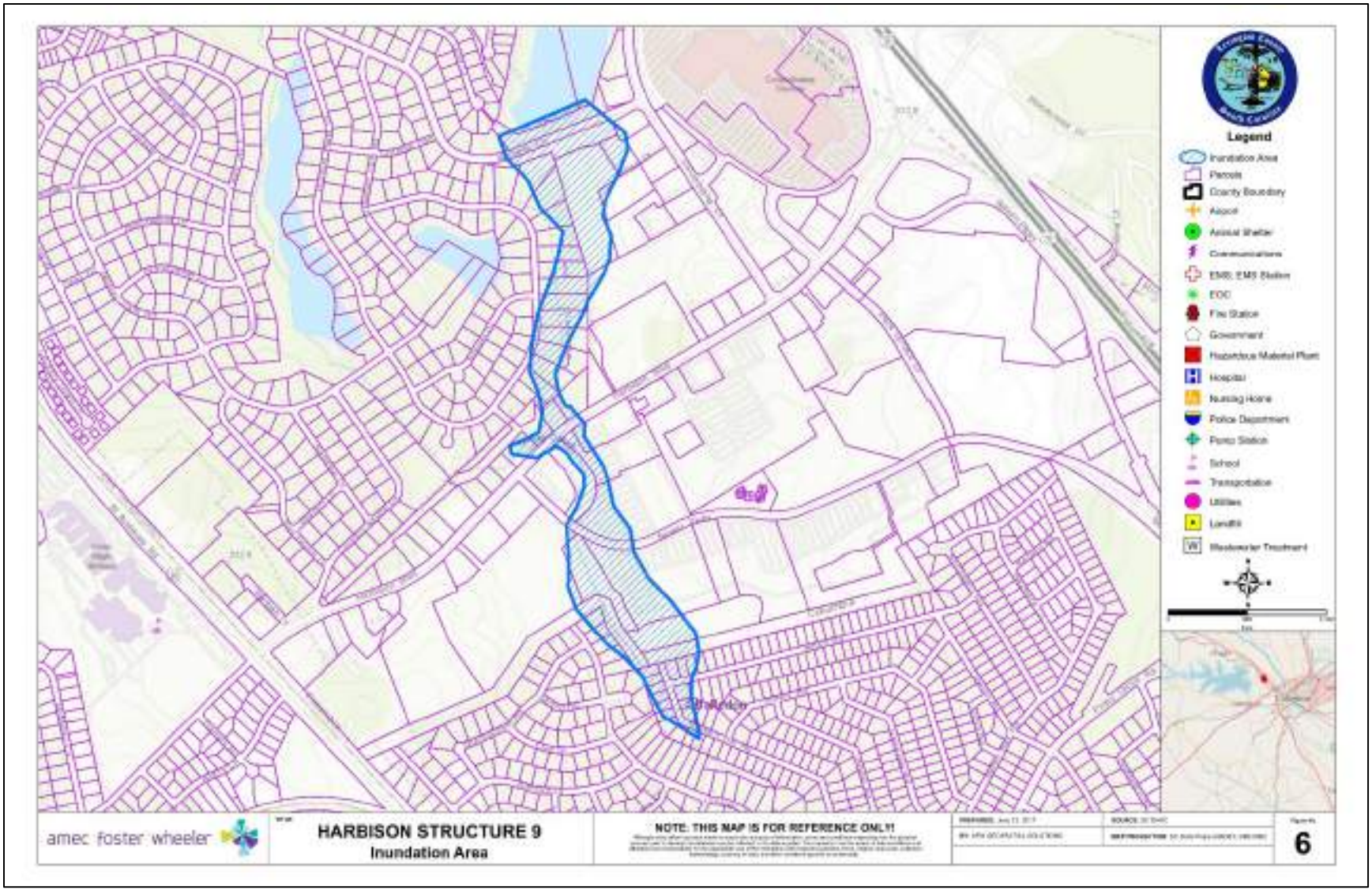


Figure 6.7 – Dam Inundation Area, Harbison Structure 9

Figure 6.8 – Dam Inundation Area, Lake Quail Valley Dam

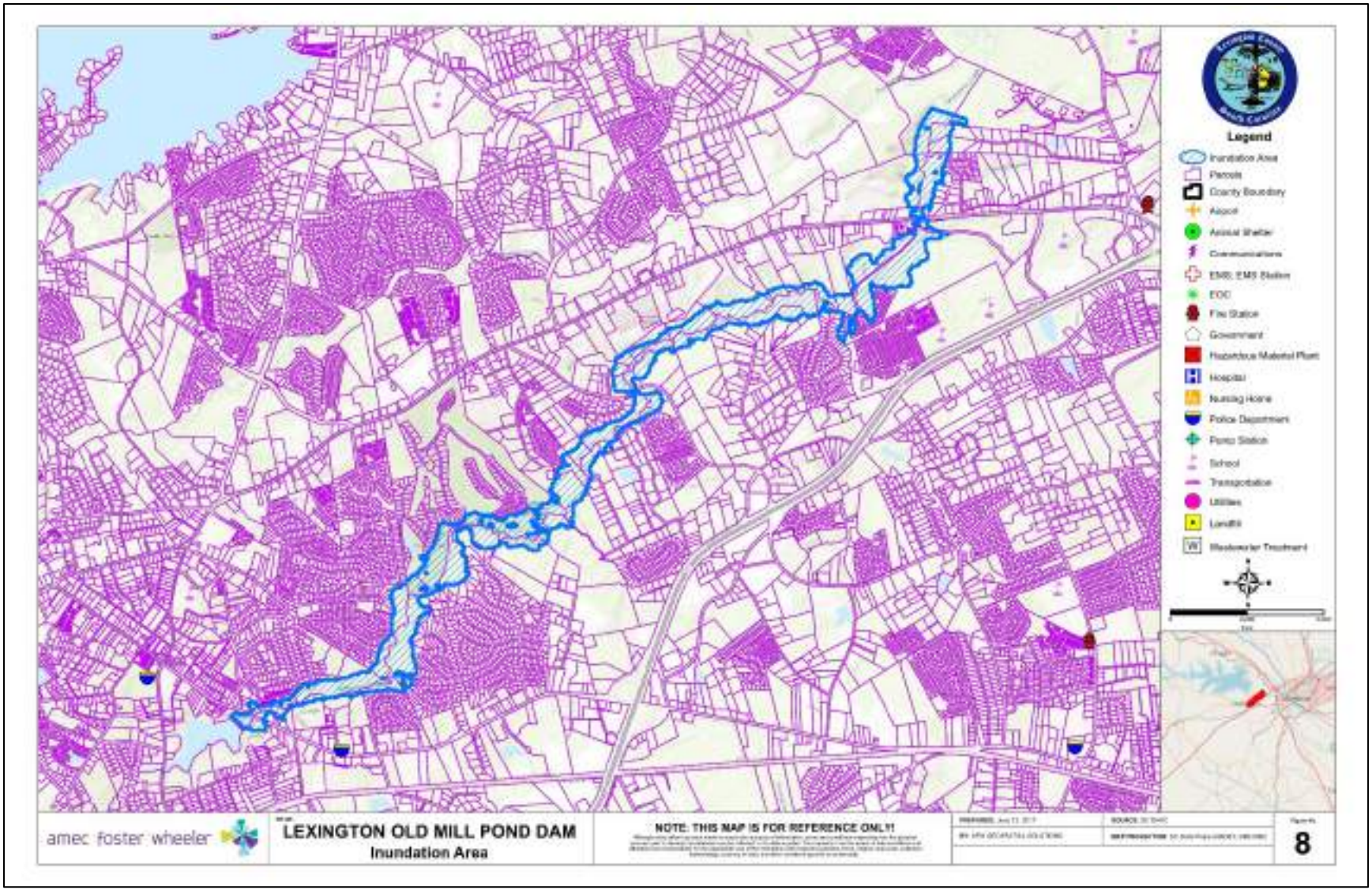


Figure 6.9 – Dam Inundation Area, Lexington Old Mill Pond Dam

Figure 6.10 – Dam Inundation Area, Little Coldstream Dam

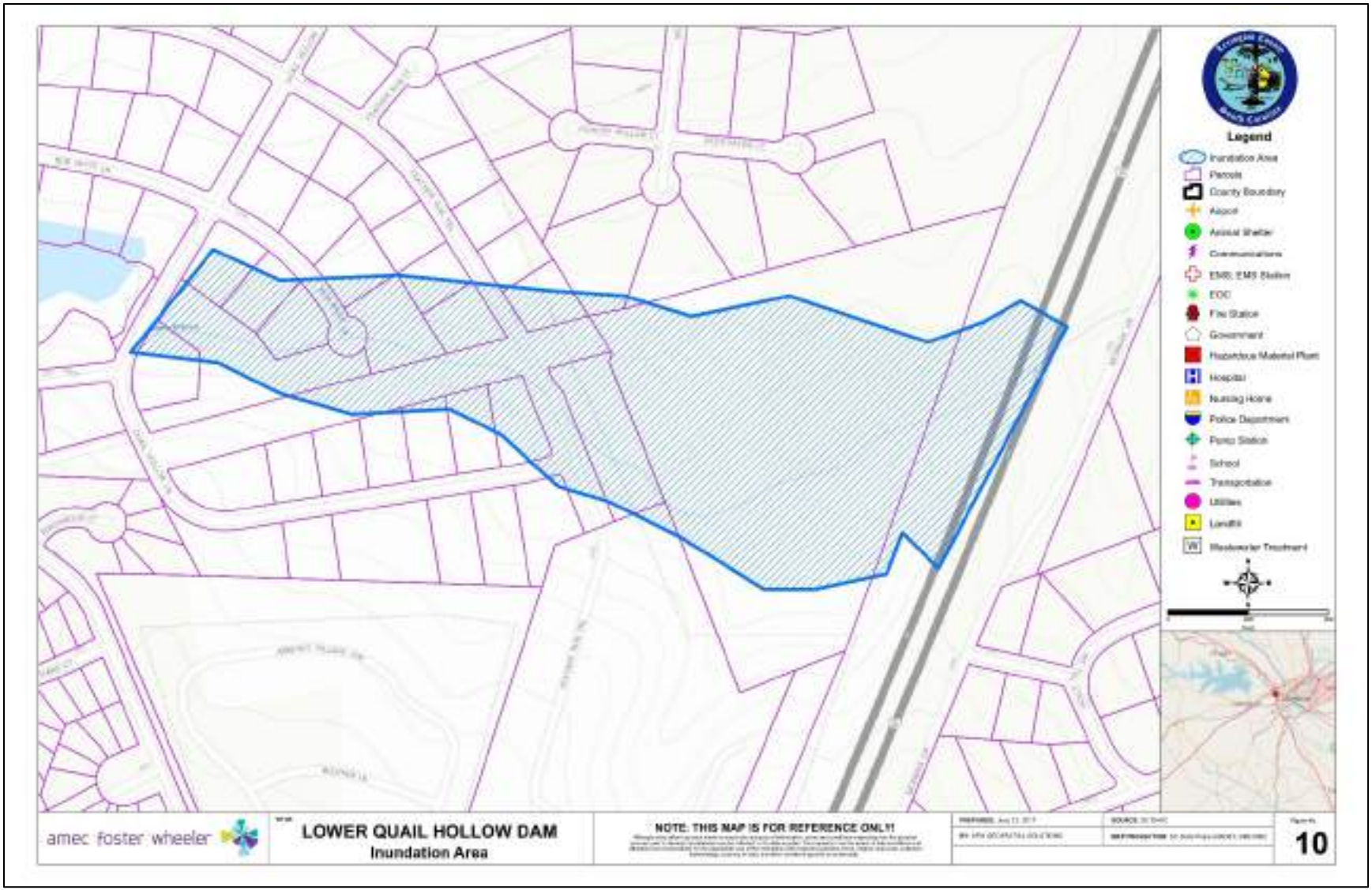


Figure 6.11 – Dam Inundation Area, Lower Quail Hollow Dam

Figure 6.12 – Dam Inundation Area, Nursery Hill Dam

Figure 6.13 – Dam Inundation Area, Saxe-Gotha Millpond Dam

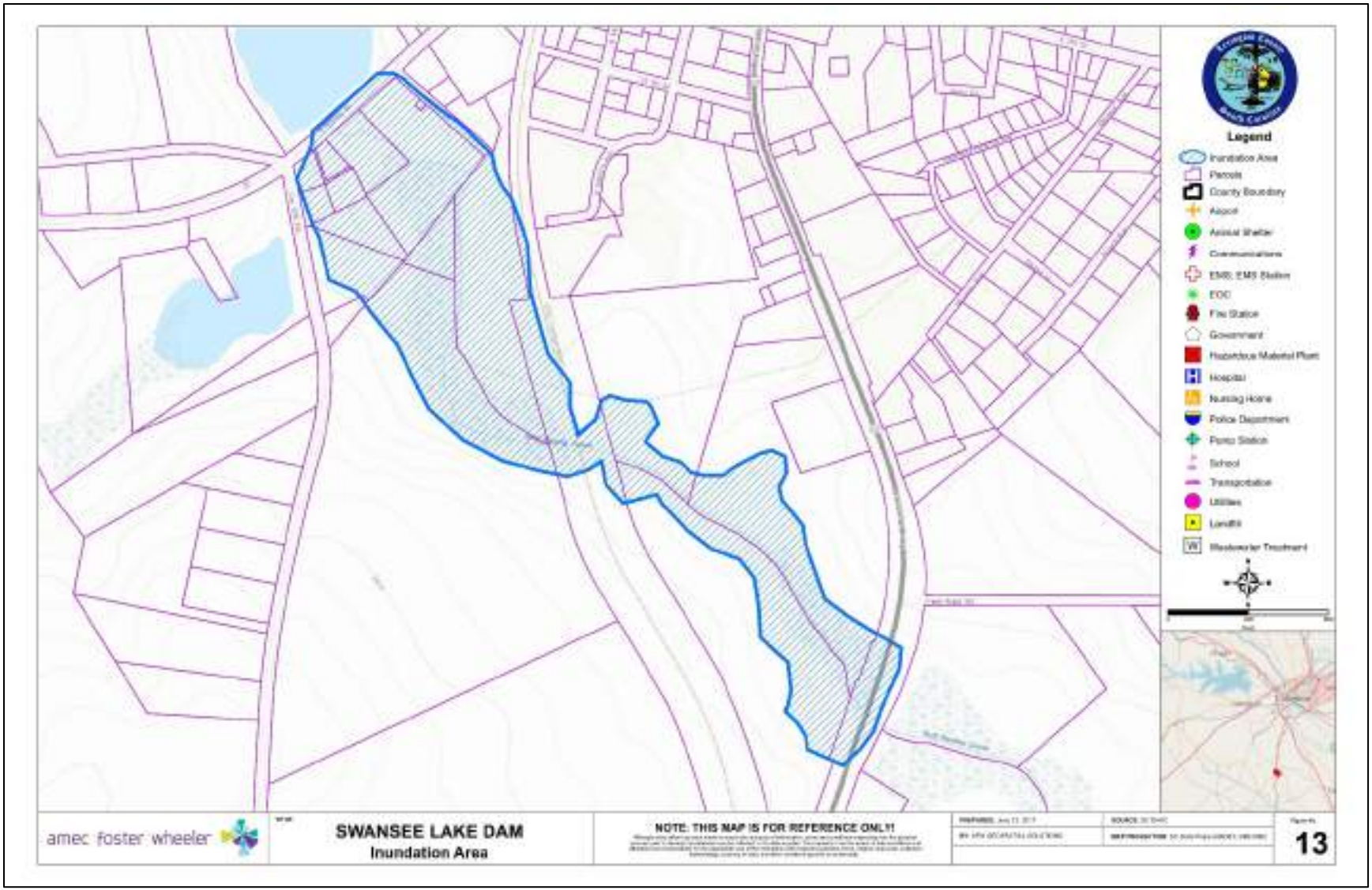


Figure 6.14 – Dam Inundation Area, Swansea Lake Dam

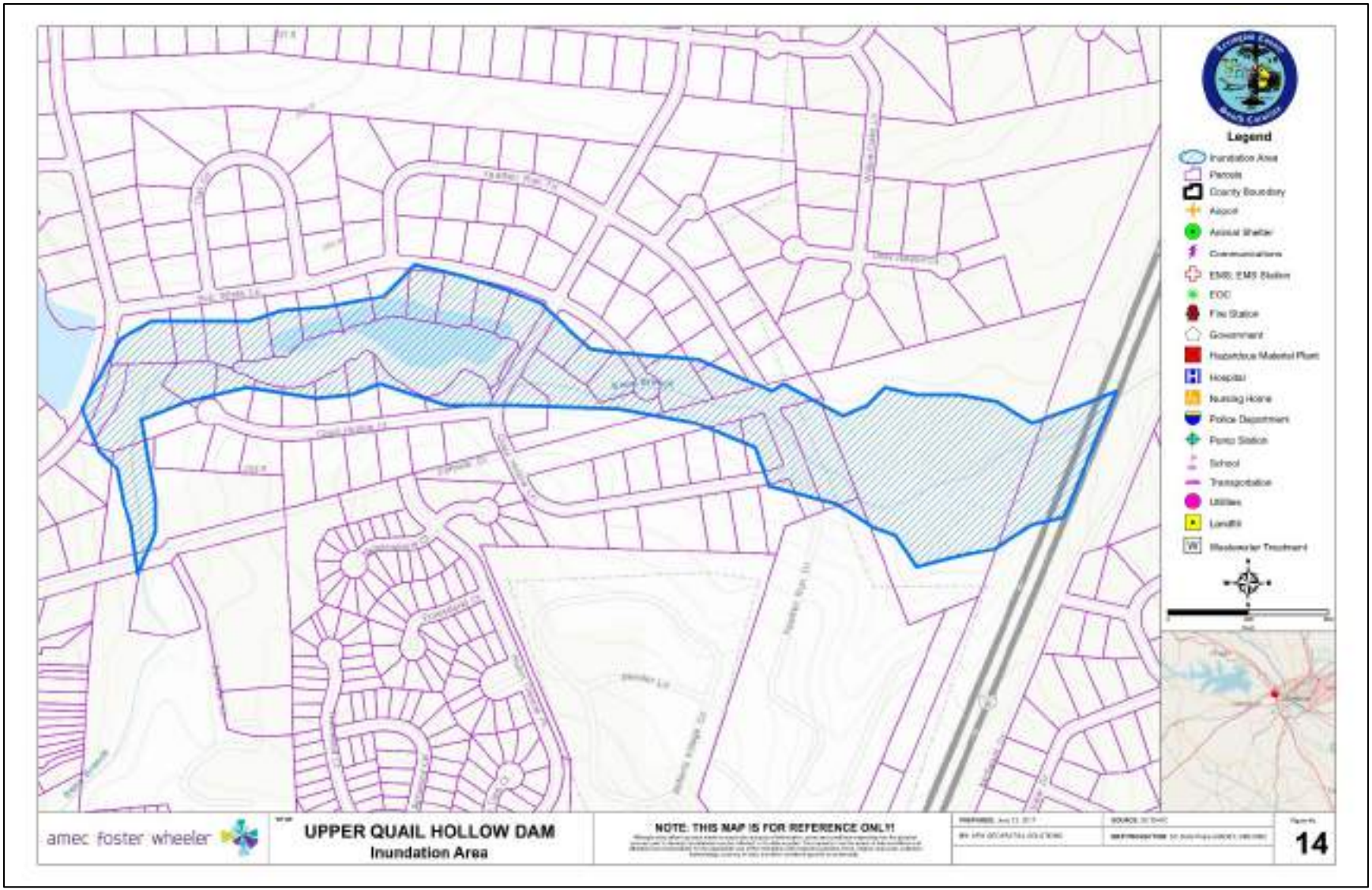


Figure 6.15 – Dam Inundation Area, Upper Quail Hollow Dam

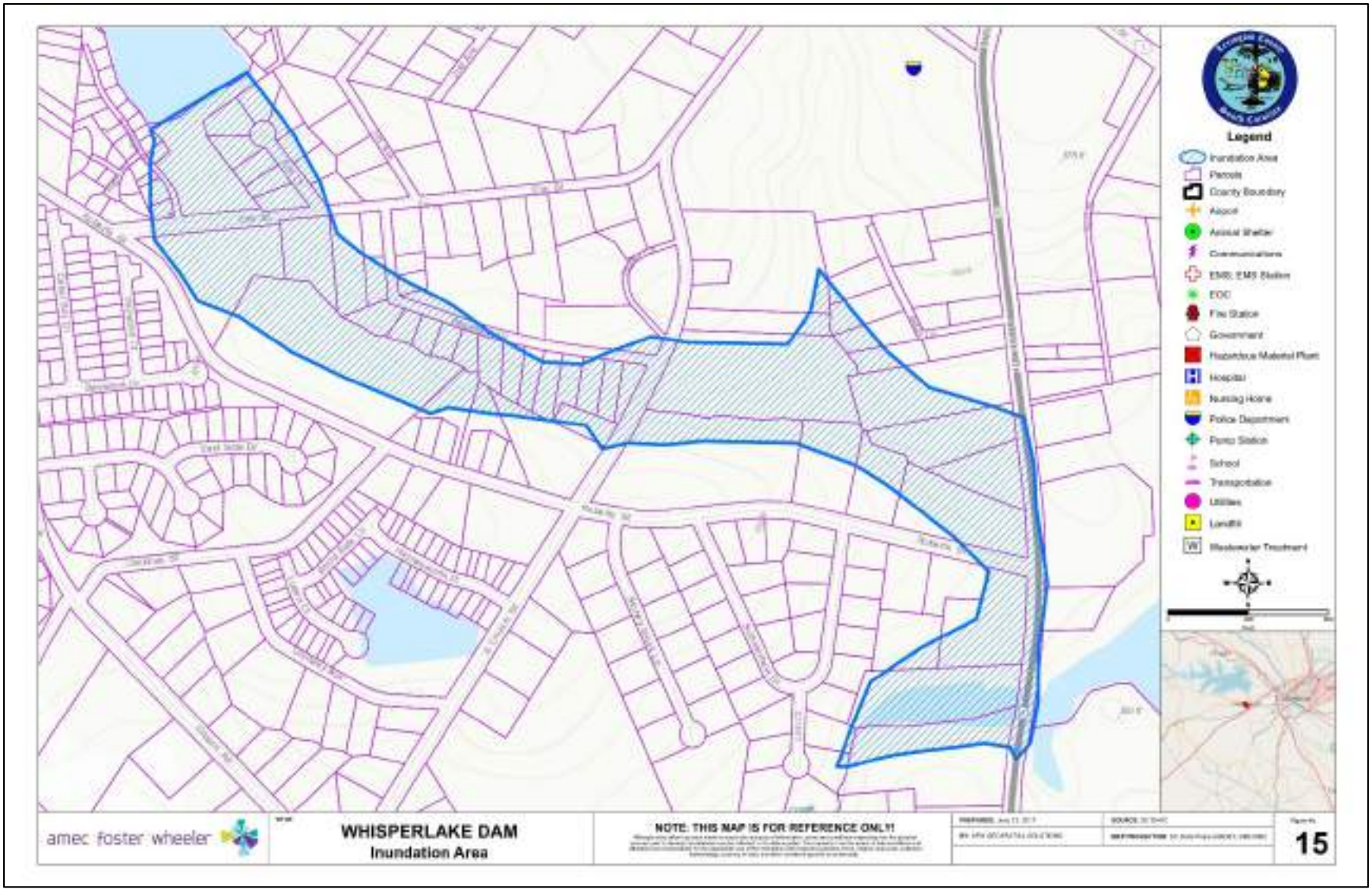


Figure 6.16 – Dam Inundation Area, Whisperlake Dam

Figure 6.17 – Dam Inundation Area, Whiteford Lake Dam

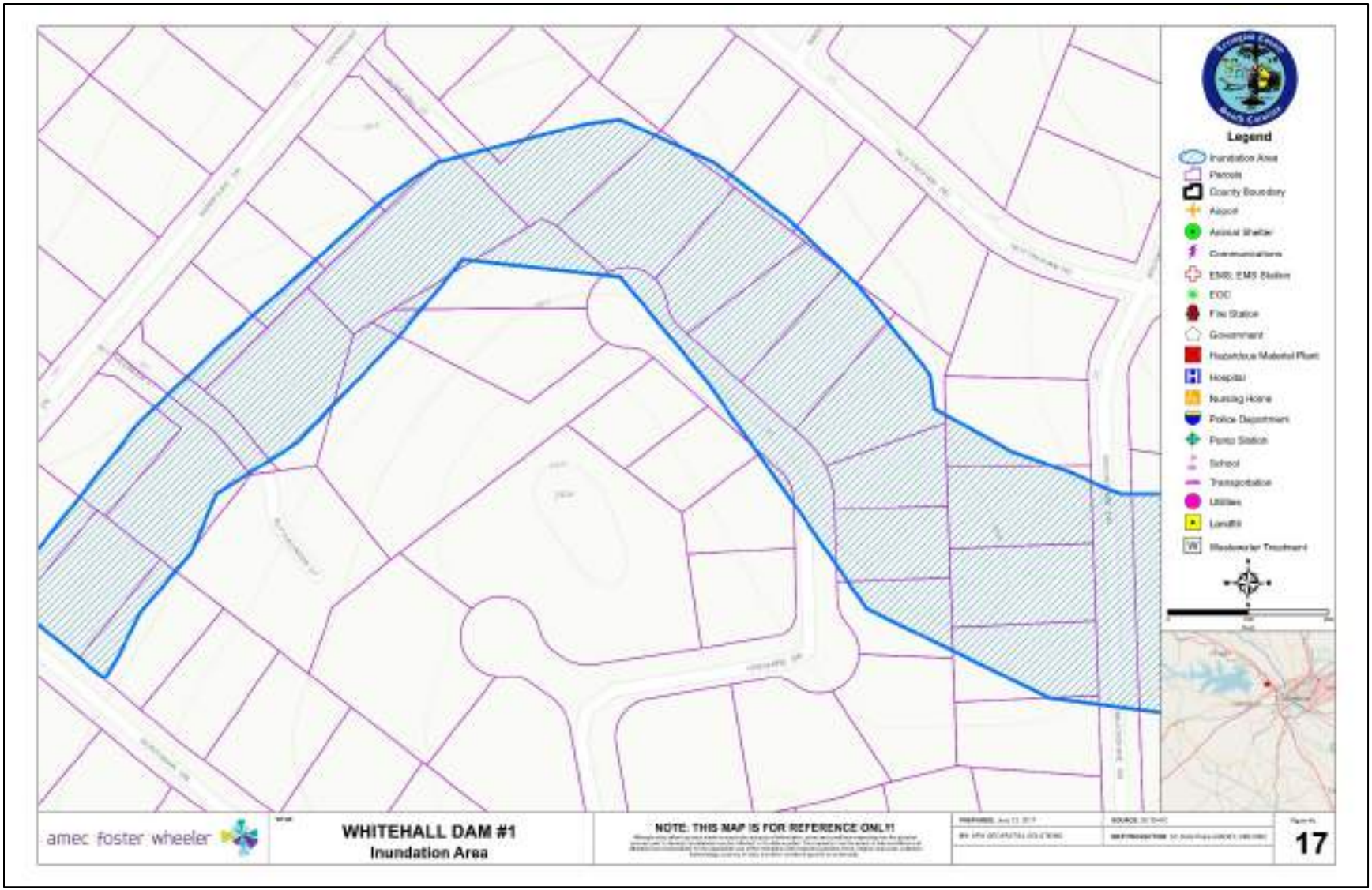


Figure 6.18 – Dam Inundation Area, Whitehall Dam #1

Figure 6.19 – Dam Inundation Area, Whitehall Dam #2

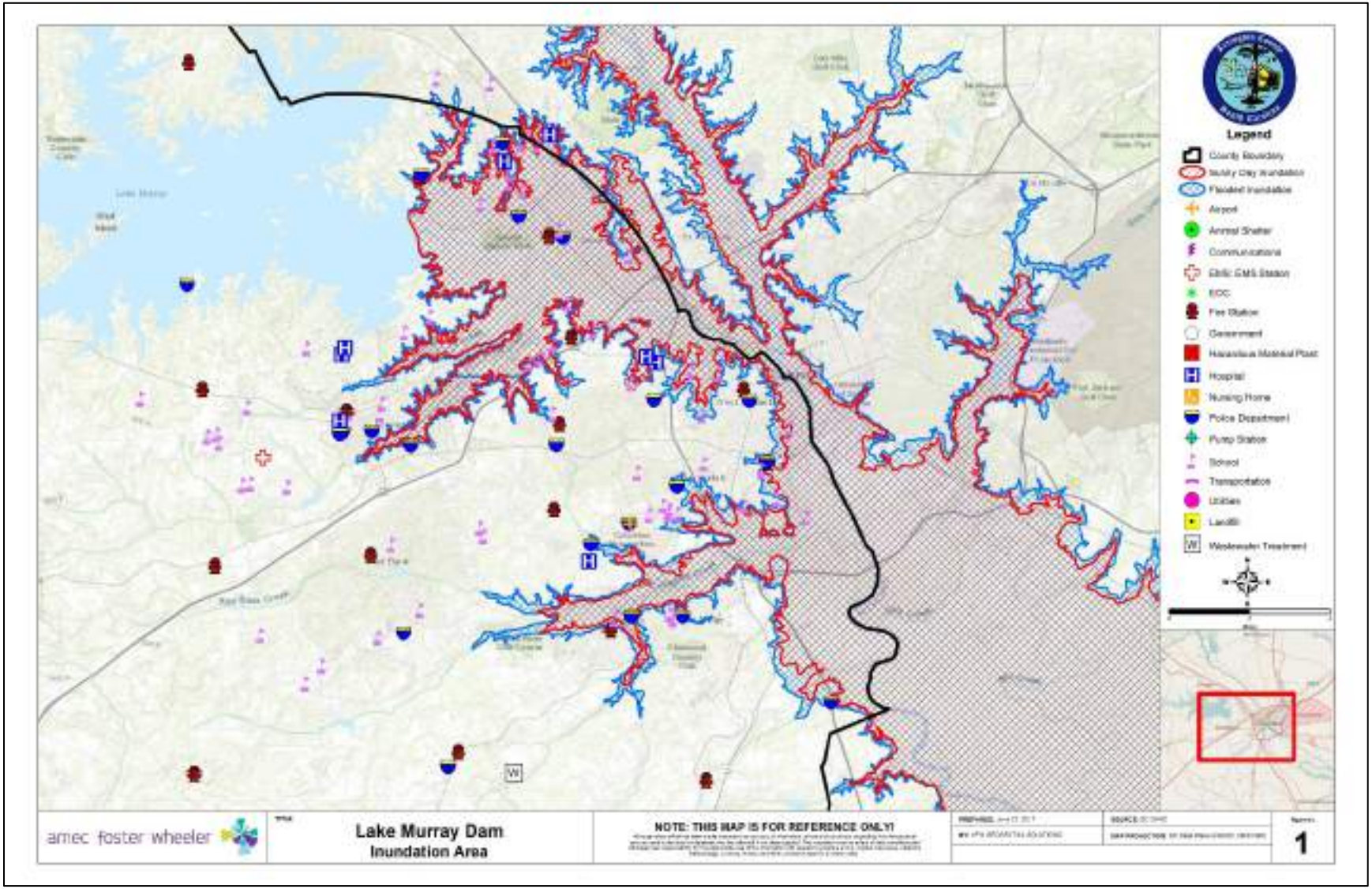


Figure 6.20 – Dam Inundation Area, Lake Murray Dam

The estimated number and building value of parcels that could potentially be impacted by a dam failure are shown in Table 6.4. **Note: the numbers presented in Table 6.4 are estimated using the DHEC dam inundation areas and building footprint data provided by the County. A dam inundation study including a hydrologic and hydraulic analysis was not performed.**

Table 6.4 – Properties Potentially at Risk to Dam Failure

Dam Name	# of Parcels at Risk	Total Building Value
Batesburg Reservoir Dam	12	$551,830
Brady Porth Dam	15	$3,053,416
Florence T Hall Dam	0	$0
Fricks Pond Dam	1	$239,400
Harbison New Town Lake	246	$39,964,360
Harbison Structure 9	80	$60,610,339
Lake Quail Valley Dam	169	$58,802,697
Lexington Old Mill Pond Dam	169	$69,028,168
Little Coldstream Dam	33	$3,679,218
Lower Quail Hollow Dam	35	$22,395,263
Nursery Hill Dam	26	$2,540,877
Saxe-Gotha Millpond Dam	33	$1,498,182
Swansea Lake Dam	18	$635,389
Upper Quail Hollow Dam	52	$24,426,625
Whisperlake Dam	74	$7,044,779
Whiteford Lake Dam	63	$18,512,644
Whitehall Dam #1	53	$5,627,562
Whitehall Dam #2	114	$12,366,112
Total	**1175**	**$329,368,225**

Table 6.5 details the number and value of parcels at risk, and Table 6.6 lists the critical facilities impacted by sunny day inundation and flooded inundation of the Lake Murray Dam.

Table 6.5 – Lake Murray Dam Inundation Exposure

Inundation Scenario	# of Parcels at Risk	Total Building Value
Sunny Day Inundation	19,125	$141,233,445
Flooded Inundation	25,777	$178,189,377

Table 6.6 – Lake Murray Dam Impacted Critical Facilities

Sunny Day Inundation	
Facility Name	**Facility Type**
Irmo EMS	EMS
Cayce EMS	EMS
Cayce	Fire Station
Irmo	Fire Station
Baptist Parkridge	Hospital
Cayce Police Department	Police Station
Irmo-Chapin Recreation Commission	Police Station
South Congaree Police Department	Police Station
River Oaks Substation	Police Station

Sunny Day Inundation	
Facility Name	**Facility Type**
Nursery Road Elementary School	School
Leaphart Elementary School	School
Busbee Creative Arts Academy	School
Northside Middle School	School
Flooded Inundation	
Facility Name	**Facility Type**
Irmo EMS	EMS
Cayce EMS	EMS
Cayce	Fire Station
Irmo	Fire Station
Charter Rivers Hospital	Hospital
Baptist Parkridge	Hospital
Cayce Police Department	Police Station
Irmo-Chapin Recreation Commission	Police Station
South Congaree Police Department	Police Station
Dixanna Substation	Police Station
River Oaks Substation	Police Station
Irmo Middle School	School
Nursery Road Elementary School	School
Leaphart Elementary School	School
Seven Oaks Elementary School	School
Harbison West Elementary School	School
Granby Education Center	School
Irmo High School	School
Meadow Glen Middle School	School
Brookland-Cayce High School	School
Busbee Creative Arts Academy	School
Northside Middle School	School
Saluda River Academy for the Arts	School
BC Grammar School No. 1	School
Congaree Elementary School	School
Northside Christian Academy	School

Citizens displaced from their homes due to a dam failure may require accommodations in temporary emergency shelters. For planning purposes, the Lake Murray Dam is estimated to impact the most buildings during a failure. If breached, this dam would potentially displace the occupants of 19,125 buildings. Using the average 2011-2015 U.S. Census household factor for Lexington County (2.54), an estimated 48,578 people could seek shelter.

6.3.2 Hurricane and Tropical Storm

Probability	Impact	Spatial Extent	Warning Time	Duration
Likely	Limited	Moderate	>24 hours	<24 hours

For the purpose of this plan, this assessment of vulnerability to hurricanes and tropical storms is limited to rainfall from these events. As such, the estimated building damage and content loss as well as critical facilities at risk mirrors what is detailed for 100- and 500-year flooding in Section 6.3.3.

Hurricanes and tropical storms are expected to pass through Lexington County, on average, once every four years. According to research provided by the NOAA Weather Prediction Center, the heaviest rainfall from hurricanes and tropical storms typically occurs in the 12-hr period starting 6 hours prior to a storm's landfall. Rainfall is not correlated with the intensity of a storm, but is related to the velocity and length of the storm along its axis of movement.

6.3.3 100-/500-year

Probability	Impact	Spatial Extent	Warning Time	Duration
Possible	Limited	Moderate	>24 hours	<1 week

Flood damage is directly related to the depth of flooding and is estimated by the application of a depth damage curve. In applying the curve, a specific depth of water translates to a specific percent damage to the structure, which translates to the same percentage of the structure's replacement value. Figure 6.21, Figure 6.22 and Figure 6.23 on the following pages depict the depth of flooding that can be expected within the region during the 1%-annual-chance flood event.

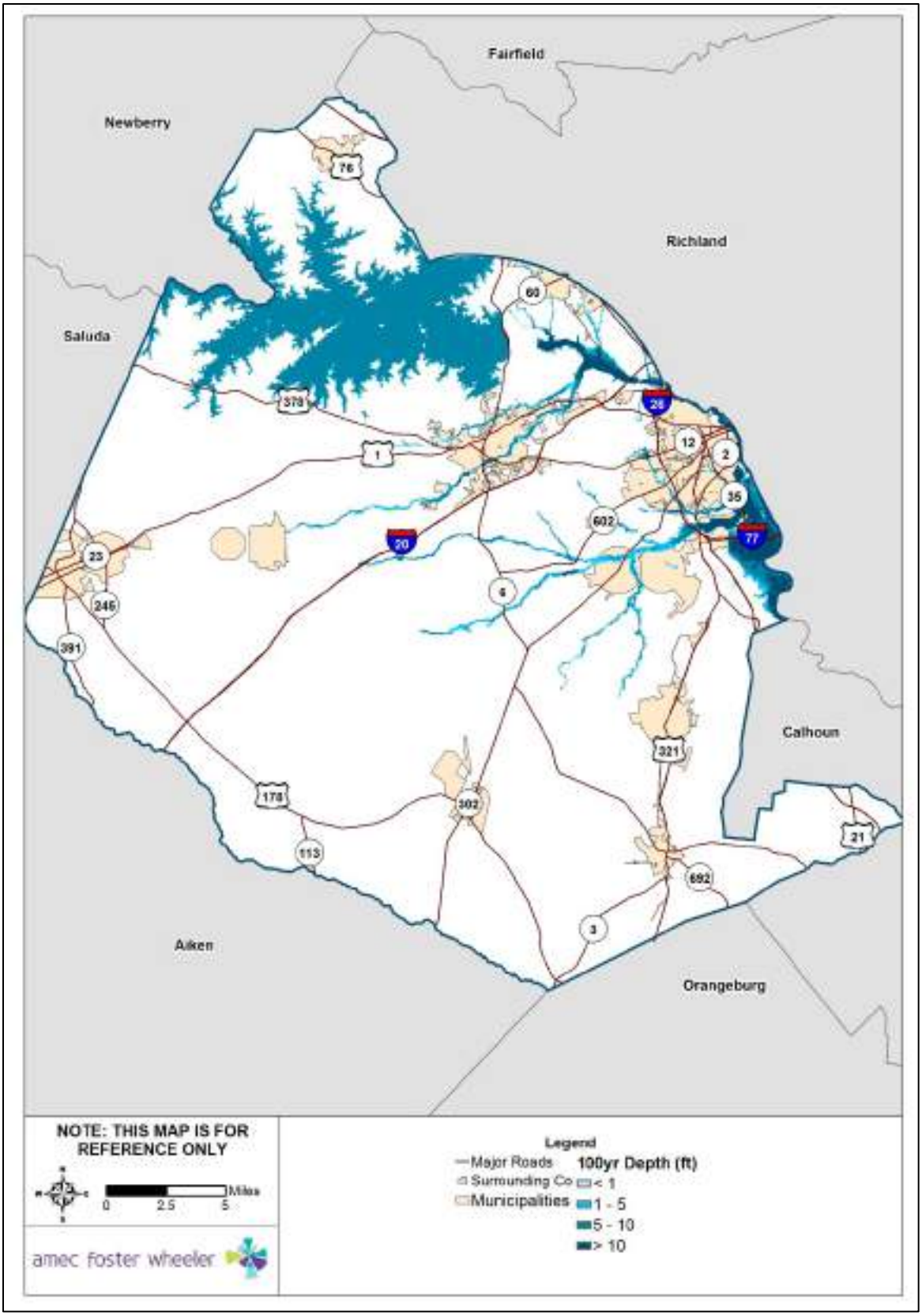


Figure 6.21 – Lexington County Flood Depth Grid (100-yr)

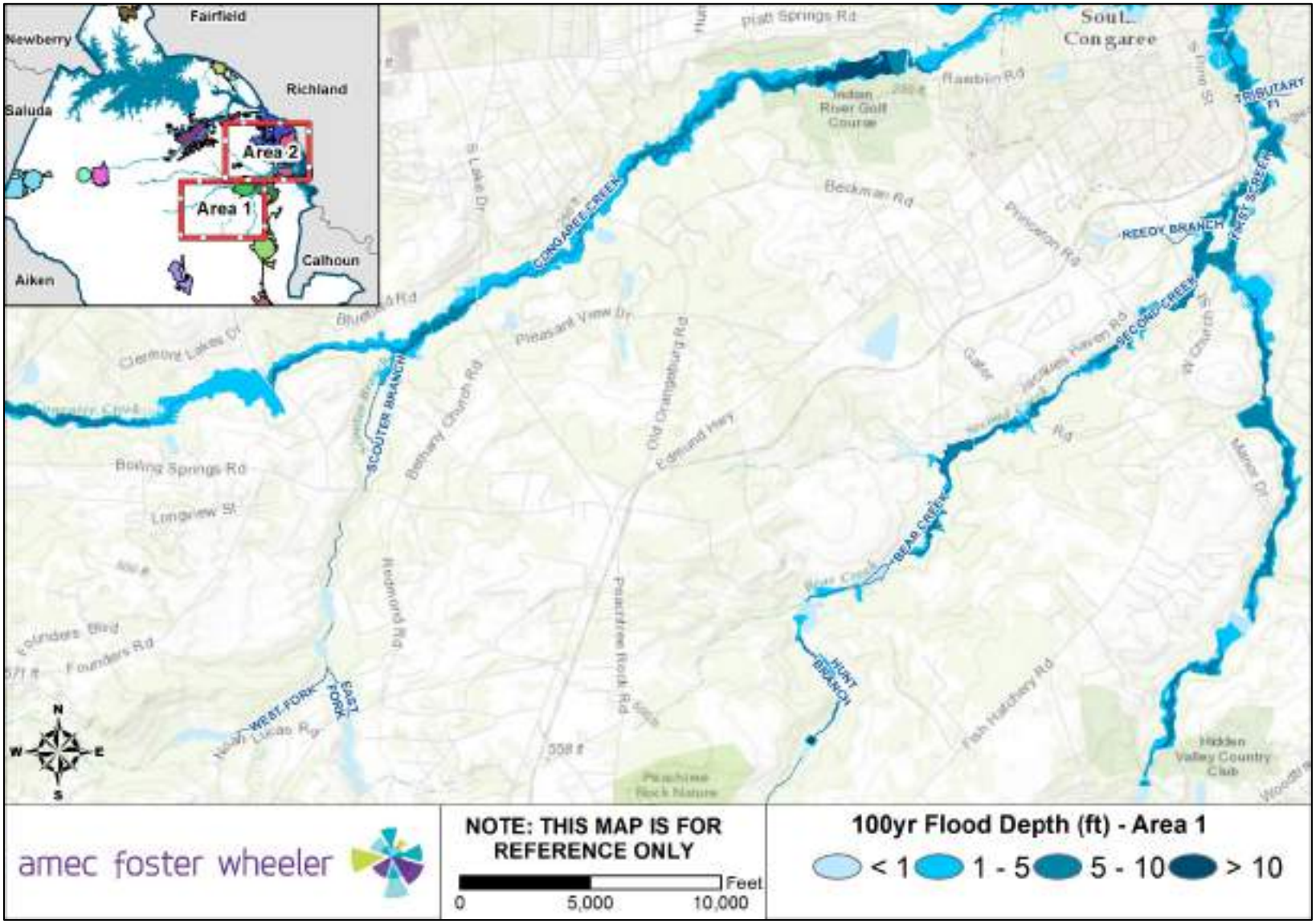


Figure 6.22 – Lexington County Flood Depth Grid (100-yr) – Area 1

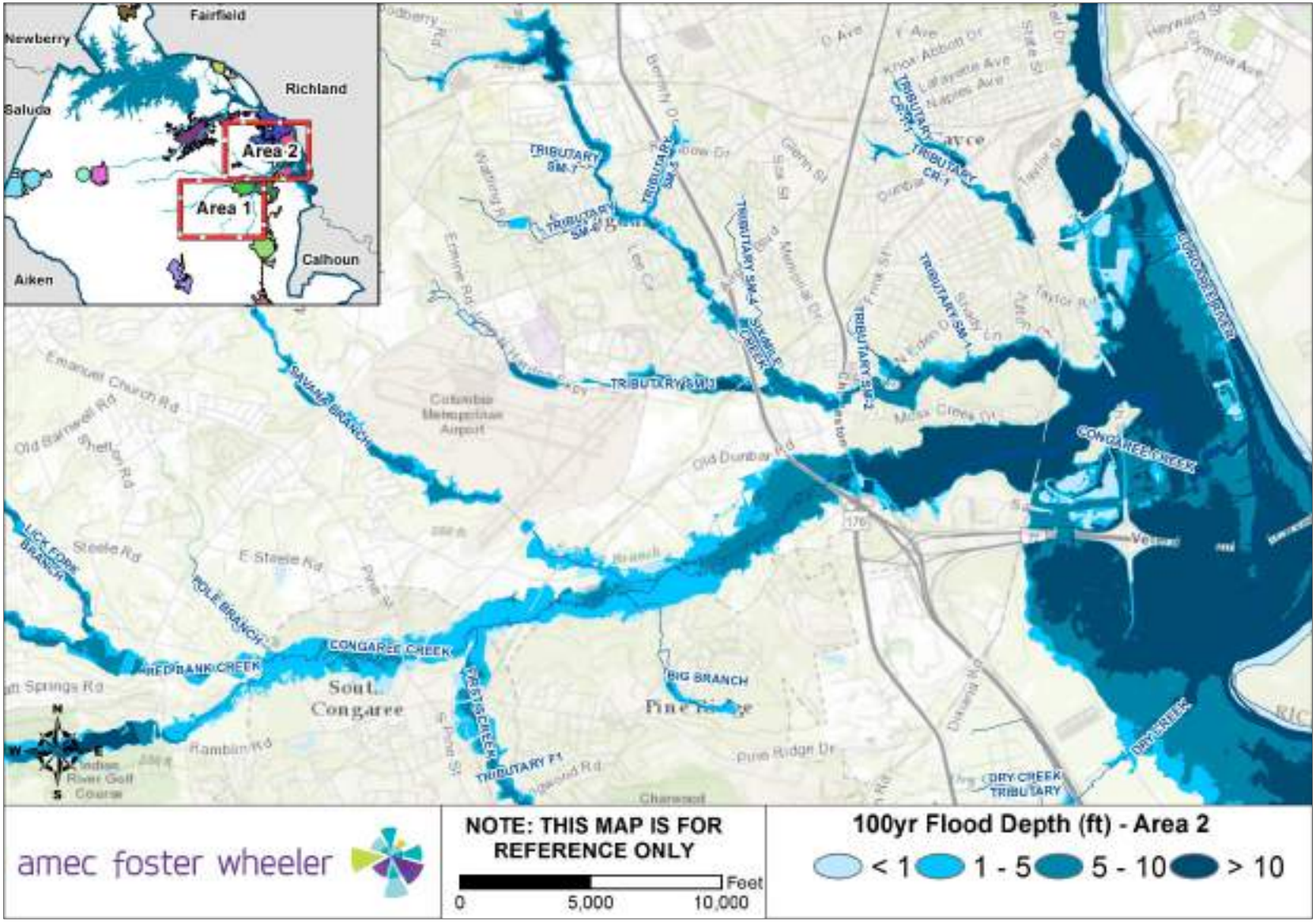


Figure 6.23 – Lexington County Flood Depth Grid (100-yr) – Area 2

Methodology

All building attribute data and estimated flood damages are derived using Hazus version 3.2. Default Hazus inventories were used to assign each building footprint a specific occupancy class (i.e. RES1, COM4, EDU2, etc.). An occupancy class is required in order to apply the correct depth damage factor which ensures the most accurate damage assessment.

Table 6.7 provides the depth damage factors that were used in calculating flood losses for the region. The depth damage factors were developed based on the default depth damage curve in Hazus. All depths assume the structure has no basement.

Table 6.7 – Flood Loss Damage Factors

Percent Damaged (%)							
Depth (ft)	Agricultural	Commercial	Education	Government	Industrial	Religious	Residential
0	0	15	4	5	2	12	9
1	6	20	22	8	7	17	14
2	11	29	29	10	12	19	23
3	15	37	34	10	19	22	28
4	19	44	39	11	25	25	32
5	25	50	44	13	30	28	36
6	30	55	48	14	36	32	39
7	35	62	53	15	41	37	43
8	41	67	57	16	46	43	46
9	46	71	62	17	51	48	49
10	51	75	66	18	56	53	52
11	57	79	70	20	61	58	56
12	63	84	75	21	66	63	60
13	70	88	79	22	71	68	64
14	75	97	83	24	76	73	68
15	79	100	87	25	81	78	73
16	82	100	91	26	86	83	80
17	84	100	95	27	91	88	81
18	87	100	99	28	96	93	83
19	89	100	100	29	100	98	84
20	90	100	100	30	100	100	85
21	92	100	100	31	100	100	85
22	93	100	100	32	100	100	85
23	95	100	100	33	100	100	85
24	96	100	100	34	100	100	85

Source: Hazus 2.1
Note: Government structures include pump stations, water treatment plants, etc. which accounts for the low percent damaged values.

Content value estimations are based on FEMA Hazus methodologies of estimating value as a percent of improved structure values by occupancy type. Table 6.8 shows the breakdown of the different occupancy types and their estimated content replacement value percentages.

Table 6.8 – Content Replacement Factors

Property Type	Content Replacement Values
Agricultural	100%
Residential	50%
Commercial	100%
Education	100%

Property Type	Content Replacement Values
Government	100%
Religious	100%
Industrial	150%

Loss Estimates

The loss estimate for flood is based on the total of improved building value and contents value. Land value is not included in any of the loss estimates as generally the land is not subject to loss from floods. Once the potential value of affected parcels was calculated, damage factors were applied to obtain loss estimates by flood zone.

Table 6.9 shows the building count, total value, estimated damages and loss ratio for buildings that fall within the 1%-annual-chance floodplain by occupancy type on the regional level. A community specific analysis for each jurisdiction can be found within each community's annex.

The loss ratio is the loss estimate divided by the total potential exposure (i.e., total of improved and contents value for all buildings located within the 1%-annual-chance floodplain) and displayed as a percentage of loss. FEMA considers loss ratios greater than 10% to be significant and an indicator a community may have more difficulties recovering from an event.

Table 6.9 – Estimated Building Damage and Content Loss – 1%-Annual-Chance Flood

Occupancy Type	Total Number of Buildings with Loss	Total Value (Building & Contents)	Estimated Building Damage	Estimated Content Loss	Estimated Total Damage	Loss Ratio
Commercial	70	$26,903,752	$1,064,908	$3,382,881	$4,447,789	16.5%
Education	0	N/A	N/A	N/A	N/A	0.0%
Government	0	N/A	N/A	N/A	N/A	0.0%
Industrial	0	N/A	N/A	N/A	N/A	0.0%
Religious	1	$93,455	$187	$1,009	$1,196	1.3%
Residential	1290	$165,987,039	$25,299,527	$13,851,500	$39,151,026.80	23.6%
Total	**1361**	**$192,984,245.80**	**$26,364,621.50**	**$17,235,390.50**	**$43,600,012.00**	**22.6%**

Source: Hazus, Version 3.2

Population at Risk

A separate analysis was performed to determine the population at risk to the individual FEMA flood zones. Using GIS, the Effective DFIRM flood zones were intersected with the building footprint layer. Those residential buildings that intersected the flood zones were multiplied by a regional household factor of 2.54 as shown in Table 6.10. The regional household factor was derived from a weighted average of the 2011-2015 Census Bureau owner-occupied and renter-occupied household factors for Lexington County.

Table 6.10 – Regional Population at Risk to Flood

Flood Return Period	Residential Property Count	Population at Risk
100-yr	1,290	3,277

Source: FEMA DFIRM, U.S. Census Bureau 5-year Community Survey (2011-2015)

Critical Facilities at Risk

A separate analysis was performed to determine critical facilities located in the 1%- and 0.2%-annual-chance floodplains. Using GIS, the Effective DFIRM flood zones were overlaid on the critical facility location data. Figure 6.24 shows critical facilities and DFIRM flood zones within Lexington County.

Table 6.11 lists the critical facilities located in moderate and high risk flood zones.

Table 6.11 – Critical Facilities in Moderate and High Risk Zones

Facility Name	Facility Type	Estimated 100-yr Flood Depth (Ft)
Zone AE		
Cayce EMS	Town Hall	4.3
Cayce Public Safety	Fire Station	4.4
Cayce Police Department	Law Enforcement	N/A
South Congaree Police Department	Law Enforcement	0.9
Lake Murray Law Enforcement	Law Enforcement	N/A
CWS-Friarsgate	Wastewater Treatment Plant	0.8
Woodland Hills West	Wastewater Treatment Plant	10.8
Zone A (100-yr)		
N/A	N/A	N/A
Zone X Shaded (500-yr)		
N/A	N/A	N/A

Source: Hazus, v.3.2

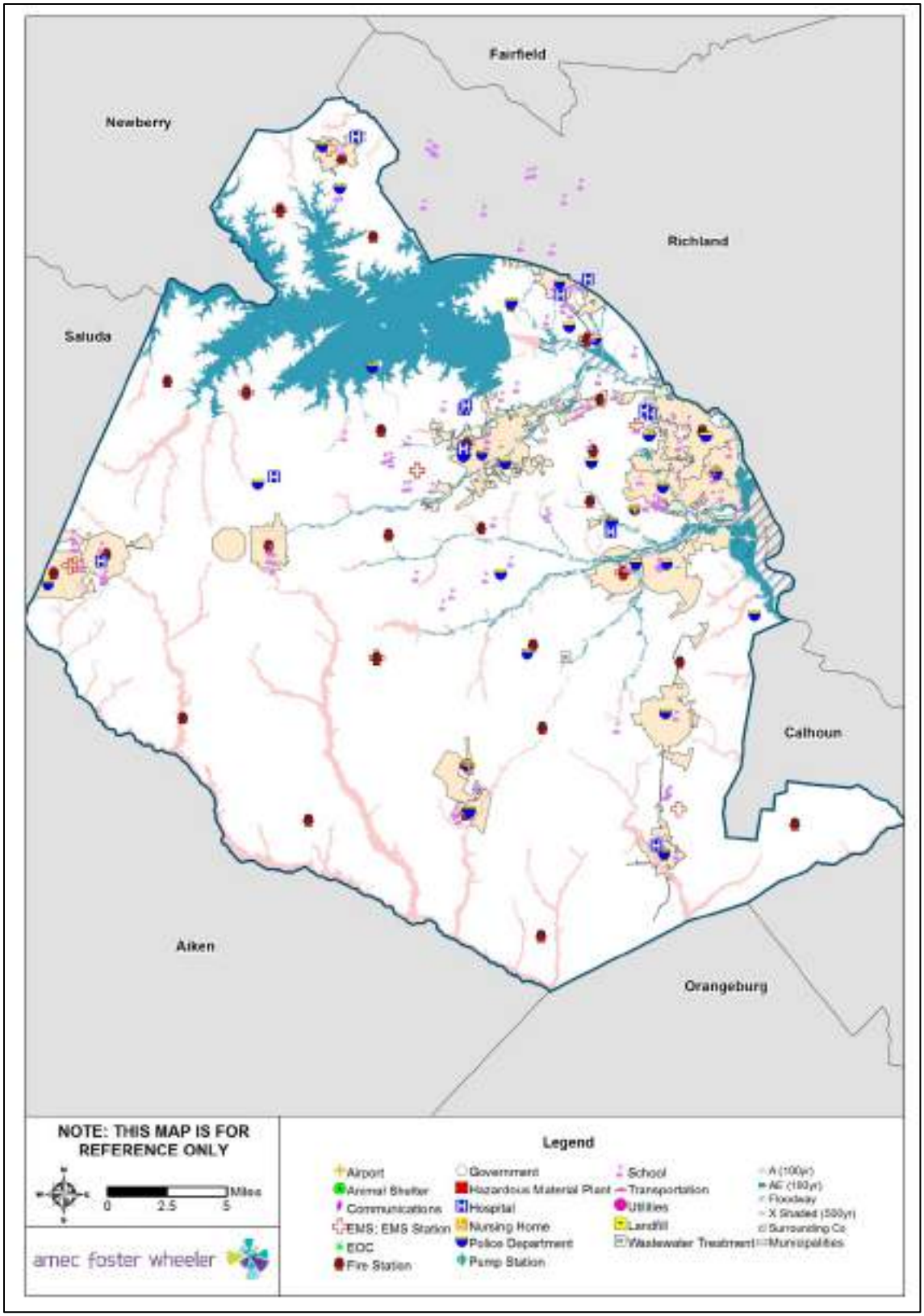


Figure 6.24 – Lexington County Critical Facilities and FEMA Flood Zones

Flood Insurance Analysis and Repetitive Loss

One valuable source of information on flood hazards is current flood insurance data for active policies and past claims. Flood insurance is required as a condition of federal aid or a mortgage or loan that is federally insured for a building located in a FEMA flood zone.

Lexington County has been a regular participant in the NFIP since June 1981. Lexington County has achieved a Class 8 flood insurance rating through participation in the NFIP's Community Rating System which rewards all policyholders in the SFHA with a 10 percent reduction in their flood insurance premiums. Non-SFHA policies (Standard X Zone policies) receive a 5 percent discount, and preferred risk policies receive no discount. The following tables reflect NFIP policy and claims data for the County categorized by occupancy type, flood zone, Pre-FIRM and Post-FIRM.

Table 6.12 – NFIP Policy and Claims Data by Occupancy Type

Structure Type	Number of Policies in Force	Total Premium	Total Coverage	Number of Closed Paid Losses	Total of Closed Paid Losses
Single Family	1,082	$720,223	$243,407,100	330	$9,759,303.12
2-4 Family	10	$6,818	$1,877,700	3	$7,094.74
All Other Residential	15	$17,427	$3,362,600	4	$311,296.00
Non Residential	45	$100,512	$16,161,300	8	$864,075.29
Total	**1,152**	**$844,980**	**$264,808,700**	**345**	**$10,941,768.00**

Source: FEMA Community Information System, April 2017

Table 6.13 – NFIP Policy and Claims Data by Flood Zone

Flood Zone[1]	Number of Policies in Force	Total Premium	Total Coverage	Number of Closed Paid Losses	Total of Closed Paid Losses
A01-30 & AE Zones	550	$498,995	$110,581,500	262	$9,765,543.67
A Zones	112	$118,135	$20,512,900	26	$263,180.09
AO Zones	0	$0	$0	0	$0.00
AH Zones	0	$0	$0	0	$0.00
AR Zones	0	$0	$0	0	$0.00
A99 Zones	0	$0	$0	0	$0.00
V01-30 & VE Zones	0	$0	$0	0	$0.00
V Zones	0	$0	$0	0	$0.00
D Zones	0	$0	$0	0	$0.00
B, C & X Zone					
Standard	32	$41,148	$7,940,900	15	$226,326.23
Preferred	420	$163,902	$124,508,000	41	$676,671.25
Total	**1,114**	**$822,180**	**$263,543,300**	**344**	**$10,931,720.00**

Source: FEMA Community Information System, April 2017
[1]Flood zone is indicative of historic policy zone.

Table 6.14 – NFIP Policy and Claims Data Pre-FIRM

Flood Zone[1]	Number of Policies in Force	Total Premium	Total Coverage	Number of Closed Paid Losses	Total of Closed Paid Losses
A01-30 & AE Zones	319	$367,850	$55,292,700	227	$8,878,776.33
A Zones	54	$83,443	$9,847,200	21	$227,934.61
AO Zones	0	$0	$0	0	$0.00

Flood Zone[1]	Number of Policies in Force	Total Premium	Total Coverage	Number of Closed Paid Losses	Total of Closed Paid Losses
AH Zones	0	$0	$0	0	$0.00
AR Zones	0	$0	$0	0	$0.00
A99 Zones	0	$0	$0	0	$0.00
V01-30 & VE Zones	0	$0	$0	0	$0.00
V Zones	0	$0	$0	0	$0.00
D Zones	0	$0	$0	0	$0.00
B, C & X Zone	156	$65,776	$44,006,700	44	$771,664.84
Standard	12	$15,455	$3,165,700	12	$206,110.71
Preferred	144	$50,321	$40,841,000	32	$565,554.13
Total	**529**	**$517,069**	**$109,146,600**	**292**	**$9,878,374.00**

Source: FEMA Community Information System, April 2017
[1]Flood zone is indicative of historic policy zone.

Table 6.15 – NFIP Policy and Claims Data Post-FIRM

Flood Zone[1]	Number of Policies in Force	Total Premium	Total Coverage	Number of Closed Paid Losses	Total of Closed Paid Losses
A01-30 & AE Zones	231	$131,145	$55,288,800	35	$886,767.34
A Zones	58	$34,692	$10,665,700	5	$35,245.48
AO Zones	0	$0	$0	0	$0.00
AH Zones	0	$0	$0	0	$0.00
AR Zones	0	$0	$0	0	$0.00
A99 Zones	0	$0	$0	0	$0.00
V01-30 & VE Zones	0	$0	$0	0	$0.00
V Zones	0	$0	$0	0	$0.00
D Zones	0	$0	$0	0	$0.00
B, C & X Zone	296	$139,274	$88,442,200	12	$131,332.64
Standard	20	$25,693	$4,775,200	3	$20,215.52
Preferred	276	$113,581	$83,667,000	9	$111,117.12
Total	**585**	**$305,111**	**$154,396,700**	**52**	**$1,053,344.00**

Source: FEMA Community Information System, April 2017
[1]Flood zone is indicative of historic policy zone.

Repetitive Loss Analysis

A repetitive loss property is a property for which two or more flood insurance claims of more than $1,000 have been paid by the NFIP within any 10-year period since 1978. An analysis of repetitive loss was completed for Lexington County Unincorporated Areas to examine repetitive loss properties against FEMA flood zones.

Methodology

According to 2016 NFIP records, there are a total of 19 unmitigated repetitive loss properties within Lexington County Unincorporated Areas. Table 6.16 details repetitive loss building counts by FEMA flood zone, building type and insurance.

Table 6.16 – Unmitigated Repetitive Loss Summary

Flood Zone[1]	Building Type		Building Count		Total Building Payment	Total Content Payment	Total Paid
	Commercial	Residential	Insured	Uninsured			
C		X	X		37,480.67	20,860.00	58,340.67

Flood Zone[1]	Building Type		Building Count		Total Building Payment	Total Content Payment	Total Paid
	Commercial	Residential	Insured	Uninsured			
A03		X		X	4,051.08	0.00	4,051.08
B		X		X	16,315.00	0.00	16,315.00
A		X	X		6,904.58	0.00	6,904.58
AE		X	X		155,433.37	3,454.00	158,887.37
AE		X	X		58,012.38	4,938.43	62,950.81
AE		X	X		54,890.30	20,400.00	75,290.30
X		X	X		33,443.71	0.00	33,443.71
AE		X	X		88,792.12	13,338.70	102,130.82
AE		X	X		120,699.37	0.00	120,699.37
AE		X	X		11,798.50	0.00	11,798.50
AE		X	X		86,399.55	0.00	86,399.55
AE		X	X		116,301.91	0.00	116,301.91
AE		X	X		17,403.14	22,131.01	39,534.15
AE		X	X		33,090.99	0.00	33,090.99
A03		X	X		99,024.63	0.00	99,024.63
AE		X		X	129,753.81	10,000.00	139,753.81
AE		X	X		69,160.87	0.00	69,160.87
X		X	X		10,257.20	0.00	10,257.20
Total	**0**	**19**	**16**	**3**	**$1,149,213.18**	**$95,122.14**	**$1,244,335.32**

Source: NFIP Repetitive Loss Data, May 31, 2016
[1]Flood Zone is based on historical policy zone.

Repetitive Loss Area Mapping

The above list of unmitigated repetitive loss properties is not a complete list of properties at risk to repeat flood events. In accordance with the principles outlined in the CRS guidance titled Mapping Repetitive Loss Areas dated August 15, 2008, 10 repetitive loss areas were identified in Lexington County. The FMPC and consulting team created the repetitive loss areas by identifying the unmitigated repetitive loss properties, surrounding historic loss properties (those with one claim paid against the NFIP) and additional properties that are likely to experience the same or similar flood conditions but have not yet had any claims paid against the NFIP. The resulting 10 repetitive loss areas are shown in detail in Figure 6.25 through Figure 6.34. The structure count within each repetitive loss area is detailed in Table 6.17 below.

Table 6.17 – Structures in Repetitive Loss Areas

Repetitive Loss Area	Number of Structures
1	17
2	54
3	26
4	22
5	11
6	10
7	14
8	4
9	5
10	4
Total	**167**

Figure 6.25 – Repetitive Loss Area Mapping, Area 1

Figure 6.26 – Repetitive Loss Area Mapping, Area 2

Figure 6.27 – Repetitive Loss Area Mapping, Area 3

Figure 6.28 – Repetitive Loss Area Mapping, Area 4

Figure 6.29 – Repetitive Loss Area Mapping, Area 5

Figure 6.30 – Repetitive Loss Area Mapping, Area 6

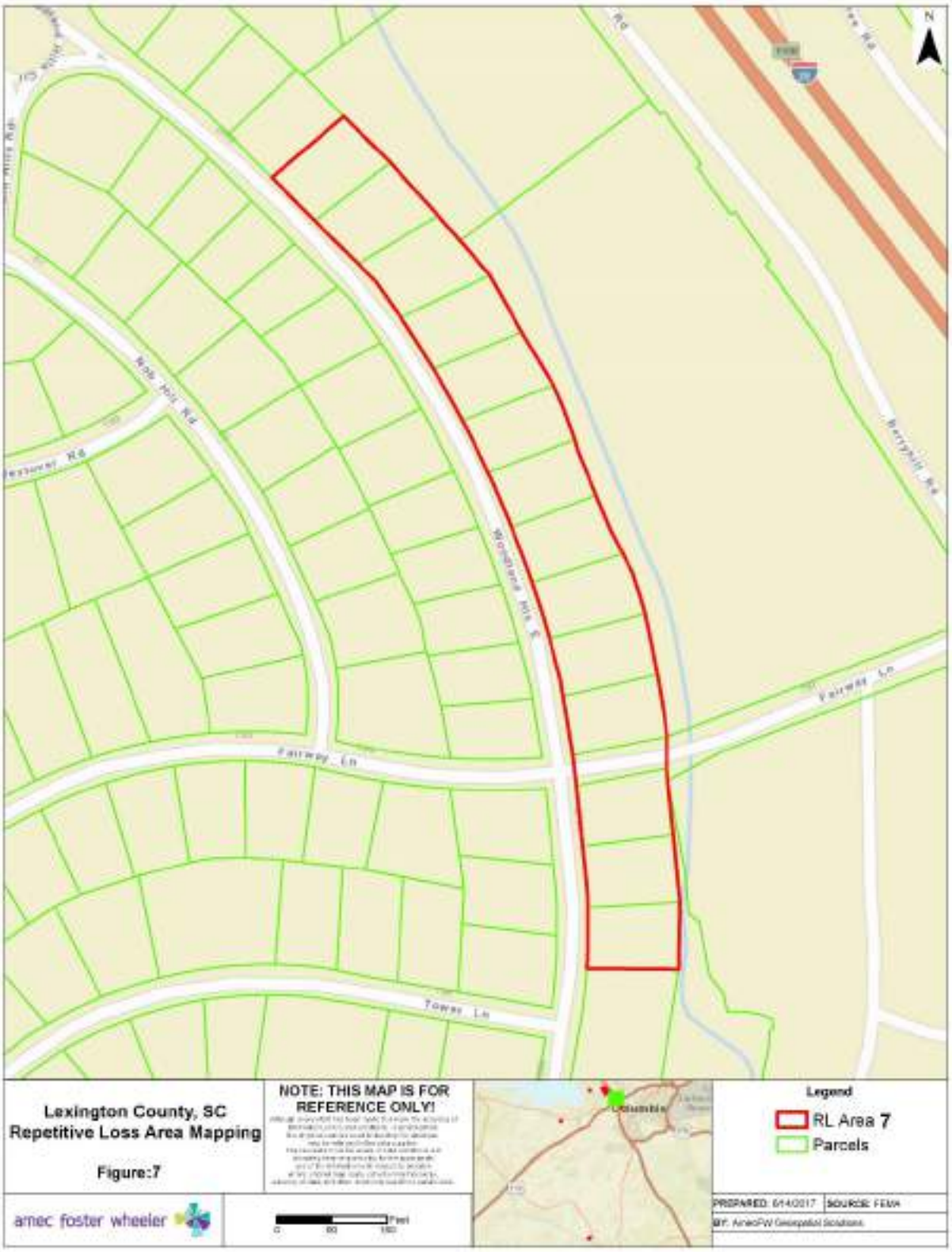


Figure 6.31 – Repetitive Loss Area Mapping, Area 7

Figure 6.32 – Repetitive Loss Area Mapping, Area 8

Figure 6.33 – Repetitive Loss Area Mapping, Area 9

Figure 6.34 – Repetitive Loss Area Mapping, Area 10

6.3.4 Localized Stormwater

Probability	Impact	Spatial Extent	Warning Time	Duration
Highly Likely	Minor	Small	>24 hours	<6 hours

Localized flooding occurs at various times throughout the year with several areas of primary concern to the County. Localized flooding and ponding affect streets and property.

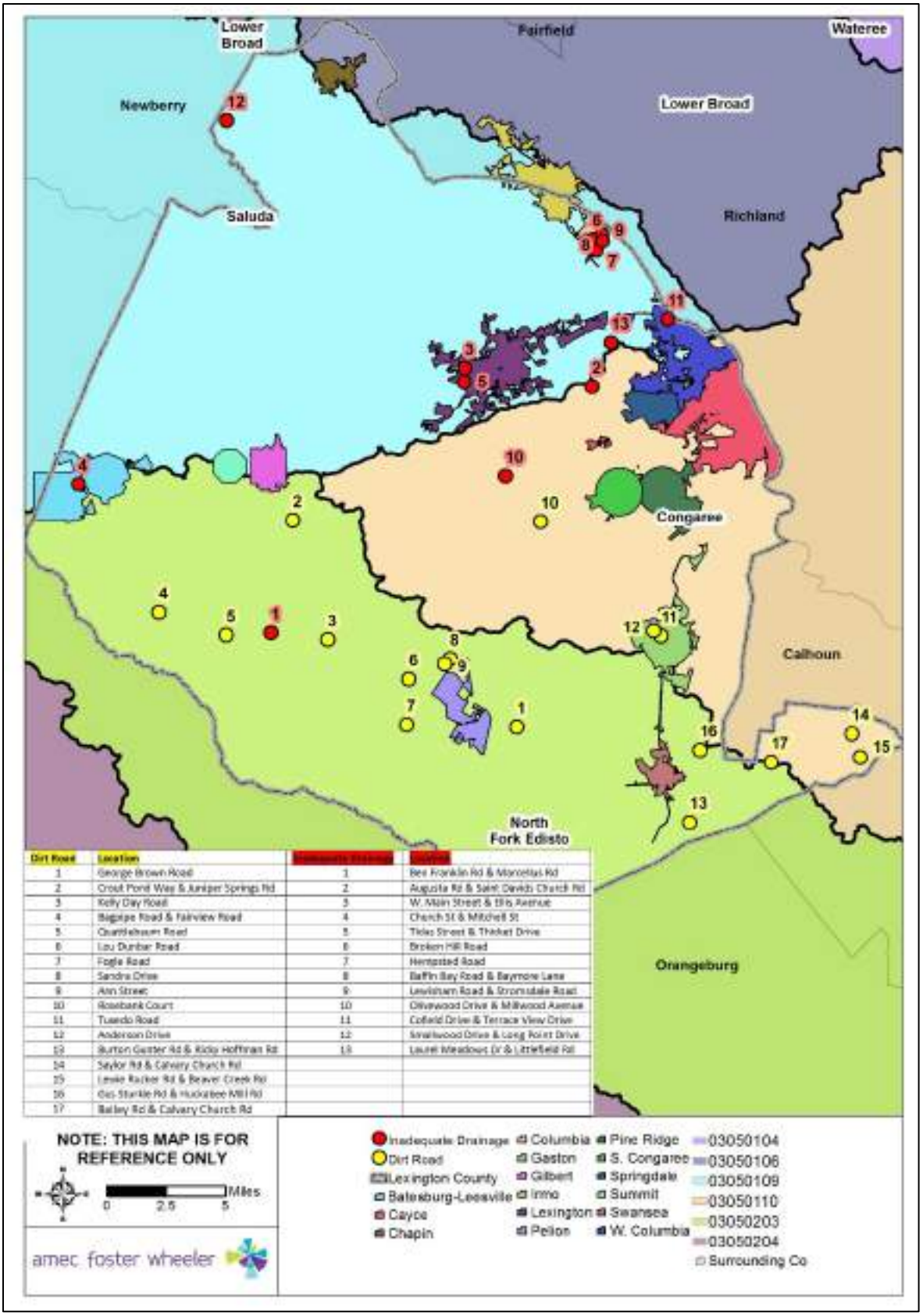
Property at Risk

Localized flooding occurs at various times throughout the year with several areas of primary concern to the County. Localized flooding and ponding affect streets and property. Areas of localized flooding were identified by the Lexington County Public Works Department.

Future Development

The risk of localized flooding to future development can be minimized by accurate recordkeeping of repetitive localized storm activity and an evaluation of regional drainage issues. Mitigating the root causes of the localized flooding or choosing not to develop in areas that often are subject to localized flooding will reduce future risks of losses due to this hazard. Figure 6.35 shows localized flooding in relation to watershed boundaries in and around the County. Many of the existing problems with inadequate drainage are occurring within the Saluda watershed, while much of the flooding associated with dirt roads is occurring in the North Fork Edisto River watershed

As development continues around the Capital region and Lake Murray in the Saluda and Congaree watersheds, not only will more property be exposed due to new construction, but the associated increase in impervious surface and reduction in flood storage areas will increase the vulnerability of existing property within these watersheds.



Dirt Road	Location	[illegible]	[illegible]
1	George Brown Road	1	Ben Franklin Rd & Marcellus Rd
2	Crout Pond Way & Juniper Springs Rd	2	Augusta Rd & Saint Davids Church Rd
3	Kelly Day Road	3	W. Main Street & Ellis Avenue
4	Bagpipe Road & Fairview Road	4	Church St & Mitchell St
5	Quattlebaum Road	5	Ticks Street & Thicket Drive
6	Lou Dunbar Road	6	Broken Hill Road
7	Fogle Road	7	Hempsted Road
8	Sandra Drive	8	Baffin Bay Road & Baymore Lane
9	Ann Street	9	Lewisham Road & Stromsdale Road
10	Rosebank Court	10	Olivewood Drive & Millwood Avenue
11	Tuxedo Road	11	Colfield Drive & Terrace View Drive
12	Anderson Drive	12	Smallwood Drive & Long Point Drive
13	Burton Gunter Rd & Ricky Hoffman Rd	13	Laurel Meadows Dr & Littlefield Rd
14	Saylor Rd & Calvary Church Rd		
15	Lewie Rucker Rd & Beaver Creek Rd		
16	Gas Sturkie Rd & Huckabee Mill Rd		
17	Bailey Rd & Calvary Church Rd		

Figure 6.35 – HUC-8 Watersheds and Localized Flooding Areas

6.4 Priority Risk Index Results

Table 6.18 summarizes the degree of risk assigned to each identified hazard using the PRI method described above.

Table 6.18 – Summary of PRI Results

Hazard	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Dam Failure	Likely	Critical	Moderate	<6 hours	<24 hours	3.0
Hurricane/Tropical Storm	Likely	Limited	Moderate	>24 hours	<24 hours	2.4
100-/500-yr Flooding	Possible	Limited	Moderate	>24 hours	<1 week	2.2
Localized Stormwater	Highly Likely	Minor	Small	>24 hours	<6 hours	2.1

6.4.1 Final Risk Classifications

The results from the PRI have been classified into three categories based on the assigned risk value:

- **Low Risk** - Minimal potential impact. The occurrence and potential cost of damage to life and property is minimal.
- **Medium Risk** - Moderate potential impact. This ranking carries a moderate threat level to the general population and/or built environment. Here the potential damage is more isolated and less costly than a more widespread disaster.
- **High Risk** - Widespread potential impact. This ranking carries a high threat to the general population and/or built environment. The potential for damage is widespread.

Table 6.19 – Summary of Hazard Risk Classification

High Risk (> 2.5)	Dam Failure
Moderate Risk (2.0 – 2.5)	Hurricane/Tropical Storm Flood: 100-/500-year Flood: Localized Stormwater
Low Risk (< 2.0)	None

7 CAPABILITY ASSESSMENT

Chapter 7 discusses the community's existing mitigation capabilities, including planning, programs, policies and land management tools. It consists of the following subsections:

- 7.1 Overview of Capability Assessment
- 7.2 Planning and Regulatory Capability
- 7.3 Floodplain Management
- 7.4 Administrative and Technical Capability
- 7.5 Fiscal Capability

7.1 Overview of Capability Assessment

The purpose of conducting a capability assessment is to determine the community's ability to implement feasible mitigation actions based on an understanding of the capacity of those agencies or departments tasked with their implementation. A capability assessment should also identify opportunities for establishing or enhancing specific mitigation policies or programs. The process of conducting a capability assessment includes developing an inventory of relevant plans, ordinances, or programs already in place; as well as assessing the community's resources and ability to implement existing and/or new policies. Conclusions drawn from the capability assessment should identify any existing gaps or weaknesses in existing programs and policies as well as positive measures already in place which can and should be supported through future mitigation efforts.

7.2 Planning and Regulatory Capability

Planning and regulatory capabilities include plans, ordinances and programs that guide development and growth within the community. Table 7.1 lists local plans, ordinances and programs currently in place for all participating jurisdictions.

Table 7.1 – Planning and Regulatory Capability

Regulatory Tool (ordinances, codes, plans)	Lexington County	Year/Comments
Comprehensive Plan	Y	2006
Zoning Ordinance	Y	2016
Subdivision Ordinance	Y	2017
Floodplain Ordinance	Y	2016
Stormwater Ordinance	Y	2016
Erosion, Sedimentation, and Pollution Control Ordinance	N	
Building Code	Y	2008
BCEGS Rating	Y*	99/4
Stormwater Management Program	Y	
Site Plan Review Requirements	Y	2010
Capital Improvements Plan	Y	No funding identified
Local Emergency Operations Plan	N	
Flood Insurance Study or Other Engineering Study for Streams	Y	2002, 2015
Repetitive Loss Plan	N	
Elevation Certificates	Y	

*Lexington County is only rated for commercial building code enforcement. A score of "99" for residential indicates there is no residential code enforcement program in place.

A description of applicable plans, ordinances and programs follows to provide more detail on the relevance of each regulatory tool in examining the capabilities for each community.

Comprehensive Plan

A Comprehensive Plan, in broad terms, is a policy statement to guide the future placement and development of community facilities. It is the basis for a community's zoning, subdivision and design regulations. Lexington County's Comprehensive Plan identifies goals for the community as well as objectives and implementation strategies to achieve those goals.

Zoning Ordinance

Zoning typically consists of both a zoning map and a written ordinance that divides the jurisdiction into zoning districts, including various residential, commercial, mixed-use and industrial districts. The zoning regulations describe what type of land use and specific activities are permitted in each district, and also regulate how buildings, signs, parking, and other construction may be placed on a lot. The zoning regulations also provide procedures for rezoning and other planning applications. Lexington County uses performance based zoning, which differs from traditional zoning by designating road classifications and zoning districts, which together determine what uses are permitted in a given parcel.

Subdivision Ordinance

A subdivision ordinance is intended to regulate the development of residential, commercial, industrial, or other uses, including associated public infrastructure, as land is subdivided into lots for future development. Subdivision design that accounts for natural hazards can reduce the exposure of future development to hazards.

Flood Insurance Study/Floodplain Ordinance

A Flood Insurance Study (FIS) provides information on the existence and severity of flood hazards within a community based on the 100-year flood event. The FIS also includes revised digital Flood Insurance Rate Maps (FIRMs) which reflect updated Special Flood Hazard Areas (SFHAs) and flood zones for the community.

A floodplain ordinance is perhaps a community's most important flood mitigation tool. In order for a county or municipality to participate in the NFIP, they must adopt a local flood damage prevention ordinance that requires jurisdictions to follow established minimum building standards in the floodplain. These standards require that all new buildings and substantial improvements to existing buildings will be protected from damage by a 100-year flood event and that new development in the floodplain will not exacerbate existing flood problems or increase damage to other properties.

Stormwater Management Program/Stormwater Ordinance

Stormwater runoff is increased when natural ground cover is replaced by urban development. Development in the watershed that drains to a river can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality. A Stormwater Management Program can prevent flooding problems caused by stormwater runoff by 1) Regulating development in the floodplain to ensure that it will be protected from flooding and that it won't divert floodwaters onto other properties; 2) Regulating all development to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions; and 3) Setting construction standards so buildings are protected from shallow water. A stormwater ordinance provides the community with the regulatory authority to implement its stormwater management standards.

Lexington County also incorporates public outreach and education into its stormwater management program as a participating member of the Lexington Countywide Stormwater Consortium. The Consortium's three primary objectives are "To create a model collaborative water quality education program in Lexington County that can be implemented throughout South Carolina and beyond," "To foster

citizen involvement and encourage behavioral change," and "To achieve clean and healthy tributaries, rivers, and ground waters throughout Lexington County." The Consortium provides workshops, public education campaigns, and community events for the public, and assists participating member jurisdictions in complying with NPDES permit requirements and enacting regulatory programs.

Building Code/Elevation Certificates

Building codes provide one of the best methods for addressing natural hazards. When properly designed and constructed according to code, the average building can withstand many of the impacts of natural hazards. Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code. Building codes can ensure that the first floors of new buildings are constructed to be higher than the elevation of the 100-year flood (the flood that is expected to have a one percent chance of occurring in any given year). ISO's Building Code Effectiveness Grading Schedule rates community's building codes and their enforcement for residential and commercial properties, each on a scale of 1 to 10 with 1 signifying "exemplary commitment to building code enforcement". Lexington County received a 4 for commercial building but is unrated for residential building, meaning they do not have a residential code enforcement program in place.

Just as important as having code standards is the enforcement of the code. Adequate inspections are needed during the course of construction to ensure that the builder understands the requirements and is following them. Making sure a structure is properly elevated and anchored requires site inspections at each step. An Elevation Certificate serves as the official record that shows new buildings and substantial improvements in all identified SFHAs are properly elevated. This elevation information is needed to show compliance with the floodplain ordinance. Communities participating in the Community Rating System (CRS) are required to use the FEMA Elevation Certificate.

Site Plan Review

The purpose of the Site Plan Review Process is to review site plans for specific types of development to ensure compliance with all appropriate land development regulations and consistency with the Comprehensive Plan.

Capital Improvement Program

A Capital Improvement Plan (CIP) is a planning document that typically provides a five-year outlook for anticipated capital projects designed to facilitate decision makers in the replacement of capital assets. The projects are primarily related to improvement in public service, parks and recreation, public utilities and facilities. A community's mitigation strategy may include structural projects that could potentially be included in a CIP and funded through a Capital Improvement Program.

Emergency Operations Plan

An emergency operations plan outlines responsibilities and the means by which resources are deployed during and following an emergency or disaster.

7.3 Floodplain Management

The NFIP aims to reduce the impact of flooding on private and public structures. It does so by providing affordable insurance to property owners and by encouraging communities to adopt and enforce floodplain management regulations. These efforts help mitigate the effects of flooding on new and improved structures. Overall, the program reduces the socio-economic impact of disasters by promoting the purchase and retention of general risk insurance, but also of flood insurance, specifically.

Participation in the NFIP is voluntary for local governments. For a county or municipality to participate in the NFIP, the community must adopt a local flood damage prevention ordinance that requires that all new buildings and substantial improvements to existing buildings will be protected from damage by a 100-year

flood event and that new development in the floodplain will not exacerbate existing flood problems or increase damage to other properties.

The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. For CRS participating communities, flood insurance premium rates are discounted in increments of 5% (i.e., a Class 1 community would receive a 45% premium discount, while a Class 9 community would receive a 5% discount. A Class 10 is not participating in the CRS and receives no discount.

Lexington County has been a regular participant in the NFIP since June 1981 and is currently a Class 8 community, which provides a 10% discount to all policyholders in the SFHA. Table 6.12 through Table 6.15 in Section 6 – Vulnerability Analysis reflect NFIP policy and claims data for the County categorized by structure type, flood zone, Pre-FIRM and Post-FIRM. The County has a floodplain management program to further restrict development in the floodplain.

7.4 Administrative and Technical Capability

Administrative and technical capability refers to the community's staff and their skills and tools that can be used for mitigation planning and to implement specific mitigation actions. It also refers to the ability to access and coordinate these resources effectively. The personnel employed by the County have been considered as well as the level of knowledge and technical expertise of these resources. Resources include engineers, planners, emergency managers, GIS analysts, building inspectors, grant writers, floodplain managers, and more. Other technical resources noted include the County's GIS data and online mapping tools as well as the County's reverse-911 call warning system. Table 7.2 provides a summary of the administrative and technical capabilities of Lexington County.

Table 7.2 – Administrative and Technical Capability

Resources	Lexington County
Planner/Engineer with knowledge of land development/land management practices	Y
Engineer/Professional trained in construction practices	Y
Planner/Engineer/Scientist with an understanding of natural hazards	Y
Personnel skilled in GIS	Y
Full-time building official	Y
Floodplain Manager	Y
Emergency Manager	Y
Grant Writer	Y
GIS data – Hazard Areas	Y
GIS data – Critical Facilities	Y
GIS data – Land use	N
GIS data – Building footprints	Y
GID data – Links to Assessor's data	Y
Warning Systems/Services (CTY System)	Y

Lexington County has a high level of capability in terms of staffing and expertise. Although the County has extensive GIS data available online, they do not have existing or future land use data nor do they have building footprints, both of which could assist in understanding hazard vulnerability and developing mitigation strategies related to development and land use.

7.5 Fiscal Capability

Financial capabilities are the resources that a jurisdiction has access to or is eligible to use to fund mitigation actions. The costs associated with implementing mitigation activities vary. Some mitigation actions such as building assessment or outreach efforts require little to no costs other than staff time and existing operating budgets. Other actions, such as the acquisition of flood-prone properties, could require a substantial monetary commitment from local, State, and Federal funding sources. Some local governments may have access to a recurring source of revenue beyond property, sales, and income taxes, such as stormwater utility or development impact fees. These communities may be able to use the funds to support local mitigation efforts independently or as the local match or cost-share often required for grant funding. Table 7.3 provides a summary of the fiscal resources available to Lexington County.

Table 7.3 – Fiscal Resources

Resources	Lexington County
Community Development Block Grants	Y
Capital improvements project funding	N
Authority to levy taxes for specific purposes	Y
Fees for water, sewer, gas or electric services	N
Impact fees for new development	N
Incur debt through general obligation bonds	N
Incur debt through special tax bonds	N
Incur debt through private activity bonds	N

8 MITIGATION STRATEGY

Requirement §201.6(c)(3): [The plan shall include] a mitigation strategy that provides the jurisdiction's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

This section describes the mitigation strategy process and mitigation action plan for the Lexington County Floodplain Management Plan. It describes how the County met the following requirements from the 10-step planning process:

- Planning Step 6: Set Goals
- Planning Step 7: Review Possible Activities
- Planning Step 8: Draft an Action Plan

8.1 Mitigation Strategy: Overview

The results of the planning process, the risk assessment, the goal setting, and the identification of mitigation actions led to the mitigation strategy and mitigation action plan for this HMP. The following umbrella mitigation strategy was used during development of this HMP:

Communicate the hazard information collected and analyzed through this planning process as well as FMPC success stories so that the community better understands what can happen where and what they themselves can do to be better prepared.

Implement the action plan recommendations of this plan.

Use existing rules, regulations, policies, and procedures already in existence.

Monitor multi-objective management opportunities so that funding opportunities may be shared and packaged and broader constituent support may be garnered.

8.1.1 Continued Compliance with the NFIP

Given the flood hazards in the planning area, an emphasis will be placed on continued compliance with the NFIP and participation in the CRS. Each participating jurisdiction will meet or exceed the following minimum requirements as set by the NFIP:

- Issuing or denying floodplain development/building permits
- Inspecting all development to assure compliance with the local ordinance
- Maintaining records of floodplain development
- Assisting in the preparation and revision of floodplain maps
- Helping residents obtain information on flood hazards, floodplain map data, flood insurance and proper construction measures

The Lexington County Community Development Department is responsible for the review and approval of all development applications to the County. The Public Works Department maintains the record of all map revisions and changes received from FEMA. As a part of the services offered to the public, the Public Works Department also provides FEMA floodplain mapping information, flood insurance program information, flooding hazards, and proper construction methods within the special flood hazard area.

The CRS was created in 1990. It is designed to recognize floodplain management activities that are above and beyond the NFIP's minimum requirements. Lexington County is currently classified as a Class 8 community, which gives a 10% premium discount to individuals in the Special Flood Hazard Area, and a

5% discount to policyholders outside the Special Flood Hazard Area. The following is a summary of the CRS Activities for which Lexington County currently receives credit based on the 2011 verification report:

Activity 310 – Elevation Certificates: The Stormwater Management Department maintains elevation certificates for new and substantially improved buildings. Copies of elevation certificates are made available upon request.

Activity 320 – Map Information Service: Credit is provided for furnishing inquirers with flood zone information from the community's latest FIRM, publicizing the service annually and maintaining records.

Activity 330 – Outreach Projects: A community brochure is mailed to all properties in the Repetitive Loss Areas on an annual basis. The community also provides flood information through workshops and displays at public buildings.

Activity 340 – Hazard Disclosure: Credit is provided for state and community regulations requiring disclosure of flood hazards.

Activity 350 – Flood Protection Information: Documents relating to floodplain management are available in the reference section of the Lexington County Public Library. Credit is also provided for floodplain information displayed on the community's website.

Activity 420 – Open Space Preservation: Credit is provided for preserving at least 5 acres in the SFHA as open space. Credit is also provided for open space land that is deed restricted and preserved in a natural state.

Activity 430 – Higher Regulatory Standards: Credit is provided for enforcing regulations that require freeboard for new and substantial improvement construction, foundation protection, cumulative substantial improvement, lower substantial improvement, protection of natural and beneficial functions, and state mandated regulatory standards. Credit is also provided for the adoption and implementation of the International Series of Building Codes, and for staff education and certification as a floodplain manager.

Activity 440 – Flood Data Maintenance: Credit is provided for maintaining and using digitized maps in the day to day management of the floodplain. Credit is also provided for maintaining copies of all previous FIRMs and Flood Insurance Study Reports.

Activity 450 – Stormwater Management: The community enforces regulations for freeboard in non-SFHA zones, soil and erosion control, and water quality.

Activity 540 – Drainage System Maintenance: The community also enforces a regulation prohibiting dumping in the drainage system.

Activity 630 – Dam Safety: All South Carolina communities currently receive CRS credit for the state's dam safety program.

8.1.2 Post-Disaster Response, Recovery, and Mitigation

Lexington County also seeks to incorporate actions associated with emergency services into its floodplain management planning. The County's efforts to include mitigation in disaster recovery are currently at work, as the County is still recovering from the October 2015 flood event that resulted in a disaster declaration for much of the State. In 2016, Lexington County received over $16.3M in Community Development Block Grant – Disaster Recovery (CDBG-DR) funds from the Department of Housing and Urban Development (HUD). The County developed an Action Plan (2017) for the allocation of these funds. The plan proposes the use of over 15% of funds for public infrastructure improvements, over 60% for

housing buyouts, and 15% for minor housing rehabilitation. This allocation shows a strong commitment to preparing for future hazards by incorporating hazard mitigation in disaster recovery.

After a disaster, communities should undertake activities to protect public health and safety and facilitate recovery. Appropriate response measures followed by Lexington County include:

- Providing safe drinking water
- Monitoring for diseases
- Vaccinating residents for tetanus and other diseases
- Clearing streets
- Cleaning up debris and garbage

Following a disaster, there should also be an effort to help prepare people and property for future hazards. Lexington County typically takes the following steps for disaster recovery:

- Public information activities to advise residents about mitigation measures they can incorporate into their reconstruction work
- Evaluating damaged public facilities to identify mitigation measures that can be included during repairs
- Identifying other mitigation measures that can lessen the impact of the next disaster
- Acquiring substantially or repeatedly damaged properties from willing sellers
- Planning for long-term mitigation activities
- Applying for post-disaster mitigation funds

Regulating Reconstruction

Lexington County also enforces reconstruction regulations to ensure that mitigation is integrated into recovery. Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. There is a special requirement to do this in floodplains, regardless of the type of disaster or the cause of damage. The NFIP requires that local officials enforce the substantial damage regulations.

Lexington County applies higher standards for rebuilding with cumulative substantial damage or improvements. These rules require that if cumulative damages to a building within a 5-year period equal or exceed 50% of the building's market value or if the cost to repair a building that is at least 35% damaged is 50% or more of the building's market value, the building must be retrofitted to meet the standards of new floodplain construction. In most cases, this means that a substantially damaged building must be elevated above the base flood elevation.

The County's Floodplain Management Ordinance and Land Development Manual also requires that all new residential construction or substantial improvement shall have the lowest floor elevated to no lower than two feet above the base flood elevation.

8.2 Goals

Requirement §201.6(c)(3)(i): [The mitigation strategy section shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.

Sections 4 through 6 document the hazards and associated risks that threaten Lexington County, including the vulnerability to structures, infrastructure, and critical facilities. Chapter 7 evaluates the capacity of the County to reduce the impact of those hazards. The intent of Goal Setting is to identify areas where improvements to existing capabilities (policies and programs) can be made so that community vulnerability is reduced. Goals are also necessary to guide the review of possible mitigation measures.

This Plan needs to make sure that recommended actions are consistent with what is appropriate for the communities. Mitigation goals need to reflect community priorities and should be consistent with other plans in the community.

Goals are general guidelines that explain what is to be achieved. They are usually broad-based policy type statements, long term and represent global visions. Goals help define the benefits that the plan is trying to achieve.

8.2.1 Coordination with Other Planning Efforts

The goals of this plan need to be consistent with and complement the goals of other planning efforts. The primary planning document where the goals of this Plan must complement and be consistent with is the Comprehensive Plan. The Comprehensive Plan is important as it is developed and designed to guide future growth within the community. Therefore, there should be some consistency in the overall goals and how they relate to each other.

8.2.2 Goal Setting Exercise

On March 15, 2017, the FMPC conducted an exercise to outline and recommend goals for this Floodplain Management Plan. The first part of the exercise involved asking each committee member: *"What should be the goals of our mitigation program?"* Each member was given a handout which appears in Figure 8.1. A full summary of the FMPC's responses is listed in Table 8.1.

Committee members discussed their choices with the larger committee membership. There was notable consistency in the members' choices. Nearly all members selected at least one goal related to the need to manage future development and its impact on flooding. The committee members' prevailing goals are listed below, with the number of votes received in parentheses:

- Make sure future development doesn't make things worse
- Protect people's lives
- Help people protect themselves
- Protect repetitively flooded areas
- Restrict development in hazardous areas

Following this exercise, the committee members reviewed their joint choices and brainstormed potential goals for Lexington County's Floodplain Management Plan. Members were led in a discussion of potential goals and asked to agree or disagree with each potential goal. Committee members were also asked to suggest other goals they felt would be appropriate.

The goal statements selected by committee members were in line with what they wanted to see in Lexington County's future. The exercise revealed important information to guide the planning effort. For example, members stressed the importance of managing future growth and preventing future development from exacerbating existing flooding problems.

Goals Exercise

What should be the goals of our mitigation program?

Here are possible answers to this question, listed in alphabetical order. Pick three that you think are most important. You may reword them or add new ones if you want.

Circle your top three answers.

- Help people protect themselves
- Make sure future development doesn't make things worse
- Maximize the share paid by benefiting property owners
- Maximize use of state and federal funds
- Minimize property owner's expenditures
- Minimize public expenditures
- New developments should pay the full cost of protection measures
- Protect businesses from damage
- Protect cars and other vehicles
- Protect centers of employment
- Protect critical facilities
- Protect forests
- Protect homes
- Protect new/future buildings
- Protect people's lives
- Protect power stations and power lines
- Protect public health
- Protect public services (fire, police, etc.)
- Protect repetitively flooded areas
- Protect scenic areas, greenways, etc.
- Protect schools
- Protect shopping areas
- Protect streets
- Protect utilities (power, phone, water, sewer, etc.)
- Protect wetlands/environmentally sensitive areas
- Protect a particular area_____
- Protect a particular property_____
- Restrict development in hazardous areas
- Use public/private partnerships
- Other_____

Figure 8.1 – Goal Setting Exercise

Table 8.1 – Goal Setting Response Summary

Goal	Number of times selected
Help people protect themselves	3
Make sure future development doesn't make things worse	8
Maximize the share paid by benefiting property owners	1
Minimize public expenditures	1
New developments should pay the full cost of protection measures	1
Protect homes	2
Protect new/future buildings	1
Protect people's lives	4
Protect repetitively flooded areas	3
Restrict development in hazardous areas	3
Other	3

Other: "Find ways to minimize existing flood hazards to older homes/buildings that are in high risk areas"; "protect roads"; "identify areas outside of SFHA that repetitively flood due to storm drain issues"

Note: Those goal options from Figure 7.1 above that are not shown here received zero (0) votes.

8.2.3 Resulting Goals

At the end of the exercise, the FMPC agreed upon four general goals for this planning effort. The refined goals are as follows:

Goal 1 – Minimize the impact of future development by employing watershed-based approaches that balance environmental, economic and engineering considerations.

Objective 1.1: Maintain and enforce regulations to protect and restore wetlands and ecological functions for long-term environmental, economic and recreational values.

Objective 1.2: Pursue stormwater management approaches and techniques that reduce runoff, improve water quality, and protect public health.

Objective 1.3: Preserve and maintain open space in flood prone areas to reduce flood damage to buildings and to provide recreational benefits.

Objective 1.4: Continue to protect wetlands and environmentally sensitive areas from encroachment of development by requiring buffers and other setback mechanisms.

Goal 2 – Reduce vulnerability and exposure to flood hazards in order to protect the health, safety and welfare of residents and visitors.

Objective 2.1: Advise the community of the safety and health precautions to implement before, during, and after a flood.

Objective 2.2: Publish the locations (roads and intersections) which often flood after heavy rain events or major storms.

Objective 2.3: Educate everyone on the benefits of improved water quality and associated habitat.

Objective 2.4: Identify the location of vulnerable populations to aid in emergency evacuations.

Objective 2.5: Conduct site investigations, research exposure and hazard data, and evaluate proposed modifications to repair and mitigate stormwater management problems.

Goal 3 – Reduce damage to all development, including repetitively flooded buildings, through flood resilient strategies and measures.

Objective 3.1: Prioritize capital improvement projects to address areas where poor drainage causes substantial flooding.

Objective 3.2: Encourage development outside the special flood hazard area (1%-annual-chance flood).

Objective 3.3: Use the most effective approaches to protect buildings from flood damage, including elevation, acquisition, and other retrofitting techniques where appropriate.

Objective 3.4: Encourage property owners to assume an appropriate level of responsibility for their own protection, including the purchase of flood insurance.

Goal 4 – Encourage property owners, through education and outreach measures, to protect their homes and businesses from flood damage.

Objective 4.1: Educate property owners, including repetitive loss properties, on FEMA grant programs and other methods in order to mitigate possible flood damage.

Objective 4.2: Provide current flood-proofing and retrofitting information to property owners.

Objective 4.3: Effectively communicate flood risk to residents, businesses, contractors, realtors and prospective buyers.

Objective 4.4: Enhance community web pages to provide comprehensive flood protection and flood preparedness information.

8.3 Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): [The mitigation strategy section shall include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure. All plans approved by FEMA after October 1, 2008, must also address the jurisdiction's participation in the NFIP, and continued compliance with NFIP requirements, as appropriate.

In order to identify and select mitigation projects to support the mitigation goals, each hazard identified in Chapter 4 – Hazard Identification was evaluated. The following were determined to be priority flood-related hazards:

- Dam/Levee Failure
- Hurricane and Tropical Storm
- Flood: 100-/500-year
- Flood: Stormwater/ Localized Flooding

The FMPC then analyzed viable mitigation options that supported the identified goals. The FMPC reviewed a PowerPoint presentation and handout covering the following six mitigation categories as well as examples of potential mitigation actions for each of these categories which are utilized as part of the CRS planning process:

- Prevention (Required to be evaluated)
- Property Protection
- Natural Resource Protection
- Emergency Services
- Structural Projects
- Public Information and Outreach

The FMPC was also provided with FEMA's *Mitigation Ideas* guidance document dated January 2013 which provides example mitigation actions organized by natural hazard. The FMPC was instructed to consider both future and existing buildings in evaluating possible mitigation actions and to also consider including projects from other plans and studies within the community including projects from the Capital Improvement Plan. A facilitated discussion then took place to examine and analyze the options. This discussion was followed by a brainstorming session that generated a list of preferred mitigation actions by hazard. A detailed discussion of the development and prioritization of flood mitigation strategies is provided in Appendix B.

8.3.1 Prioritization Process

Once the mitigation actions were identified, the FMPC was provided with several decision-making tools, including FEMA's recommended prioritization criteria, STAPLEE sustainable disaster recovery criteria; Smart Growth principles; and others, to assist in deciding why one recommended action might be more important, more effective, or more likely to be implemented than another. To be a qualifying mitigation project, the project must meet at least four of the seven STAPLEE criteria. STAPLEE stands for the following:

- Social: Does the measure treat people fairly? (e.g. different groups, different generations)
- Technical: Is the action technically feasibly? Does it solve the problem?
- Administrative: Are there adequate staffing, funding and other capabilities to implement the project?
- Political: Who are the stakeholders? Will there be adequate political and public support for the

project?

- Legal: Does the jurisdiction have the legal authority to implement the action? Is it legal?
- Economic: Is the action cost-beneficial? Is there funding available? Will the action contribute to the local economy?
- Environmental: Does the action comply with environmental regulations? Will there be negative environmental consequences from the action?

In accordance with the DMA requirements, an emphasis was placed on the importance of a benefit-cost analysis in determining action priority. It was agreed that the following four criteria would be used to determine the priority of the action items:

- Contribution of the action to save life or property
- Availability of funding and perceived cost-effectiveness
- Available resources for implementation
- Ability of the action to address the problem

With these criteria in mind, FMPC members were asked to prioritize each mitigation project based on estimated completion time and the importance of the project relative to other mitigation strategies. Potential time frames for implementation were simplified into short range, medium range or long range priority. The time frames for project implementation were determined to be as follows:

Short Range = Project should be completed within 12 months
Medium Range = Project should be completed in 12 to 36 months
Long Range = Project should be completed in 36 to 60 months

All of the above criteria—including STAPLEE criteria, benefit-cost analysis, and time frame—were then used to develop an overall priority rating of high, medium, or low. The process of identification and analysis of mitigation alternatives allowed the FMPC to come to consensus and to prioritize recommended mitigation actions. The FMPC discussed the contribution of the action to saving lives or property as first and foremost, with additional consideration given to the benefit-cost aspect of a project; however, this was not a quantitative analysis. The team agreed that prioritizing the actions collectively enabled the actions to be ranked in order of relative importance and helped steer the development of additional actions that meet the more important objectives while eliminating some of the actions which did not garner much support. Benefit-cost was also considered in greater detail in the development of the Mitigation Action Plan detailed in Chapter 9. The cost-effectiveness of any mitigation alternative will be considered in greater detail through performing benefit-cost project analyses when seeking FEMA mitigation grant funding for eligible actions associated with this plan.

8.4 Mitigation Action Plan

Requirement §201.6(c)(3)(iii): [The mitigation strategy section shall include an] action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization shall include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

This action plan was developed to present the recommendations developed by the FMPC for how Lexington County can reduce the risk and vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. Emphasis was placed on both future and existing development. The action plan summarizes who is responsible for implementing each of the prioritized actions as well as when and how the actions will be implemented. Each action summary also includes a discussion of the benefit-cost review conducted to meet the regulatory requirements of the Disaster Mitigation Act. Table 8.2 identifies the mitigation actions.

The FMPC also realizes that new needs and priorities may arise as a result of a disaster or other circumstances and reserves the right to support new actions, as necessary, as long as they conform to the overall goals of this plan.

It should be clarified that the actions included in this mitigation strategy are subject to further review and refinement; alternatives analyses; and reprioritization due to funding availability and/or other criteria. The County is not obligated by this document to implement any or all of these projects. Rather this mitigation strategy represents the desires of the community to mitigate the risks and vulnerabilities from identified hazards. The actual selection, prioritization, and implementation of these actions will also be further evaluated in accordance with the CRS mitigation categories and criteria contained in Appendix B.

Table 8.2 – Mitigation Action Plan

Action Number	Project	Priority	Goals Addressed	Mitigation Category	Responsible Department/ Agency/Person	Funding Sources	Timeframe
1	Designate October of each year as Flood Awareness Month.	High	2, 4	Public Information & Outreach	Public Works Department / Stormwater Division, FMPC, Information Services Department	Operating Budget	12 months
2	Create public information brochure on hazards associated with flooding.	High	2, 4	Public Information & Outreach	Public Works Department / Stormwater Division, Information Services Department	Operating Budget	12 months
3	Coordinate with adjacent counties on channel improvements within the watershed.	Medium	1, 3	Property Protection, Structural Projects	Public Works Department / Stormwater Division	Operating Budget	24 to 36 months
4	Create a stormwater utility within the County.	High	1, 2, 3	Prevention, Property Protection	Public Works Department / Stormwater Division	Operating Budget	24 to 36 months
5	Coordinate with South Carolina Department of Transportation to improve or replace structurally deficient bridges.	High	2, 3	Structural Projects	Public Works Department / Stormwater Division, SCDOT	Operating Budget, SCDOT Funding	12 to 24 months
6	Evaluate all critical facilities within the floodplain for flood protection.	Medium	1, 2, 3	Emergency Services	Lexington County Emergency Management	Operating Budget	12 to 24 months
7	Create outreach materials for private dam owners to educate on regular maintenance and inspection needs.	High	2, 4	Public Information & Outreach, Emergency Services	Public Works Department / Stormwater Division	Operating Budget	12 months
8	Enforce “no dumping” regulations in streams and channels, and provide outreach to property owners and HOAs on regulations.	Low	2, 4	Public Information & Outreach, Prevention	Public Works Department / Stormwater Division, FMPC, Information Services Department	Operating Budget	24 to 36 months
9	Create outreach materials to encourage property owners to remove debris from top of stream banks.	Medium	2, 4	Public Information & Outreach, Prevention	Public Works Department / Stormwater Division, FMPC, Information Services Department	Operating Budget	12 to 24 months
10	Identify all stormwater and drainage piping on private property.	Low	1, 2, 3	Prevention, Property Protection	Public Works Department / Stormwater Division	Stormwater Utility	36 to 60 months
11	Promote grant funding to target repetitive loss property owners to mitigate against future flooding.	Medium	2, 3, 4	Public Information & Outreach, Property Protection	Emergency Management, Planning & GIS Department	CDBG-DR & HMGP	12 to 24 months
12	Inspect drainage site “hot spots” before and after heavy rain events.	High	2, 3	Property Protection	Public Works Department / Stormwater Division	Operating Budget	12 months

Action Number	Project	Priority	Goals Addressed	Mitigation Category	Responsible Department/ Agency/Person	Funding Sources	Timeframe
13	Restrict development in the floodway to promote open space.	Medium	1, 2, 3	Prevention	Community Development Department, Planning & GIS Department	Operating Budget	12 to 24 months
14	Create a capital improvements program.	High	1, 2, 3	Property Protection	Public Works Department / Stormwater Division	Stormwater Utility	24 to 36 months
15	Improve culvert at US-1 / Kmart area to resolve flooding issues.	Medium	2, 3	Structural Projects, Property Protection	Public Works Department / Stormwater Division, SCDOT	Stormwater Utility	36 to 48 months
16	Improve drainage in the Whitehall subdivision to resolve flooding issues.	Medium	2, 3	Structural Projects, Property Protection	Public Works Department / Stormwater Division	Stormwater Utility	36 to 48 months
17	Improve drainage in the Lloydswood subdivision to resolve flooding issues.	Medium	2, 3	Structural Projects, Property Protection	Public Works Department / Stormwater Division	Stormwater Utility	36 to 48 months
18	Improve drainage at Rawls Creek area to resolve flooding issues by conducting annual inspection and maintenance.	Medium	2, 3	Structural Projects, Property Protection	Public Works Department / Stormwater Division	Stormwater Utility	36 to 48 months
19	Improve drainage at 6-mile Creek area to resolve flooding issues by conducting annual inspection and maintenance.	Medium	2, 3	Structural Projects, Property Protection	Public Works Department / Stormwater Division	Stormwater Utility	36 to 48 months
20	Improve drainage in the Kinley Creek area to resolve flooding issues and conduct annual inspection and maintenance.	Medium	2, 3	Structural Projects, Property Protection	Public Works Department / Stormwater Division	Stormwater Utility	36 to 48 months
21	Add additional flood gauges in the Kinley Creek area.	Low	1, 2	Emergency Services	Lexington County Emergency Management	?	48 to 60 months
22	Consider implementation of setbacks from navigable waters to protect the natural and beneficial functions of the floodplain.	Medium	1, 2, 3	Natural Resource Protection	Community Development Department, Planning & GIS Department	Operating Budget	24 to 36 months
23	Create a flood news listserv to disseminate information via email or text message.	High	2, 4	Public Information & Outreach	Public Works Department/ Stormwater Division, Information Services Department, FMPC	Operating Budget	12 months
24	Speak to HOAs about flood awareness, safety, and preparedness.	High	2, 4	Public Information & Outreach	Lexington County Environmental Coordinator, FMPC, Information Services	Operating Budget	12 months

8.5 Detailed Mitigation Actions

1. Designate October of each year as Flood Awareness Month.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Lexington County experienced devastating floods in October 2015. Creating a flood awareness month will serve as an annual reminder of the severity of that flooding and the need for residents to protect themselves and prepare for future floods.
Other Alternatives: No action; may result in future complacency about flood risk
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used to create outreach events and materials
Responsible Office: Public Works Department / Stormwater Division
Priority: High
Cost Estimate: Staff time, funds for informational mailings and events
Benefits (Losses Avoided): Local residents and property owners will be prompted to take preparedness and preventive actions by remembering the potential severity of flooding and receiving information on how they can take action.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 12 months

2. Create public information brochure on hazards associated with flooding.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Residents and property owners may be unaware of the flood risks in the County. A public information brochure will increase awareness about flood risk, preparedness steps, and property protection measures to reduce losses from future floods.
Other Alternatives: No action
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used to create outreach events and materials
Responsible Office: Public Works Department / Stormwater Division
Priority: High
Cost Estimate: Staff time, funds for informational mailings and events
Benefits (Losses Avoided): Local residents and property owners will learn about flood risk, preparedness and preventive actions, and where to find more information on flooding in the County.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 12 months

3. Coordinate with adjacent counties on channel improvements within the watershed.

Hazards Addressed: Flood: 100-/500-year; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Channel improvements in Lexington County affect surrounding counties that are in the same watersheds, and vice versa. Working with surrounding counties that are in the same watersheds as Lexington County will ensure more holistic approach to managing flooding and drainage.
Other Alternatives: Lexington County is affected by changes made throughout the watershed, which includes surrounding counties. Without coordinating and collaborating, Lexington County will have limited control of its flood risk, and the changes in stream channels in surrounding counties may have a negative effect on Lexington County.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department

/ Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: Medium
Cost Estimate: Staff time
Benefits (Losses Avoided): This watershed-based approach to floodplain management will reduce the impact of future flooding.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 24 to 36 months

4. Create a stormwater utility within the County.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background:
Other Alternatives: No action; fewer incentives to reduce stormwater and fewer resources to address it.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: High
Cost Estimate: Staff time
Benefits (Losses Avoided): Lexington County will encourage residents and property owners to reduce the stormwater their property generates. Additionally, the County will gain a new revenue source that can pay for capital improvement projects to solve drainage problems.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 24 to 36 months

5. Coordinate with South Carolina Department of Transportation to improve or replace structurally deficient bridges.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Erosion associated with flooding can undermine the structural integrity of bridges and other infrastructure over time. SCDOT has identified seven bridges in the County that need repairs or replacement to ensure they are structurally sound. These bridges can serve as critical transportation infrastructure in the event of an evacuation or a disaster.
Other Alternatives: No action risks allowing conditions to further deteriorate to dangerous levels
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division and South Carolina Department of Transportation staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: High
Cost Estimate: Staff time
Benefits (Losses Avoided): The preventative maintenance and repairs identified for Lexington County will keep these bridges in safe working order.
Potential Funding: The cost will be paid for by the County's operating budget and SCDOT funding.
Timeframe: 12 to 24 months

6. Evaluate all critical facilities within the floodplain for flood protection.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical

Storm; Dam Failure
Issue/Background: Critical facilities are those that are integral to hazard response and recovery efforts. If these facilities are impacted by a flood to the extent that their operation is interrupted, it can have adverse impacts on the County's ability to respond to and recover from a disaster. Protecting critical facilities reduces vulnerability and protects the health and safety of residents and visitors.
Other Alternatives: No action; critical facilities may be at risk of service interruption during flood events.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Lexington County Emergency Management staff capabilities will be used to evaluate critical facilities.
Responsible Office: Lexington County Emergency Management
Priority: Medium
Cost Estimate: Staff time
Benefits (Losses Avoided): Evaluating critical facilities is the first step toward identifying what actions should be taken to protect them and reduce the County's vulnerability to flooding.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 12 to 24 months

7. Create outreach materials for private dam owners to educate on regular maintenance and inspection needs.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Private dam owners may be unaware of their responsibility to inspect and maintain their dams, resulting in maintenance issues that increase risk of failure and flooding.
Other Alternatives: No action; private dam maintenance issues may go unaddressed
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used to create outreach events and materials
Responsible Office: Public Works Department / Stormwater Division
Priority: High
Cost Estimate: Staff time, funds for informational mailings and events
Benefits (Losses Avoided): Private dam owners will understand their responsibilities and improve maintenance on their dams, reducing risk of failure and flooding.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 12 months

8. Enforce "no dumping" regulations in streams and channels, and provide outreach to property owners on regulations.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Dumping in streams and channels can clog these important drainage channels or reduce their capacity to carry waters, increasing the likelihood of flooding following heavy rain events. Residents and property owners may not realize that dumping is illegal and that it can cause flood hazards.
Other Alternatives: No action; however, this is an on-going effort and is requested by the public.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: Low
Cost Estimate: Staff time, funds for informational mailings
Benefits (Losses Avoided): Education and enforcement will reduce the incidence of dumping in the

County's waters.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 24 to 36 months

9. Create outreach materials to encourage property owners to remove debris from top of stream banks.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Residents and property owners may not realize that debris from yard maintenance can clog waterways and result in flood hazards. Placing debris on the top of the bank without moving it to a secure location can cause even more blockages when future floodwaters force debris back into the channel.
Other Alternatives: No action; behaviors are unlikely to change without education and outreach.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: Medium
Cost Estimate: Staff time, funds for informational mailings and events
Benefits (Losses Avoided): Residents and property owners will be more likely to properly dispose of debris, which will reduce flood hazards associated with blocked drainage channels.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 12 months

10. Identify all stormwater and drainage piping on private property.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: There are many stormwater drainage features including underground stormwater piping that were placed in subdivisions without proper easements being established. In most cases these developments were prior to the County's Subdivision Regulations. The County is not certain as to the number and location of all underground stormwater piping.
Other Alternatives: No action; however, this is an on-going effort and is requested by the public.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: Low
Cost Estimate: Staff time
Benefits (Losses Avoided): Clear understanding of the total problem of stormwater piping placed outside of designated easements and how the County can proceed to help fix known and unknown problems.
Potential Funding: The cost will be paid for by the County's stormwater utility, once established.
Timeframe: 36 to 60 months

11. Promote grant funding to target repetitive loss property owners to mitigate against future flooding.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: There are 19 repetitive loss properties in the County and most of them are Pre-FIRM buildings have been flooded more than 2 times in a rolling 10-year period. Some were most recently

damaged after the October 2015 flood.
Other Alternatives: No action;
Existing Planning Mechanism(s) through which Action Will Be Implemented: Community Development Department / Planning & GIS Department staff capabilities will be used
Responsible Office: Community Development Department / Planning & GIS Department
Priority: Medium
Cost Estimate: Staff time, funds for informational mailings and events
Benefits (Losses Avoided): Owners of repetitive loss properties will be prompted to consider options for acquisition or relocation, which could reduce exposure to future flood hazards.
Potential Funding: CDBG-DR funding and HMGP funding is available for projects once identified
Timeframe: 12 to 24 months

12. Inspect drainage site "hot spots" before and after heavy rain events.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Blocked or clogged drainage systems can cause backwater overbank flooding which can impact property owners with increased potential for flooding. The areas that have the high potential to flood without a major storm event should be inspected before and after heavy rain events to ensure the systems are functioning properly.
Other Alternatives: No action; however, this is an on-going effort and is requested by the public.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: High
Cost Estimate: Staff time, funds for informational mailings and events
Benefits (Losses Avoided): Local residents and property owners will be prompted to take preparedness and preventive actions by remembering the potential severity of flooding and receiving information on how they can take action.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 12 months

13. Restrict development in the floodway to promote open space.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Lexington County has a regulation against developing in the floodway but allows exceptions to these regulations. Developing in the floodway causes a rise of the flood height, which increases flood hazard risk in surrounding areas. The County should continue to enforce these regulations and reduce the number of exceptions allowed to ensure no net rise of the base flood height.
Other Alternatives: No action; however, without enforcement current regulations may not be effective
Existing Planning Mechanism(s) through which Action Will Be Implemented: Community Development Department / Planning & GIS Department staff capabilities will be used
Responsible Office: Community Development Department / Planning & GIS Department
Priority: Medium
Cost Estimate: Staff time, funds for informational mailings and events
Benefits (Losses Avoided): Preserving open space in the floodway can protect the natural and beneficial function of the existing floodplain and prevent future flooding.
Potential Funding: The cost will be paid for by the County's operating budget.

Timeframe: 12 to 24 months

14. Create a capital improvements program.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Lexington County currently maintains a list of needed stormwater system improvements but does not have a designated revenue stream or identify funding for those projects. Developing a capital improvements program will establish a timeline and ensure that funding is identified to accomplish these improvements.
Other Alternatives: No action; continue making improvements when funds become available.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: High
Cost Estimate: Staff time
Benefits (Losses Avoided): Developing a capital improvements program will ensure that funding is available when it is needed and that necessary stormwater infrastructure projects are completed in a timely manner.
Potential Funding: The cost of capital improvements to stormwater infrastructure will be paid by the stormwater utility funds once it is established.
Timeframe: 24 to 36 months

15. Improve culvert at US-1 / Kmart area to resolve flooding issues.

Hazards Addressed: Flood: Stormwater/Localized Flooding
Issue/Background: Lexington County Public Works identified the culvert at the US-1 / Kmart area as inadequate to address stormwater, resulting in localized flooding problems.
Other Alternatives: No action; localized flooding would continue to occur without mitigation.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division, SCDOT
Priority: Medium
Cost Estimate: $1,000,000 for structural improvements
Benefits (Losses Avoided): Improving the infrastructure and increasing its capacity to handle stormwater will reduce future localized flooding.
Potential Funding: The cost will be paid for by the County's stormwater utility.
Timeframe: 36 to 48 months

16. Improve drainage at Whitehall subdivision to resolve flooding issues.

Hazards Addressed: Flood: Stormwater/Localized Flooding
Issue/Background: Lexington County Public Works identified drainage problems at the Whitehall subdivision which result in localized flooding problems.
Other Alternatives: No action; localized flooding would continue to occur without mitigation.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: Medium
Cost Estimate: $1,000,000 for structural improvements

Benefits (Losses Avoided): Improving the infrastructure and increasing its capacity to handle stormwater will reduce future localized flooding.
Potential Funding: The cost will be paid for by the County's stormwater utility.
Timeframe: 36 to 48 months

17. Improve drainage at Lloydswood subdivision to resolve flooding issues.

Hazards Addressed: Flood: Stormwater/Localized Flooding
Issue/Background: Lexington County Public Works identified drainage problems at the Lloydswood subdivision which result in localized flooding problems.
Other Alternatives: No action; localized flooding would continue to occur without mitigation.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: Medium
Cost Estimate: $1,000,000 for structural improvements
Benefits (Losses Avoided): Improving the infrastructure and increasing its capacity to handle stormwater will reduce future localized flooding.
Potential Funding: The cost will be paid for by the County's stormwater utility.
Timeframe: 36 to 48 months

18. Improve drainage in the Rawls Creek area to resolve flooding issues by conducting annual inspection and maintenance.

Hazards Addressed: Flood: Stormwater/Localized Flooding
Issue/Background: Lexington County Public Works identified drainage problems in the Rawls Creek area which result in localized flooding problems.
Other Alternatives: No action; localized flooding would continue to occur without mitigation.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: Medium
Cost Estimate: $10,000,000 for structural improvements, $50,000 for ongoing maintenance
Benefits (Losses Avoided): Improving the infrastructure and increasing its capacity to handle stormwater will reduce future localized flooding.
Potential Funding: The cost will be paid for by the County's stormwater utility.
Timeframe: 36 to 48 months

19. Improve drainage in the 6-Mile Creek area to resolve flooding issues by conducting annual inspection and maintenance.

Hazards Addressed: Flood: Stormwater/Localized Flooding
Issue/Background: Lexington County Public Works identified drainage problems in the 6-Mile Creek area which result in localized flooding problems.
Other Alternatives: No action; localized flooding would continue to occur without mitigation.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: Medium
Cost Estimate: $50,000 for ongoing maintenance

Benefits (Losses Avoided): Improving the infrastructure and increasing its capacity to handle stormwater will reduce future localized flooding.
Potential Funding: The cost will be paid for by the County's stormwater utility.
Timeframe: 36 to 48 months

20. Improve drainage in the Kinley Creek area to resolve flooding issues and conduct annual inspection and maintenance.

Hazards Addressed: Flood: Stormwater/Localized Flooding
Issue/Background: Lexington County Public Works identified drainage problems in the Kinley Creek area which result in localized flooding problems.
Other Alternatives: No action; localized flooding would continue to occur without mitigation.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division staff capabilities will be used
Responsible Office: Public Works Department / Stormwater Division
Priority: Medium
Cost Estimate: $25,000,000 for structural improvements; $50,000 for annual maintenance
Benefits (Losses Avoided): Improving the infrastructure and increasing its capacity to handle stormwater will reduce future localized flooding.
Potential Funding: The cost will be paid for by the County's stormwater utility.
Timeframe: 36 to 48 months

21. Add additional flood gauges in the Kinley Creek area.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding
Issue/Background: Lexington County Emergency Management uses flood gauge data to evaluate the severity of flooding and issue emergency warnings.
Other Alternatives: No action; Emergency Management would rely on less complete data.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Lexington County Emergency Management staff capabilities will be used
Responsible Office: Lexington County Emergency Management
Priority: Low
Cost Estimate:
Benefits (Losses Avoided): Adding flood gauges will improve data available to Lexington County Emergency Management for flood modeling and warning purposes.
Potential Funding: Lexington County Emergency Management budget
Timeframe: 48 to 60 months

22. Consider implementation of setbacks from navigable waters to protect the natural and beneficial functions of the floodplain.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Lexington County Public Works identified drainage problems in the Kinley Creek area which result in localized flooding problems. Instituting setbacks from the Kinley Creek and other waterways facing similar issues will help protect future development from damage and will preserve the natural floodplain function of the Creek.
Other Alternatives: No action; localized flooding would continue to occur without mitigation.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Community Development

Department / Planning & GIS Department staff capabilities will be used
Responsible Office: Community Development Department / Planning & GIS Department
Priority: Medium
Cost Estimate: Staff time
Benefits (Losses Avoided): Improving the Creek's natural floodplain functions by instituting setbacks to limit development and increase the Creek's drainage capacity will reduce future localized flooding.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 24 to 36 months

23. Create a flood news listserv to disseminate information via email or text message.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background: Based on public survey results, email is one of the best ways to reach County residents to deliver important information. A listserv will allow residents to sign up to receive emails and text messages with important information about flooding.
Other Alternatives: No action; localized flooding would continue to occur without mitigation.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Public Works Department / Stormwater Division & Information Services staff capabilities will be used, FMPC members will assist with sign up outreach
Responsible Office: Public Works Department / Stormwater Division, FMPC, Information Services Department
Priority: High
Cost Estimate: Staff time
Benefits (Losses Avoided): Residents will receive information about flood preparedness, mitigation, and more via email and/or text message, increasing flood awareness throughout the County.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 12 months

24. Speak to HOAs about flood awareness, safety, and preparedness.

Hazards Addressed: Flood: 100-/500-year; Flood: Stormwater/Localized Flooding; Hurricane/Tropical Storm; Dam Failure
Issue/Background:
Other Alternatives: No action; localized flooding would continue to occur without mitigation.
Existing Planning Mechanism(s) through which Action Will Be Implemented: Existing HOA meetings provide a useful platform to disseminate information about flood risk to home owners. The Lexington County Environmental Coordinator's time and skills will be used.
Responsible Office: Environmental Coordinator, FMPC, Information Services Department
Priority: High
Cost Estimate: Staff time
Benefits (Losses Avoided): Residents will receive information about flood risk and preparedness.
Potential Funding: The cost will be paid for by the County's operating budget.
Timeframe: 12 months

9 PLAN ADOPTION

44 CFR Subsection D §201.6(c)(5): [The plan shall include] documentation that the plan has been formally approved by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).

The purpose of formally adopting this plan is to secure buy-in, raise awareness of the plan, and formalize the plan's implementation. The adoption of this plan completes Planning Step 9 of the 10-step planning process: Adopt the Plan, in accordance with the requirements of DMA 2000. This plan will be adopted by the appropriate governing body for each participating community pending FEMA and SCEMD approval.

10 PLAN IMPLEMENTATION & MAINTENANCE

Requirement §201.6(c)(4): [The plan maintenance process shall include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Implementation and maintenance of the plan is critical to the overall success of hazard mitigation planning. This is Planning Step 10 of the 10-step planning process. This section provides an overview of the overall strategy for plan implementation and maintenance and outlines the method and schedule for monitoring, updating, and evaluating the plan. The section also discusses incorporating the plan into existing planning mechanisms and how to address continued public involvement. It consists of the following subsections:

10.1 Implementation

Once adopted, the plan must be implemented to be effective. While this plan contains many worthwhile actions, the County will need to decide which action(s) to undertake first. The priority assigned the actions in the planning process and funding availability will affect that decision. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the Floodplain Management Plan recommendations and their underlying principles into other plans and mechanisms, such as the County's Comprehensive Plan and Zoning Ordinance. The County already implements policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government. Implementation will be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and highlight the multi-objective, win-win benefits to each program and the community. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and vigilant review of programs for coordination and multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the costlier recommended actions. This will include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the County will be positioned to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal earmarked funds, benefit assessments, and other grant programs, including those that can serve or support multi-objective applications.

10.1.1 Responsibility for Implementation of Goals and Activities

Elected officials, officials appointed to head community departments and community staff are charged with implementation of various activities in the plan. During the quarterly reviews as described later in this section, an assessment of progress on each of the goals and activities in the plan will be determined and noted. At that time, recommendations will be made to modify timeframes for completion of activities, funding resources, and responsible entities. On a quarterly basis, the priority standing of various

activities may also be changed. Some activities that are found not to be doable may be deleted from the plan entirely and activities addressing problems unforeseen during plan development may be added.

10.1.2 Role of FMPC in Implementation, Monitoring and Maintenance

With adoption of this plan, the County will be responsible for the plan implementation and maintenance. The FMPC identified in Section 2 will reconvene **quarterly** each year to ensure that mitigation strategies are being implemented and that the County continues to maintain compliance with the NFIP. As such, the County agrees to continue its relationship with the FMPC and:

- Act as a forum for flood mitigation issues;
- Disseminate flood mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Ensure flood mitigation remains a consideration for community decision makers;
- Maintain a vigilant monitoring of multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended revisions to the County Council; and
- Inform and solicit input from the public.

The FMPC's primary duty moving forward is to see the plan successfully carried out and report to the County Council, SCEM, FEMA, and the public on the status of plan implementation and mitigation opportunities. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about flood mitigation, passing concerns on to appropriate entities, and posting relevant information on the County website (and others as appropriate).

10.2 Maintenance

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

10.2.1 Maintenance Schedule

The Lexington County Public Works Department is responsible for initiating plan reviews. In order to monitor progress and update the mitigation strategies identified in the action plan, the County will revisit this plan quarterly and following a hazard event. The County will submit a five-year written update to SCEM and FEMA Region IV, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule. With this plan update anticipated to be fully approved and adopted in 2017, the next plan update for Lexington County will occur in 2022.

10.2.2 Maintenance Evaluation Process

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or
- Increased vulnerability as a result of new development (and/or further annexation).

Updates to this plan will:

- Consider changes in vulnerability due to action implementation;
- Document success stories where mitigation efforts have proven effective;

- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to infrastructure inventories; and
- Incorporate new action recommendations or changes in action prioritization.

Changes will be made to the plan during the update process to accommodate for actions that have failed or are not considered feasible after a review of their consistency with established criteria, time frame, community priorities, and/or funding resources. Actions that were not ranked high but were identified as potential mitigation activities will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation. Updating of the plan will be by written changes and submissions, as is appropriate and necessary, and as approved by the County Council. In keeping with the five-year update process, the FMPC or similar committee will convene public meetings to solicit public input on the plan and its routine maintenance and the final product will be adopted by the County Council.

Specifically, the County will adhere to the following process for the next update of this FMP:

Quarterly Plan Review Process

For the 2017 Floodplain Management Plan update review process, the Lexington County Public Works Department will be responsible for facilitating, coordinating, and scheduling reviews and maintenance of the plan. The review of the Floodplain Management Plan will be conducted as follows:

- The County's Public Works Department will reconvene the FMPC or similar committee to meet and review the progress toward implementation of the plan's mitigation action plan. This review will evaluate the progress made on implementation of each mitigation action listed in Section 8.4 Mitigation Action Plan.
- Meetings of the FMPC shall be published in accordance with local rules regarding public notice.
- Prior to the review, department heads and others tasked with implementation of the various activities will be queried concerning progress on each activity in their area of responsibility and asked to present a report at the review meeting.
- After each quarterly meeting, minutes of the meeting and a status report will be prepared by the County's Public Works Department.
- The results of each quarterly FMPC meeting will be made available to the local news media and the County Council for informational purposes.
- The County's Public Works Department will maintain copies of minutes and status reports to provide to ISO/FEMA as part of the community's annual recertification to the CRS program.

Criteria for Annual Reviews in Preparation for 5-Year Update

The criteria recommended in 44 CFR 201 and 206 will be utilized in reviewing and updating the plan. More specifically, annual reviews will monitor changes to the following information:

- Community growth or change in the past quarter.
- The number of substantially damaged or substantially improved structures by flood zone.
- The renovations to public infrastructure including water, sewer, drainage, roads, bridges, gas lines, and buildings.
- Natural hazard occurrences that required activation of the Emergency Operations Center (EOC) and whether the event resulted in a presidential disaster declaration.

- Natural hazard occurrences that were not of a magnitude to warrant activation of the EOC or a federal disaster declaration but were severe enough to cause damage in the community or closure of businesses, schools, or public services.
- The dates of hazard events descriptions.
- Documented damages due to the event.
- Closures of places of employment or schools and the number of days closed.
- Road or bridge closures due to the hazard and the length of time closed.
- Assessment of the number of private and public buildings damaged and whether the damage was minor, substantial, major, or if buildings were destroyed. The assessment will include residences, mobile homes, commercial structures, industrial structures, and public buildings, such as schools and public safety buildings.
- Review of any changes in federal, state, and local policies to determine the impact of these policies on the community and how and if the policy changes can or should be incorporated into the Floodplain Management Plan. Review of the status of implementation of projects (mitigation strategies) including projects completed will be noted. Projects behind schedule will include a reason for delay of implementation.

10.2.3 Incorporation into Existing Planning Mechanisms

Another important implementation mechanism that is highly effective and low-cost is incorporation of the Floodplain Management Plan recommendations and their underlying principles into other plans and mechanisms. Where possible, plan participants will use existing plans and/or programs to implement hazard mitigation actions. As previously stated, mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. As described in this plan's capability assessment, Lexington County already implements policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. These existing mechanisms include:

- Central Midlands Hazard Mitigation Plan
- Lexington County Comprehensive Plan
- Zoning Ordinance, Stormwater Ordinance, Floodplain Management Ordinance
- Other plans, regulations, and practices with a mitigation focus

Those involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, programs, etc., as appropriate. As described in Section 10.1 Implementation, incorporation into existing planning mechanisms will be done through the routine actions of:

- Monitoring other planning/program agendas;
- Attending other planning/program meetings;
- Participating in other planning processes; and
- Monitoring community budget meetings for other community program opportunities.

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community.

Efforts should continuously be made to monitor the progress of mitigation actions implemented through other planning mechanisms and, where appropriate, their priority actions should be incorporated into updates of this Floodplain Management Plan.

10.2.4 Continued Public Involvement

Continued public involvement is imperative to the overall success of the plan's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stories from the plan implementation and seek additional public comment. The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and through public hearings.

Public Involvement Process for Quarterly Reviews

The public will be noticed by placing an advertisement on the County's website specifying the date and time for the review and inviting public participation.

Public Involvement for Five-year Update

When the FMPC reconvenes for the five-year update, they will coordinate with all stakeholders participating in the planning process—including those that joined the committee since the planning process began—to update and revise the plan. In reconvening, the FMPC will be responsible for coordinating the activities necessary to involve the greater public, including disseminating information through a variety of media channels detailing the plan update process. As part of this effort, public meetings will be held and public comments will be solicited on the plan update draft. The subcommittee will also coordinate this public outreach process with the program for public information established pursuant to the most current guidelines from the CRS.

APPENDIX A – PLANNING PROCESS DOCUMENTATION

Planning Step 1: Organize to Prepare the Plan

Resolution Creating the FMPC

COUNTY OF LEXINGTON, SOUTH CAROLINA

RESOLUTION
R-17-03

THE COUNCIL FOR THE COUNTY OF LEXINGTON, SOUTH CAROLINA, MEETING IN GENERAL SESSION THE 11TH DAY OF APRIL, TWO THOUSAND AND SEVENTEEN, ADOPTED THE FOLLOWING:

WHEREAS, the County of Lexington and its residents have exposure to flood hazards that increase the vulnerability of the life, property, environment, and the County's economy; and

WHEREAS, the County of Lexington participates in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) Program to reduce the cost of flood insurance to County residents; and

WHEREAS, the County of Lexington entered into the Community Rating System Program on October 1, 1991; and

WHEREAS, the County of Lexington is currently a CRS Classification 8, saving policy holders (residents and businesses) within the 100-year FEMA mapped floodplain ten percent (10%) on the cost of flood insurance and those outside the mapped floodplain a savings of five percent (5%); and

WHEREAS, the CRS Program requires the County to adopt a Floodplain Management Plan (FMP) based on the number of repetitively flooded properties in the County; and

WHEREAS, FEMA and the CRS Program encourage public participation and involvement from citizens and other stakeholders throughout the planning process, and Lexington County received a Flood Mitigation Assistance (FMA) Planning Grant to fund the development of a Floodplain Management Plan; and

WHEREAS, the Floodplain Management Planning Committee (FMPC) will be involved in the development of the FMP through assessment of the flooding problems in the County, development of goals that address the identified flood hazards, and creation of various mitigation strategies to implement to reduce damage to insurable structures in the future and help protect lives; and

WHEREAS, members of the FMPC shall include the following: County staff representing the Department of Public Works, Emergency Management, Community Development, Planning and GIS, and five citizens selected from the community; and

WHEREAS, the FMPC has the responsibility to meet and fulfill the obligations of the CRS Program and its floodplain management planning process that commenced on November 29, 2016 with a completion date of August 31, 2017.

NOW, THEREFORE, BE IT RESOLVED that we, the members of Lexington County Council, establish the County of Lexington Floodplain Management Planning Committee for the development of a Floodplain Management Plan under the guidance of FEMA's Community Rating System (CRS) Program and FEMA's Flood Mitigation Assistance (FMA) Grant requirements.

M. Todd Cullum, Chairman
Debra H. Summers, Vice Chairman
Scotty R. Wentzone
Paul L. Brigham, Jr.
Darrell Hudson
Bobby C. Keisler
Brad Joe Gunnion
Philip R. Napoleon
Roger Stutz

ATTEST: Diana W. Burnett
Diana W. Burnett, Clerk

Table A-1: FMPC Meeting Dates

Meeting Type	Meeting Topic	Meeting Date/ Time	Meeting Location
FMPC #1	3) Introduction to DMA and CRS planning process	November 29, 2016 6:00 – 7:00 p.m.	Lexington County Fire Services Training Building 436 Ball Park Road, Lexington, SC
	4) Organize resources: the role of the FMPC, planning for public involvement, and coordinating with other agencies and stakeholders		
FMPC #2	3) Review/discussion of Flood Risk Assessment (Assess the Hazard)	March 15, 2017 4:00 – 6:00 p.m.	Lexington County Fire Services Training Building
	4) Develop Plan Goals		
FMPC #3	2) Review/discussion of Vulnerability Assessment (Assess the Problem)	May 17, 2017 4:00 – 6:00 p.m.	Lexington County Fire Services Training Building
FMPC #4	3) Develop Capability Assessment	July 24, 2017 4:00 – 6:00 p.m.	Lexington County Administration Building 2nd Floor
	4) Develop Mitigation Strategy		
FMPC #5	3) Review "Draft" Plan	August 17, 2017 4:00 – 5:30 p.m.	Town of Lexington Municipal Complex
	4) Solicit comments and feedback from the FMPC		

Table A-2: Stakeholder Invitation List

	First Name	*Last Name*	*Organization/Position*	*Address 1*	*Address 2*
LEXINGTON COUNTY, SC FLOODPLAIN MANAGMENT PLAN LIST OF STAKEHOLDERS					
Educational Institutions					
1	Harris	Pastides	University of South Carolina, President	Osborne Administration Building, Suite 206	Columbia, SC 29208
Neighboring Communities					
2			Richland County Emergency Management	1410 Laurens Street	Columbia, SC 29204
3			Calhoun County Emergency Management	201 Mill Street	Saint Matthews, SC 29135
4	Bill	Staley	Orangeburg County Emergency Management	1558 Ellis Avenue	Orangeburg S.C., 29118
5	Tommy	Long	Newberry County Emergency Management	540 Wilson Road	Newberry, SC 29108
6			Aiken County Emergency Management	621 York Street	Aiken, SC 29801
7	Joshua	Morton	Saluda County Emergency Management	111 Law Enforcement Drive	Saluda, SC 29138
8	Elise	Partin	Cayce, Mayor	1800 12th Street	Cayce, SC 29033
9	Bobby	Horton	West Columbia, Mayor	200 North 12th Street	West Columbia, SC 29169
10	Steve	MacDougall	Lexington, Mayor	111 Maiden Lane	Lexington, SC 29072
11	Danny	Jones	South Congaree, Mayor	119 West Berry Road	West Columbia, SC 29172
12	Michael	Bishop	Springdale, Mayor	2915 Platt Springs Road	Springdale, SC 29170
13	Marguerite	Crapps	Batesburg-Leesville, Mayor	PO Box 2329	Batesburg-Leesville, SC 29070
14	Troy	Bivens	Gaston, Mayor	PO Box 429	Gaston, SC 29053
Federal Government					
15	Susan	Wilson	FEMA Region IV, Chief, Floodplain Management & Insurance Branch	3003 Chamblee Tucker Rd. - Hollins Bldg.	Atlanta, GA 30341
16	Janice	Mitchell	FEMA Region IV, Mitigation Division	3003 Chamblee Tucker Rd. - Hollins Bldg.	Atlanta, GA 30341
17	Mandy	Todd	ISO/CRS Specialist	1993 Meadowood Lane	Longs, SC 29568
18	Mike	Bratcher	ISO/CRS Specialist	213 West Broad Street	Beulaville, NC 28518
19	Eric	Strom	USGS - South Carolina Office	720 Gracern Road, Stephenson Center, Suite 129	Columbia, SC 29210

20	Tracy	Stakely	Congaree National Park Superintendent	100 National Park Road	Hopkins, SC 29061
21			U.S. Army Corps of Engineers Regulatory Program	Strom Thurmond Federal Building, 1835 Assembly Street, Rm 865 B-1	Columbia, SC 29201
State Government					
22	Maria	Cox	Flood Mitigation Program State Coordinator	1000 Assembly Street	Columbia, SC 29201
23	Jessica	Artz	Flood Mitigation Program Mitigation Specialist	1000 Assembly Street	Columbia, SC 29201
24	Bill	Marshall	SC Scenic Rivers Program	P.O. Box 167	Columbia, SC 29202
25	Larry	Nates	Lexington Conservation District	123 Park Road	Lexington, SC 29072
Business Community & Non-Profits Organizations					
26	Rebecca	Jordan	American Red Cross	2751 Bull Street	Columbia, SC 29201
27	Mark	Robertson	Nature Conservancy Field Office	2231 Devine Street, Suite 100	Columbia, SC 29205
28	Mac	Bennett	United Way of the Midlands	1818 Blanding Street	Columbia, SC 29201
29	Sara	Johnson Borton	The State Media Company	1401 Shop Road	Columbia, SC 29201
30			Lexington County Chronicle	131 Swartz Road	Lexington, SC 29072
31	Mike	Maddock	The Columbia Star	P.O. Box 5955	Columbia, SC 29250

Example Stakeholder Coordination Letter

County of Lexington
Public Works Department
Floodplain Management

February 6, 2017

Mr. Mike Bratcher
ISO/CRS Specialist
213 West Broad St
Beulaville, NC 28518

RE: County of Lexington Flood Mitigation Plan

Dear Mr. Bratcher:

The County of Lexington is developing a flood mitigation plan to address the flood hazards and associated stormwater and local drainage issues that impact the community. This planning process incorporates the 10-steps of Activity 510-Floodplain Management Planning in the National Flood Insurance Program's (NFIP) Community Rating System (CRS) Program.

Our objective in reaching out to other agencies and stakeholders is to coordinate with those who may bring additional information to the planning process and associated flood issues within Lexington County. Any information, studies, etc. which may supplement the work of the established Floodplain Mitigation Committee would be welcomed. Additionally, I invite your participation at our committee and public meetings throughout the planning process.

The County has teamed with Mr. David Stroud of AMEC Foster Wheeler to help complete the 510 Plan. As the program manager for this project I can be reached at (803) 785-8121 or cstone@lex-co.com or you may send information directly to my attention to the address on this letterhead. Additionally you can contact our planning consultant, David Stroud with AMEC at (919) 765-9986 or david.stroud@amec.com.

We look forward to hearing from you and/or participation at future committee and public meetings.

Sincerely,

Christopher J. Stone, CFM
Lexington County Floodplain Manager

212 S. Lake Drive • Lexington, South Carolina 29072 • (803) 785-8121

FMPC Meeting Sign in Sheets, Agendas, and Minutes

Meeting 1: November 29, 2016

Lexington County
Flood Mitigation Plan
Lexington, SC
Tuesday, November 29th, 2016

Attended by:

	Name	Organization	E-mail Address	Phone Number
1	DAVID STROUD	Amec Foster Wheeler	david.Stroud@amecfw.com	919-325-6497
2	Jeff McNesby	PW	jmcNesby@lex-co.com	785 8153
3	Melanie Gall	HVRI / Univ. of SC	GALLM@MAILBOX.SC.EDU	777-9816
4	Susan Cutter	HVRI / Univ of SC	scutter@sc.edu	(803) 777-1590
5	Alan Rickenbaker	Lexington Co PGIS	arickenbaker@lex-co.com	803-785-5161
6	Millie Massey	L.C CERT	masseym@midlandstech.edu	803-240-5984
7	JIM BARKER	LCPW	jbarker@lex-co.com	785-8588
8	Robbie Derrick	Lex.Co. Community Dev.	rderrick@lex-co.com	785-5163
9	CHRIS STONE	Lex Co. Stormwater	cstone@lex-co.com	785-8121
10	MARK FUGE	RESIDENT, PINEGLEN SUBDIVISION	PINEGLENWATCH@GMAIL.COM	803-960-0010
11	Angela Vandelay	Amec Foster Wheeler	angela.vandelay@amecfw.com	803-798-1200
12	Sheri M. Armstrong	LEX CO. SW/PW	SARMSTRONG@lex-co.com	803-785-8117
13	WRENN BARRETT	LEX. Co Public Works	wbarrett@lex-co.com	803 785 8201
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Lexington County Floodplain Management Plan

Floodplain Management Planning Committee Meeting Agenda
November 29, 2016

1. Trends in Disasters; Why Plan?
2. Disaster Mitigation Act (DMA) Planning Requirements
3. Community Rating System (CRS) Program
    a. Basics of the CRS Program
    b. NFIP Flood Insurance Discounts
    c. Benefits of the CRS Program
4. CRS Program Activities
    a. Activity 510 Floodplain Management Planning (FMP) Process
        i. 10-Step Planning Process
5. Recent Flood Data
    a. October 2015 floods
        i. State collected data
        ii. Local data
6. Questions

Page 1 of 1

Lexington County Floodplain Management Plan

Floodplain Management Planning Committee Meeting Minutes
November 29, 2016

The Lexington County Public Works Department held a Floodplain Management Planning Committee (FMPC) Kick-off Meeting in the Lexington County Fire Services Training Building located at 436 Ball Park Road on Tuesday, November 29, 2016 starting at 6 p.m.

David Stroud, a consultant with Amec Foster Wheeler, opened the meeting by providing the meeting agenda which included: trends in disasters, Disaster Mitigation Act (DMA) planning requirements, basics and benefits of the Community Rating System (CRS) Program, and an overview of Activity 510 Floodplain Management Planning (FMP) process.

Mr. Stroud then provided a PowerPoint presentation which discussed recent trends in disasters which reflect a continual increase in expenses and more disaster declarations. Mr. Stroud also discussed the four phases of DMA along with the ten planning steps of the CRS program. It was demonstrated that each of the 10 CRS planning steps fit within the four phases of DMA to create a seamless planning process. An overview of the CRS Program was also provided including the expected insurance savings benefits to Lexington County.

The presentation went on to discuss the 10 CRS planning steps including how the FMPC would function throughout the planning process, what the responsibilities of the FMPC would be, the various flood hazards that should likely be profiled in the FMP, and how goals and projects would be developed for the plan. The presentation also outlined the main components of the FMP, the hazard identification, risk assessment, vulnerability assessment, capability assessment, and mitigation action plan.

Mr. Stroud also reviewed data collected on the recent October 2015 flood event and its impacts. He then discussed the next steps that the FMPC and Amec Foster Wheeler will take in the planning process.

Before closing the meeting, the FMPC proceeded to identify the hazards that should be addressed in the FMP. The following hazards were identified: Stream Bank Erosion, Dam/Levee Failure, Flood (100-/500-year), Stormwater/Localized Flooding (including tidal flooding), Hurricanes and Tropical Storms, and Repetitive Flooding.

After a question and answer period, the meeting ended at 7 p.m.

Page 1 of 1

Meeting 2: March 15, 2017

Lexington County
Flood Mitigation Plan
Lexington, SC
Wednesday, March 15th, 2017

amec foster wheeler

Attended by:

	Name	Organization	E-mail Address	Phone Number
1	Chris Stone	Lex - CO	cstone@lex-co.com	8127
2	Joanne Fineberg	Coldstream HOA	jzfineberg@gmail.com	803-951-8259
3	Robbie Derrick	Lexington Co.	rderrick@lex-co.com	785-5163
4	Jeff McNesby	Public Works	jmcnesby@lex-co.com	785-8153
5	WRENN BARRETT	Lex. Co. Public Works	wbarrett@lex-co.com	785-8201
6	JIM BARKER	PW	jbarker@lex-co.com	785-8588
7	Alan Rickenbaker	PGIS	arickenbaker@lex-co.com	785-5161
8	DAVID STROUD	AMEC FW	david.stroud@amecfw.com	(99)325-6497
9	Sheri Armstrong	Lex Co PW	SArmstrong@lex-co.com	785-8117
10	Angela Vandelay	Amec Foster Wheeler	angela.vandelay@amecfw.com	798-1200
11	MARK FUGE	PINE GLEN NEIGHBORHOOD	PINEGLENWATCH@GMAIL.COM	960-0010
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Lexington County Floodplain Management Plan

Floodplain Management Planning Committee Meeting Agenda
March 15, 2017

1. Where we are in the CRS Planning Process
2. Profiled Flood Hazards
    a. Dam/Levee Failure
    b. Flood: 100-/500-year
    c. Flood: Stormwater/Localized
    d. Hurricane & Tropical Storm
    e. Secondary hazards:
        i. Repetitive Flooding
        ii. Stream Bank Erosion
3. Development of Goals for the Floodplain Management Plan
    a. Messages to develop goals
    b. Potential goals
    c. Open discussion
4. Next Planning Steps
5. Questions

Page 1 of 1

Lexington County Floodplain Management Plan

Floodplain Management Planning Committee Meeting Minutes
March 15, 2017

The Lexington County Public Works Department held a Floodplain Management Planning Committee (FMPC) Meeting in the Lexington County Fire Services Training Building located at 436 Ball Park Road on Wednesday, March 15, 2017 starting at 4 p.m.

David Stroud, a consultant with Amec Foster Wheeler, opened the meeting by providing the meeting agenda which included: a review of where we are in the CRS planning process, an overview of the hazard profiles, and a discussion to develop goals for Activity 510 Floodplain Management Planning (FMP).

Mr. Stroud then provided a PowerPoint presentation, beginning with an overview of where we are in the CRS planning process. Thus far, progress has been made on CRS Steps 1, 2, and 3 by holding the Kick-Off meeting and the first public meeting, forming the FMPC, coordinating with other agencies, and distributing the flood protection questionnaire. This second FMPC meeting continues to work toward completing CRS steps 2 and 3.

The presentation then reviewed the hazards identified in the previous FMPC meeting and the initial findings from flood hazard mapping. Based on initial findings, the FMPC decided to evaluate stream bank erosion as a secondary cause and effect within each hazard rather than profile it individually.

Mr. Stroud then moved on to discuss goal setting. He defined mitigation goals as a component of the mitigation strategy and explained the need to create goals as part of the CRS planning process. Mr. Stroud then led the FMPC through several goal development exercises, reviewed goals from related and past planning efforts, and provided a series of example goals in order to assist the FMPC in defining goals for Lexington County.

Before closing the meeting, Mr. Stroud discussed the next steps, including a presentation of the HIRA and development of floodplain management mitigation strategies.

After a question and answer period, the meeting ended at 6 p.m.

Page 1 of 1

Meeting 3: May 17, 2017

Lexington County
Flood Mitigation Plan
Lexington, SC
Wednesday, May 17, 2017

amec foster wheeler

Attended by:

	Name	Organization	E-mail Address	Phone Number
1	Joanne Finkelberg	Coldstream HOA	jzfinkelberg@gmail.com	803-351-8259
2	Jim Barker	Lex Co PW	jbarker@lex-co.com	785-8201
3	Alan Rickenbaker	Lex Co PGIS	arickenbaker@lex-co.com	785-5161
4	Chas Stone	Lex Co	cstone@lex-co.com	785-8121
5	Wrenn Barrett	" "	wbarrett@lex-co.com	785-8201
6	Sheri Armstrong	Lex Co.	sarmstrong@lex-co.com	785-8117
7	Angela Windsor	Amec-Foster Wheeler	angela.windsor@amecfw.com	798-1320
8	David Strus	Amec Foster Wh	david.strus@amecfw.com	919-325-6497
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Lexington County Floodplain Management Plan

Floodplain Management Planning Committee Meeting Agenda
May 17, 2017

1. Where we are in the CRS Planning Process
2. Goals for the FMP
    a. Top Results from Goal Setting Exercises
    b. Preliminary Goals
3. Review the Hazard Identification and Risk Assessment
    a. Hazard Profiles
    b. Vulnerability Assessment
    c. Priority Risk Index
    d. Flood Insurance Data
    e. Repetitive Losses
4. Next Planning Steps
    a. Data needs:
        i. Dam Inundation from DHEC
        ii. Localized Stormwater from County
    b. Complete RLAA mapping
    c. Collect comments on HIRA
    d. Develop mitigation projects
5. Questions

Page 1 of 1

Lexington County Floodplain Management Plan

Floodplain Management Planning Committee Meeting Minutes
May 17, 2017

The Lexington County Public Works Department held a Floodplain Management Planning Committee (FMPC) Meeting in the Lexington County Fire Services Training Building located at 436 Ball Park Road on Wednesday, May 17, 2017 starting at 4 p.m.

David Stroud, a consultant with Amec Foster Wheeler, opened the meeting by providing the meeting agenda which included: a review of preliminary goals based on goal setting exercises completed at the previous FMPC meeting and a presentation of the Hazard Identification and Risk Assessment (HIRA), including a profile of each hazard, a vulnerability assessment, and a priority risk index rating for each hazard.

After presenting the preliminary goals for the FMPC's approval, Mr. Stroud reviewed the CRS Planning Process and the Town and FMPC's progress thus far in developing the Floodplain Management Plan (FMP).

The presentation then reviewed all of the hazards profiled for Lexington County, which included dam/levee failure, 100- and 500-year flooding, stormwater and localized flooding, and hurricanes and tropical storms. For each hazard profiled by the consultant team, Mr. Stroud presented the findings of risk and vulnerability to that hazard as well as a priority risk index (PRI) rating used to quantify risk and compare the hazards to each other in order to prioritize the creation of mitigation actions. The findings prioritized dam failure as "high risk" and hurricane/tropical storm, 100- and 500-year flooding, and stormwater/localized flooding as "moderate risk".

Before closing the meeting, Mr. Stroud discussed the next steps, including following up on several data needs, including dam inundation data from DHEC and localized stormwater flooding areas from the County. Next steps noted also included completing the repetitive loss area mapping, distributing the HIRA to collect and incorporate FMPC comments, and developing mitigation projects.

After a question and answer period, the meeting ended at 6 p.m.

Page 1 of 1

Meeting 4: July 24, 2017

Lexington County
Flood Mitigation Plan Stakeholders Meeting
Lexington, SC
Monday, July 24, 2017

amec foster wheeler

Attended by:

	Name	Organization	E-mail Address	Phone Number
1	Angela Vandelay	Amec FW	angela.vandelay@amecfw.com	803-798-1200
2	David Stroud	Amec FW	david.stroud@amecfw.com	919-325-6497
3	Guillermo Espinosa	CMCOG	gespinosa@cmcog.org	803-744-5120
4	Robbie Derrick	County of Lex - Comm Dev	rderrick@lex-co.com	803-785-5163
5	Mollie Massey	LC CERT	massey m@midlandtech.edu	803-240-5784
6	Shane Armstrong	LC Public Works	SHRMSTRONG@lex-co.com	803-785-8117
7	Alan Rickenbaker	PGIS	arickenbaker@lex-co.com	5161
8	MARK FUGE	PINEGLEN NEIGHBORHOOD	PINEGLENWATCH@GMAIL.COM	803-960-0010
9	WRENN BARRETT	Lex Co Public Works	Wbarrett@lex-co.com	803 785 8201
10	Chris Stone	PW	cstone@lex-co.com	803-785-8121
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Lexington County Floodplain Management Plan

Floodplain Management Planning Committee Meeting Agenda
July 24, 2017

1. Where we are in the CRS Planning Process
    a. Current Public Involvement Efforts
        i. Recent news story
    b. Drafting an Action Plan
        i. Who, How, & When
2. Review of Flood Problems
3. Mitigation Categories
    a. FEMA Mitigation Alternatives
        i. Alter, Avert, Adapt, Avoid
    b. Categories
        i. Preventive, Property Protection, Natural Resource Protection, Emergency Services, Structural Projects, Public Information
4. Potential Mitigation Projects
    a. Central Midlands HMP Projects
    b. Lexington County Kinley Creek Study
    c. Lexington County Unfunded Capital Improvement Projects
5. Next Planning Steps
    a. Finalize Flood Mitigation Projects
    b. Prepare Final Draft Plan
    c. Review Final Draft Plan – FMPC
    d. Final Public Meeting to Present Draft Plan
    e. Submit plan to SCDNR/SCEMD and ISO for Review
6. Questions

Page 1 of 1

Lexington County Floodplain Management Plan

Floodplain Management Planning Committee Meeting Minutes
July 24, 2017

The Lexington County Public Works Department held a Floodplain Management Planning Committee (FMPC) Meeting in the Lexington County Fire Services Training Building located at 436 Ball Park Road on Wednesday, May 17, 2017 starting at 4 p.m.

David Stroud, a consultant with Amec Foster Wheeler, opened the meeting by providing the meeting agenda. He then proceeded with a recap of the CRS planning process and the current steps underway. Lexington County is continuing Step 2 (Involve the Public) and Step 3 (Coordinate). Most recently, a news story on the floodplain management plan ran on WLTX Channel 19. The FMPC is also moving into Step 8 (Draft an Action Plan), which involves identifying mitigation action items as well as responsible persons/agencies, funding sources, and a timeline for each action to be implemented.

Prior to discussing possible action items, Mr. Stroud reviewed the flood hazards present in the County. The presentation included data on hazard risk and vulnerability for dam failure, 1% and 0.2% annual chance flooding, stormwater/localized flooding, and hurricanes and tropical storms. The presentation also reviewed unmitigated repetitive loss properties and stream bank erosion related to these flood hazards.

Next, Mr. Stroud introduced the FMPC members to the possible mitigation alternatives, which are to alter the hazard, avert the hazard, adapt the hazard, or avoid the hazard. He also discussed the six mitigation categories that the County should address with mitigation actions. The FEMA mitigation categories are: preventive, property protection, natural resource protection, emergency services, structural projects, and public information. With these categories and the flood risk and vulnerability data in mind, the FMPC reviewed the Central Midlands Hazard Mitigation Plan, the Kinley Creek Watershed Study, and the unfunded Capital Improvements Projects related to drainage in order to identify mitigation strategies for the Floodplain Management Plan. The FMPC also brainstormed additional actions that could be pursued in this plan.

Following the mitigation action brainstorming session, Mr. Stroud discussed next steps for the planning process, which are to: finalize flood mitigation projects, prepare the final draft plan, have the FMPC review the final draft plan, hold a final public meeting to present the draft plan, and submit the plan to SCDNR/SCEMB and ISO for review.

After a question and answer period, the meeting ended at 5 p.m.

Page 1 of 1

Meeting 5: August 17, 2017

Lexington County, SC
Floodplain Management FMPC Meeting
August 17, 2017

Name	~~Citizen~~/Agency	E-Mail	Phone Number
DAVID STROUD	Amec FOSTER WHEELER	david.Stroud@amecfw.com	919-325-6497
Abby Moore	Amec Foster wheeler	abigail.moore@amecfw.com	919-786-9986
Guillermo Espinosa	CMCOG	gespinosa@cmcog.org	803-744-5126
Joanne Grieberg	Coldstream HOA	coldstreamhoa@gmail.com	805-354-8259
Chris Stone	Lex Co	cstone@lex-co.com	785-8121
Alan Rickenbaker	Lex Co	arickenbaker@lexco.com	785-1454
MARK FUGE	PINE GLEN	PINEGLENWATCH@GMAIL.COM	803-960-0010
Millie Massey	LC. CERT	Massey@midlandstech.edu	803-240-5784
Sheri Armstrong	LEX-CO	sarmstrong@lex-co.com	785-8201

Lexington County Floodplain Management Plan

Floodplain Management Planning Committee Meeting Agenda
August 17, 2017

1. Where we are in the CRS Planning Process
    a. Current Public Involvement Efforts
    b. Drafting the Plan
    c. Implementation and Maintenance
2. Review of Draft Plan
    a. Structure of the Plan
    b. Review of the Hazards
    c. Review of the Goals
    d. Review of the Mitigation Strategy
        i. Flood Mitigation Projects
    e. Implementation
3. Next Steps
    a. Incorporate Comments into Draft Plan
4. Questions

Page 1 of 1

Lexington County Floodplain Management Plan

Floodplain Management Planning Committee Meeting Minutes
August 17, 2017

The Lexington County Public Works Department held a Floodplain Management Planning Public Meeting in the Town of Lexington Municipal Complex located at 11 Maiden Lane on Thursday, August 17, 2017 starting at 4:00 p.m. Three residents were in attendance in addition to three Lexington County representatives.

David Stroud, a consultant with Amec Foster Wheeler, opened the meeting by providing the meeting agenda which included an overview of the CRS planning process and a review of the draft plan including a discussion of the mitigation strategy and implementation and maintenance procedures.

Mr. Stroud then provided a PowerPoint presentation which discussed the planning process and the draft plan. The planning process is approaching the plan adoption stage. This will occur after the draft plan has been reviewed and comments are incorporated. It was noted that public outreach is continuing through all steps of the planning process.

The presentation went on to discuss the structure of the draft plan. Mr. Stroud reviewed the hazards included in the plan and the findings of the risk and vulnerability assessments. He also reviewed the findings of the floodplain management planning public survey. Based on the results of this survey, the FMPC agreed to add a project to create a listserv for flood-related information and outreach to the mitigation strategy. Mr. Stroud reviewed the goals of the plan as well as the other mitigation actions items. The FMPC made recommendations and revisions to the mitigation strategy. Increased FMPC involvement and responsibility was recommended for all mitigation action items related to public information and outreach.

Mr. Stroud then discussed the next steps that the FMPC and Amec Foster Wheeler will take in the planning process. The FMPC and the public will be able to provide comments on the draft plan. After these comments are incorporated the plan will be adopted and sent to SCEMD and FEMA for review.

After a question and answer period, the meeting ended at 5:30 p.m.

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Table A-3: Public Meeting Dates

Meeting Type	Meeting Topic	Meeting Date/Time	Meeting Locations
Public Meeting #1	1) Introduction to DMA, CRS and the planning process	January 17, 2017 5:30 – 7:00 p.m.	Town of Lexington Municipal Complex 11 Maiden Lane Lexington, SC
	2) Introduction to hazard identification		
Public Meeting #2	1) Review "Draft" Floodplain Management Plan	August 17, 2017 5:30 – 7:00 p.m.	Town of Lexington Municipal Complex
	2) Solicit comments and feedback from the public		

Public Meeting Sign-in Sheets, Agendas, Minutes, Advertisements

Public Meeting #1: January 17, 2017

Lexington County
FMP Public Meeting
Lexington, SC
Tuesday, January 17, 2017

amec foster wheeler

Attended by:

	Name	Organization (Neighborhood)	E-mail Address	Phone Number
1	HAROLD MOXLEY	RESIDENT (POOL VALLEY)	SHMOXLEY@ATT.NET	803-760-8019
2	Wes Rhoten	Resident & Businessowner	Countrysausagestore@yahoo.com	(803)834 2216
3	DAVID DRUKENNEDY	Resident (Whitehall)	drukennedy@sc.rr.com	803 240 9395
4	SHERI ARMSTRONG	Lex Co.	sarmstrong@lex-co.com	803-785-8117
5	CHRIS Stone	Lex Co	cstone@lex-co.com	803-785-8127
6	Angela Vandelay	Amec Foster Wheeler	angela.vandelay@amecfw.com	803-798-1200
7	DAVID STRIND	AMEC FOSTER WHEELER	david.strind@amecfw.com	919-325-6497
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Lexington County Floodplain Management Plan

Floodplain Management Planning Public Meeting Agenda
January 17, 2017

1. Trends in Disasters; Why Plan?
2. Disaster Mitigation Act (DMA) Planning Requirements
3. Community Rating System (CRS) Program
    a. Basics of the CRS Program
    b. NFIP Flood Insurance Discounts
    c. Benefits of the CRS Program
4. CRS Program Activities
    a. Activity 510 Floodplain Management Planning (FMP) Process
        i. 10-Step Planning Process
5. Recent Flood Data
    a. October 2015 floods
        i. State collected data
        ii. Local data
6. Questions

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Lexington County Floodplain Management Plan

Floodplain Management Planning Public Meeting Minutes
January 17, 2017

The Lexington County Public Works Department held a Floodplain Management Planning Public Kick-off Meeting in the Town of Lexington Municipal Complex located at 11 Maiden Lane on Tuesday, January 17, 2017 starting at 5:30 p.m. Three residents were in attendance in addition to two Lexington County representatives.

David Stroud, a consultant with Amec Foster Wheeler, opened the meeting by providing the meeting agenda which included: trends in disasters, Disaster Mitigation Act (DMA) planning requirements, basics and benefits of the Community Rating System (CRS) Program, and an overview of Activity 510 Floodplain Management Planning (FMP) process.

Mr. Stroud then provided a PowerPoint presentation which discussed recent trends in disasters which reflect a continual increase in expenses and more disaster declarations. Mr. Stroud also discussed the four phases of DMA along with the ten planning steps of the CRS program. It was demonstrated that each of the 10 CRS planning steps fit within the four phases of DMA to create a seamless planning process. An overview of the CRS Program was also provided including the expected insurance savings benefits to Lexington County.

The presentation went on to discuss the 10 CRS planning steps including and explanation of the FMPC and how the FMPC would function throughout the planning process. The presentation also outlined the various flood hazards that should likely be profiled in the FMP, as well as how goals and projects would be developed for the plan.

Mr. Stroud also reviewed data collected on the recent October 2015 flood event and its impacts. He then discussed the next steps that the FMPC and Amec Foster Wheeler will take in the planning process.

After a question and answer period, the meeting ended at 7 p.m.

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Columbia Daily News, January 9, 2017

Lexington County seeks public input on flood hazards

January 9, 2017 by Hal Millard

SHARE

Have property in Lexington County? Does it sometimes flood? Then officials want to hear from you.

Lexington County officials announced Monday they are seeking help from the public to identify areas within the county that historically flood as they seek to develop a new comprehensive Floodplain Management Plan.

A public-input meeting has been scheduled for January 17, from 5:30 p.m. to 7 p.m. at the Town of Lexington Municipal Complex, located at 111 Maiden Lane in Lexington.

Officials said development of the Floodplain Management Plan will benefit the county's goal of reducing flood-insurance premiums for homeowners and businesses in the unincorporated areas of Lexington County, and aid in ongoing floodplain and stormwater management efforts.

The purpose of the meeting is to share information related to the development of the Floodplain Management Plan as well as to gain input from residents, business owners, and other stakeholders on current flood problems and possible mitigation solutions.

The information gained from these meetings will supplement the technical data and studies generated throughout the planning process, officials said.

The purpose of the flood plan is to assess current flood hazard conditions, including historically flooded areas and the most critical, repetitively flooded properties, and to develop appropriate mitigation strategies for the county to consider in reducing or eliminating future flood losses like those experienced in the devastation left behind in the historic floods of October 2015.

Officials said the final Floodplain Management Plan will take approximately one year to complete, and will be submitted for adoption by the County Council.

Comments

1 Comments

Lexington County Facebook Page, January 9, 2017

Batesburg-Leesville Twin City News, January 12, 2017

Lex. Co. Stormwater Division seeks public input on flood hazards

The County of Lexington is seeking help from the public to identify areas within the County that historically flood as part of a process to create a Floodplain Management Plan.

A public meeting will be held on Jan. 17, 2017, from 5:30 p.m. to 7 p.m. at the Town of Lexington Municipal Complex, located at 111 Maiden Lane, Lexington SC, 29072.

Development of the Floodplain Management Plan will benefit the County's goal of reducing flood insurance premiums for homeowners and businesses in the unincorporated areas of Lexington County and aid in ongoing floodplain and stormwater management efforts.

The purpose of this meeting is to share information related to the development of the Floodplain Management Plan as well as to gain input from residents, business owners, and other stakeholders on current flood problems and possible mitigation solutions. The information gained from these meetings will supplement the technical data and studies generated throughout the planning process.

The purpose of the Floodplain Management Plan is to assess current flood hazard conditions, including historically flooded areas and the most critical repetitively flooded properties, and to develop appropriate mitigation strategies for the County to consider in reducing or eliminating future flood losses.

The final Floodplain Management Plan will take approximately one year to complete, and will be submitted for adoption by the County Council.

Judy R. Busbee
Lexington County Council

Public Meeting #2: August 17, 2017

Lexington County, SC
Floodplain Management Planning Public Meeting
August 17, 2017

Name	Citizen/Agency	E-Mail	Phone Number
Tom Barnes	✓	TBARNES022@gmail.com	803-206-0352
Robert Tedford	✓		
DAVID LOWMAN	✓		
SHERI ARMSTRONG	LEX CO.	SARMSTRONG@lexco.com	803-785-8117
DAVID STROUD	AMECFOSTERWHEELER	david.stroud@amecfw.com	919-325-6497
Harrison Cahill	Lex Co	hcahill@lex-co.com	(803) 212-5553
Abby Moore	amec Foster wheeler	abigail.moore@amecfw.com	
Chris Stone	Lex CO	cstone@lex-co.com	803-785-8121

Lexington County Floodplain Management Plan

Floodplain Management Planning Public Meeting Agenda
August 17, 2017

1. Where we are in the CRS Planning Process
    a. Current Public Involvement Efforts
    b. Drafting the Plan
    c. Implementation and Maintenance
2. Review of Draft Plan
    a. Structure of the Plan
    b. Review of the Hazards
    c. Review of the Goals
    d. Review of the Mitigation Strategy
        i. Flood Mitigation Projects
    e. Implementation
3. Next Steps
    a. Incorporate Comments into Draft Plan
4. Questions

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Lexington County Floodplain Management Plan

Floodplain Management Planning Public Meeting Minutes
August 17, 2017

The Lexington County Public Works Department held a Floodplain Management Planning Public Meeting in the Town of Lexington Municipal Complex located at 11 Maiden Lane on Thursday, August 17, 2017 starting at 6:00 p.m. Three residents were in attendance in addition to three Lexington County representatives.

David Stroud, a consultant with Amec Foster Wheeler, opened the meeting by providing the meeting agenda which included an overview of the CRS planning process and a review of the draft plan including a discussion of the mitigation strategy and implementation and maintenance procedures.

Mr. Stroud then provided a PowerPoint presentation which discussed the planning process and the draft plan. The planning process is approaching the plan adoption stage. This will occur after the draft plan has been reviewed and comments are incorporated. It was noted that public outreach is continuing through all steps of the planning process.

The presentation went on to discuss the structure of the draft plan. Mr. Stroud reviewed the hazards included in the plan and the findings of the risk and vulnerability assessments. He also reviewed the findings of the floodplain management planning public survey. Finally, Mr. Stroud discussed the goals of the plan as well as the mitigation strategy.

Mr. Stroud then discussed the next steps that the FMPC and Amec Foster Wheeler will take in the planning process, and emphasized the ways for the public to continue to get involved in the planning process. The FMPC and the public will be able to provide comments on the draft plan. After these comments are incorporated the plan will be adopted and sent to SCEMD and FEMA for review.

After a question and answer period, in which attendees asked about the mitigation action item on repetitive loss property buyouts and how implementation of the buyout process will proceed, the meeting ended at 7:00 p.m.

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Floodplain Management Plan Public Survey

FLOODPLAIN MANAGEMENT PLAN QUESTIONNAIRE

We need your help! Lexington County is working to become less vulnerable to flooding, and your participation is important to us! The County is preparing a *Floodplain Management Plan*. This Plan will identify and assess our community's flood hazard risks and determine how to best minimize or manage those risks and what outreach materials may be necessary to better communicate those risks.

This survey is an opportunity for you to share your opinions and participate in the mitigation planning process. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that help lessen the impacts of future hazard events.

BACKGROUND INFORMATION

1. Where do you live?

- ❑ Unincorporated Lexington County
- ❑ Other: _____

FLOOD INFORMATION

2. Have you ever experienced or been impacted by high water or flooding in Lexington County?

- ❑ Yes
- ❑ No

a. If "Yes," please explain: _____

_____

3. How concerned are you about the possibility of your community being impacted by flooding?

- ❑ Extremely concerned
- ❑ Somewhat concerned
- ❑ Not concerned

4. Is your home located in a Federal Emergency Management Agency (FEMA) floodplain?

- ❑ Yes
- ❑ No
- ❑ I don't know

5. Do you have flood insurance for your home/personal property?

- ❑ Yes
- ❑ No
- ❑ I don't know

a. If "No," why not?

- ❑ My home is not located in a floodplain
- ❑ I rent
- ❑ It's too expensive
- ❑ I never really considered it
- ❑ I don't need it because my home is elevated or otherwise protected
- ❑ I don't need it because it never floods
- ❑ Other (please explain): _____

Page 1 of 2

MITIGATION ACTIONS

6. **Have you taken any actions to protect your home from flood damage?**
   - ❑ Yes
   - ❑ No

   b. **If "Yes," please explain:** _____

   _____

   _____

7. **Do you know what government agency/office to contact regarding the risks associated with flooding?**
   - ❑ Yes
   - ❑ No

8. **What is the most effective way for you to receive information about how to make your home or neighborhood more resistant to flood damage?**
   - ❑ Newspaper
   - ❑ Television advertising or programs
   - ❑ Radio advertising or programs
   - ❑ Public workshops/meetings
   - ❑ School meetings
   - ❑ Mail
   - ❑ Email
   - ❑ Lexington County website
   - ❑ Social media
   - ❑ Other (please explain): _____

9. **What are some steps your local government could take to reduce the risk of flooding in your neighborhood?**

   _____

   _____

   _____

THANK YOU FOR YOUR PARTICIPATION!

*This survey may be submitted anonymously; however, if you provide us with your name and contact information below we will have the ability to follow up with you to learn more about your ideas or concerns and inform you of future opportunities to participate (**optional**):*

Name: _____

Address: _____

Phone: _____ **E-mail:** _____

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Floodplain Management Plan Public Survey Results

Results from the public survey are summarized below. The County received a total of 38 survey responses. Percentages are calculated based on the total number of respondents to each question and are rounded to the nearest whole number.

Q1. Where do you live?

Answer Choices	Percentage	Number Responding
Unincorporated Lexington County	61%	23
Other	39%	15
Total		**38**

If other:

- Whitehall
- Town of Lexington (5)
- West Columbia (3)
- Seven Oaks
- Gaston (unincorporated)
- South Congaree
- Cayce (2)
- Chapin
- Other

Q2: Have you ever experienced or been impacted by high water or flooding in Lexington County?

Answer Choices	Percentage	Number Responding
Yes	37%	14
No	63%	24
Total		**38**

If yes, explain:

- "Home and yard flooding yearly for 28 years"
- "Ongoing since at least 1970; had 5.5 ft inside house in Oct 2015"
- "Grandmother's backyard (and occasionally lower level of house) on Natchez Trail floods with heavy/sustained rain"
- "This last flood Pelion got flooded and that has never happened before."
- "My home was severely flooded in the October 2015 flood. Prior to that flood I had experienced numerous less severe floods resulting in damage to my outdoor property and landscaping, and extensive cleanup."
- "Water table is already high where I live. So, heavy rains takes while to soak into ground..."
- "Main road to neighborhood closed since flood."
- "During the 2015 flood a creek in our neighborhood became so full we were scared to cross it. Crossing the creek was the only way in and out of the neighborhood."
- "My garage, my shed, and yard were flooded twice during 2015. Once in June and once in October."
- "Flood oct 2015, dam releasing water- neighbors in lower lining areas were affected. Biggest issue was those living on the Saluda river just 2 miles below the dam not getting a heads up when they were releasing."
- "Michaelmas "M" Avenue in Cayce has ditch running through my backyard that looks like a lake with over a foot of water gushing and flooding backyard. Since the M ave was paved 4 years ago and the height increased, all the water coming from down the hill from M ave and 9th street is flowing to front yards and front yards are flooding with a foot of water too. This is making us being unable to leave the house because we are trapped by flood/water completely around the house."
- "Street flooding in neighborhood and sewer manhole overflow as a result of floodwaters."
- "Our house backs up to 12 mile creek near Barr road. We are in Vintners wood subdivision. During the oct incident, the creek was within feet of our back fence."
- "My house flooded in October 2015."

Q3: How concerned are you about the possibility of your community being impacted by flooding?

Answer Choices	Percentage	Number Responding
Extremely concerned	34%	13
Somewhat concerned	53%	20
Not concerned	13%	5
Total		**38**

Q4: Is your home located in a Federal Emergency Management Agency (FEMA) floodplain?

Answer Choices	Percentage	Number Responding
Yes	11%	4
No	53%	20
I don't know	37%	14
Total		**38**

Q5a: Do you have flood insurance for your home/personal property?

Answer Choices	Percentage	Number Responding
Yes	13%	5
No	76%	29
I don't know	11%	4
Total		**38**

5b: If "No," why not? (Note: Some respondents selected multiple answers.)

Answer Choices	Percentage	Number Responding
My home is not located in a floodplain	55%	16
I rent	7%	2
It's too expensive	21%	6
I never really considered it	14%	4
I don't need it because my home is elevated or otherwise protected	10%	3
I don't need it because it never floods	7%	2
Other	3%	1
Total		**29**

If other:

- "Had it in 2015 but house is condemned"

Q6: Have you taken any actions to protect your home from flood damage?

Answer Choices	Percentage	Number Responding
Yes	24%	9
No	76%	29
Total		**38**

If yes, explain:

- "dams & landscaping"
- "installed gutters, rain barrels, and kept a clear pathway for storm water to runoff"
- "regrading backyard to reduce/redirect flow of excessive water"
- "Just small things that for the most part proved to be ineffective."
- "Back filling with top soil..Too try and build ground up..."

- "I've contacted County public works and have worked on improving drainage around my house."
- "City of Cayce prevents us from protecting our property by telling us they will fine us $1000/day."
- "Sand bags along lower door jambs along portion of the home."

Q7: Do you know what government agency/office to contact regarding the risks associated with flooding?

Answer Choices	Percentage	Number Responding
Yes	37%	14
No	63%	24
Total		**38**

Q8: What is the most effective way for you to receive information about how to make your home or neighborhood more resistant to flood damage? (Note: Some respondents selected multiple answers.)

Answer Choices	Percentage	Number Responding
Newspaper	16%	6
Television advertising or programs	34%	13
Radio advertising or programs	16%	6
Public workshops/meetings	5%	2
School meetings	11%	4
Mail	32%	12
Email	53%	20
Lexington County website	39%	15
Social media	45%	17
Other	3%	1
Total		**38**

If Other: "Whitehall newsletter"

Q9: What are some steps your local government could take to reduce the risk of flooding in your neighborhood?

- "Replace the pipes under Taylor Drive (City of Lexington)"
- "better storm water management"
- "Reroute run off water from Harbison, and other areas that pours into Kinley Creek, sometimes even when we are only having a light rain in our neighborhood."
- "General maintenance of the creek on a regularly scheduled basis."
- "Replace the storm culvert."
- "Shore up the creek bank to prevent further erosion."
- "I'm very concerned about the corley mill road bridge, over the 14 mile creek. It always has problems during heavy rains. Lets work on getting road crews to pay attention to drainage ditches." MOST IMPORTANTLY: Lets try to think about the growth in the county responsibly. All these developers are coming in and making millions off of throwing up houses. We need a way to catch our infrastructure up to where it needs to be. Some sort of fee needs to be placed on new developments to cover stormwater issues. I would love to participate in any committees or boards you would need input on. Thanks!"
- "The city of Lexington's uncontrolled growth that keeps paving over more and more ground cover which diverts water into nearby streams need to be stopped."
- "When it flooded a while back, the dirt roads in Gaston were a mess. They could at least add gravel to the roads, because they don't want to pave them."
- "Better roadside ditches along with pitfall ditches and pipes that would take a large amount of water at one time. However, these roadside ditches and pipes are on SCDOT R/W..."

- “Make sure storm drains are not obstructed.”
- “Require building codes and subdivision codes to include a secondary escape route from neighborhoods when crossing water/drain fields and ditches is necessary to leave said subdivision. Preferably one that does not cross a body of water. This way residents are not trapped in their subdivision with no way out.”
- “Make sure the drainage systems can handle all of the stormwater runoff from the new housing and commercial developments that the county seems to let fly through the approval process.”
- “Clean out ditches side of the road. where water stands in the road after rain, and during rain, build up the road to avoid this. The road off of Wire road, Dradebil road, that’s been closed since the last storm, for Gods sake, fix the road !!”
- “Improve drainage, maintain drainage pipes, update infrastructure.”
- “Corley Mill Rd in certain areas floods, and the bridge puddles really bad with any amount of rain.”
- “Eliminate drainage water from my property”
- “Clear debris out of storm water conveyances and drop inlets! Make sure stormwater conveyances are properly sized!”
- “flooding”
- “Prepare a Flood Management Plan”

Public Outreach Efforts Beyond Attending Public Meetings

Public outreach efforts listed in Section 2.2.1 are documented below.

TV news crews from WISTV 10 NBC and WACH FOX 57 attended the first public meeting and interviewed Amec Foster Wheeler consultant David Stroud after the meeting, publicizing the planning process and ways the public could continue to get involved. Newspaper articles in the Columbia Daily News and the Batesburg-Leesville Times are shown in Appendix A under public meeting advertisements. In addition to publicizing the meeting, these articles explained the floodplain management planning process to the reader. The County's Facebook page was also used to publicize and explain the floodplain management planning process. South Carolina Public Radio was also used to reach the Lexington County public. A news story aired in May 2017 discussing the planning process and how residents and property owners could benefit from improved floodplain management and getting involved in the planning process.

Public Engagement Story on WLTX TV News and Website

Draft Risk Assessment Posted for Public Review and Comment

COUNTY COUNCIL

Contact Information

Christopher Stone
Floodplain Manager
212 South Lake Drive
Lexington, SC 29072
Phone: (803) 785-8121
Fax: (803) 785-5186

QUICK LINKS

Floodplain Management

Lexington County has participated in the National Flood Insurance Program (NFIP) since 1979. The purpose of the Lexington County Floodplain Management Program is to protect the lives and property of the citizens who build in a floodplain.

Lexington County, as a participant in the National Flood Insurance Program (NFIP) and the Community Rating System (CRS), offers flood information for property located in the unincorporated areas of Lexington County. Flood Insurance Rate Maps (FIRMS) and Elevation Certificates may be viewed at the Lexington County Administration Building. The Lexington County Main Library also has a set of FIRM maps for viewing as well as various other helpful brochures. Flood Information can be viewed digitally under the GIS Property, Mapping and Data Service link. For any information about the National Flood Insurance program in Lexington County please contact Christopher Stone at 803-785-8121.

The Federal Emergency Management Association (FEMA) establishes the minimum requirements and guidelines that must be adopted as part of a Floodplain Management Program. In order to not only help protect structures, but to also help lower flood insurance rates, Lexington County has adopted more stringent regulations.

While Lexington County may determine a property or structure is out of a flood hazard area, flood insurance may still be required at the discretion of the mortgage company.

Participation in the NFIP also means, in most cases, federal assistance would be made available in the event of a flood.

Flood Damage Prevention Ordinance - effective beginning January 1, 2017

Land Development Manual: Ch. 11/Flood Damage Prevention - effective beginning January 1, 2017

Land Development Manual: Ch. 6/Floodplain - effective until December 31, 2016

Lexington County Floodplain Management Outreach Project

South Carolina DNR Flood Mitigation

-
www.floodsmart.org

https://waterdata.usgs.gov/sc/nwis/rt

Lexington County is working to become less vulnerable to flooding, and your participation is important to us! The County is preparing a Floodplain Management Plan which will identify and assess our community's flood hazard risks and determine how to best minimize or manage those risks and what outreach materials may be necessary to better communicate those risks.

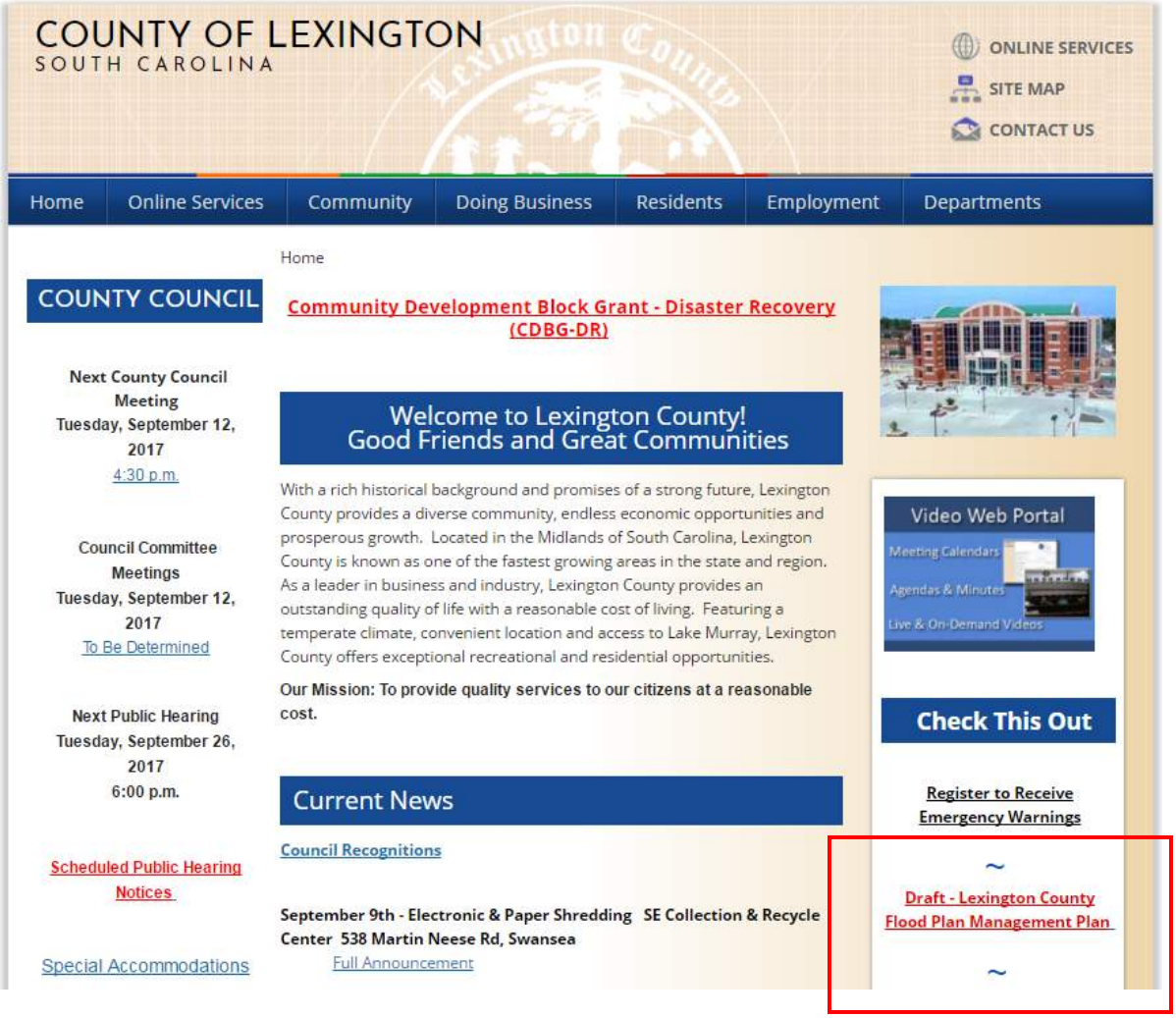
The following link is the draft Hazard Identification and Risk Assessment (HIRA) section of the Flood Mitigation Plan. We welcome your comments on this draft section. The information you provide will help us better understand your hazard concerns and can lead to mitigation activities that help lessen the impacts of future hazard events. Please e-mail your comments to cstone@lex-co.com by **July 24, 2017**.

Thank you for your input!

https://app.box.com/s/bd8qwey5twy1e8u9w4dw35sk65u8zsml

Draft Risk Assessment Announcement on Facebook

Draft Plan Posted on County Website



A hard copy of the plan was also made available in the Lexington County Public Works Department's office.

APPENDIX B – MITIGATION STRATEGY

This section reviews alternative mitigation strategies and tools considered for this plan, including how each strategy can reduce future flood losses, what the community currently has in place, and whether the community should adopt the strategy or revise their current use of it. The following categories of mitigation strategies are examined and were chosen based on the Community Rating System.

- Prevention and Regulatory Measures
- Floodplain Management Regulations for Current & Future Conditions
- Property Protection Measures
- Natural Resource Protection
- Emergency Services
- Structural Projects
- Public Information and Outreach

CRS Alternative Mitigation Measures per Category

Note: the CRS Credit Sections are based on the 2017 CRS Coordinator's Manual.

B.1 Prevention and Regulatory Measures

Preventative measures are designed to keep a problem—such as flooding—from occurring or from getting worse. The objective of preventative measures is to ensure that future development is not exposed to damage and does not cause an increase in damages to other properties. Building, zoning, planning and code enforcement offices usually administer preventative measures. Some examples of types of preventative measures include:

- Comprehensive or land use plan
- Building code
- Zoning ordinance
- Floodplain management regulations
- Subdivision regulations
- Stormwater management regulations
- Open space preservation

Comprehensive or Land Use Plan

Planning activities direct development away from areas at risk of flooding, particularly floodplains and wetlands. They do this in combination with the zoning ordinance by designating land uses that are compatible with the natural conditions of land that is prone to flooding, such as open space or recreation. Planning and growth management activities can also provide benefits by simply allowing developers more flexibility in arranging improvements on a parcel of land through the planned development approach.

Lexington County Planning and GIS Department is responsible for both short and long-range planning in the County. The County's Comprehensive Plan identifies goals for the community as well as objectives and implementation strategies to achieve those goals. Unlike a traditional comprehensive plan, it does not provide a future land map. Instead, long-range conditions are reflected in the requirements of the County's zoning ordinance, managed by the Lexington County Community Development Department.

A Comprehensive Plan, in broad terms, is a policy statement to guide the future placement and development of community facilities. It is the basis for a community's zoning, subdivision and design

regulations and a community's official maps and amendments to the zoning, subdivision and design ordinances.

Local Implementation

The purpose of the comprehensive or land use plan is to provide a guide for future growth and development that meets the community's vision and goals for its future. Decisions about the community's future should prioritize health, safety, and general welfare, among other considerations. The community's code of ordinances, particularly the zoning ordinance, serves as a way to implement policies developed in the comprehensive plan. Lexington County's comprehensive plan goals include to "provide for proper drainage of storm and flood waters, emphasizing preservation of natural drainage ways."

Reducing Future Flood Losses

The comprehensive plan can work to reduce future flood losses by recognizing flood mitigation as a priority for the community and by directing development away from hazard prone areas. In Lexington County, the comprehensive plan sets improving drainage of flood waters as a goal.

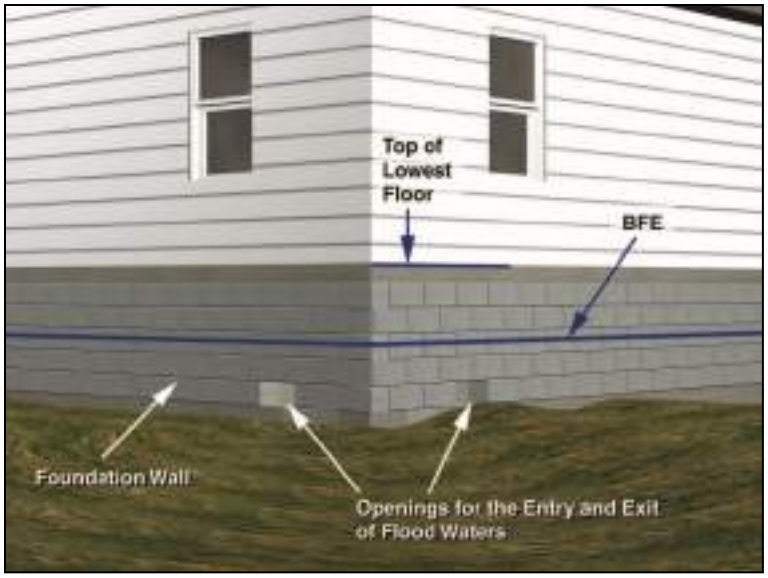
CRS Credit

CRS credits are available for regulations that encourage developers to preserve floodplains or other hazardous areas away from development. There is no credit for a plan, only for the enforceable regulations that are adopted pursuant to a plan. Lexington County currently receives credit for Activity 430 – Higher Regulatory Standards.

Building Codes

Building codes provide one of the best methods of addressing natural hazards by providing guidance on how to build in hazardous areas. When properly designed and constructed according to code, the average building can withstand many of the impacts of natural hazards. Hazard protection standards for all new and improved or repaired buildings can be incorporated into the local building code. Building codes can ensure that the first floors of new buildings are constructed to be higher than the elevation of the 100-year flood (the flood that is expected to have a one percent chance of occurring in any given year). This is shown in Figure B1.

Just as important as having code standards is the enforcement of the code. Adequate inspections are needed throughout construction to ensure that the builder understands the requirements and is following them. Making sure a structure is properly elevated and anchored requires site inspections at each step.



Source: FEMA Publication: *Above the Flood: Elevating Your Floodprone House, 2000*

Figure B.1 – Building Codes and Flood Elevations

Local Implementation

Lexington County adopted their current Building Code Ordinance in April 2008 to comply with the 2006 Edition of the International Building Code (IBC). In accordance with the IBC, the ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less than one unit vertical in 20 units horizontal (5-percent slope) for a minimum distance of 10 feet measured perpendicular to the face of the wall. If physical obstructions or lot lines prohibit 10 feet of horizontal distance, a 5-percent slope shall be provided to an *approved* alternative method of diverting water away from the foundation. Swales used for this purpose shall be sloped a minimum of 2 percent where located within 10 feet of the building foundation. Impervious surfaces within 10 feet of the building foundation shall be sloped a minimum of 2 percent away from the building.

ASCE 24 is a referenced standard in the International Building Code. Any building or structure that falls within the scope of the IBC that is proposed in a flood hazard area is to be designed in accordance with ASCE 24. Freeboard is required as a function of the nature of occupancy and the flood zone. Dwellings and most other buildings have 1-foot of freeboard; certain essential facilities have 2-3 feet; only agricultural facilities, temporary facilities and minor storage facilities are allowed to have their lowest floors at the BFE. Lexington County Flood Damage Prevention Ordinance requires all new or substantial improvement construction in the SFHA to be constructed with 2-foot of freeboard above the base flood elevation.

Lexington County Community Development Department is responsible for ensuring the public safety through the enforcement of federal, state, and local codes governing construction. County staff reviews plans, issues building permits, and performs inspections to ensure Code compliance related to aspects of life-safety, structural integrity, energy conversation, accessible design and electrical, plumbing, fuel gas, heating and air conditioning systems.

Reducing Future Flood Losses

Future flood losses in Lexington County can be reduced through enforcement of the County Building Code/2006 IBC with the sloping requirement of grade away from buildings. Enforcement of the 2-foot freeboard requirement will provide an extra level of protection for buildings constructed in the County.

CRS Credit

The CRS encourages strong building codes. It provides credit in two ways: points are awarded based on the community's Building Code Effectiveness Grading Schedule (BCEGS) classification and points are awarded on a scale of 1-10 for adopting and enforcing the International Code series. Lexington County's BCEGS rating is a 99 (unrated) for residential and 4 for commercial. The County is unrated for residential code enforcement because they do not have a program in place. Lexington County currently receives credit for Activity 430 – Higher Regulatory Standards. Specifically, the County has adopted cumulative substantial improvement and lower substantial improvement regulations.

Zoning Ordinance

Zoning dictates the type of development that can occur in any given parcel or area. By setting restrictions on the use and form of development, zoning can prevent development in areas at risk of flooding, particularly floodplains and wetlands. To do so, a flood prone parcel or area must be zoned only for a use that would not increase vulnerability to flooding. Zoning restrictions must be enacted with the goal of protecting health, safety, and general welfare. To change a parcel's zoning, the community's future land use map must reflect the desired new use in order to justify the rezoning.

Local Implementation

The purpose of the County's zoning ordinance is to provide the minimum regulations necessary to facilitate safe and orderly growth, and to also ensure that growth forms an integral part of a community of functional neighborhoods, retail and commercial centers; increases collective security and community identity to promote civic awareness and responsibility; and enhances the quality of life for the entire County to ensure the greatest possible economic and social benefits for all residents. These regulations are intended to promote consistency with the goals, objectives and policies of the County's Comprehensive Plan. Lexington County uses performance based zoning, which differs from traditional zoning by designating road classifications and zoning districts, which together determine what uses are permitted in each parcel.

Reducing Future Flood Losses

Zoning can work with comprehensive or land use planning to reduce future flood losses by directing development away from hazard prone areas. In Lexington County, there are no specific requirements for floodplains in the zoning ordinance.

CRS Credit

CRS credits are available for regulations that encourage developers to preserve floodplains or otherwise keep development away from hazardous areas. There is no credit for adopting a zoning ordinance, but the zoning ordinance can enable other CRS-credited activities such as open space preservation and higher regulatory standards.

Floodplain Management Regulations

Maintaining adequate flood control is vital to a healthy and productive community. Natural floodplains protect human life and property from flood damage in the event of a storm. The beautiful, functioning wetlands, riparian buffers and marshlands offer economic and health benefits as well as their rich and diverse ecosystems. By making wise land use decisions in the development and management of floodplains, beneficial functions can be protected and negative impacts to the quality of the environment can be reduced.

The National Flood Insurance Program (NFIP) is administered by the Federal Emergency Management Agency (FEMA). As a condition of making flood insurance available for their residents, communities that participate in the NFIP agree to regulate new construction in the area subject to inundation by the 100-

year (base) flood. The floodplain subject to these requirements is shown as an A or V Zone on the Flood Insurance Rate Map (FIRM).

Local Implementation

Lexington County's Flood Damage Prevention Ordinance requires that all construction, additions, conversions and/or development located in areas of special flood hazard comply with certain minimum standards intended to minimize damage from floods. Furthermore, any substantially improved or substantially damaged home must be brought up to the NFIP and the County's Flood Ordinance requirements. The County's Land Development Manual further clarifies specific regulations referenced in the Flood Damage Prevention Ordinance.

The following provisions apply in the SFHA where base flood elevation data and designated floodways been provided:

1. *New construction and substantial improvement of any residential structure (including manufactured homes) shall have the lowest floor elevated at least two (2) feet above the base flood elevation.*
2. *New construction and substantial improvement of any commercial, industrial, or nonresidential structure (including manufactured structures) shall have the lowest floor elevated at least two (2) feet above the level of the base flood elevation. Non-residential structures may instead be floodproofed with the submittal of an engineer's certification that the techniques meet all FEMA requirements for floodproofing.*
3. *No basements are permitted.*
4. *If fill is placed for a building pad and the floodplain line is moved, the ground shall be sloped from the pad down to the 1% annual chance flood elevation over a distance of 10 or more horizontal feet.*
5. *Should solid foundation perimeter walls be used to elevate a structure, flood openings sufficient to automatically equalize hydrostatic flood forces shall be provided based on the following criteria: Lexington County, South Carolina Land Development Manual Lexington County Public Works Stormwater Division 2016 11-39 a. Provide a minimum of 2 openings on at least 2 separate walls having a total net area of not less than 1 square-inch for every 1 square-foot of enclosed area. b. The bottom of openings shall be no higher than 1 foot above grade. c. Openings may be equipped with screens, louvers, valves, or other covering devices that permit the automatic flow of floodwater in both directions, provided they cannot be closed at any time.*
6. *Electrical, ventilation, plumbing, heating and air conditioning equipment (including ductwork), and other service facilities shall be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of the base flood plus 2 feet. This requirement does not preclude the installation of outdoor faucets for shower heads, sinks, hoses, etc., as long as cut off devices and back flow devices are installed to prevent contamination to the service components and thereby minimize any flood damages to the building.*
7. *Fuel storage tanks located below the base flood elevation must be secured against flotation and lateral movement. This can be accomplished by anchoring the tank with tie down straps or anchor bolts onto a concrete slab or counterweight.*
8. *Non-residential structures may be flood-proofed in lieu of elevation provided that all areas of the structure below the required elevation are watertight with walls substantially impermeable to the passage of water, using structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. A registered, professional engineer shall certify that the standards of this subsection are satisfied.*
9. *All critical type developments shall be elevated to the 0.2%-annual chance flood (formerly called the 500 year flood) elevation or be elevated to the highest known historical flood elevation (where records are available), whichever is greater. Critical type developments are defined in Lexington*

County's Flood Damage Prevention Ordinance. If no data exists establishing the 0.2%-annual chance flood elevation or the highest known historical flood elevation, the applicant shall provide a hydrologic and hydraulic engineering analysis that generates the 0.2%-annual chance flood elevation data.

The following provisions apply in the SFHA where streams exist without base flood elevations and/or floodways:

1. *The applicant shall provide a hydrologic and hydraulic engineering analysis, in accordance with the FEMA map revision submittal process (See Section 11.6.2), that generates base flood elevations and designated floodways for all subdivision proposals and other proposed developments containing at least 50 lots or 5 acres, whichever is less. As each development is affected by a wide array of extenuating circumstances, the final decision for the scope of the flood study will be made by the County Floodplain Manager.*
2. *If the provisions noted above are satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions and shall be elevated or flood proofed in accordance with the elevations established.*
3. *No encroachments, including fill, new construction, substantial improvements or new development shall be permitted within 50 feet of the stream bank unless certification with supporting technical data by a registered, professional engineer is provided demonstrating that such encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.*

The following provisions apply in SFHAs where streams with base flood elevations are provided but no floodways have been designated:

1. *No encroachments, including fill, new construction, substantial improvements or new development shall be permitted within 50 feet of the stream bank unless certification with supporting technical data by a registered, professional engineer is provided demonstrating that such encroachments shall not result in any increase in flood levels during the occurrence of the base flood discharge.*
2. *If the provision noted above is satisfied, all new construction and substantial improvements shall comply with all applicable flood hazard reduction provisions.*

The code also has additional standards for within designated and undesignated floodways and for development outside the SFHA.

The code also defines cumulative substantial damage and cumulative substantial improvement requirements. See Chapter 11 of the County's Land Development Manual for more detail.

Reducing Future Flood Losses

Lexington County's current flood damage prevention ordinance and Land Development Manual can reduce future flood losses by encouraging the development and redevelopment of properties to higher regulatory standards that reduce the likelihood of sustaining any damages. These standards are particularly effective for protecting new development, but can only be required for existing development when substantial damages are sustained or when substantial improvements are to be made.

CRS Credit

Lexington County currently receives credit for Activity 430 – Higher Regulatory Standards. The County receives credit for enforcing regulations that require freeboard for new and substantial improvement construction, foundation protection, cumulative substantial improvement, lower substantial improvement, protection of natural and beneficial functions, and state mandated regulatory standards. Credit is also provided for adoption and implementation of the International Series of Building Codes, and for staff education and certification as a floodplain manager.

Subdivision Ordinance

Subdivision ordinances are intended to encourage planned development of land that accounts for the infrastructure needs of growth as well as the vision and goals of the comprehensive plan related to new development.

Local Implementation

Lexington County has a subdivision ordinance in place, last updated February 14, 2017. The ordinance sets flooding and drainage requirements for all development.

Reducing Future Flood Losses

The County's subdivision regulations refer to regulation in the Flood Damage Prevention Ordinance and the Stormwater Management Ordinance, but also states a requirement for a drainage easement along all drainage ways, and stipulates that "No structures shall be built within such easements without the permission of the Director of Public Works… In those instances where the natural drainage way is too large in size to be adequately protected by an easement, the subdivider shall designate the property as a reserve parcel on the subdivision plat."

CRS Credit

CRS credits are available for regulations that encourage developers to preserve floodplains or other hazardous areas away from development. There is no credit for adopting a subdivision ordinance, but it can enable other CRS-credited activities, such as higher regulatory standards. Lexington County currently receives credit for Activity 430 – Higher Regulatory Standards.

Stormwater Management

Stormwater runoff is increased when natural ground cover is replaced by urban development. Development in the watershed that drains to a river can aggravate downstream flooding, overload the community's drainage system, cause erosion, and impair water quality. There are three ways to prevent flooding problems caused by stormwater runoff:

1) Regulating development in the floodplain to ensure that it will be protected from flooding and that it won't divert floodwaters onto other properties, and
2) Regulating all development to ensure that the post-development peak runoff will not be greater than it was under pre-development conditions.
3) Setting construction standards so buildings are protected from shallow water.

Local Implementation

The County's Public Works Department is responsible for the operation and maintenance of the stormwater drainage systems of Lexington County. The Public Works Department also ensures that construction and development complies with the County's Stormwater Management Ordinance, Flood Damage Prevention Ordinance, and Land Development Manual. The stormwater regulations comply with the NPDES requirements from the EPA. Additionally, the Department develops engineering plans, and bids and installs capital drainage improvements projects.

Reducing Future Flood Losses

Stormwater management and the requirement that post development runoff cannot exceed pre-development conditions for the 2-, 10-, and 25-year storm event is one way to prevent future flood losses. Retention and detention requirements also help to reduce future flood losses.

CRS Credit

Lexington County currently receives credit for Activity 450 – Stormwater Management. The community enforces regulations for freeboard in non-SFHA zones, soil and erosion control, and water quality.

Open Space Preservation

Keeping the floodplain and other hazardous areas open and free from development is the best approach to preventing damage to new developments. Open space can be maintained in agricultural use or can serve as parks, greenway corridors and golf courses.

Comprehensive and capital improvement plans should identify areas to be preserved by acquisition and other means, such as purchasing an easement. With an easement, the owner is free to develop and use private property, but property taxes are reduced or a payment is made to the owner if the owner agrees to not build on the part set aside in the easement.

Although there are some federal programs that can help acquire or reserve open lands, open space lands and easements do not always have to be purchased. Developers can be encouraged to dedicate park land and required to dedicate easements for drainage and maintenance purposes. These are usually linear areas along property lines or channels. Maintenance easements also can be donated by streamside property owners in return for a community maintenance program.

Local Implementation

The first goal of Lexington County's Comprehensive Plan Goals and Objectives is to "Provide for proper drainage of storm and flood waters, emphasizing preservation of natural drainage ways" supported by specific objectives to "Preserve those areas along drainage channels, streams and rivers that are needed to carry runoff of storm and flood waters" and to "Restrict stormwater runoff from development that aggravates existing drainage problems." As noted under the subdivision regulations section above, the Lexington County Subdivision Ordinance requires drainage easements along all drainage ways.

Reducing Future Flood Losses

Creating or maintaining open space is the primary way to reduce future flood losses. Lexington County has many open space and natural parcels which serve to reduce future flood losses by remaining open. These open space areas create opportunities for the public to benefit from education and recreation while eliminating potential for future flooding.

CRS Credit

Lexington County currently receives credit for Activity 420 – Open Space Preservation for preserving 5 acres of the SFHA and for open space land that is deed restricted and preserved in a natural state. Preserving flood prone areas as open space is one of the highest priorities of the Community Rating System. Credit is based on the area of the floodplain that is designated as public undeveloped properties, parks, wildlife refuges, golf courses, or other uses that can be kept vacant through ownership or regulations.

Conclusions

- Most zoning ordinances don't designate floodplain as a special type of district.
- At least a minimal amount of the County's floodplain is open space in public ownership or under deed restriction.
- The County has limited capacity to implement preventive projects related to drainage.
- The County has regulations against dumping but limited enforcement of those policies.
- Stormwater management capability is limited by data. The County contains many old stormwater pipes installed prior to easement requirements. The location of these pipes is unknown.
- The County's Flood Damage Prevention Ordinance includes a 2-food freeboard standard.

- The County's Flood Damage Prevention Ordinance incorporates Cumulative Substantial Improvement.

Recommendations and Funding

- The County should continue to implement activities in the CRS Program under the guidance of the 2017 CRS Coordinator's Manual
- The County should continue to promote open space preservation, especially in floodways, to minimize increases in flood heights due to development and reduce future flood damages.
- The County should create a stormwater utility to fund capital improvement projects.
- The County should enforce existing "no dumping" regulations to ensure their efficacy.
- The County should identify the location of all stormwater piping to provide more complete understanding of stormwater problems and an improved capability to address these problems.
- Funding for these recommended projects can come from the County's operating budget. Once the County's stormwater utility is formed, it can provide funding for other preventive activities.

B.3 Property Protection Measures

Property protection measures are used to modify buildings or property subject to damage. Property protection measures fall under three approaches:

- Modify the site to keep the hazard from reaching the building,
- Modify the building (retrofit) so it can withstand the impacts of the hazard, and
- Insure the property to provide financial relief after the damage occurs.

Property protection measures are normally implemented by the property owner, although in many cases technical and financial assistance can be provided by a government agency.

Keeping the Hazard Away

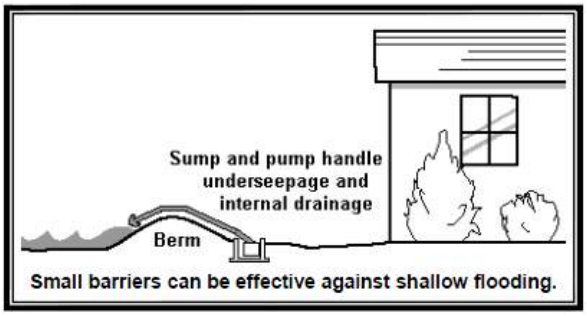
Generally, natural hazards do not damage vacant areas. As noted earlier, the major impact of hazards is to people and improved property. In some cases, properties can be modified so the hazard does not reach the damage-prone improvements. For example, a berm can be built to prevent floodwaters from reaching a house.

There are five common methods to keep a flood from reaching and damaging a building:

- Erect a barrier between the building and the source of the flooding.
- Move the building out of the flood-prone area.
- Elevate the building above the flood level.
- Demolish the building.
- Replace the building with a new one that is elevated above the flood level.

Barriers

A flood protection barrier can be built of dirt or soil (a "berm") or concrete or steel (a "floodwall"). Careful design is needed so as not to create flooding or drainage problems on neighboring properties. Depending on how porous the ground is, if floodwaters will stay up for more than an hour or two, the design needs to account for leaks, seepage of water underneath, and rainwater that will fall inside the perimeter. This is usually done with a sump or



Small barriers can be effective against shallow flooding.

drain to collect the internal groundwater and surface water and a pump and pipe to pump the internal drainage over the barrier.

Barriers can only be built so high. They can be overtopped by a flood higher than expected. Barriers made of earth are susceptible to erosion from rain and floodwaters if not properly sloped, covered with grass, and properly maintained. A berm can also settle over time, lowering its protection level. A floodwall can crack, weaken, and lose its watertight seal. Therefore, barriers need careful design and maintenance (and insurance on the building, in case of failure).

This low floodwall has landscaping to minimize the adverse impact on the property's appearance.

Relocation

Moving a building to higher ground is the surest and safest way to protect it from flooding. While almost any building can be moved, the cost increases for heavier structures, such as those with exterior brick and stone walls, and for large or irregularly shaped buildings. However, experienced building movers can handle any job. In areas subject to flash flooding, deep waters, or other high hazard, relocation is often the only safe approach. Relocation is also preferred for large lots that include buildable areas outside the floodplain or where the owner has a new flood-free lot (or portion of the existing lot) available.

Small, wood frame buildings are the easiest to relocate

Source: Kennedy House Movers, Huntsville, AL

Building Elevation

Raising a building above the flood level can be almost as effective as moving it out of the floodplain. Water flows under the building, causing little or no damage to the structure or its contents. Raising a building above the flood level is cheaper than moving it and can be less disruptive to a neighborhood. Elevation has proven to be an acceptable and reasonable means of complying with floodplain regulations that require new, substantially improved, and substantially damaged buildings to be elevated above the base flood elevation.

Demolition

Some buildings, especially heavily damaged or repetitively flooded ones, are not worth the expense to protect them from future damages. It is cheaper to demolish them and either replace them with new, flood protected structures, or relocate the occupants to a safer site. Demolition is also appropriate for buildings that are difficult to move - such as larger, slab foundation or masonry structures - and for dilapidated structures that are not worth protecting. Generally, demolition projects are undertaken by a government agency, so the cost is not borne by the property owner, and the land is converted to public open space use, like a park.

Demolishing a repetitively flooded home

Pilot Reconstruction

If a building is not in good shape, elevating it may not be worthwhile or it may even be dangerous. An alternative is to demolish the structure and build a new one on the site that meets or exceeds all flood protection codes. FEMA funding programs refer to this approach as "pilot reconstruction." It is still a pilot

program, and not a regularly funded option. Certain rules must be followed to qualify for federal funds for pilot reconstruction:

- Pilot reconstruction is only possible after it has been shown that acquisition or elevation are not feasible, based on the program's criteria.
- Funds are only available to people who owned the property at the time of the event for which funding is authorized.
- It must be demonstrated that the benefits exceed the costs.
- The new building must be elevated to the advisory base flood elevation.
- The new building must not exceed more than 10% of the old building's square footage.
- The new building must meet all flood and wind protection codes.
- There must be a deed restriction that states the owner will buy and keep a flood insurance policy.
- The maximum federal grant is 75% of the cost, up to $150,000. FEMA is developing a detailed list of eligible costs to ensure that disaster funds are not used to upgrade homes.

Local Implementation

Lexington County does not currently receive credit for Activity 520 – Acquisition and Relocation or Activity 530 – Flood Protection.

Reducing Future Flood Losses

If implemented in the County, these tools could reduce future flood losses by reducing exposure and/or vulnerability to flood. If floodwaters cannot reach a building or if there are no longer structures present to be exposed to a flood, damages can be dramatically reduced.

CRS Credit

The CRS provides the most credit points for acquisition and relocation under Activity 520, because this measure permanently removes insurable buildings from the floodplain.

Retrofitting

An alternative to keeping the hazard away from a building is to modify or retrofit the site or building to minimize or prevent damage. There are a variety of techniques to do this, as described below.

Dry Floodproofing

Dry floodproofing means making all areas below the flood protection level watertight. Walls are coated with waterproofing compounds or plastic sheeting. Openings, such as doors, windows and vents, are closed, either permanently, with removable shields, or with sandbags. Dry floodproofing of new and existing nonresidential buildings in the regulatory floodplain is permitted under state, FEMA and local regulations. Dry floodproofing of existing residential buildings in the floodplain is also permitted as long as the building is not substantially damaged or being substantially improved. Owners of buildings located outside the regulatory floodplain can always use dry floodproofing techniques.

Dry floodproofing is only effective for shallow flooding, such as repetitive drainage problems. It does not protect from the deep flooding along lakes and larger rivers caused by hurricanes or other storms.

Wet Floodproofing

The alternative to dry floodproofing is wet floodproofing: water is let in and everything that could be damaged by a flood is removed or elevated above the flood level. Structural components below the flood level are replaced with materials that are not subject to water damage. For example, concrete block walls are used instead of wooden studs and gypsum wallboard. The furnace, water heater and laundry facilities are permanently relocated to a higher floor. Where the flooding is not deep, these appliances can be raised on blocks or platforms.

Local Implementation

Lexington County does not currently receive credit for Activity 530 – Flood Protection.

CRS Credit

The CRS provides the most credit points for acquisition and relocation under Activity 520, because this measure permanently removes insurable buildings from the floodplain. The CRS credits barriers and elevating existing buildings under Activity 530. Elevating a building above the flood level will also reduce the flood insurance premiums on that individual building. Because barriers are less secure than elevation, not as many points are provided. Higher scores are possible, but they are based on the number of buildings removed compared to the number remaining in the floodplain. Points are calculated for each protected building, with bonus points for the protection of repetitive loss buildings and critical facilities.

Insurance

Technically, insurance does not mitigate damage caused by a natural hazard. However, it does help the owner repair, rebuild, and hopefully afford to incorporate some of the other property protection measures in the process. Insurance offers the advantage of protecting the property, as long as the policy is in force, without requiring human intervention for the measure to work.

Private Property

Although most homeowner's insurance policies do not cover a property for flood damage, an owner can insure a building for damage by surface flooding through the NFIP. Flood insurance coverage is provided for buildings and their contents damaged by a "general condition of surface flooding" in the area. Most people purchase flood insurance because it is required by the bank when they get a mortgage or home improvement loan. Usually these policies just cover the building's structure and not the contents. Contents coverage can be purchased separately. Renters can buy contents coverage, even if the owner does not buy structural coverage on the building. Most people don't realize that there is a 30-day waiting period to purchase a flood insurance policy and there are limits on coverage.

Public Property

Governments can purchase commercial insurance policies. Larger local governments often self-insure and absorb the cost of damage to one facility, but if many properties are exposed to damage, self-insurance can drain the government's budget. Communities cannot expect federal disaster assistance to make up the difference after a flood.

Under Section 406(d) of the Stafford Act:

> "If an eligible insurable facility damaged by flooding is located in a [mapped floodplain] … and the facility is not covered (or is underinsured) by flood insurance on the date of such flooding, FEMA is required to reduce Federal disaster assistance by the maximum amount of insurance proceeds that would have been received had the buildings and contents been fully covered under a National Flood Insurance Program (NFIP) standard flood insurance policy. [Generally, the maximum amount of proceeds for a non-residential property is $500,000.]

Communities Need to:

- Identify all insurable facilities, and the type and amount of coverage (including deductibles and policy limits) for each. The anticipated insurance proceeds will be deducted from the total eligible damages to the facilities.
- Identify all facilities that have previously received Federal disaster assistance for which insurance was required. Determine if insurance has been maintained. A failure to maintain the required insurance for the hazard that caused the disaster will render ineligible for Public Assistance funding…

- [Communities] must obtain and maintain insurance to cover [their] facility - buildings, equipment, contents and vehicles - for the hazard that caused the damage in order to receive Public Assistance funding. Such coverage must, at a minimum, be in the amount of the eligible project costs. FEMA will not provide assistance for that facility in future disasters if the requirement to purchase insurance is not met. - FEMA Response and Recovery Directorate Policy No. 9580.3, August 23, 2000

In other words, the law expects public agencies to be fully insured as a condition of receiving federal disaster assistance.

Local Implementation

Flood insurance information for the County is provided in Section 6.3.3.

CRS Credit

There is no credit for purchasing flood insurance, but the CRS does provide credit for local public information programs that explain flood insurance to property owners. The CRS also reduces the premiums for those people who do buy NFIP coverage. Lexington County currently receives credit for Activity 330 – Outreach Projects and is a Class 8 CRS community with a 10% reduction on flood insurance premiums for properties in the SFHA.

Conclusions

- There are several ways to protect properties from flood damage. The advantages and disadvantages of each should be carefully examined for each situation.
- Property owners can implement some property protection measures at little cost, especially for sites in areas of low level flooding.
- The County can encourage property protection by promoting mitigation options such as retrofitting, relocation, and acquisition, especially to repetitive loss property owners.
- There are many known and unknown inadequacies in stormwater infrastructure throughout the County. The County can support property protection by better identifying unknown problem areas and creating a plan to fix all identified issues.
- Property protection measures can protect the most flood-prone buildings in the County such as those which are repetitively flooded.

Recommendations and Funding

- Encourage homeowners to take responsibility for protecting their own properties by providing advice and assistance on retrofitting, relocation, or acquisition options, especially for repetitive loss properties.
- Encourage the purchase of flood insurance to increase the policy base in Lexington County.
- Create a stormwater utility in the County, the funds from which can support property protection projects.
- Create a capital improvements program to follow through with needed improvements to stormwater infrastructure.
- Funding for these recommendations is available in the County's operating budget and will eventually be supported by funds from the stormwater utility, once established.
- CDBG-DR and HMGP grant funding can support mitigation of repetitive loss properties.

B.4 Natural Resource Protection

Resource protection activities are generally aimed at preserving (or in some cases restoring) natural areas. These activities enable the naturally beneficial functions of fields, floodplains, wetlands, and other natural

lands to operate more effectively. Natural and beneficial functions of watersheds, floodplains and wetlands include:

- Reduction in runoff from rainwater and stormwater in pervious areas
- Infiltration that absorbs overland flood flow
- Removal and filtering of excess nutrients, pollutants and sediments
- Storage of floodwaters
- Absorption of flood energy and reduction in flood scour
- Water quality improvement
- Groundwater recharge
- Habitat for flora and fauna
- Recreational and aesthetic opportunities

As development occurs, many of the above benefits can be achieved through regulatory steps for protecting natural areas or natural functions. This section covers the resource protection programs and standards that can help mitigate the impact of natural hazards, while they improve the overall environment. Six areas were reviewed:

- Wetland protection
- Erosion and sedimentation control
- Stream/River restoration
- Best management practices
- Dumping regulations
- Farmland protection

Wetland Protection

Wetlands are often found in floodplains and topographically depressed areas of a watershed. Many wetlands receive and store floodwaters, thus slowing and reducing downstream flows. They also serve as a natural filter, which helps to improve water quality, and they provide habitat for many species of fish, wildlife and plants. Lexington County contains freshwater forested and shrub wetlands throughout its jurisdiction, particularly along the Congaree Creek and its tributaries, the Black Creek, and the North Fork Edisto River. Lexington County requires 50-foot water quality buffers for streams, shorelines, and wetlands.

Erosion and Sedimentation Control

Farmlands and construction sites typically contain large areas of bare exposed soil. Surface water runoff can erode soil from these sites, sending sediment into downstream waterways. Erosion also occurs along stream banks and shorelines as the volume and velocity of flow or wave action destabilize and wash away the soil. Sediment suspended in the water tends to settle out where flowing water slows down. This can clog storm drains, drain tiles, culverts and ditches and reduce the water transport and storage capacity of river and stream channels, lakes and wetlands.

There are two principal strategies to address these problems: minimize erosion and control sedimentation. Techniques to minimize erosion include phased construction, minimal land clearing, and stabilizing bare ground as soon as possible with vegetation and other soil stabilizing practices.

Stream/River Restoration

There is a growing movement that has several names, such as "stream conservation," "bioengineering," or "riparian corridor restoration." The objective of these approaches is to return streams, stream banks

and adjacent land to a more natural condition, including the natural meanders. Another term is "ecological restoration," which restores native indigenous plants and animals to an area.

A key component of these efforts is to use appropriate native plantings along the banks that resist erosion. This may involve retrofitting the shoreline with willow cuttings, wetland plants, or rolls of landscape material covered with a natural fabric that decomposes after the banks are stabilized with plant roots.

In all, restoring the right vegetation to a stream has the following advantages:

- Reduces the amount of sediment and pollutants entering the water
- Enhances aquatic habitat by cooling water temperature
- Provides food and shelter for both aquatic and terrestrial wildlife
- Can reduce flood damage by slowing the velocity of water
- Increases the beauty of the land and its property value
- Prevents property loss due to erosion
- Provides recreational opportunities, such as hunting, fishing and bird watching
- Reduces long-term maintenance costs

As required by state regulations, Lexington County monitors its drainage outfalls into the Lower Saluda River, Congaree Creek, Lorrick Branch, Rawls Creek, Lower Broad River, Fourteen Mile Creek, Kinley Creek, Twelvemile Creek, Sixmile Creek, Bull Swamp, and Congaree River. The County also manages development in water supply watersheds within its jurisdiction.

Best Management Practices

Point source pollutants come from pipes such as the outfall of a municipal wastewater treatment plant. They are regulated by the US EPA. Nonpoint source pollutants come from non-specific locations and harder to regulate. Examples of nonpoint source pollutants are lawn fertilizers, pesticides, other chemicals, animal wastes, oils from street surfaces and industrial areas, and sediment from agriculture, construction, mining and forestry. These pollutants are washed off the ground's surface by stormwater and flushed into receiving storm sewers, ditches and streams.

The term "best management practices" (BMPs) refers to design, construction and maintenance practices and criteria that minimize the impact of stormwater runoff rates and volumes, prevent erosion, protect natural resources and capture nonpoint source pollutants (including sediment). They can prevent increases in downstream flooding by attenuating runoff and enhancing infiltration of stormwater. They also minimize water quality degradation, preserve beneficial natural features onsite, maintain natural base flows, minimize habitat loss, and provide multiple usages of drainage and storage facilities.

The County’s stormwater management ordinance contains requirements for stormwater BMPs, and the County participates in the Lexington County Stormwater Consortium, which promotes BMPs and educates County officials and residents on their use.

Dumping Regulations

BMPs usually address pollutants that are liquids or are suspended in water that are washed into a lake or stream. Dumping regulations address solid matter, such as shopping carts, appliances and landscape waste that can be accidentally or intentionally thrown into channels or wetlands. Such materials may not pollute the water, but they can obstruct even low flows and reduce the channels' and wetlands' abilities to convey or clean stormwater.

Many cities have nuisance ordinances that prohibit dumping garbage or other "objectionable waste" on public or private property. Waterway dumping regulations need to also apply to "non-objectionable"

materials, such as grass clippings or tree branches, which can kill ground cover or cause obstructions in channels. Regular inspections to catch violations should be scheduled.

Many people do not realize the consequences of their actions. They may, for example, fill in the ditch in their front yard without realizing that is needed to drain street runoff. They may not understand how regrading their yard, filling a wetland, or discarding leaves or branches in a watercourse can cause a problem to themselves and others. Therefore, a dumping enforcement program should include public information materials that explain the reasons for the rules as well as the penalties.

Per the Lexington County Stormwater Ordinance, it is illegal the discharge or dump into any of the County's waters.

Farmland Protection

Farmland protection is an important piece of comprehensive planning and zoning throughout the United States. The purpose of farmland protection is to provide mechanisms for prime, unique, or important agricultural land to remain as such, and to be protected from conversion to nonagricultural uses.

Frequently, farm owners sell their land to residential or commercial developers and the property is converted to non-agricultural land uses. With development comes more buildings, roads and other infrastructure. Urban sprawl occurs, which can lead to additional stormwater runoff and emergency management difficulties.

Farms on the edge of cities are often appraised based on the price they could be sold for to urban developers. This may drive farmers to sell to developers because their marginal farm operations cannot afford to be taxed as urban land. The Farmland Protection Program in the United States Department of Agriculture's 2002 Farm Bill (Part 519) allows for funds to go to state, tribal, and local governments as well as nonprofit organizations to help purchase easements on agricultural land to protect against the development of the land.

Reducing Future Flood Losses

Natural resource protection activities can reduce future flood losses by increasing and/or maintaining the capacity and ability of natural floodplains and drainage systems to manage floodwaters.

CRS Credit

There is credit for preserving open space in its natural condition or restored to a state approximating its natural condition. The credit is based on the percentage of the floodplain that can be documented as wetlands protected from development by ownership or local regulations. Lexington County currently receives credit for Activity 420 – Open Space Preservation for preserving part of the SFHA as open space.

Lexington County receives credit for Activity 450 – Stormwater Management for enforcing regulations for soil and erosion control as well as water quality. The County also receives credit for enforcing regulations for freeboard in non-SFHA zones.

The County also receives credit for Activity 540 – Drainage System Maintenance for enforcing a regulation prohibiting dumping in the drainage system. Additional credit is available for regular inspections and maintenance of the drainage system.

Conclusions

- Flood hazard mitigation projects can use resource protection programs to support protecting natural features that can mitigate the impacts of flooding.
- Lexington County ordinances prohibit illicit discharges into public drainage areas or onto public or private property.

- Preserving open space and natural areas will serve to benefit the natural resource areas and protect natural occurring processes and help to protect certain species of plants and animals.

Recommendations and Funding

- Lexington County should encourage acquisition and/or relocation of repetitive loss properties in order to preserve these properties as open space.
- The County should target outreach to its residents regarding illicit discharges into public drainage areas or onto public or private property.
- The County should consider implementing setbacks from navigable waters to protect the natural and beneficial functions of the floodplain.
- Funding for these activities is available in the County's operating budget.

B.5 Emergency Services

Emergency services measures protect people during and after a disaster. A good emergency management program addresses all hazards, and it involves all local government departments. This section reviews emergency services measures following a chronological order of responding to an emergency. It starts with identifying an impending problem (threat recognition) and continues through post-disaster activities.

Threat Recognition

The first step in responding to a flood is to know when weather conditions are such that an event could occur. With a proper and timely threat recognition system, adequate warnings can be disseminated.

The National Weather Service (NWS) is the prime agency for detecting meteorological threats. Severe weather warnings are transmitted through NOAA's Weather Radio System. Local emergency managers can then provide more site-specific and timely recognition after the Weather Service issues a watch or a warning. A flood threat recognition system predicts the time and height of a flood crest. This can be done by measuring rainfall, soil moisture, and stream flows upstream of the community and calculating the subsequent flood levels.

On smaller rivers and streams, locally established rainfall and river gauges are needed to establish a flood threat recognition system. The NWS may issue a "flash flood watch." This is issued to indicate current or developing hydrologic conditions that are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain nor imminent. These events are so localized and so rapid that a "flash flood warning" may not be issued, especially if no remote threat recognition equipment is available. In the absence of a gauging system on small streams, the best threat recognition system is to have local personnel monitor rainfall and stream conditions. While specific flood crests and times will not be predicted, this approach will provide notice of potential local or flash flooding.

Warning

The next step in emergency response following threat recognition is to notify the public and staff of other agencies and critical facilities. More people can implement protection measures if warnings are early and include specific detail.

The NWS issues notices to the public using two levels of notification:

- Watch: conditions are right for flooding, thunderstorms, tornadoes or winter storms.
- Warning: a flood, tornado, etc., has started or been observed.

A more specific warning may be disseminated by the community in a variety of ways. The following are the more common methods:

- CodeRED countywide mass telephone emergency communication system

- Commercial or public radio or TV stations
- The Weather Channel
- Cable TV emergency news inserts
- Telephone trees/mass telephone notification
- NOAA Weather Radio
- Tone activated receivers in key facilities
- Outdoor warning sirens
- Sirens on public safety vehicles
- Door-to-door contact
- Mobile public address systems
- Email notifications

Just as important as issuing a warning is telling people what to do in case of an emergency. A warning program should include a public information component. Lexington County has a reverse 9-1-1 call system and makes preparedness information available on its website.

StormReady

The National Weather Service established the StormReady program to help local governments improve the timeliness and effectiveness of hazardous weather related warnings for the public. To be officially StormReady, a community must:

- Establish a 24-hour warning point and emergency operations center
- Have more than one way to receive severe weather warnings and forecasts and to alert the public
- Create a system that monitors weather conditions locally
- Promote the importance of public readiness through community seminars
- Develop a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises

Being designated a StormReady community by the National Weather Service is a good measure of a community's emergency warning program for weather hazards. Lexington County is currently credited by NOAA as a StormReady community.

Response

The protection of life and property is the most important task of emergency responders. Concurrent with threat recognition and issuing warnings, a community should respond with actions that can prevent or reduce damage and injuries. Typical actions and responding parties include the following:

- Activating the emergency operations center (emergency preparedness)
- Closing streets or bridges (police or public works)
- Shutting off power to threatened areas (utility company)
- Passing out sand and sandbags (public works)
- Holding children at school or releasing children from school (school superintendent)
- Opening evacuation shelters (the American Red Cross)
- Monitoring water levels (public works)
- Establishing security and other protection measures (police)

An emergency action plan ensures that all bases are covered and that the response activities are appropriate for the expected threat. These plans are developed in coordination with the agencies or offices that are given various responsibilities.

Emergency response plans should be updated annually to keep contact names and telephone numbers current and to ensure that supplies and equipment that will be needed are still available. They should be critiqued and revised after disasters and exercises to take advantage of the lessons learned and of changing conditions. The result is a coordinated effort implemented by people who have experience working together so that available resources will be used in the most efficient manner possible.

Evacuation and Shelter

There are six key components to a successful evacuation:

- Adequate warning
- Adequate routes
- Proper timing to ensure the routes are clear
- Traffic control
- Knowledgeable travelers
- Care for special populations (e.g., elderly, disabled, prisoners, hospital patients, schoolchildren)

Those who cannot get out of harm's way need shelter. Typically, the American Red Cross will staff a shelter and ensure that there is adequate food, bedding, and wash facilities. Shelter management is a specialized skill. Managers must deal with problems like scared children, families that want to bring in their pets, and the potential for an overcrowded facility.

Post-Disaster Recovery and Mitigation

After a disaster, communities should undertake activities to protect public health and safety and facilitate recovery. Appropriate measures include:

- Patrolling evacuated areas to prevent looting
- Providing safe drinking water
- Monitoring for diseases
- Vaccinating residents for tetanus and other diseases
- Clearing streets
- Cleaning up debris and garbage

Following a disaster, there should be an effort to help prepare people and property for the next disaster. Such an effort would include:

- Public information activities to advise residents about mitigation measures they can incorporate into their reconstruction work.
- Evaluating damaged public facilities to identify mitigation measures that can be included during repairs.
- Identifying other mitigation measures that can lessen the impact of the next disaster.
- Acquiring substantially or repeatedly damaged properties from willing sellers.
- Planning for long-term mitigation activities.
- Applying for post-disaster mitigation funds.

Regulating Reconstruction

Requiring permits for building repairs and conducting inspections are vital activities to ensure that damaged structures are safe for people to reenter and repair. There is a special requirement to do this in floodplains, regardless of the type of disaster or the cause of damage. The NFIP requires that local officials enforce the substantial damage regulations. These rules require that if the cost to repair a building in the mapped floodplain equals or exceeds 50% of the building's market value, the building must be retrofitted to meet the standards of a new building in the floodplain. In most cases, this means that a substantially

damaged building must be elevated above the base flood elevation. Lexington County enforces regulations that require cumulative substantial improvement and lower substantial improvement, increasing the likelihood that properties will be brought into compliance with current regulations following a flood event.

CRS Credit

Flash flood warnings are issued by National Weather Service Offices, which have the local and county warning responsibility. Flood warnings are forecasts of coming floods, and are distributed to the public by the NOAA Weather Radio, commercial radio and television, and through local emergency agencies. Lexington County uses a reverse 9-1-1 calling system to disseminate warnings. The warning message tells the expected degree of flooding, the affected river, when and where flooding will begin, and the expected maximum river level at specific forecast points during flood crest.

There are several highways allowing evacuation from various parts of the County—including Route 20, Route 26, and Route 77—but the County does not have designated evacuation routes.

Lexington County does not currently receive credit for Activity 510 – Flood Warning Program. Community Rating System credits are based on the number and types of warning media that can reach the community's flood prone population. Depending on the location, communities can receive credit for the telephone calling system and more credits if there are additional measures, like telephone trees. The County can also earn credit for being designated as a StormReady community.

Conclusions

- There are 7 critical facilities located in the AE Zone and a total of 215 critical facilities at risk throughout the County.
- Warning systems can be improved with additional data collection to ensure that information is accurate and timely.

Recommendations and Funding

- The County should evaluate all critical facilities located within the floodplain to determine need for flood protection.
- The County should add additional flood gauges to the Kinley Creek area to improve data collection and the ability to issue accurate, timely warnings.
- Funding can be expected through Lexington County Emergency Management.

B.6 Structural Projects

Four general types of flood control projects are reviewed here: levees, reservoirs, diversions, and dredging. These projects have three advantages not provided by other mitigation measures:

- They can stop most flooding, protecting streets and landscaping in addition to buildings.
- Many projects can be built without disrupting citizens' homes and businesses.
- They are constructed and maintained by a government agency, a more dependable long-term management arrangement than depending on many individual private property owners.

However, as shown below, structural measures also have shortcomings. The appropriateness of using flood control depends on individual project area circumstances.

- Advantages
    - They may provide the greatest amount of protection for land area used
    - Because of land limitations, they may be the only practical solution in some circumstances

  - They can incorporate other benefits into structural project design, such as water supply and recreational uses
  - Regional detention may be more cost-efficient and effective than requiring numerous small detention basins
- Disadvantages
  - They can disturb the land and disrupt the natural water flows, often destroying wildlife habitat
  - They require regular maintenance
  - They are built to a certain flood protection level that can be exceeded by larger floods
  - They can create a false sense of security
  - They promote more intensive land use and development in the floodplain

Levees and Floodwalls

Probably the best-known flood control measure is a barrier of earth (levee) or concrete (floodwall) erected between the watercourse and the property to be protected. Levees and floodwalls confine water to the stream channel by raising its banks. They must be well designed to account for large floods, underground seepage, pumping of internal drainage, and erosion and scour.

Reservoirs and Detention

Reservoirs reduce flooding by temporarily storing flood waters behind dams or in storage or detention basins. Reservoirs lower flood heights by holding back, or detaining, runoff before it can flow downstream. Flood waters are detained until the flood has subsided, and then the water in the reservoir or detention basin is released or pumped out slowly at a rate that the river can accommodate downstream.

Retention pond

Reservoirs can be dry and remain idle until a large rain event occurs. Or they may be designed so that a lake or pond is created. The lake may provide recreational benefits or water supply (which could also help mitigate a drought).

Flood control reservoirs are most commonly built for one of two purposes. Large reservoirs are constructed to protect property from existing flood problems. Smaller reservoirs, or detention basins, are built to protect property from the stormwater runoff impacts of new development.

Diversion

A diversion is a new channel that sends floodwaters to a different location, thereby reducing flooding along an existing watercourse. Diversions can be surface channels, overflow weirs, or tunnels. During normal flows, the water stays in the old channel. During floods, the floodwaters spill over to the diversion channel or tunnel, which carries the excess water to a receiving lake or river.

Local Implementation

Lexington County does not currently receive credit for Activity 530 – Flood Protection. Structural flood control projects that provide 100-year flood protection and that result in revisions to the Flood Insurance Rate Map are not credited by the CRS so as not to duplicate the larger premium reduction provided by removing properties from the mapped floodplain.

CRS Credit

Structural flood control projects are credited by the CRS Program relative to the percent of buildings in the SFHA protected by these projects.

Conclusions

- There are many areas identified that experience flooding due to overburdened channels and/or inadequate drainage systems.
- Needed channel improvements in neighboring counties within the watershed also affect the County.
- South Carolina Department of Transportation has identified several bridges in the County in need of repair or replacement.

Recommendations and Funding

- Coordinate with neighboring counties to make necessary channel improvements.
- Coordinate with SCDOT to repair or replace bridges, as necessary.
- Funding for these projects could come through the County's stormwater utility and Capital Improvement Program (CIP) funds, once established.
- Funding for bridge repairs is available through SCDOT, and coordination activities can be supported by the County's operating budget.

B.7 Public Information and Outreach

Outreach Projects

Outreach projects are the first step in the process of orienting property owners to the hazards they face and to the concept of property protection. They are designed to encourage people to seek out more information in order to take steps to protect themselves and their properties.

Awareness of the hazard is not enough; people need to be told what they can do about the hazard. Thus, projects should include information on safety, health and property protection measures. Research has shown that a properly run local information program is more effective than national advertising or publicity campaigns. Therefore, outreach projects should be locally designed and tailored to meet local conditions.

Community newsletters/direct mailings: The most effective types of outreach projects are mailed or distributed to everyone in the community. In the case of floods, they can be sent only to floodplain property owners.

News media: Local newspapers can be strong allies in efforts to inform the public. Local radio stations and cable TV channels can also help. These media offer interview formats and cable TV may be willing to broadcast videos on the hazards.

Libraries and Websites

The two previous activities tell people that they are exposed to a hazard. The next step is to provide information to those who want to know more. The community library and local websites are obvious places for residents to seek information on hazards, hazard protection, and protecting natural resources.

Books and pamphlets on hazard mitigation can be given to libraries, and many of these can be obtained for free from state and federal agencies. Libraries also have their own public information campaigns with displays, lectures and other projects, which can augment the activities of the local government. Today, websites are commonly used as research tools. They provide fast access to a wealth of public and private

sites for information. Through links to other websites, there is almost no limit to the amount of up to date information that can be accessed on the Internet.

In addition to online floodplain maps, websites can link to information for homeowners on how to retrofit for floods or a website about floods for children.

Technical Assistance

Hazard Information

Residents and business owners that are aware of the potential hazards can take steps to avoid problems or reduce their exposure to flooding. Communities can easily provide map information from FEMA's FIRMs and Flood Insurance Studies. They may also assist residents in submitting requests for map amendments and revisions when they are needed to show that a building is located outside the mapped floodplain.

Some communities supplement what is shown on the FIRM with information on additional hazards, flooding outside mapped areas and zoning. When the map information is provided, community staff can explain insurance, property protection measures and mitigation options that are available to property owners. They should also remind inquirers that being outside the mapped floodplain is no guarantee that a property will never flood.

Property Protection Assistance

While general information provided by outreach projects or the library is beneficial, most property owners do not feel ready to retrofit their buildings without more specific guidance. Local building department staffs are experts in construction. They can provide free advice, not necessarily to design a protection measure, but to steer the owner onto the right track. Building or public works department staffs can provide the following types of assistance:

- Visit properties and offer protection suggestions
- Recommend or identify qualified or licensed contractors
- Inspect homes for anchoring of roofing and the home to the foundation
- Explain when building permits are needed for home improvements.

Public Information Program

A Program for Public Information (PPI) is a document that receives CRS credit. It is a review of local conditions, local public information needs, and a recommended plan of activities. A PPI consists of the following parts, which are incorporated into this plan:

- The local flood hazard
- The property protection measures appropriate for the flood hazard
- Flood safety measures appropriate for the local situation
- The public information activities currently being implemented within the community, including those being carried out by non-government agencies
- Goals for the community's public information program
- The outreach projects that will be done each year to reach the goals
- The process that will be followed to monitor and evaluate the projects

Local Implementation

Lexington County currently receives credit under Activity 330 – Outreach Projects as well as Activity 350 – Flood Protection Information. A community brochure is mailed to all properties in the Repetitive Loss Areas on an annual basis, and the community provides flood information through workshops and displays at public buildings. Documents relating to floodplain management are available in the reference section

of the Lexington County Public Library. Credit is also provided for floodplain information displayed on the County's website.

CRS Credit

Additional credits are available under Activity 330 – Outreach Projects for creating a Program for Public Information. Credit is also available under Activity 350 for providing additional information on the County website including real time gage information and elevation certificates.

Conclusions

- Lexington County has a public awareness and outreach program.
- The County provides information to citizens through its website, news media, public meetings, targeted mailings, public library, public building information displays, and workshops and special events.

Recommendations and Funding

- Work to improve flood insurance coverage in Lexington County.
- Continue to send targeted outreach materials to Repetitive Loss Areas.
- Develop outreach materials on the County's "no dumping" regulations to support enforcement activities.
- Develop outreach materials to encourage property owners to remove debris from tops of stream banks.
- Develop targeted outreach materials for dam owners to ensure proper inspection and maintenance occurs.
- Funding will come from staff time to implement these projects and the County's operating budget.

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