



GREENVILLE COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN UPDATE



January 2015

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Greenville County

Multi-jurisdictional Hazard Mitigation Plan Update

Section One

EXECUTIVE SUMMARY

This section has been revised to reference the jurisdictions included in the plan and summarize key components of the update process.

In order for Greenville County to take advantage of certain future hazard mitigation grant programs, it must prepare a Hazard Mitigation Plan (HMP) that outlines mitigation planning activities designed to reduce the impact of natural hazards on the community. Greenville County is threatened by a number of natural hazards that endanger the health and safety of the population, jeopardize its economic vitality, and imperil the quality of its environment. This HMP updates the January 2010 plan that is set to expire in January 2015.

Greenville County Council and the governing bodies of each jurisdiction represented fully support the development and implementation of the HMP. Resolutions supporting the HMP are contained in Appendix B. The implementation, monitoring and maintenance of the HMP rest with the Disaster Mitigation Committee (Section 3), which is coordinated by the Greenville County Floodplain Administrator. The policies and procedures of the DMC are addressed fully in Section 3 and Section 4.

This 2015 HMP update incorporates the following jurisdictions: City of Greenville, City of Simpsonville, City of Fountain Inn and the City of Mauldin. The HMPs for each of these jurisdictions are included as appendices to this plan. If desired, other jurisdictions in the County will be able to join this HMP as “add-on jurisdictions” at a later date after compiling all required information.

This Update was prepared under guidance from the SC Emergency Management Division through the combined efforts of Greenville County; planning partners from each jurisdiction; and, the Disaster Mitigation Committee (DMC). The following key individuals from each jurisdiction participated in the development of this updated multi-jurisdictional plan.

- Greenville County

| | |
|---------------|--------------------------|
| Robert Hall | Floodplain Administrator |
| Teresa Barber | Codes Enforcement |

- City of Greenville

| | |
|-----------------|---------------------------|
| Christian Crear | Environmental Engineering |
|-----------------|---------------------------|

- City of Simpsonville

| | |
|--------------|--------------|
| Jay Crawford | Public Works |
| John Laux | Public Works |

- City of Fountain Inn

| | |
|-------------|--------------|
| Lori Cooper | Public Works |
|-------------|--------------|

- City of Mauldin

| | |
|-------------|-------------------------------------|
| Kim Hamel | Floodplain Administrator |
| Russel Sapp | Fire Chief/Asst. City Administrator |

Mitigation Planning Process

The general approach to mitigation planning and preparation of this HMP update includes the elements listed below. The hazards, mitigation actions and goals for each jurisdiction will vary based upon their specific needs. The Local Mitigation Plan Review Tool contained in Appendix A provided plan development guidance for jurisdictions represented in this HMP.

- Meet the criteria described in the Disaster Mitigation Act of 2000 and Section 510 – Floodplain Management Planning of the Community Rating System program;
- As applicable to each jurisdiction, address flooding, tornado/high winds, earthquake, thunderstorms, wildfire, dam failure, drought/heat wave; winter/ice storms; and,
- Follow the ten (10) step Federal Emergency Management Agency (FEMA) planning process as outlined below.
 1. **Organize:** Create the DMC and develop a schedule for project completion.
 2. **Public Involvement:** Insure that the general public and a variety of stakeholders have an opportunity to provide input into the planning process.
 3. **Coordination:** Coordinate with appropriate individuals and organizations to insure adequate representation at various meetings.
 4. **Hazard Assessment:** Identify and address applicable natural hazards. Activities include review of existing plans; review of past events and claims data; and, obtaining input from committee members and the public.

5. **Problem Assessment:** Review available information regarding the impact of hazards on public health and safety, infrastructure and property damage. Where possible, the impacts on property should be measured in dollar losses. Optional efforts include; utilizing HAZUS earthquake and flood/wind data to determine expected extent of damages and performing a facilities inventory.
6. **Goal Setting:** Establish goals and objectives for the plan.
7. **Mitigation Activities:** Determine mitigation activities relative to the hazards being considered and the unique characteristics of each jurisdiction represented. The following six basic mitigation strategies were considered in the 2010 HMP and were revised as necessary in this update: 1) Preventive measures, 2) Public Education & Awareness, 3) Natural resource protection, 4) Emergency services, 5) Property protection, and 6) Structural projects.
8. **Draft Plan:** Prepare a draft plan containing a description of the planning process, the hazard assessment and problem analysis, the goals, and a summary of appropriate measures. The draft plan will be reviewed by each jurisdiction represented. The entire plan will be made available for public review through placement on a public website(s) or by other means appropriate for each jurisdiction represented. Also, the plan will be open to public review and comment through a County-wide meeting for the public and representatives of each jurisdiction included in the HMP Update.
9. **Final Plan:** The final plan will be prepared considering comments from the internal review and the public. The final plan will be adopted by resolution of the Greenville County Council and the local governing bodies for each municipality.
10. **Implementation:** The DMC, including committee representatives from each jurisdiction, will review and revise the plan as required during the next 5 year cycle.

To date, Tasks 1 – 8 have been completed and the final plan is being prepared for review and approval. A copy of the council resolutions adopting this plan will be attached to indicate that Tasks 8 and 9 have been completed. Task 10 is an on-going activity.

Mitigation Initiatives

In the 2010 HMP update, the DMC performed a natural hazards assessment and developed potential mitigation initiatives based upon that assessment. Additional input was received from a variety of other groups representing homeowners, business owners, academia, emergency response organizations and industry. Ranking of initiatives was based on a point system and each initiative was scored by the DMC. The initiative ranking results can be found in Section 8 of this document.

At least annually, the DMC meets to review and revise mitigation initiatives as necessary. This process includes soliciting additional mitigation initiatives, evaluating

response to recent disasters, and tracking the progress of those initiatives already reviewed and approved.

Goals and Objectives

The DMC has retained the eight (8) goals established in the 2010 HMP update. These goals included educating the public and government officials; improving communications and response activities; and, protecting structures. Specific objectives were established for each goal and initiatives were approved to meet the required objectives.

Accomplishments

Most of the mitigation objectives contained in the 2010 HMP have either been completed or are being continued as “best management practice”. Two objectives were eliminated from further consideration based upon funding considerations and other criteria (e.g., public acceptance, liability).

Of particular note are the programs that Greenville County has implemented to address flooding issues. These programs include the “Dwelling Elevation Program” which has elevated six (6) homes located in the floodplain; the “425 Drainage Projects” designed to improve stormwater conveyances county-wide; replacement and improvement of bridges; and, the flood prone structure acquisition program resulting in removal of approximately 124 structures from the floodplain. We anticipate continuation of these programs throughout the 2015 HMP cycle subject to availability of funding.

Summary

Hazard mitigation planning is not a one time project, but rather an on-going process. Greenville County and represented municipalities started the planning process for the 2015 HMP update in 2013 and are continuing to update the HMP as required to keep the plan active and relevant. The multi-jurisdictional approach to development of this HMP and incorporation of the County-wide risk assessment affirm our commitment to the hazard mitigation planning process.

Greenville County

Multi-jurisdictional Hazard Mitigation Plan Update

Section Two

INTRODUCTION AND PURPOSE

Minimal formatting changes and revision to content were made to this section for the 2015 HMP Update. Information regarding integration of HMP elements into other County plans and programs was added.

2.1 Introduction

The Disaster Mitigation Committee (DMC) was established to make the population, neighborhoods, businesses and institutions of the community more resistant to the impacts of future disasters. The committee performed a comprehensive evaluation of the vulnerabilities of the communities covered by this HMP to future natural hazards. The goal of this evaluation was to identify ways to make the communities more resistant to those hazards and to establish methodology for implementing valuable mitigation alternatives.

2.2 Purpose

This 2015 HMP update is a multi-purpose planning document that addresses the following functions:

- Provide a Methodical, Substantive Approach to Mitigation Planning

The approach utilized by the DMC relies on a methodical process to identify vulnerabilities to future disasters and to propose the mitigation initiatives necessary to avoid or minimize those vulnerabilities. This process includes interviews, research, data collection, plan development, community involvement, work sessions, and implementation. Each step in the process builds upon the previous step, so that there is a high level of assurance that the mitigation initiatives proposed by the participants have a valid basis for both their justification and priority for implementation. One key purpose of this plan is to document that process and to present its results to the community.

- Enhance Public Awareness and Understanding

The DMC is interested in finding ways to make the community as a whole more aware of the natural hazards that threaten the public health and safety, the economic vitality of businesses, and the operational capability of important facilities and institutions. The plan identifies the hazards threatening Greenville County as a whole, providing an assessment of the relative level of risk they pose. The plan also includes a number of proposed ways to avoid or minimize those vulnerabilities. This information will be very helpful to individuals desiring to understand how the community could become safer from the impacts of future disasters.

The DMC and its member organizations will continue to conduct community outreach and public information programs. The purpose of these programs is to engage the community as a whole in the multi-jurisdictional mitigation planning process. The planning process includes shaping the goals, priorities, and content of the plan, as well as to provide information and education to the public regarding ways to be more protected from the impacts of future disasters.

- Create a Decision Tool for Management

This HMP Update provides information needed by the managers and leaders of local government, business and industry, community associations, and other key institutions and organizations to take actions to address vulnerabilities to future disasters. It also provides proposals for specific projects and programs that are needed to eliminate or minimize the risks to specific hazards. The plan is based on the best available data, which although limited in many regards, provides a solid foundation for hazard planning and future improvements.

These proposals, called “mitigation initiatives” in the plan, have been justified on the basis of their economic benefits using a uniform technical analysis. These initiatives have also been prioritized. This approach is intended to provide a decision tool for the management of participating organizations and agencies regarding why the proposed mitigation initiatives should be implemented, which should be implemented first, and the economic and public welfare benefits of doing so.

- Promote Compliance with State and Federal Program Requirements

There are a number of state and federal grant programs, policies, and regulations that encourage or even mandate local government to develop and maintain a comprehensive hazard mitigation plan. This plan is specifically intended to assist the participating local governments to

comply with these requirements, and to enable them to more fully and quickly respond to state and federal funding opportunities for mitigation-related projects. Because the plan defines, justifies, and prioritizes mitigation initiatives that have been formulated through a technically valid hazard analysis and vulnerability assessment process, the participating organizations are better prepared to more quickly and easily develop the necessary grant application materials for seeking state and federal funding.

- Enhance Local Policies for Hazard Mitigation Capability

A component of the hazard mitigation planning process conducted by the Greenville County DMC is the analysis of the existing policy, program, and regulatory basis for control of growth and development, as well as the functioning of key facilities and systems. This process involves cataloging the current mitigation-related policies of local government so that they can be compared against the hazards that threaten the jurisdiction and the relative risks these hazards pose to the community. When the risks posed to the community by a specific hazard are not adequately addressed in the community's policy or regulatory framework, the potential impacts of future disasters can be even more severe. Therefore, the planning process utilized by the DMC supports evaluation of the adequacy of the community's policies and programs in light of the level of risk posed by specific hazards.

- Integrate HMP Requirements into Other County Plans

The Greenville County HMP is supported by other County planning mechanisms and programs including the following:

- County Comprehensive Plan
- Capital Improvement Program
- Emergency Operations Plan
- Stormwater Management Plan
- Land Development Regulations

Section 7.5.4 provides information on the types of support provided by these plans and programs to the Greenville County HMP.

The following sections of the HMP present the detailed information to support these purposes. Section 3 describes the current DMC organization and its approach to managing the planning process. The plan provides a description of the mitigation-related characteristics of Greenville County, such as its land uses and population growth trends; the mitigation-related policies already in-place;

identified critical facilities present in the community; and, repetitively damaged properties. The plan then summarizes the results of the hazard identification and vulnerability assessment process, and addresses the adequacy of the current policy basis for hazard management by Greenville County and participating organizations. The plan also documents the structural and non-structural mitigation initiatives to address the identified vulnerabilities. The plan further addresses the mitigation goals and objectives established by the DMC and the actions to be taken to maintain, expand and refine the HMP and the planning process. Finally, the past and planned efforts of the DMC to engage the entire community in the mitigation planning process are documented.

Greenville County

Multi-jurisdictional Hazard Mitigation Plan Update

Section Three

DISASTER MITIGATION COMMITTEE

Section 3 has been revised by expanding upon the Greenville County Disaster Mitigation Committee (DMC) organizational structure; updating the DMC members table; clarifying the DMC processing of mitigation initiatives; and, adding a summary of DMC meetings held during the 2010 – 2015 HMP cycle.

3.1 Introduction

The DMC is composed of a number of county agencies, municipal government representatives, community organizations, and institutions. This section discusses the committee organizational structure and its role in the planning process. Also provided is a summary of the current status of planning activities by the participants documenting the level of participation by the Greenville County DMC.

On an annual basis, the DMC will meet to discuss this HMP update and, if necessary, will refine its contents and direction. In this meeting, the committee will review mitigation activities that are ongoing or planned. This meeting will allow the members of the committee to consider the HMPs ability to meet the community's needs.

Proposed changes to the HMP will be considered by the group and, if agreed upon, will be incorporated into the plan. These changes will be presented to Greenville County Council for review as part of the annual report to Council.

In addition, the DMC will promote public involvement in the planning process by posting the annual report on the County website and soliciting public comment. These comments will be shared with DMC members. It is also a function of the DMC to coordinate and exchange information with agencies and departments represented by individual committee members.

3.2 Organizational Structure

The following is a list of entities currently on the DMC. Greenville County departments are indicated by "GC".

- Assistant GC Administrator
- GC Office of the County Attorney
- GC Codes Enforcement/Floodplain Administrator
- GC E911
- GC Solid Waste Dept.
- GC Engineering Department
- GC Soil and Water Conservation District
- GC Fire Chief
- GC Planning Commission
- GC Emergency Management Dept.
- USDA, NRCS
- SC Appalachian Council of Governments
- National Weather Service
- Furman University
- Greenville Technical College
- Volunteer Engineering Corp
- Hydro-Tech, Inc.
- Ethox Chemical
- Home Builders Association
- City of Greenville
- City of Mauldin
- City of Simpsonville
- City of Ft. Inn
- City of Greer
- City of Travelers Rest

The DMC encourages participation by all interested agencies, organizations, and individuals. The organization is intended to represent a partnership between the public and private sector of the community, working together to create a disaster resistant community. The proposed mitigation initiatives developed by the DMC and listed in this plan, when implemented, are intended to make the entire community safer from the impacts of future disasters, for the benefit of every individual, neighborhood, business and institution.

DMC members and their committee affiliation are provided below. Individual committee representatives may change during the planning cycle; however, it is anticipated that all of the listed agencies, departments and jurisdictions will maintain at least one representative on the committee.

| Greenville County DMC | | | |
|------------------------|---|---|----------------|
| Name | Department | Address | Phone Number |
| Paula Gucker * | GC – Assistant County Administrator | 301 University Ridge, Greenville SC 29601 | (864) 467-7010 |
| Robert Hall* | GC - Floodplain Administrator | 301 University Ridge, Greenville SC 29601 | (864) 467-7523 |
| <i>Teresa Barber *</i> | GC Code Enforcement Officer | 301 University Ridge, Greenville SC 29601 | (864) 467-7459 |
| Brenda James | GC - Assistant to Codes Enforcement Director | 301 University Ridge, Greenville SC 29601 | (864) 467-7357 |
| Bob Mihalic | Governmental Affairs Coordinator (Outreach) | 301 University Ridge, Greenville SC 29601 | (864) 467-7055 |
| Christian Crear | City of Greenville | 360 S. Hudson Street Greenville, SC 29601 | (864) 467-4400 |
| Kim Hamel | City of Mauldin - Planning & Economic Development | 5 E Butler Rd. Mauldin, SC 29662 | (864) 289-8922 |
| <i>Jay Crawford*</i> | City of Simpsonville | 110 Woodside Park Drive, Simpsonville SC 29681 | (864) 967-9531 |
| John Laux | City of Simpsonville | 110 Woodside Park Drive, Simpsonville SC 29681 | (864) 967-9531 |
| Lori Cooper* | City of Fountain Inn | 200 N. Main Street, Fountain Inn SC 29644 | (864) 409-3334 |
| Roger Case* | City of Fountain Inn | 200 N. Main Street, Fountain Inn SC 29644 | (864) 409-3334 |
| Christopher Harvey | Fire Chief City of Greer | 103 West Poinsett Street Greer, SC 29650 | (864) 848-2165 |
| Dianna Gracely | City of Travelers Rest | 117 N. Poinsett Highway, Travelers Rest SC 29690 | (864) 834-7958 |
| Ed Abraham | Greenville Tech. College | 225 South Pleasantburg Drive, Greenville SC 29607 | (864) 250-8351 |
| Gene Wilson | Greenville Tech. College | 225 South Pleasantburg Drive, Greenville SC 29607 | (864) 250-8251 |

| Greenville County DMC | | | |
|-----------------------|--|--|----------------|
| Name | Department | Address | Phone Number |
| Marcia Papin | GC - Solid Waste Operations Manager | 301 University Ridge, Greenville SC 29601 | (864) 467-8433 |
| Steward Lawrence | GC- Risk Manager | 301 University Ridge, Greenville SC 29601 | (864) 467-7547 |
| Warren Edwards | GC – Health and Safety Coordinator | 301 University Ridge, Greenville SC 29601 | (864) 467-7318 |
| Hesha Gamble* | GC – County Engineer | 301 University Ridge, Greenville SC 29601 | (864) 467-4612 |
| Rich O'Kelly | Volunteer Engineering Corps and Emergency Management | 206 South Main Street Greenville, SC 29601 | (864) 297-8600 |
| Bill Sykes | Volunteer Eng. Corps | H2L Consulting Engineers | (864) 233-8844 |
| Eric Vinson | GC – Planning | 301 University Ridge, Greenville SC 29601 | (864) 467-7270 |
| Sonya Dawson | Planning - Subdivisions | 301 University Ridge, Greenville SC 29601 | (864) 467-5686 |
| Steve Graham | GC - Fire Chiefs | 5020 Pelham Road Greenville SC 29615 | (864) 284-9916 |
| Judith Wortkoetter * | GC - County Engineer | 301 University Ridge, Greenville SC 29601 | (864) 467-7010 |
| Tony Sturey | NWS Meteorologist | 1549 GSP Drive, Greer SC 29651 | (864) 848-9970 |
| Larry Gabric | National Weather Service | 1549 GSP Drive, Greer SC 29651 | (864) 848-9970 |
| Abbas Fiuzat* | Hydro-Tech Inc. | 202 Albermarle Dr, Clemson SC 29631 | (864) 710-8555 |
| Mark Sutton | GC - E911 | 206 South Main Street Greenville, SC 29601 | (864) 467-5928 |
| Chip Bentley | SC Appalachian of Council Governments | P.O. Drawer 6668 Greenville, SC 29606 | (864) 242-9733 |
| Chief Ken Taylor | South Greenville FD | 8305 Augusta Road, Pelzer SC 29669 | (864) 243-3535 |

| Greenville County DMC | | | |
|------------------------------|--|---|---------------------|
| Name | <i>Department</i> | Address | Phone Number |
| Dean Campbell | Assistant Greenville County Attorney | 301 University Ridge, Ste. 2400, Greenville, 29601 | (864) 467-7114 |
| Charles Bristow | Ethox Chemicals | P. O. Box 5094 Greenville SC 29606 | (864) 274-1620 |
| Todd Usher | Home Builders Association of Greenville | 5 Creekside Park Court, Suite A Greenville, SC 29615 | (864) 254-0133 |
| Jay Marett | Greenville County Office of Emergency Management | 206 South Main St. Greenville, SC 29601 | (864) 467-2680 |
| Lynne Newton | USDA NRCS | 301 University Ridge, Suite 4800 Greenville, SC 29601 | (864) 467-2755 |
| Kirsten Robertson | Greenville County Soil & Water Conservation District | 301 University Ridge, Suite 4800 Greenville, SC 29601 | (864) 467-2755 |
| Suresh Muthukrishnan | Furman University | 3300, Poinsett Highway, Greenville, SC 29613 | (864) 294-3361 |

Notes: * Member served on Initiative Ranking Committee for the 2010 HMP Update.

3.3 DMC Operations Overview

The DMC represents a broad spectrum of organizations participating in the planning process and is the planning decision-making group. The committee members serve as the official liaison to their respective agencies and the community. Most importantly for this document, however, is the DMC's role to approve proposed mitigation initiatives for incorporation into the plan; for determining the priorities for implementation of those initiatives; and, for removing or terminating initiatives that are no longer desirable for implementation.

The DMC also coordinates the actual technical analyses and planning activities that are fundamental to development of this plan. These activities may include conducting the hazard identification and vulnerability assessment processes, as well as receiving and coordinating the mitigation initiatives proposed for incorporation into this plan. The coordinating process constitutes a "peer review" of the proposed mitigation initiatives submitted for incorporation into the plan. Through the peer review, each proposed initiative is reviewed for its consistency

with the goals and objectives established for the planning process and its relationship to identified hazards and defined vulnerabilities to those hazards. The peer review incorporated into the planning process also strives to assure the following: Assumptions used by the organization to develop the proposal are reasonable; proposal's would not conflict with or duplicate other proposed initiatives; Initiatives specifically address risk to a hazard(s); proposals are feasible and consistent with known requirements; and proposals, if implemented, would not cause harm or disruption to adjacent jurisdictions.

City and County agencies, as well as local organizations, are the key to accomplishing the planning process. The effort begins with developing a community profile of Greenville County to document the basic characteristics that are relevant to controlling the impacts of disasters. Then vulnerability assessments are conducted of key facilities, systems and neighborhoods to define how these may be vulnerable to the impacts of all types of disasters. Finally, the DMC uses the vulnerability assessments to formulate and characterize mitigation initiatives they could implement if the resources to do so became available.

Once these proposed initiatives are reviewed and coordinated, the DMC can then decide to formally approve them by vote in order to incorporate them into the Greenville County Multi-jurisdictional Hazard Mitigation Plan Update. As soon as a proposed mitigation initiative is approved, it is incorporated into the HMP. The Committee assigns responsibility for implementing the initiative to an individual member or Department. The new initiative is introduced to County Council and the public through the annual report to Council. The new initiative is expected to be implemented as soon as the resources and/or opportunity to do so becomes available.

The DMC is also responsible for coordinating the efforts to involve the community at large in the mitigation planning process, and to promote mitigation-related educational programs in the community. More detailed information regarding the public information and community outreach activities involved in the development and implementation of this plan are provided in Section 5.

The following is a list of DMC meetings that occurred during the 2010 HMP Cycle through the publish date of this plan:

2010 HMP Cycle

- November 9, 2010

- Discussed recently completed HMP Update
- Reviewed ongoing initiatives, particularly watershed studies
- Reviewed recently installed rain gages and weather stations. Provided online access information to the DMC.

- Removed two initiatives: *Gates at Flooded Intersections* and *Fire Station Relocation*.
- October 26, 2011
- Reviewed mitigation initiatives and added one watershed study: *Grove Creek Stormwater Master Plan*
 - Reviewed and summarized Hazard Information Advertisements
 - Notified DMC of GIS system improvements with regard to addition of nine (9) watershed impoundment easements.
 - Reviewed June 2011 storm event response
- October 31, 2012
- Floodplain Administrator provided Powerpoint presentation on status of mitigation initiatives.
 - Reviewed mitigation initiatives with full committee
 - Assigned development of County Severe Weather Manual to the GC Health and Safety Coordinator
 - The GC Emergency Management Director provided update of County radio communications capabilities
 - Neighborhood drainage projects list updated
- October 24, 2013
- Floodplain Administrator provided Powerpoint presentation on preparation of Multi-jurisdictional Hazard Mitigation Plan Update.
 - Discussed DMC review and comment on draft Plan. Based upon discussion, Floodplain Administrator submitted draft document and HMP Initiatives Progress Report to all committee members for review/comment. Previous years responses to natural hazards events were discussed.
 - Committee members were asked to review goals and objectives in Plan Update for possible revision.
 - GC Health and Safety Coordinator reported on completion of County Severe Weather Manual.
 - The GC Office of Emergency Management made a brief presentation of the County Hazards and Vulnerabilities Assessment Project.

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Section Four

DISASTER MITIGATION COMMITTEE OPERATING PROCEDURES

Section 4 has been revised to clarify DMC operating procedures; to add information regarding incorporation of existing technical data into the planning process; to clarify the formal plan update adoption process; and, to adjust the section format for clarity. As referenced in Section 4.3, the flood risk map from the new Flood Risk Report for Greenville County and surrounding areas (4/29/2011) has been added to Appendix G.

4.1 Introduction

This section of the Greenville County Multi-jurisdictional Hazard Mitigation Plan describes the characteristics of the DMC and basic procedures for conducting the planning process. These procedures involve both a technical approach to the planning and an organizational methodology for incorporating mitigation initiatives into the Greenville County HMP.

The planning process was started by organizing the DMC and obtaining participation from key organizations, municipalities and institutions. The planning work conducted to update this document relies heavily on the expertise and authorities of the participating agencies and organizations, rather than on detailed scientific or engineering studies. The DMC is confident that because of their role in the community, the best judgment of the participating individuals, and the use of readily available information, the DMC can achieve a level of detail in the analysis that is adequate for purposes of multi-jurisdictional mitigation planning. As the planning process continues, mitigation needs of the community can be refined as initiatives are implemented and additional studies are completed. In fact, one outcome of the 2010 HMP update was the preparation of more detailed flood studies in several watersheds throughout the County.

4.2 Planning Schedule

After the DMC was organized, a planning schedule for development of the HMP was developed. At the outset of the planning period, the DMC reaffirmed the goals of the planning process as well as the specific objectives within each goal that will help to focus the planning efforts. The goals and objectives established by the Greenville County DMC for the 2015 HMP update cycle, as well as the

anticipated plan maintenance schedule, are described in Section 7 of this plan update.

Conducting the needed analyses and then formulating proposed mitigation initiatives to avoid or minimize known vulnerabilities of the community to future disasters is an enormous effort, and one that must take place over a long period of time. Therefore, for any one planning period, the goals and objectives set by the DMC are intended to help focus the effort of the participants, for example, by directing attention to certain types of facilities or planning areas, or by emphasizing implementation of selected types of proposed mitigation initiatives.

4.3 Hazard Identification and Risk Estimation

In developing the 2005 HMP, the DMC identified hazards that threaten all or portions of the community. The DMC also used general information to estimate the relative risk of the various hazards as an additional method to focus their analysis and planning efforts. The DMC compared the likelihood or probability that a hazard will impact an area, as well as the consequences of that impact to public health and safety, property, the economy, and the environment. This comparison of the consequences of an event with its probability of occurrence is a measure of the risk posed by that hazard to the community. The DMC compared the estimated relative risks of the different hazards it identified to highlight which hazards should be of greatest concern during the mitigation planning process.

Information resources regarding hazard identification and risk estimation, although limited, are available. The DMC considered hazard specific maps, including floodplain delineation maps, whenever applicable, and have attempted to avail themselves of GIS-based analyses of hazard areas and the locations of critical facilities, infrastructure components, and other properties located within the defined hazard areas. Section 6 of this HMP update provides the specific results and conclusions reached from this effort for the planning area as a whole including notation of the available reference materials utilized in the analysis.

In 2011, Greenville County and the municipalities represented in this HMP received a significant quantity of new technical data that has been incorporated into the planning process. A Preliminary Flood Insurance Study (FIS) for Greenville County and Incorporated Areas was received in September 2011. FEMA also provided a Flood Risk Report that contained a Flood Risk Map as well as data regarding potential losses for various flood event scenarios in each jurisdiction.

The preliminary FIS incorporated four (4) major watershed studies completed by the County that were included in the 2010 HMP update as mitigation initiatives. Appendix H contains the index maps for the FIS, showing the available map

panels including those that were updated. The index maps also show the FIRM map repositories for each jurisdiction represented in this HMP update.

In 2013, Greenville County completed a Hazards and Vulnerabilities Assessment Project (HVAP) in an effort to gain a more in-depth assessment of the potential impact of hazard events within Greenville County. Both natural and man-made hazards were assessed. Appendix I contains the assessment report that includes recommendations to improve the County response to identified hazards.

Other sources of technical data utilized by the DMC in the planning process include but are not limited to:

| | |
|-----------------------------------|--------------------------------|
| National Weather Service | Storm events, rain totals |
| GC Engineering Department | Drainage projects |
| GC Planning/GIS Departments | Land use, property information |
| USDA NRCS | Stream restoration activities |
| GC Office of Emergency Management | Risk assessment |

New technical information is presented to the DMC during the annual meetings and included in the HMP Update as appropriate subsequent to committee review.

4.4 Vulnerability Assessment

Vulnerability to disasters is determined by estimating the relative risk of different hazards followed by an assessment of the types of physical or operational impacts potentially resulting from a hazard event. Two methods are available to the DMC to assess the communities' vulnerabilities to future disasters.

The first is a methodical, qualitative examination of the vulnerabilities of important facilities, systems and planning areas to the impacts of future disasters. For the participating organizations, this is done by the individuals most familiar with the facility, system or planning area through a guided, objective assessment process. The process ranks both the hazards to which the facility, system or planning area is most vulnerable, as well as the consequences to the community should it be disrupted or damaged by a disaster. This process typically results in identification of specific vulnerabilities that can be addressed by specific mitigation initiatives that could be proposed and incorporated into the HMP. As an associated process, the DMC also reviews past experiences with disasters to see if those events highlight the need for specific mitigation initiatives based on the type or location of damage they caused. Again, these experiences can result in the formulation and characterization of specific mitigation initiatives for incorporation into the HMP.

The second method involves comparison of the existing policy, program and regulatory framework to control growth, development and facility operations in a

manner that minimizes vulnerability to future disasters. The DMC members can assess the existing codes, plans, and programs to compare County provisions and requirements against the hazards posing the greatest risk to the community. If indicated, the County can then propose development of additional codes, plans or policies as mitigation initiatives for incorporation into the HMP for future implementation when it is appropriate to do so.

With regard to critical facilities, vulnerability has been determined based upon past experience with disasters and a review of existing resources to deal with those types of disasters. The HVAP report (Appendix I) provides additional analysis of critical facility vulnerabilities.

4.5 Developing Hazard Mitigation Initiatives

The DMC participants highlighted the most significant vulnerabilities to assist in prioritizing specific hazard mitigation initiatives designed to eliminate or minimize those vulnerabilities. The procedure used in HMP development involved describing the initiative, relating it to one of the goals and objectives established by the DMC, and justifying its implementation on the basis of its economic benefits and/or protection of public health and safety, as well as valuable or irreplaceable environmental or cultural resources. Each proposed mitigation initiative was also “prioritized” for implementation.

In characterizing a mitigation initiative for incorporation into the HMP, it is important to recognize that the level of analysis has been intentionally designed to be appropriate for this stage in the planning process. The DMC is interested in having a satisfactory level of confidence that a proposed mitigation initiative, when it is implemented, will be cost effective, feasible to implement, acceptable to the community, and technically effective in its purpose.

To do this, the technical analyses were based on a straightforward, streamlined approach, relying largely on the informed judgment of experienced local officials. The analyses have not been specifically designed to meet the known or anticipated requirements of any specific state or federal funding agency, due largely to the fact that such requirements can vary with the agency and type of proposal. If the organization proposing the initiative is applying for funding from any state or federal agency, or from any other public or private funding source, that organization will address the specific informational or analytical requirements of the funding agency.

Once a proposed mitigation initiative has been developed, the information used to characterize the initiative is submitted to the DMC for review. At this point, an initiative is considered to be a “pending initiative” that is being processed for incorporation into the plan, when it then becomes an “approved initiative.”

During initial 2005 HMP development, upon receipt of a pending initiative, the Initiative Ranking Committee evaluated the merits of the proposal as well as the validity of the judgments and assumptions that went into its characterization. The Initiative Ranking Committee also considered issues including: assuring that the proposal is consistent with the goals and objectives established for the planning period; confirming that it would not duplicate or harm a previously submitted proposal; and, considering its potential for conflict with other programs or interests

Beginning with the 2010 Plan Cycle, initiatives are considered directly by the entire DMC during the annual meeting. The DMC may vote to incorporate the proposed initiative into the HMP or may return it to the submitting organization for revision or reconsideration. Upon approval by the DMC, the proposed initiative is then considered to be officially part of the HMP.

4.6 Mitigation Initiative Implementation

Once incorporated into the HMP, the agency or organization assigned the initiative becomes responsible for its implementation. This could mean developing a budget for the effort, or making application to state and federal agencies for financial support for implementation. This approach holds each department accountable for proper and timely implementation of the mitigation initiatives. The DMC is responsible for overall coordination of these efforts. The current implementation status of mitigation initiatives is discussed in Section 5 and Section 8.

In the plan implementation process, the DMC continues to monitor the implementation status of initiatives, to assign priorities for implementation and to take other such actions to support and coordinate implementation of initiatives by the involved organizations. Other actions include maintaining, refining and expanding the technical analyses that supports the planning effort.

Mitigation initiative implementation is based on the following important concepts:

- A multi-organizational and multi-jurisdictional planning group establishes specific goals and objectives to address the community's vulnerabilities to all types of hazards.
- The planning procedure utilizes a logical process of hazard identification, risk evaluation and vulnerability assessment, as well as review of past disaster events, that is consistently applied by all participants through the use of common evaluation criteria.
- Mitigation initiatives are proposed for incorporation into the plan.

- The process encourages participants to propose specific mitigation initiatives that are feasible to implement and clearly directed at reducing specific vulnerabilities to future disasters.
- Proposed mitigation initiatives are characterized in a substantive manner, suitable for this level of planning, to assure their cost effectiveness and technical merit.
- Mitigation initiatives to be incorporated into the plan are prioritized in accordance with objective, comprehensive criteria that are used by all participating departments.
- The plan is periodically reviewed and adopted to ensure that the mitigation actions taken by their organizations are consistent with each community's larger vision and goals, as well as their overall unique needs and circumstances.

Based upon comments from DMC members, meetings held during the 2010 HMP plan cycle have incorporated the following suggestions to facilitate the overall planning process. These ideas include:

- Perform kick-off meetings with municipalities early in the 2015 HMP update process
- Bring maps to planning meetings
- Consider future land use in the update process
- Review mitigation initiatives status as presented to Council in the annual Mitigation Initiatives Progress Reports (Appendix E)
- Use a portion of the meeting to highlight successful implementation of mitigation initiatives

4.7 Formal Adoption of HMP Update

On January 5, 2010, the 2010 HMP update was formally adopted by Greenville County Council through Resolution No. 1365. Upon FEMA approval of this 2015 HMP update, Greenville County will formally adopt the plan in a public meeting. The resolution for that adoption will follow the same format as Resolution No. 1365 and will be placed in Appendix B.

Following adoption or approval of the plan the respective agencies and organizations will continue to implement the plan; to expand its scope as necessary; to continue its analyses; and, to take other such continuing action to maintain the planning process. This includes action by the DMC to incorporate

proposed mitigation initiatives into the plan without continuously soliciting the formal approval of the plan by the County Council. The Greenville County mitigation planning process prioritizes proposed mitigation initiatives using an objective, fixed set of criteria, but has the flexibility to adjust the implementation schedule of the initiatives to respond to unique or unanticipated conditions. For example, additional rain and stream gages may be required immediately in a given study area to support the County NPDES permit or a future watershed study.

Greenville County

Multi-jurisdictional Hazard Mitigation Plan Update

Section Five

HAZARD MITIGATION PLAN IMPLEMENTATION

This section addresses general aspects of implementing the HMP, including an overview of completed mitigation objectives. Additional objectives proposed during the 2010 – 2015 plan cycle are not presented here; however, all current and proposed mitigation objectives are described in detail in Section 8. Additional information regarding public involvement in plan maintenance has been added to this section.

Implementation of mitigation initiatives specific to municipal jurisdictions covered by this HMP Update is addressed in Appendices J through M. The plans in these Appendices also contain documentation regarding formal adoption of this HMP Update by these jurisdictions.

5.1 Introduction

This section discusses implementation of the 2015 HMP update. There are several aspects of plan implementation that need to be addressed:

- The status of promulgation or formal adoption of the plan by the County Council,
- Mitigation initiatives that have been implemented and completed since the 2010 HMP update,
- The DMC's priorities for implementation of approved initiatives,
- DMC activities to engage the public and the community at large in the mitigation planning process,
- A discussion of how recent disaster experience has illustrated the need for and success of the Greenville County HMP.

5.2 Status of Plan Promulgation and Approval

Promulgation and approval of the plan is an important step in assuring its implementation. The 2005 HMP was approved through Greenville County Council Resolution No. 1118 on December 13, 2004. The 2010 HMP update was approved through Greenville County Resolution No. 1365 on January 5, 2010 (see Appendix B).

Upon FEMA approval of this 2015 HMP update, Greenville County will formally adopt the plan in a public meeting. The resolution for that adoption will follow the same format as Resolution No. 1365 and will be placed in Appendix B of this document.

In future planning efforts, the DMC will seek input from both the public and participating organizations. Further, approximately once every five years, the DMC will again seek the approval of the plan by the County Council. This interval will provide a sufficient period for the DMC to assess HMP effectiveness. Further, this time frame will coincide generally with the review of the County's Community Rating System program.

5.3 Completed Mitigation Initiatives

Many of the mitigation initiatives proposed in the 2005 HMP and the 2010 HMP update have been implemented and completed. The following pictures illustrate the Dwelling Elevation Program as one example of a successful mitigation initiative.



A completed project



Another project nearing completion



The elevation is now complete

The following table shows the mitigation initiatives proposed in the 2005 HMP and the 2010 HMP update that have been completed. The table indicates the plan cycle in which the initiative was completed. Note that some initiatives are ongoing but completed projects within those initiatives are mentioned in this table. Section 7 contains a description of all ongoing and proposed initiatives.

**Table 5-1
Completed Mitigation Initiatives**

| Initiative | Description | HMP Cycle |
|--|--|------------------|
| Revisions to Flood Damage Prevention Ordinance | Flood Damage Prevention Ordinance Revisions (Feb/May 2007). Provided clarification and enhancement of requirements regarding floodplain studies/ encroachments. | 2005 |
| Brushy Creek Watershed Study | The Brushy Creek Stormwater Master Plan was completed May 2007. The study produced floodplain maps for the watershed and a mitigation alternatives analysis that targeted three major subdivisions. Over 90 flood prone structures located in the 1% Special Flood Hazard Area of this watershed have been removed as a result of this study. | 2005 |
| Rocky Creek Watershed Study | In August 2005, the Rocky Creek Stormwater Master Plan was submitted to FEMA with a request for a Physical Map Revision (PMR). FEMA notified the County that the Plan would be processed as a PMR when funding became available. The final report for this study was completed in May 2007. Several bridges in this watershed have been upgraded. The modeling data from this study as well as all other completed studies was submitted to FEMA to support the new County-wide FIS. | 2005 |
| Upper Reedy River Watershed Study | The Upper Reedy Watershed Study was initiated in late 2007 and completed in November 2009. This study provided new floodplain maps for this watershed and an alternatives analysis with recommended flood mitigation measures for targeted areas. Over 25 homes located in the SFHA have been removed as a result of this study. Also, several bridges have been replaced with a resulting higher Level of Service (LOS) with regard to flooding. | 2005 |

| Initiative | Description | HMP Cycle |
|--|---|------------|
| Gilder Creek Watershed Study | The Gilder Creek Watershed Study was initiated in late 2007 and completed in April 2010. This study produced new floodplain maps for this watershed and an alternatives analysis that recommended flood mitigation measures for targeted areas. Several bridges in this watershed have been upgraded to a higher LOS and one home has been removed from the SFHA. | 2010 |
| Flood Pool Elevations | The County Floodplain Administrator's office maintains an elevation database for the nine (9) reservoirs included in the Rabon Creek, South Tyger and Huff Creek Watershed Districts. The impoundment easements for these areas were added to the County GIS in 2012. Future construction within these easements is regulated. | 2010 |
| Bridge / Culvert Replacement | The County replaced and upgraded 7 stream crossings during the 2005 HMP cycle and 21 crossings during the 2010 HMP cycle. These upgrades improved channel flow characteristics through the crossings, providing a higher level of service. | 2005/ 2010 |
| River Gage Installation | River gages have been installed at four locations on the Reedy River and one location each on Brushy Creek and Gilder Creek. One additional gage has been installed on the Mountain Creek Church Road bridge over Mountain Creek Tributary 1. The National Weather Service utilizes the gage data in forecasting and in issuing emergency alerts. | 2010 |
| Formal Agreements with Utility Providers | Greenville County has a Preferred Customer agreement with the electric utility provider to restore power to critical facilities first after a severe weather event. | 2010 |
| Enhance Hazard Updates | An informational page regarding Mandatory Purchase of Flood Insurance was added to all floodplain verifications performed for the public (2008). As part of our Community Rating System (CRS) program, the Codes Enforcement website was enhanced to include a floodplain management page with links to flood safety; FEMA; flood facts; elevation grant program; ordinance; permitting; and, frequently asked questions. Also, a floodplain management section targeting building contractors was linked to this site. | 2005/ 2010 |

| Initiative | Description | HMP Cycle |
|------------------------------------|--|------------|
| | As part of CRS, Repetitive Loss Areas surrounding repetitive loss structures were delineated. An address list for parcels contained in these areas was developed and is used annually to send relevant information on flooding issues. Also, a Repetitive Loss Area map was generated on GIS. | |
| Stream Crossing Debris Removal | NRCS spent \$1 million for stream bank stabilization and debris removal projects (2005). NRCS received \$250,000 in 2006 and \$750,000 in 2007 for stream bank stabilization and debris removal projects. | 2005 |
| Dwelling Elevation Program | <p>Year 2005</p> <ul style="list-style-type: none"> - 15 N Chastain Dr. (Completed/\$7,500 disbursed) - 7 N Chastain Dr. (Completed/\$7,500 disbursed) - 2 Plano Dr. (Completed/ICC funds) - 12 N Chastain Dr. (Completed/ICC funds) - 6 N Chastain Dr. (Completed/ICC funds) <p>Year 2007</p> <ul style="list-style-type: none"> - 302 Hillbrook Rd. (Fire Damage – Elev. Completed/\$7,500 disbursed) | 2005 |
| Develop Inter-local Agreements | <p>This initiative addresses agreements between municipalities and the National Weather Service (NWS) to share information on development or changes that may affect a downstream community. Currently, a statewide mutual aid agreement is in place.</p> <p>The County notifies the NWS of homes that are removed from the floodplain under our acquisition program. The County and NWS have Memorandums of Understanding for sharing data from County rain/stream gages. Also, an MOU is in place for the Mountain Creek Church Road stream gage where the gage equipment was supplied by the NWS.</p> | 2010 |
| 425 Projects / Structural Projects | <p>Numerous projects have been completed to improve localized drainage and stream flow. The following summarizes these drainage projects and structure acquisitions.</p> <p>2005 – 3 drainage projects; 2 designs for improvements</p> <p>2007 – 5 crossing/channel improvements; 1 det. pond</p> | 2005/ 2010 |

| Initiative | Description | HMP Cycle |
|------------|--|-----------|
| | 2010 - 4 drainage and culvert improvements 2011 – 6 drainage and culvert improvements 2012 – 8 drainage and culvert improvements | |

5.4 Priority for Initiative Implementation

The DMC periodically reviews the proposed mitigation initiatives to determine their priority for implementation. This assessment encourages the committee to focus on those initiatives designated as priority. However, each participating organization has independent authority and responsibility for implementation of their proposed mitigation initiatives. Therefore, there may be instances where an organization implements a mitigation initiative that best serves their immediate need, especially where funding becomes available for implementation. Availability of resources is a major determining factor in mitigation implementation.

5.5 Public Information and Participation

The DMC, as well as individual participating agencies and organizations, has been active in attempting to engage the general public in the planning process. As detailed below, several public information activities have been undertaken to explain the mitigation planning process to the community and to solicit their input and involvement in the planning process, as well as to provide mitigation awareness and educational information. Greenville County will continue public involvement in the planning process during the 2015 HMP cycle.

The primary methods used to foster public involvement in the planning process are:

- Outreach meetings with the public and affected groups.

Appendix C contains a compilation of outreach meetings conducted by Greenville County from the period 2007 – 2014. These meetings cover a variety of topics that include or relate to hazard mitigation. Relevant HMP information and comments received from the public at these meetings will be brought to the attention of the DMC for consideration at the annual meeting.

- HMP annual report to Council

Annually, a progress report is submitted to the County Council; County Administration; State Flood Mitigation Officer; and, to the media through the County Government Affairs Coordinator. This report contains a review of HMP mitigation initiatives and notes progress made on each. The mitigation initiatives are posted on the County website and the public is invited to comment on the report and make suggestions for new mitigation initiatives.

- Information releases to the media.

The County Government Affairs Coordinator (GAC) assists in issuing media releases related to hazard mitigation planning. Annually, the Hazard Mitigation Plan Initiatives Progress Report is submitted to the GAC for release. Other examples of media contact include notification of new watershed studies and notice of public meeting for the 2011 Preliminary Flood Insurance Study where the public had the opportunity to review the new study and provide comments during the appeal period.

The following is one example of outreach conducted with regard to two of the mitigation initiatives: Upper Reedy River and Gilder Creek Watershed Studies.

- Three meetings were conducted with the public to discuss hazards mitigation planning with regard to flooding. These meetings were held to obtain different perspectives on potential hazards; study needs; alternatives analysis and data gathering.
 1. Pre-study meetings were held in the Gilder Creek watershed and the Reedy River watershed. These meetings solicited documentation of previous flood events from the residents. The pictures and comments were used to prepare detailed hydraulic & hydrologic models and alternative analyses to address flooding issues.
 2. Follow-up meetings were conducted in both watersheds to show results of the flood studies; and, to discuss the idea of retrofits and other initiatives that may reduce the amount of flooding.

The public will be involved in the 2015 HMP update planning process with two (2) public meetings. One public meeting will be held prior to plan approval and adoption. The second meeting will be held at the time of plan adoption. Documentation for the required public meetings will be placed in Appendix C.

The public is notified through the County website that the HMP is available for review in the Codes Enforcement Office throughout the year. Any feedback received from Council or the public is transmitted to the DMC during the annual fall meeting. The DMC will consider all public feedback for inclusion in the plan update and planning process. A compilation of the progress reports for the 2010 HMP cycle is contained in Appendix E.

5.6 Effectiveness of Mitigation Initiatives

Of course, the true measure of progress in the implementation of mitigation initiatives is success in saving lives, avoiding property damage and protecting valuable or irreplaceable resources in the community. As the mitigation initiatives are implemented, there will be more opportunities to measure the “success” of the Disaster Mitigation Committee’s mitigation efforts.

The best measurement of success is evaluation of the community’s experience with actual disasters in terms of lives saved or property damage avoided. In addition, recent disaster events can be very helpful in highlighting the mitigation needs of the community based on the type, location or magnitude of the impacts experienced. In turn, this can be a major factor in the future progress of implementation of the plan. Such recommendations can be referred to a “lead” agency with the intention that the organization will use the information to propose additional mitigation initiatives for incorporation into the plan.

Greenville County has targeted flood damage prevention as a major goal and, subsequently, many of the initiatives contained in the HMP address this effort. The effectiveness of these initiatives is direct and measurable. For example, 124 homes, including repetitive loss properties, have been removed from the 1% Special Flood Hazard Area (SFHA). Additional homes have been elevated above the Base Flood Elevation and vented in accordance with NFIP requirements. Further, four (4) major watershed studies and a Preliminary FIS have been conducted, resulting in more comprehensive flood map coverage and more detailed mapping. Since 2007, this enhanced mapping has been used in permitting new construction and in controlling encroachment into the 1% SFHA. These efforts have resulted in hundreds of homes being either completely removed from the flood hazard or located such that adverse impact from flooding is minimal.

Greenville County

Multi-jurisdictional Hazard Mitigation Plan Update

Section Six

HAZARDS AND VULNERABILITIES

This section presents an assessment of natural hazards the County is subject to and our vulnerability to those hazards. For clarification, identified hazard events have been associated with the plan cycle in which they occur. A table of hazard events occurring during the 2010 HMP cycle has been added to Appendix D. Additional information on hazards and vulnerabilities is contained in the recently completed Hazards and Vulnerability Assessment Project (HVAP) Report contained in Appendix I. Structural valuation information has been updated in Table 6-5.

The following hazards evaluated in this section apply equally among all jurisdictions: Winter Storms, Tornadoes/High Winds, Severe storms/Thunderstorms, Drought, Wildfires and Earthquakes. There may be some variation in the impact from Floods and Dam Failures across jurisdictions. Vulnerability to these hazards is addressed by each jurisdiction as applicable.

6.1 Introduction

This section of the HMP update summarizes the hazard identification and vulnerability assessment processes used in preparing this plan. The intent of this section is to provide a compilation of the information gathered and the judgments made about the hazards threatening Greenville County as a whole, and the potential vulnerability to those hazards. This information is then used for formulating mitigation actions and priorities.

The following hazards evaluated in this section apply equally among all jurisdictions: Winter Storms, Tornadoes/High Winds, Severe storms/Thunderstorms, Drought, Wildfires and Earthquakes. There may be some variation in the impact from Floods and Dam Failures across jurisdictions. Vulnerability to these hazards is addressed by each jurisdiction as applicable.

In the following sections, the natural hazards that can pose a threat to Greenville County are discussed. Included is an evaluation of past events for some of these hazards that occurred during the last two plan cycles. This is followed by an estimation of the risk caused by each of these hazards. The evaluation of the risk is followed by a section on vulnerability assessment. Due to "Right to

Privacy” restraints, detailed information on repetitive loss properties is not included in the HMP. Information on land uses and critical facilities is included.

Assessment of hazards is based upon available information that includes a review of historical events. Available information on the extent of damages in terms of areas affected and costs is limited. All relevant natural hazards have been identified and appropriately assessed in order to prepare Greenville County for future events.

No new natural hazards were identified during the 2010 HMP cycle. Therefore, new information in this HMP Update consists of hazard events that substantiate previously identified hazards.

Greenville County acknowledges that climate change can have an impact on hazards affecting the County. Over time, the County may experience more intense rainfall events and droughts of longer duration. However, it is not anticipated that climate change will have a significant impact during this planning cycle. Issues regarding climate change will be considered again in the next planning cycle.

6.2 Hazard Identification

The following information regarding natural hazards that can affect Greenville County is based on various sources. Some of the most beneficial of these sources are listed in the following table. Additionally, interviews with Greenville County employees and residents have provided valuable information on historical events.

**Table 6-1
Natural Hazards Information Sources**

| Item # | Source Title | Applicable Hazard(s) |
|---------------|--|-----------------------------|
| 1 | SC State Hazard Mitigation Plan | All hazards |
| 2 | SC State Flood Mitigation Plan | Floods |
| 3 | Greenville County Emergency Operation Plan | All hazards |
| 4 | USC SHELDUS Data | All hazards |
| 5 | Greenville County Flooding Problem Areas | Floods |
| 6 | Greenville County Flood Insurance Studies | Floods |
| 7 | Greenville County Flood Control Ordinance | Floods |
| 8 | USGS Earthquake Hazards Program | Earthquake |
| 9 | USGS National Landslide hazards Program | Landslides |

| Item # | Source Title | Applicable Hazard(s) |
|--------|------------------------------------|----------------------|
| 10 | USC Hazards Research Laboratory | All hazards |
| 11 | 2000 US Census Data | All hazards |
| 12 | FEMA's HAZUS Software | All hazards |
| 13 | Greenville County GIS information | All hazards |
| 14 | SC State Climatology Data | All hazards |
| 15 | State Tornado Data | Tornadoes/High Winds |
| 16 | Local/State Newspapers | All hazards |
| 17 | Greenville County FIRMs | Floods |
| 18 | NCDC Storm Events – South Carolina | All hazards |

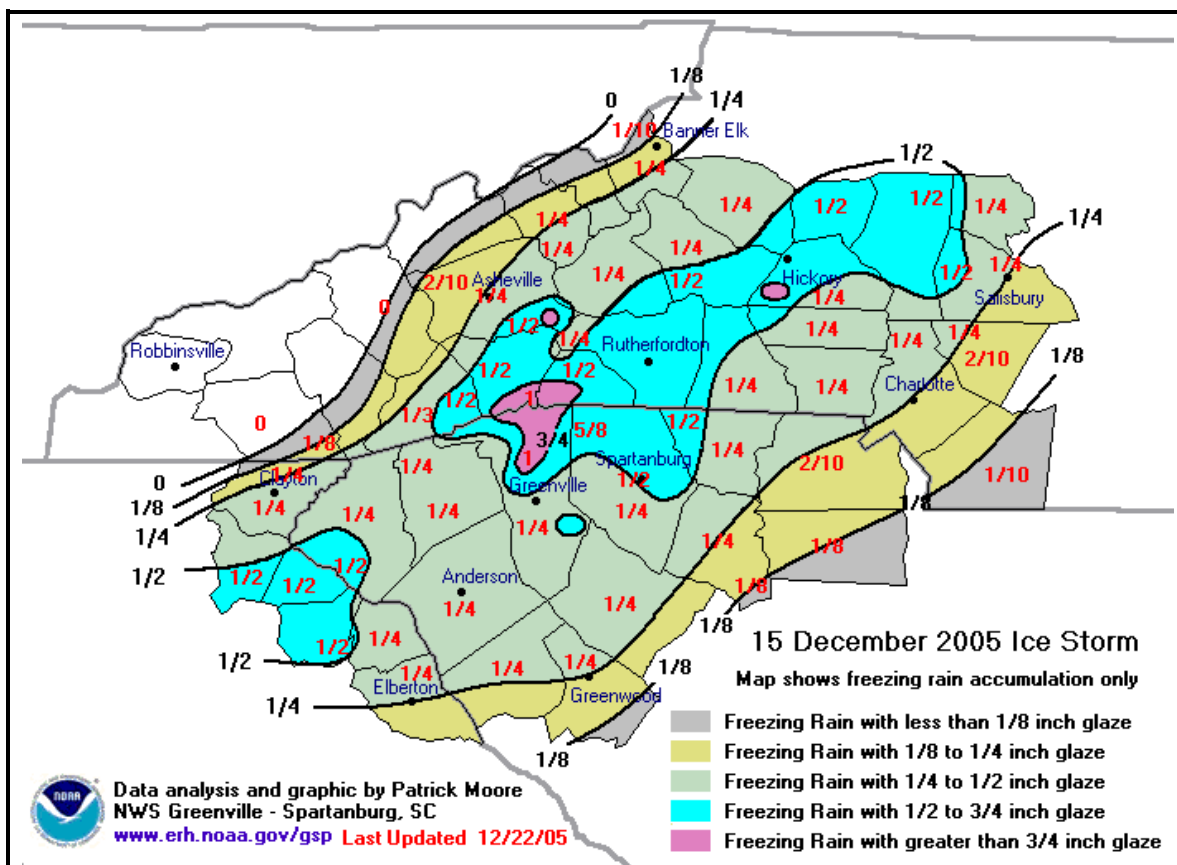
Winter Storms: This type of hazard is commonly associated with precipitation in the form of ice or sleet and cold temperatures that cause major disruptions to many types of services and are dangerous to those without heat and/or water. Roads covered in ice or blocked by fallen trees prevent emergency services from reaching those in need. Overhead lines are commonly torn down by the fallen trees or weight of the ice on the lines, leaving homes and businesses without electricity and heat. In addition, water lines freeze and break from the cold temperatures and accumulated ice/snow on building roofs can cause structural failure. Direct and indirect costs associated with this hazard can be large and are often mitigated with federal and/or state funds. The SHELDS database (Appendix D) lists recorded winter storms since 1960.

Occurrences During the 2005 HMP Cycle: Winter storms are a common threat to all portions of Greenville County. Over the last decade there have been a number of winter storm events which have severely impacted the Greenville County area. On April 8, 2007, a hard freeze dropped temperatures across the western Carolina's to the lower 20's. This resulted in an estimated \$1,000,000 crop loss across the Upper Region of the state. On December 15, 2005, a damaging ice storm spread across the northwestern portion of the state. Ice as thick as three quarters of an inch accumulated on trees and power lines, causing a vast amount of damage and power outages. The estimated amount of property damage peaked at \$900,000.

Occurrences During the 2010 HMP Cycle: Appendix D contains a summary of significant Natural Hazard Events recorded by Greenville County that occurred during the 2010 HMP cycle. A major snow and ice storm occurred in January 2011 causing hazardous driving conditions and power outages for several days. The Greenville-Spartanburg Airport was closed temporarily and schools were closed for most of the week.

Hazard Extent

The following graphic shows the accumulation of freezing rain during the major January 2011 winter storm event. The graphic indicates a freezing rain accumulation ranging from 1/4" to over 3/4" glaze. Freezing rain accumulation at these levels is sufficient to cause the types of problems discussed above.



The following table describes the heaviest snowfalls recorded by the National Weather Service for the Greenville-Spartanburg area since 1892. The highest snowfall in a single day was 15 inches and occurred in February 1902.

| THE 10 HEAVIEST SNOWFALLS GREENVILLE-SPARTANBURG AREA 1892 – PRESENT | | | | |
|--|--------|--------|--------|------|
| | AMOUNT | DATE | | YEAR |
| 1 | 15.0 | 15-Feb | | 1902 |
| 2 | 14.4 | 16-Dec | 17-Dec | 1930 |
| 3 | 12.0 | 7-Jan | | 1988 |
| 4 | 11.4 | 3-Dec | | 1971 |
| 5 | 11.0 | 29-Dec | | 1935 |
| 6 | 10.5 | 2-Dec | | 1896 |
| 7 | 10.2 | 22-Jan | | 1987 |
| 8 | 9.8 | 12-Mar | 13-Mar | 1993 |
| 9 | 9.7 | 1-Mar | 2-Mar | 1927 |

| | | | |
|----|-----|--------|------|
| 10 | 9.3 | 24-Mar | 1983 |
|----|-----|--------|------|

Floods: This hazard is associated with large infrequent rainfall events or weak hurricanes or tropical storms that have moved inland. Flooding problem areas are commonly found in densely populated areas that have inadequate drainage systems or buildings located in flood prone areas. Flooding can also be associated with steeply sloped mountainous regions in the form of flash floods. These hazards are extremely dangerous due to the velocity of the moving water and debris. Greenville County has both of these situations: the northern portions are susceptible to flash flooding and the central urbanized core is dotted with problem areas due to buildings located in the floodplain. The lower sections of Greenville County also have flood prone areas as a result of the large volumes of runoff that have accumulated throughout the County. This hazard can therefore affect the entire County.

The following table provides monthly precipitation normals for Greenville County over a 30 year period as recorded at the Greenville-Spartanburg Airport. This data shows average and extreme precipitation levels for the period.

NCDC 1971-2000 Monthly Precipitation Normals - GSP Airport

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Annual |
|-----------------------------------|------|------|-------|-------|------|-------|-------|-------|-------|------|------|------|--------|
| Mean Precipitation (in.) | 4.41 | 4.24 | 5.31 | 3.54 | 4.59 | 3.92 | 4.65 | 4.08 | 3.97 | 3.88 | 3.79 | 3.86 | 50.24 |
| Highest Precipitation (in.) | 7.19 | 7.43 | 11.37 | 10.15 | 8.89 | 10.12 | 13.57 | 17.37 | 11.65 | 9.51 | 7.85 | 8.45 | 17.37 |
| Year Highest Occurred | 1993 | 1971 | 1980 | 1979 | 1972 | 1994 | 1984 | 1995 | 1975 | 1971 | 1992 | 1983 | 1995 |
| Lowest Precipitation (in.) | 0.29 | 0.53 | 1.13 | 0.69 | 1.31 | 0.17 | 0.75 | 0.79 | 0.27 | 0.00 | 1.34 | 0.64 | 0.00 |
| Year Lowest Occurred | 1981 | 1978 | 1985 | 1976 | 1987 | 1993 | 1993 | 1999 | 1978 | 2000 | 1973 | 1980 | 2000 |

As indicated in Appendix D, the SHELATUS database records a total of 64 flooding events over the reporting cycle (1960 – Present) with two of those

occurring during the 2005 HMP cycle. Floods occurred in 29 of the years within the reporting period through 2009.

Occurrences During the 2005 HMP Cycle: On July 7, 2005, Tropical Storm Cindy resulted in significant rainfall, which caused countywide flooding. The flooding first developed along the Reedy River and Brushy Creek in the downtown Greenville area. Simultaneously, Greer experienced urban flooding so severe that residents from an apartment complex had to be rescued after Maple Creek overtopped into their parking lot. Maple Creek also flooded several mobile homes and left other homes flooded with as much as six (6) feet of water. Residents in Mauldin also needed assistance leaving their homes. Gilder Creek flooded Holland Rd. in Simpsonville before noon. Over 25 roads were closed due to flooding and 6 were damaged. The County estimated property damages around \$300,000.

Just prior to the 2005 HMP cycle, on September 27, 2004, flooding developed quickly across the county. Several automobiles were stranded in water in the southeastern portion of the County. Gilder Creek flooded from Mauldin down to the Enoree River. Waters exceeded the top of a bridge at E. Georgia Rd. Property damage was estimated at \$20,000.

The Reedy exceeded normal levels from Berea to downtown Greenville. That day alone, \$23,000 in property damage was reported. After flooding due to the heavy rainfall on the 7th abated, the Saluda River crested a second time on the morning of September 9, 2004. Heavy rainfall fell upstream and worked its way through the system, causing over \$100,000 in damage.

Occurrences During the 2010 HMP Cycle (See Appendix D): Minor flooding events were recorded in June 2010, March 2011 and July 2012. Roads experiencing localized flooding during these events included Poinsett Hwy., Rutherford Rd., White Horse Rd., Hammett Bridge Rd., Bridwell Rd., Enoree Rd., Stockton Rd. and Brushy Creek Rd. No homes were flooded but one road was closed temporarily.

On June 5, 2013, heavy rains swept across Greenville County causing some road and yard flooding. The Rocky Creek, Brushy Creek and Gilder Creek watersheds received a large amount of rain causing flooding on Suber Rd, Garlington Rd, Camelot Drive and Neely Ferry Rd. A bridge failure occurred at Neely Ferry Rd. Some rain gages in the County recorded 3.75 inches of rain and numerous complaints were received regarding stormwater drain overflow into homes and yards. The City of Mauldin had several substantially damaged structures due to flooding and a mobile home park was heavily damaged.

Hazard Extent

Based on the FEMA Flood Insurance Rate Maps, Greenville County has four primary flood zone designations: Zones A, AE, X and Shaded X. These flood zones vary according to levels of flood risk. Zone X is a moderate to low risk flood zone. However, it is worthwhile to note that many flood related complaints received after a significant rain event are related to overflowing storm drains and culverts in Zone X areas, not rising streams. Zone X may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain.

Zone AE areas have a 1% annual average chance of flooding and a 26% chance of flooding over the life of a typical 30-year mortgage. Shaded X zones indicate areas with a 0.2% chance of flooding in any given year. The preliminary County-wide flood insurance study provides a comprehensive analysis of flood zones and provides flood elevation data on many previously unstudied areas. The FEMA – Greenville County Flood Risk Map (FRM) associated with that study identifies flood risk within the County (see Appendix G). Appendix H contains the preliminary FIS map index showing the Flood Insurance Rate Map panels that were printed and are available for review.

The three (3) major river systems impacting the County are the Saluda River, the Reedy River, and the Enoree River systems. Flooding extents associated with these river systems is approximately 49 square miles or 6.2% of the total county area. Further, approximately 15 square miles of special flood hazard area extend into urbanized areas as defined by the U.S. Census Bureau.

In general, flooding depth is highly dependent on the flooding source and the proximity to the source. Obviously, flooding at the fringes of the floodplain are less deep than they are closer to the river or stream. Also, the northern portions of the County have relatively steep sloping floodplains, but as you move to the south the floodplains tend to become less steep. Steeper floodplains create a narrower and deeper flood while flatter floodplains are wider and less deep. All three major river systems extend from the northern portions of the County through the urbanized center to the more rural southern portions.

Structural flooding has occurred during recent flood events with depth of flooding ranging to approximately seven (7) feet at one residence. At this depth, road crossings overtop, emergency services become limited, and structural damage can be wide spread. Watersheds experiencing flooding depths approaching those contained in the Greenville County Flood Insurance Study include; Gilder Creek, Rocky Creek, and the Upper Reedy River watersheds.

Tornadoes/High Winds: The high winds associated with tornadoes/high winds or microbursts can cause major disruptions, similar to the effects of winter storms; blocked roads, downed trees and damaged electricity lines. Tornadoes/high winds are commonly formed as part of larger thunderstorm systems or spin offs from hurricanes. People living in mobile or manufactured

housing represent a particular vulnerability. Greenville County, as a whole, is affected by tornadoes/high winds. Weak tornadoes/high winds have occurred infrequently, but the potential always exists for a strong system to form. Generally, the impact of these events is expected to be much smaller in comparison to other hazards such as winter storms due to the concentrated nature of tornadoes/high winds and limited area of disruption. In addition, tornadoes/high winds often occur in milder periods of the year when the potential for extreme temperatures is low. The spring months have historically been the most active season for tornadoes/high winds and most of the damages and lives lost due to tornadoes have occurred during this time.

Several tornadoes have occurred in Greenville County, most of which are weak systems that do not cover a large area and last a couple of hours at most. According to the SHELDUS database (Appendix D) there have been 17 recorded tornadoes in Greenville County since 1960. The most destructive event in terms of injuries occurred in May 1973 while the most property damage occurred in March 1979. Typically, high winds have ripped roofs and shingles; blown down trees onto buildings and cars; and, created projectiles that have caused personal injury as well as extensive property damage. Structures permitted by the County meet the International Building Code requirements for wind load design.

Occurrences During the 2005 HMP Cycle: The SHELDUS database indicates 12 wind events and one (1) tornado event during the 2005 HMP cycle. In August 2008 an EF1 tornado caused an estimated \$50,000 in property damage.

The wind events during this period produced a total estimated \$600,000 in property damage. On April 16, 2007, a brief yet intense high wind event took place in the Upstate with winds reaching 60 mph. Hundreds of trees fell on power lines resulting in a widespread power outage. Trees also fell on cars and homes, and even claimed the life of one (1) Walhalla resident (Oconee County). Total damages for this event reached \$500,000, including damages assessed by Greenville County. A very similar, but not so aggressive event took place in April 2005 when estimated damages totaled \$30,000.

Occurrences During the 2010 HMP Cycle (see Appendix D): Several high wind events occurred in 2011 and 2012. A major wind event occurred in June 2011 with peak winds in excess of 60 mph. Numerous structures were affected and the Codes Dept. dispatched survey teams to record damage. The County WebEOC was activated during the event. There was one injury caused by a falling tree and power was disrupted. The SHELDUS recorded wind event in April 2012 produced an estimated \$20,000 in property damage.

Hazard Extent

The Fujita Scale (F-Scale) is the standard measurement for rating the strength of a tornado. The National Weather Service (NWS) bases this scale on an analysis

of damage after a tornado to infer wind speeds. On February 1, 2007, the NWS transitioned from the F-Scale to the Enhanced Fujita Scale (EF-Scale). The EF-Scale is considerably more complex and enables surveyors to assess tornado severity with greater precision. The following table indicates the wind speeds associated with each scale.

| FUJITA SCALE | | | OPERATIONAL EF-SCALE | |
|--------------|------------------------|---------------------|----------------------|---------------------|
| F Number | Fastest 1/4-mile (mph) | 3 Second Gust (mph) | EF Number | 3 Second Gust (mph) |
| 0 | 40-72 | 45-78 | 0 | 65-85 |
| 1 | 73-112 | 79-117 | 1 | 86-110 |
| 2 | 113-157 | 118-161 | 2 | 111-135 |
| 3 | 158-207 | 162-209 | 3 | 136-165 |
| 4 | 208-260 | 210-261 | 4 | 166-200 |
| 5 | 261-318 | 262-317 | 5 | Over 200 |

The following table presents Greenville County historical tornado data taken from the Tornado Project website (1950 - 2012) that utilizes archived data from the NOAA Storm Prediction Center. Based upon this data, an F3 tornado is the maximum intensity anticipated event with an F0 or F1 tornado being the most likely event.

| Historical Tornado Intensity in Greenville County | |
|---|-----------------------|
| Event Date | Fujita Scale F Number |
| May 1952 | F3 |
| September 1959 | F0 |
| June 1964 | F1 |

| | |
|---------------|----|
| December 1964 | F0 |
| May 1967 | F2 |
| July 1967 | F0 |
| August 1969 | F0 |
| May 1973 | F1 |
| March 1975 | F1 |
| March 1979 | F2 |

Severe Storms/Thunderstorms: This hazard forms at the convergence of cold and warm, moist air masses, producing strong winds, hail, lightning, intense rainfall, and tornadoes. These systems are commonly concentrated over a few square miles and have durations of several hours. Most occur in warmer months, but in the milder climates of the southeast, can form any time of the year. Damages from thunderstorms are usually the result of high winds and localized flooding but may also include lightning or hail damage.

Greenville County is similar to most portions of the State and region when considering the threat potential of thunderstorms. The more common variety of thunderstorms begin late in the afternoon after ground surfaces have sufficiently warmed from intense summer heat and end normally within an hour or two. These hazards can occur at any location within the County. Most of the rain events in Greenville County occur as thunderstorms, which are characteristically high intensity but smaller rain total events.

Occurrences During the 2005 HMP Cycle: The SHELATUS database reports eight (8) thunderstorm events during the 2005 Plan cycle, resulting in an estimated \$550,000 property damage total. On July 21, 2008, a microburst caused roof damage to a building on the campus of North Greenville College. The portion of the roof that was removed was tossed onto the roof of another building, adding to the damages. Widespread severe storms affected most of the Upstate accounting for over \$500,000 in damages.

Occurrences During the 2010 HMP cycle (see Appendix D): Numerous severe storm events occurred over the 2010 plan cycle as indicated in Appendix D, *2010 Plan Cycle Hazard Events Damage Summary*. Damage occurred as a result of hail, high winds and rain associated with these storms. Particularly severe storms occurred in June 2010, June 2011 and June 2013.

Hazard Extent

The maximum impact of severe storms or thunderstorms is primarily determined by the impact of winds and flooding. These hazards have been identified and evaluated above. Power outage is a typical occurrence with severe thunderstorms due to trees falling on overhead lines. In the June 2010 storm

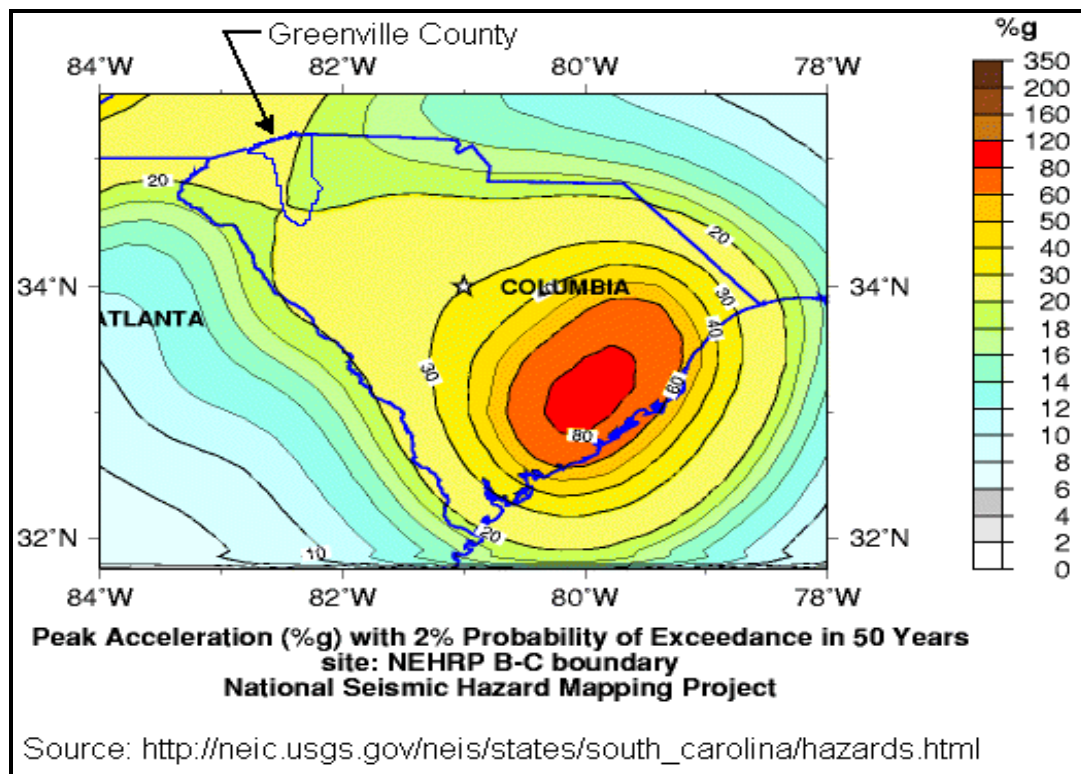
approximately 2,000 customers were without power while over 2,800 customers lost power in the June 2011 storm.

Earthquakes: This hazard involves the sudden quick movement of large pieces of earth, believed to be caused by the slipping of tectonic plates past one another, releasing energy to surface layers. This sudden motion can cause major destruction to buildings, roads, dams, and other structures. In addition, underground utility lines can be ruptured.

Greenville County is located approximately 60 miles southeast of an epicenter located near Asheville, North Carolina. An epicenter is the estimated origin of the seismic waves that eventually reach the ground surface.

Although earthquakes have occurred in South Carolina in the recent past, most are of a magnitude that they are not noticed by anyone other than a seismologist. Most of the earthquakes that have recently occurred were located near the Charleston/Summerville area to the south. Union County to the east has not experienced a significant earthquake in over 90 years. Due to the proximity of Greenville County to this designated epicenter, the County is considered to be at risk to this hazard. All areas of the County are equally susceptible to this hazard.

After review of data from the National Seismic Hazard Mapping Project, it was determined that the peak acceleration (ie., 20% - 30% g) for an event with a 2% probability of exceedance in 50 years poses a minor risk for the County. This potential impact is considered very small risk in magnitude and frequency as compared to other areas of the State and the United States. (Ref: Table pg. 6.6 of the Plan and International Building Codes, 2006 Edition, Table 1613.5(1) and 1613.59(2).)



Occurrences During the 2005 Plan Cycle: Although no significant earthquake has impacted Greenville County, on December 7, 2007, residents were awakened by a small tremble. An earthquake measuring 3.1 on the Richter scale was centered about six (6) miles north of Columbus, N.C. and shook a widespread area as far south as Simpsonville, SC. No damages were reported.

Occurrences During the 2010 Plan Cycle: No earthquake events were recorded during the 2010 plan cycle.

Hazard Extent

The terms magnitude and intensity are used to describe the overall severity of an earthquake. The severity of an earthquake depends on the amount of energy released at the epicenter, the distance from the epicenter, and the underlying soil type. All these factors affect how much the ground shakes, known as Peak Ground Acceleration (PGA) and what a building experiences, known as Spectral Acceleration (SA) during an earthquake. An earthquake's magnitude is a measurement of the total amount of energy and is expressed in terms of the Richter scale. Intensity measures the effects of an earthquake at a particular place and is expressed in terms of the Modified Mercalli scale. The following table shows the approximate comparison between Richter scale magnitude and Modified Mercalli Intensity (MMI).

| Magnitude and Intensity Comparison | |
|---|----------------------------|
| Richter Magnitude Scale | Typical Maximum MMI |
| | |
| 1.0 to 3.0 | I |
| 3.0 to 3.9 | II to III |
| 4.0 to 4.9 | IV to V |
| 5.0 to 5.9 | VI to VII |
| 6.0 to 6.9 | VII to IX |
| 7.0 and Higher | VIII and Higher |

MMI Damage/Perception

- I - Not felt except by a very few under especially favorable conditions
- II - Felt only by a few people at rest, especially on upper floors of buildings
- III - Felt quite noticeably by people indoors, especially on building upper floors
 - Many people do not recognize it as an earthquake
 - Standing motor cars may rock slightly
 - Vibrations similar to the passing of a truck
- IV - Felt indoors by many, outdoors by few during the day
 - At night, many awakened
 - Dishes, windows, doors, disturbed; walls make cracking sound
 - Sensation like heavy truck striking building
 - Standing motor cars rocked noticeably
- V - Felt by nearly everyone; many awakened
 - Some dishes, windows broken
 - Unstable objects overturned
 - Pendulum clocks may stop
- VI - Felt by all; many frightened
 - Some heavy furniture moved
 - Few instances of fallen plaster
 - Damage slight
- VII - Damage negligible in buildings of good design and construction
 - Slight to moderate damage in well-built ordinary structures
 - Considerable damage in poorly built or badly designed structures
 - Some chimneys broken
- VIII - Damage slight in specially designed structures

- Considerable damage in ordinary buildings with partial collapse
 - Damage great in poorly built structures
 - Fall of chimneys, factory stacks, columns, monuments, walls
 - Heavy furniture overturned
- IX
- Damage considerable in specially designed structures
 - Well-designed frame structures thrown out of plumb
 - Damage great in substantial buildings, with partial collapse
 - Buildings shifted off foundations
- X
- Some well-built wooden structures destroyed
 - Most masonry and frame structures destroyed with foundations
 - Rails bent
- XI
- Few, if any masonry or frame structures remain standing
 - Bridges destroyed
 - Rails bent greatly
- XII
- Total damage
 - Lines of sight and level are distorted
 - Objects thrown into the air

The *South Carolina Earthquake Guide* indicates that, in 1913, an earthquake occurred in the Upstate County of Union. Based upon the level of damage reported, the magnitude of the earthquake by today's standards would be 5.5 on the Richter scale. Union County is less than 50 miles southeast of Greenville County.

Wildfires: Wildfires can be an extremely hazardous event, especially on urban fringes that are in close proximity to wooded areas. Wildfires are commonly more frequent during drought periods, but can occur at any time during any given year. Wildfires can occur due to natural causes (e.g., lightning strikes) or they can be man-made fires. According to the State Mitigation Plan, during the most recent drought period in South Carolina, the state experienced over 4,100 wildfires accounting for a loss of about of 27,000 acres per year, a significant increase from other time periods.

“There are three classes of wild fires: surface fire, ground fire, and crown fire. A surface fire is the most common of these three classes moving slowly burns along a forest floor. A ground fire (muck fire) is usually started by lightning or human carelessness and burns on or below the forest floor. Crown fires spread rapidly by wind and move quickly by jumping along the tops of trees.” – “South Carolina Hazard Mitigation Plan, 2010”

With over 224,000 acres of forest (approximately 46% of total land area), all portions of Greenville County are susceptible to all three (3) classes of wildfire to

some degree. Economic impacts can be significant to the timber industry in the County as over \$4M is attributed to timber production. Due to the nature of the forest/urban interface, consideration must also be given to potential structural damage due to wildfire. Greenville County has an urbanized core that runs east to west in the center of the County and that is expanding to the north and south. Those northern and southern leading edges of development are especially susceptible to wildfire with the northern edge being the most susceptible due to a higher proportion of forested area in that region.

Appendix G contains a map showing the potential extent of wildfire impact within the County. The map indicates that these areas surround the developed municipalities represented in this HMP Update.

Occurrences During the 2005 Plan Cycle: On February 26, 2009 a fire spread across 351 acres of Jones Gap State Park. To date, a damage assessment has not been completed.

Occurrences During the 2010 Plan Cycle: No wildfires were recorded.

Hazard Extent

According to the 2005 SC Hazards Assessment (SCEMD) the wildfire hazard probability for Greenville County is “Low”.

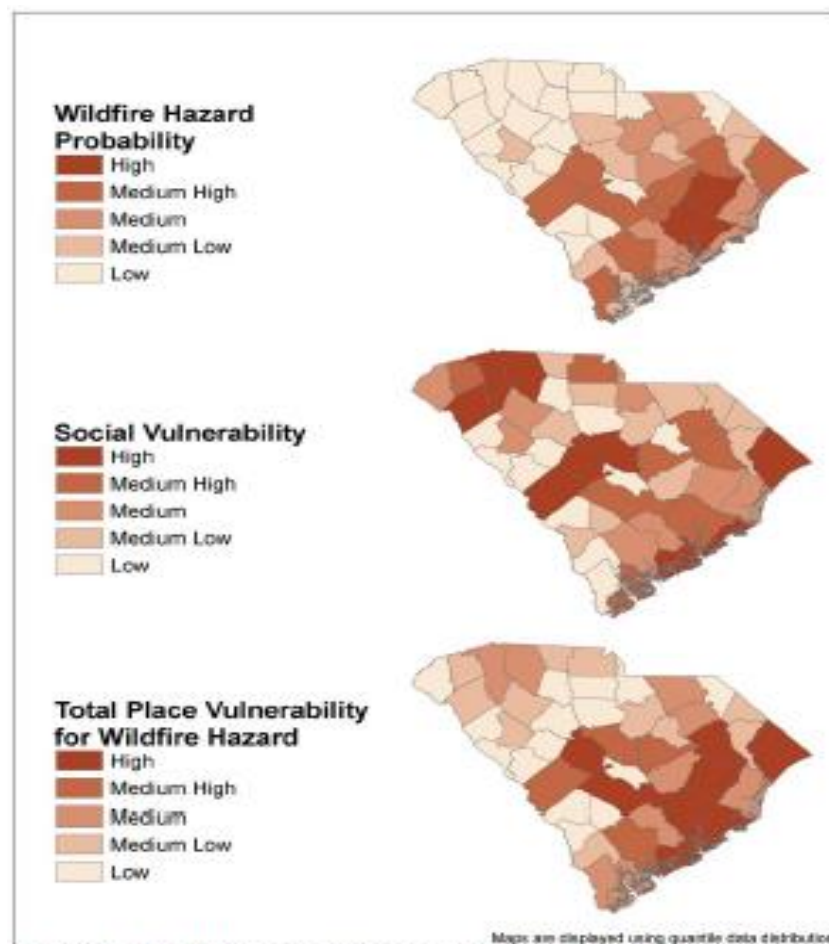


Figure 5.7: Hazard Frequency of Occurrence, Social Vulnerability, and Place Vulnerability Scores for Wildfire Hazards

Drought/Heat wave: This hazard is characterized as an extended period of months or years when a region notes a deficiency in its water supply, generally caused by a region receiving consistently below average precipitation. Droughts can have a significant impact on a region, particularly on the cost and availability of certain goods and services. As drought conditions worsen and water supplies decrease, water restrictions may be imposed on home owners and businesses and the cost of water treatment may increase. Hydroelectric power plants, by definition, require water for operation. There are also potential implications on agriculture and forestry activities in the County. Historically, drought has not had a significant impact on Greenville County's economy or infrastructure.

Occurrences During the 2005 Plan Cycle: During the period of 2007 and 2008 Greenville County was designated by the National Weather Service to be located in a region of extreme drought. However Greenville County and the municipalities located in the County have an abundant supply of potential potable water reserves, and did not require any mandatory water use restrictions.

Occurrences During the 2010 Plan Cycle: The SC State Climatology Office drought reporting archive indicates that a period of drought occurred from 2010 to 2013. The following reporting periods and severity indicate the progression of the drought during this period.

| | |
|----------------|---|
| July 2010 | Upgraded from Normal to Incipient |
| September 2011 | Upgraded from Incipient to Moderate |
| November 2012 | Downgraded from Moderate to Incipient |
| April 2013 | Downgraded from Incipient to Normal |

Hazard Extent

According to the State Climatology Office, droughts have had severe adverse impacts on the people and economy of South Carolina. Periods of dry weather have occurred in each decade since 1818 (National Water Summary 1988-1989 Hydrologic Events and Floods and Droughts, 1991). The SHELUDS database

reports drought in Greenville County in 1977, 1978, 1984, 1986, 1988, 1993, 1994 and 1995.

A Regional Drought Monitor web application for dynamic drought index maps in North and South Carolina has been developed as a web-based spatial decision support system for water resource planning and management. This application is available through the SCDNR website and was used to review the Palmer Drought Severity Index data for Greenville County from the period 1950 to 2010. The Palmer Index was developed by Wayne Palmer in the 1960s and uses temperature and rainfall information in a formula to determine dryness. It has become the semi-official drought index. The Palmer Index is most effective in determining long term drought—a matter of several months—and is not as good with short-term forecasts (a matter of weeks). It uses a 0 as normal, and drought is shown in terms of minus numbers; for example, minus 2 is moderate drought, minus 3 is severe drought, and minus 4 is extreme drought.

Using the web application, Greenville County experienced periods of at least **moderate** drought during 28 of the yearly periods between 1950 and 2010. The County experienced **extreme** drought during seven (7) of those years. Based upon the Palmer Index, Greenville County is capable of experiencing extreme drought.

Dam Failure: Dam structural integrity is vulnerable to failure from many causes. Although most reservoirs are small in size where a dam failure would not cause significant damage, some dams, called High Hazard, are such that the result of failure would likely impact many lives and properties. These structures may fail due to excessive rainfall events or overtopping and the associated erosion. Negligence or improper design can also cause breaches in these controls.

The SC Department of Health and Environmental Control administers a regulatory program for dams that includes a classification system for potential hazard. The hazards pertain to potential loss of human life or property damage in the event of failure or improper operation of the dam or appurtenant works. Probable future development of the area downstream from the dam that would be affected by its failure is considered in determining the classification. Dams are subject to reclassification if the Department determines that the hazard has changed. The following classifications are contained in the regulation:

Dam Hazard Potential Classification

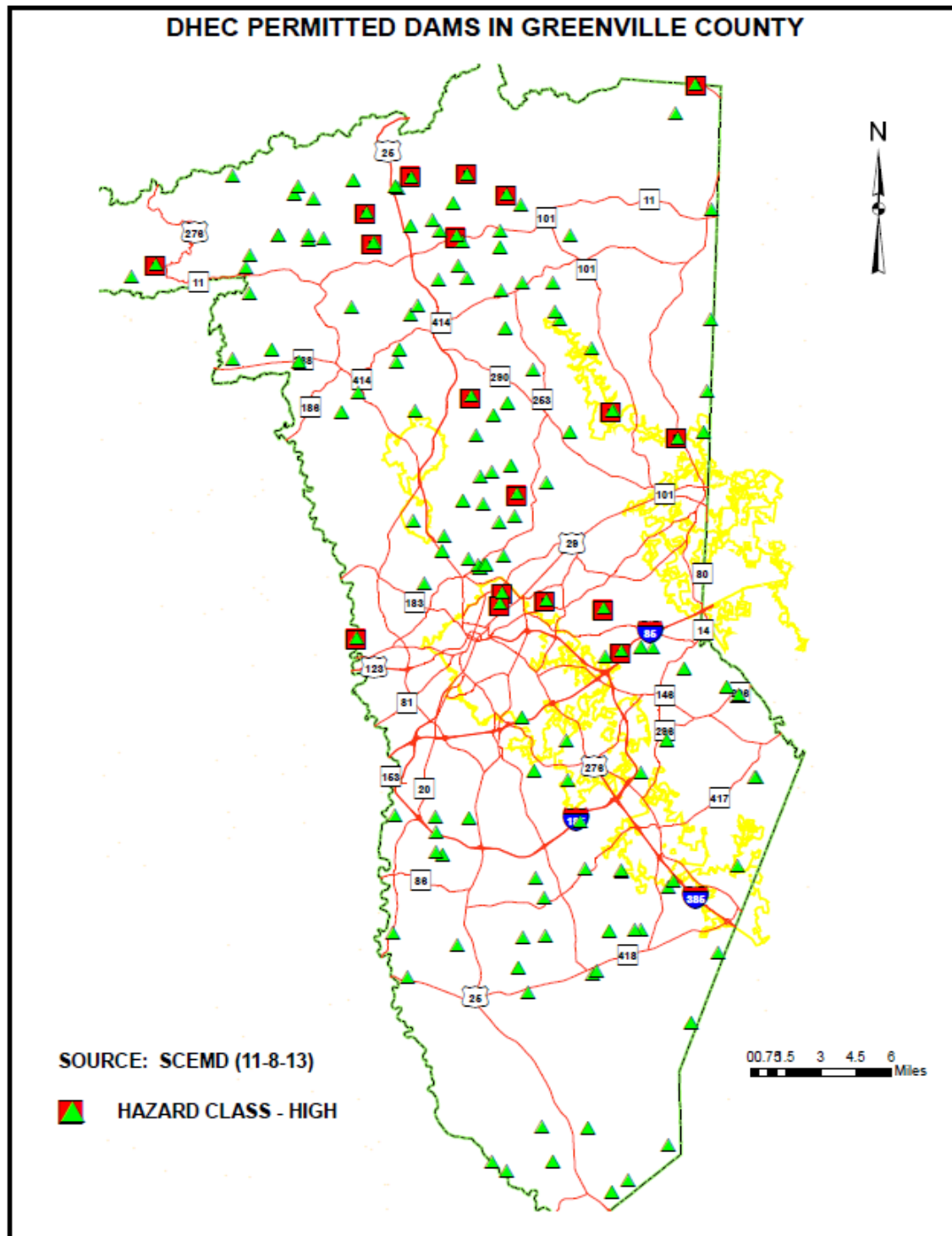
Hazard Classification

High Hazard (Class I)

Hazard Potential

Dams located where failure will likely cause loss of life or serious damage to homes, industrial

| | |
|-------------------------------|---|
| | and commercial facilities, important public utilities, main highway(s) or railroads. |
| Significant Hazard (Class II) | Dams located where failure will not likely cause loss of life but may damage homes, industrial and commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important public utilities. |
| Low Hazard (Class III) | Dams located where failure may cause minimal property damage to others. Loss of life is not expected. |



This map indicates the general locations for SCDHEC permitted dams in Greenville County. (Source: SCEMD). Eighteen (18) of these dams have been rated as High Hazard. The Association of State Dam Safety Officials maintains a list of dam failures in the United States that have occurred from 1869 to

present. Only two (2) dam failures with fatalities and property damage are recorded in South Carolina and neither of those was in Greenville County.

Occurrences During the 2005 Plan Cycle: There have been no reports of dam failure occurring during the 2005 Plan Cycle.

Occurrences During the 2010 Plan Cycle: At 2:30 pm on April 12, 2012 Greenville County received calls reporting low water levels at Oak Grove Lake Park. County, State and Recreation District officials arrived onsite to assess the situation. There was a wide whirlpool between the vertical standpipe and the earthen dam. Water was observed leaving the lake through the spillway at full capacity. Some erosion of the earthen dam occurred as well as sloughing of the northernmost island. By 8:30 pm the lake had completely drained. No downstream flooding of homes or property occurred. Subsequently, the dam was repaired and the lake was reopened in 2013.

6.3 Probability of Future Hazards

Table 6-2 lists each type of hazard and the probability of the occurrence of a future event in any given year is calculated. This calculation is based upon the number of years in which at least one event occurred divided by the total number of years of data for that event. The historical events databases are contained in Appendix D. The data shows a high potential of occurrence for winter storms, floods, tornadoes/high winds and severe storms/thunderstorms. Also, drought/heat wave is considered to be a significant threat. Fortunately, over the past few years the County has experienced significant rainfall and area reservoirs are at full pool.

Table 6-2
Probability of Future Hazards

| Hazard | Total No. of Data Years | Historical No. of Years with at Least 1 Event through 2009 | 2010 HMP Cycle No. of Years with at Least 1 Event | <u>Total # Event Years</u> # Data Years (Frequency) | Future Probability of Occurrence (%) |
|--------------------------|-------------------------|--|---|---|--------------------------------------|
| | | | | | |
| Winter Storms | 53 | 42 | 1 | 0.81 | 81 |
| Floods | 53 | 29 | 4 | 0.62 | 62 |
| Tornadoes/ High Winds | 53 | 48 | 4 | 0.98 | 98 |

| Hazard | Total No. of Data Years | Historical No. of Years with at Least 1 Event through 2009 | 2010 HMP Cycle No. of Years with at Least 1 Event | <u>Total # Event Years</u> # Data Years (Frequency) | Future Probability of Occurrence (%) |
|---------------------------------|-------------------------|--|---|---|--------------------------------------|
| Severe Storms/ Thunderstorms | 53 | 46 | 4 | 0.94 | 94 |
| Earthquakes* | * | * | * | * | * |
| Wildfires | 53 | 2 | 0 | 0.4 | 4 |
| Drought/ Heat Wave | 63 | 27 | 3 | 0.48 | 48 |
| Dam Failure | 145 | 0 | 1 | 0.007 | < 1 |

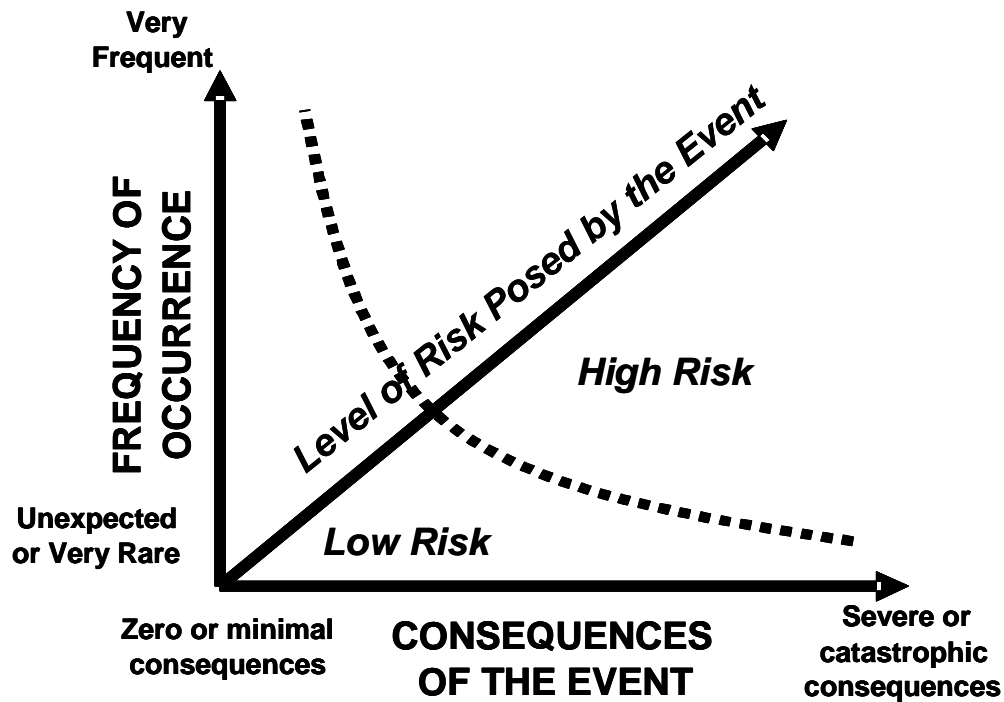
* See 50 Year Probability of Exceedance graphic in narrative.

6.4 Risk Estimation

As noted in Section 4, the technical planning process begins with hazard identification. In this process, representatives of Greenville County consider all of the natural hazards that are likely to threaten the community. When the hazard types relevant to Greenville County are identified, the participants can make an estimate of the risk each poses.

The estimate of risk is based on the judgment of the planners regarding the likely frequency of occurrence of the hazard event compared to its probable consequences. For purposes of this analysis, “risk” is defined as a relative measure of the probability that a hazard event will occur in comparison to the consequences or impacts of that event. That is, if a hazard event occurs frequently, and has very high consequences, then that hazard is considered to pose a very high risk to the affected communities. In comparison, if a hazard event is not expected to occur frequently, and even if it did, the consequences would be minimal, then that hazard is considered to pose a very low risk.

This relationship between frequency of occurrence and consequences of an event can be illustrated by the following graph:



This graph illustrates that some hazards can be defined as “low risk,” for they do not occur often enough and/or do not result in significant impacts even when they do. In comparison, other hazards may occur often enough and/or have sufficiently severe consequences when they do, that they must be considered “high risk.” Each of the hazards considered to be a threat to Greenville County can be assessed for its probability of occurrence and its likely consequences.

By considering the relative risk of the different hazards that threaten Greenville County, greater priority can be given to the “higher” risk hazards in order to most effectively utilize the time and resources available for the mitigation planning process. In this way, the planning approach used for Greenville County supports what can be termed “risk-based planning” because it facilitates the participants’ capabilities to focus on the highest risk hazards.

Initially, the DMC derived a “relative risk score” using a qualitative process in which planners recorded, on a numeric scale, the likely frequency of occurrence, the extent of the community that would be impacted, and the likely consequences in terms of public safety, property damage, economic impact and harm to valuable environmental resources. The numeric total of the assessments of each of these is considered to constitute the “relative risk score.”

The same numeric criteria are used to classify the risk that a defined hazard poses to Greenville County. Use of common evaluation criteria enables the planning group as a whole to make comparisons of the relative risk of one hazard type in relation to another. As noted above, such comparisons can also be used

to guide and prioritize the planning process by enabling planners to focus on the hazards with the highest assessed risk.

These common risk estimation numeric factors used by participants in the planning process are listed in the following table.

Table 6-3
Risk Estimation Factors

| RISK FACTOR | EVALUATION CRITERION | ASSIGNED VALUE |
|---|--|----------------|
| Area Impacted | No developed area impacted | 0 |
| | Less than 25% of developed area impacted | 1 |
| | Less than 50% of developed area impacted | 2 |
| | Less than 75% of developed area impacted | 3 |
| | Over 75% of developed area impacted | 4 |
| Probability of Occurrence | Unknown but rare occurrence | 1 |
| | Unknown but anticipate an occurrence | 2 |
| | 100 years or less occurrence | 3 |
| | 25 years or less occurrence | 4 |
| | Once a year or more occurrence | 5 |
| Health and Safety Consequences | No health or safety impact | 0 |
| | Few injuries/illnesses | 1 |
| | Few fatalities or many injuries/illnesses | 2 |
| | Numerous fatalities | 3 |
| Consequences to Property | No property damage | 0 |
| | Few properties destroyed or damaged | 1 |
| | Few destroyed – many damaged | 2 |
| | Few damaged – many destroyed | 2 |
| | Many properties damaged and destroyed | 3 |
| Consequences to Environmental Resources | Little or no environmental damage | 0 |
| | Resources damaged with short term recovery practical | 1 |
| | Resources damaged with long term recovery feasible | 2 |
| | Resources destroyed beyond recovery | 3 |
| Economic Consequences | No economic impact | 0 |
| | Low direct and / or low indirect costs | 1 |
| | Low direct and high indirect costs | 2 |
| | High direct and low indirect costs | 2 |
| | High direct and high indirect costs | 3 |

A single, numeric value is selected from each of the five risk factors. The five values are then used to derive a total relative risk value for a particular hazard that is “weighted” for the probability of its occurrence.

The total relative risk for a particular hazard is calculated by adding the selected numeric values for each of the “*Impact Area*,” “*Health & Safety*,” “*Property*,” “*Environment*” and “*Economy*” and multiplying this total by the numeric value selected for the “*Probability of Occurrence*,” or, in other words, by using this formula:

$$\left[\begin{array}{c} \text{Area} \\ \text{Impacted} \end{array} + \begin{array}{c} \text{Health and Safety} \\ \text{Consequences} \end{array} + \begin{array}{c} \text{Consequences to} \\ \text{Property} \end{array} + \begin{array}{c} \text{Consequences to} \\ \text{Environmental} \\ \text{Resources} \end{array} + \begin{array}{c} \text{Economic} \\ \text{Consequences} \end{array} \right] \times \begin{array}{c} \text{Probability of} \\ \text{Occurrence} \end{array} = \begin{array}{c} \text{Relative} \\ \text{Risk} \end{array}$$

The resulting numeric value for relative risk can vary from zero, meaning the identified hazard poses no estimated risk at all to the jurisdiction, up to a maximum of 80, which means that the hazard poses a very substantial risk to the jurisdiction. The actual values selected for Greenville County are found below in the section “Identified Hazards”.

The “weighting” of the relative risk value by the “Probability of Occurrence” factor provided multi-jurisdictional mitigation planners with a more realistic basis to prioritize their subsequent planning work. While a postulated hazard event could result in catastrophic damages to the County, perhaps it only has an extremely rare probability of occurrence. With this “weighted” approach, the actual risk from this hazard would have a low relative risk rating. In comparison, a hazard that occurs on a very frequent basis, say once every few years, but has lesser consequences, would result in a higher relative risk value due to its higher probability or frequency of occurrence. Therefore, multi-jurisdictional mitigation planners from Greenville County prioritized their efforts to focus on these higher risk hazards as they completed the vulnerability assessments and proposed mitigation initiatives to address those vulnerabilities.

Pursuant to the requirements of the Disaster Mitigation Act of 2000, Greenville County was required to evaluate a prescribed list of natural hazards. These hazards were: Earthquakes; Tsunamis; Coastal and Riverine Erosion; Landslides/Sinkholes; Hurricanes and Coastal Storms; Severe Storms/Tornadoes/High Winds; Floods; Wildfires; Dam/Levee Failure; Volcanic Activity; Drought/Heat Wave; and Winter Storms/Freezes. While many of these hazards are relevant to Greenville County, some are not due to the geographic location and characteristics of the planning area. In the planning process, each of these hazards has been assessed by Greenville County. If, under that planning process, a specific hazard was assessed, and the relative risk estimate for that hazard was determined to be zero (meaning the hazard actually poses no identifiable risk to the jurisdiction), then that hazard was not considered further in the planning process. This included subsequent assessments of vulnerability of

the community to that hazard and the evaluation of the adequacy of county policies to manage the risks posed by that hazard.

In deriving these estimates of risk for each hazard, Greenville County utilized available information regarding the geographic areas that may be impacted by each identified hazard, as well as population, infrastructure, and facilities within those impacted areas. This analysis included inventories of valuable environmental resources, as well as factors that are influential to the economic well being of the community. For much of the County, this information was available in a geographic information system (GIS) database, or was accessed from internet websites and existing GIS databases available from state and federal agencies.

Risk Evaluation

For the Greenville County mitigation planning area, the results of the hazard identification and risk estimation process are shown in Table 6-4. This table shows the relative risk posed by various hazards to Greenville County. The numeric criteria used for this analysis are defined above. Note that Greenville County does not have levees.

**Table 6-4
Risk Estimation**

| Hazard | Probability of Occurrence | Area of Impact | Consequence of Occurrence | | | | Risk Rating |
|------------------------|---------------------------|----------------|---------------------------|----------|-------------|----------|-------------|
| | | | Health & Safety | Property | Environment | Economic | |
| Winter Storms | 5 | 4 | 1 | 1 | 0 | 2 | 40 |
| Flooding | 4 | 1 | 1 | 1 | 1 | 2 | 24 |
| High Winds/ Tornado | 5 | 1 | 1 | 1 | 0 | 1 | 20 |
| Thunderstorms | 5 | 2 | 0 | 0 | 0 | 1 | 15 |
| Earthquakes | 1 | 4 | 1 | 1 | 0 | 1 | 7 |
| Wildfires | 2 | 1 | 1 | 2 | 2 | 1 | 14 |
| Dam Failure | 1 | 1 | 2 | 2 | 1 | 2 | 8 |
| Drought/ Heat wave | 3 | 3 | 1 | 0 | 1 | 1 | 18 |

The highest risk hazards throughout the planning area, in descending order based on the relative risk ratings, are:

- Winter Storms
- Flooding
- High Winds/Tornadoes
- Drought/Heat Wave
- Thunderstorms
- Wildfires
- Dam Failure
- Earthquakes

Based on data collection, the following hazards pose little risk and therefore will not be further analyzed:

- Tsunamis
- Coastal and Riverine Erosion
- Landslides/Sinkholes
- Coastal Storms, and
- Volcanic Activity

6.5 Vulnerability Assessment

Information gathered from discussions with County officials, DMC members and residents provided much of basis for the evaluation of risk and vulnerability found in this HMP. The vulnerability assessment process used by the DMC begins with profiling the basic, mitigation-related characteristics of the County. Very basic demographic, land use and infrastructure information was used in preparing the initial HMP and was revised for this 2015 HMP update. The resulting information is presented below.

Table 6-5 indicates the building valuation of properties that may be affected by one or more of eight (8) hazards identified in the plan.

Table 6-5
Greenville County Structural Property Valuation

| Class | No. of Properties | Building Valuation (\$) |
|----------------------|--------------------------|--------------------------------|
| Res. – Single Family | 141,138 | 18,873,897,309 |
| Res. – Multi Family | 1,508 | 992,359,411 |
| Manufactured Homes | 6,659 | 85,698,259 |
| Industrial | 2,246 | 920,079,038 |
| Commercial | 10,910 | 3,744,993,257 |
| Gov't & Schools | 401 | 35,433,163 |

6.5.1 Repetitive Loss Properties

Greenville County, City of Greenville, City of Simpsonville, City of Ft. Inn and the City of Mauldin participate in the National Flood Insurance Program. Another indication of the hazards threatening Greenville County, and the risk posed by those hazards, is to identify whether properties have been repeatedly damaged by past flood events.

Under the National Flood Insurance Program, repetitive loss properties are of significant interest since they are prone to flood damage and are a substantial drain on program insurance funding. Greenville County has identified 43 repetitive loss properties within our jurisdiction of which all are residential properties with the exception of one (1) church and one (1) commercial property. During the 2005 plan cycle, the county eliminated 13 properties through various mitigation efforts, mainly through acquisition of properties. The structures on these parcels have been removed and the county retains restricted titles preventing any new development. Over the 2010 plan cycle an additional 9 properties were mitigated. One additional property was added to the list in 2012; however, it was added as a mitigated property so that 21 unmitigated repetitive loss properties remain. The locations of repetitive loss properties are subject to the Privacy Protection Act of 1974.

6.5.2 Land Use Trends and Potential Vulnerability

The DMC recognizes that the way in which land is utilized, especially land within known hazard-prone areas, is a key measure of community vulnerability, because some land uses, such as for residential or industrial development, can be more susceptible to disaster-related damages than others. Therefore, analysis of land use trends is performed routinely by the Greenville County Planning Department. The DMC recognizes that its efforts, particularly to identify the areas at risk from various hazards, is a key factor in guiding the careful use of land to minimize future vulnerabilities to disaster. When needed and desired, modifications to County plans, ordinances, codes and general policies will be proposed as mitigation initiatives for incorporation into this plan.

Greenville County has taken several measures to control development, from an economic and vulnerability standpoint. Two of the better examples include the constant revisions that are made to zoning standards and the Dwelling Elevation Program for buildings located in the floodplain. Greenville County has adopted a revised Floodplain Ordinance that exceeds the minimum requirements of the National Flood Insurance Program. The County also has achieved a Class 8 ranking within the Community Rating System. Finally, Greenville County has adopted the International Building Code Standards as amended by the State of South Carolina.

To address new building and infrastructure, the County will continue to enforce zoning regulations, including the low density zoning provisions of the Zoning and Land Development Regulations, by requiring open space, riparian buffers and floodplain set aside areas as required in Article 7 of the Greenville County Zoning Ordinance. The County will also continue enforcement of the International Series Building-related and Fire codes as well as the Greenville County Flood Damage Prevention Ordinance.

6.5.3 Critical Facilities

Many facilities and systems in the County are very important to the health, safety and welfare of the community, especially during disasters caused by natural hazards. Therefore, high priority is given to assessing their vulnerabilities to future disasters and proposing mitigation initiatives to address identified vulnerabilities. The DMC has created a detailed list of critical facilities. However, technical evaluations of each of these facilities have not been completed. Engineers from the Volunteer Service Corps have evaluated disaster shelters within the County to determine their ability to withstand impact from potential natural disasters. Also, the County Public Works Department has evaluated County transportation routes servicing critical facilities.

6.5.4 Summary

It must be emphasized that the fundamental reason for undertaking the hazard identification and vulnerability assessment process is to highlight vulnerabilities that need to be addressed by the development of proposed mitigation initiatives for incorporation into the HMP. Because of the numerous facilities, systems and neighborhoods in Greenville County that need to be assessed for their vulnerability to disasters, this component of the mitigation planning process can be expected to be continued in future updates of the plan. Additional data gathering will facilitate this effort.

This 2015 HMP update includes a review of Greenville County's risk from and vulnerability to natural hazards based upon new data as well as evaluation of the success of mitigation initiatives that have been implemented. After careful consideration of the 2010 HMP, the DMC determined that the existing mitigation priorities are still relevant, so no changes in priorities were made in this 2015 HMP update.

Greenville County

Multi-jurisdictional Hazard Mitigation Plan Update

Section Seven

MITIGATION GOALS AND PLAN IMPLEMENTATION

Minor updates to this section have been made in order to clarify the goals and objectives. Mitigation initiatives deleted during the 2010 Plan cycle have been removed from the table on Planning Goals and Objectives. A table has been added to clarify the County programs that enhance the mitigation effort. Applicable municipal programs that enhance the mitigation effort are contained in Appendices J through M. Tentative DMC meeting dates have been added to the section addressing the Next Planning Cycles.

7.1 Introduction

This section of the Greenville County Multi-jurisdictional Hazard Mitigation Plan Update describes the goals and objectives established by the DMC, and the completed and anticipated actions for implementation and maintenance of this plan in an ongoing effort to achieve these goals.

7.2 Mitigation Plan Goals and Objectives

The DMC established a number of goals and objectives to guide its work in the development of the original HMP. The goals and objectives helped to focus the efforts of the group in the mitigation planning effort to achieve an end result that matches the unique needs, capabilities and desires of Greenville County.

The goals and objectives selected by the DMC for the planning process are listed below.

- 1) County government will have the capability to develop, maintain, and utilize hazard information**
 - a) Data and information needed for defining hazards, risk areas and vulnerabilities in the community will be obtained
 - b) The capability to effectively utilize available data and information related to mitigation planning and program development will be available

- c) The effectiveness of mitigation initiatives implemented in the community will be reviewed and documented
- d) There will be a program to derive mitigation “lessons learned” from significant disaster events occurring in or near the community

2) The County will have the capability to initiate and sustain emergency response operations during and after a disaster

- a) Communications systems supporting emergency services operations will be available to provide for effective communication during times of disaster
- b) Designated evacuation shelters will be capable of operating during and after disaster events
- c) Emergency services organizations will have the capability to detect emergency situations and promptly initiate emergency response operations
- d) Local emergency services facilities will be assessed and County-owned service facilities will be capable of operating during a disaster event
- e) Response capabilities will be available to protect visitors, special needs individuals, and the homeless from a disaster’s health and safety impacts

3) The continuity of County government operations will not be significantly disrupted by disasters

- a) Measures will be implemented to alert County personnel of impending disasters and corresponding action plans
- b) County employees will be trained in disaster response and operations

4) The policies and regulations of County government will support effective hazard mitigation programming throughout the County

- a) County government will establish and enforce building and land development codes that are effective in addressing the hazards threatening the community
- b) County government will protect high hazard natural areas from new or continuing development
- c) Land use policies, plans and regulations will discourage or prohibit inappropriate location of structures or infrastructure components in areas of higher risk

- d) Reconstruction and rehabilitation of structures and utilities in the County will incorporate appropriate hazard mitigation techniques
 - e) Regulations will be established and enforced to ensure that public and private property maintenance is consistent with minimizing vulnerabilities to disaster
 - f) The County will continue participation in the National Flood Insurance Program and the associated Community Rating System
- 5) Residents of the County will have homes, institutions, and places of employment that are less vulnerable to disasters**
- a) Programs for removal, relocation or retrofitting of vulnerable utilities in high hazard areas will be established
 - b) The vulnerability to disasters of schools, libraries, museums, and other institutions important to the daily lives of the community will be minimized
- 6) The economic vitality of the County will not be significantly threatened by a disaster**
- a) County government emergency response and disaster recovery plans will appropriately consider the needs of key employers in the community
 - b) County government will encourage community businesses and industries to make their facilities and operations disaster resistant
 - c) County government will implement appropriate communications initiatives to address public concerns of community condition and functioning in the aftermath of a disaster
- 7) The availability and functioning of the County's infrastructure will not be significantly disrupted by a disaster**
- a) County government will encourage hazard mitigation programming by private sector organizations owning or operating key community utilities
 - b) Routine maintenance of the community's infrastructure will be done to minimize the potential for system failure due to a disaster
 - c) Transportation facilities and systems serving the County will be constructed and/or retrofitted to minimize the potential for disruption during a disaster

8) Key County employees will be trained to recognize hazards threatening local areas and the techniques to minimize vulnerability to those hazards. Information on hazard mitigation will be disseminated to the public.

- a) Interested individuals will be encouraged to participate in hazard mitigation planning and training activities
- b) Education programs in risk communication and hazard mitigation will be established and implemented
- c) Managers of public facilities will be knowledgeable in hazard mitigation techniques and the components of the County's mitigation plan
- d) Technical training in mitigation planning and programming will be given to appropriate local government employees
- e) The public will have facilitated access to information needed to understand their vulnerability to disasters and effective mitigation techniques

These goals selected by the DMC are related to the broad mitigation needs and capabilities of the communities involved, although some of the initiatives are focused on a specific hazard type or category. In general the Greenville County mitigation goals and objectives are "multi-hazard" and multi-jurisdictional in scope and can be described as statements of the desired "mitigation-related capabilities" that will be present in the future as the goals are achieved.

Guidance to meet the goals of this mitigation plan will be provided by the State of South Carolina Emergency Management Division, pursuant to the State Mitigation Plan. The state does not provide a specific set of goals, however, guidance and coordination of hazard preparations and mitigation is available.

7.3 "Goal-based" Planning Process

The goals established by the Greenville County DMC are considered to be broad, general guidance that defines the long-term direction of the planning. As indicated in the list of goals and objectives above, each goal statement has one or more objectives that provide a more specific framework for actions to be taken by the DMC and its participants. The objectives define actions or results that can be placed into measurable terms by the DMC, and translated into specific assignments for implementation by the participants in the DMC and associated agencies and organizations.

The objectives selected by the DMC are intended to create a specific framework for guiding the development of proposed mitigation initiatives for incorporation into the plan. Whenever feasible, the planning participants have attempted to associate each proposed mitigation initiative with the objective statement the initiative is intended to achieve. By associating a mitigation initiative with a specific objective, the proposed initiative is also, of course, intended to help achieve the broader goal statement to which the objective corresponds. Proposing mitigation initiatives that are consistent with the selected objectives is a principal mechanism for the DMC participants to achieve the stated goals of the mitigation planning program.

To illustrate this point, the table below shows a list of the mitigation initiatives contained in the 2010 HMP Update and the objective statements which they are intended to help achieve. New initiatives added during the 2010 Plan cycle are indicated in “**bold**” type. This format allows the DMC to identify which of the established objectives is to be addressed by the proposed initiative, if any. The DMC is able to consider achievement of a specific objective under an established goal as it reviews a proposed initiative for incorporation into the plan; or, as it assigns the initiative a priority or schedule for implementation. This approach creates a framework for “goal-based” planning by the DMC, focusing the group’s efforts on proposing and implementing mitigation initiatives intended to achieve the established mitigation goals.

As the HMP is reviewed and updated by the DMC, the goals and supporting objective statements are also reviewed to ensure they are still applicable to meeting the unique needs, interests and desires of the community.

**Table 7-1
Planning Goals and Objectives**

| Initiative Description | | Planning Goal(s) Targeted | Planning Objective Satisfied |
|---------------------------------|---------------------------|------------------------------|---------------------------------|
| A. Prevention | | | |
| | Brushy Creek Study | 1, 5 | 1a, 5b |
| | Rocky Creek Study | 1, 5 | 1a, 5b |
| | Upper Reedy Study | 1, 5 | 1a, 5b |
| | Gilder Creek Study | 1, 5 | 1a, 5b |
| | Grove Creek Study | 1, 5 | 1a, 5b |
| | Bridge/Culvert Analysis | 1, 5 | 1a, 5b |
| | Severe Weather Manual | 3 | 3b |
| B. Public Education & Awareness | | | |
| | Flood Pool Elevations | 1, 8 | 1a, 8c, 8e |
| | Enhance GIS Database | 1, 8 | 1a-b, 8c, 8e |
| | Enhance Hazards Education | 3, 8 | 3b, 8a-e |

| Initiative Description | | Planning Goal(s) Targeted | Planning Objective Satisfied |
|--|--|------------------------------|---------------------------------|
| | Realtor Flood Hazard Education | 8 | 8a-e |
| | Prepared Hazard Info Ads | 2, 8 | 2c, 8c, 8e |
| | Weather Stations | 1 | 1a-b, |
| | FIRM Updates | 1 | 1a-b |
| | Flood Signs | 5, 8 | 5b, 8e |
| C. Natural Resources Protection | | | |
| | Stream Crossing Debris Removal | 5, 7 | 5, 7b-c |
| D. Emergency Services | | | |
| | Early Warning System | 2, 3 | 2a, 2c, 2e, 3a |
| | Improve Radio Communications | 2 | 2a, 2c, 2e |
| | Communications Protocol | 2 | 2a, 2c, 2d, 2e |
| | Post-disaster Review Meetings | 1, 2, 3, 6, 7, 8 | 1d, 2e, 3b, 6a-b, 7a, 8a |
| | Installation of River Gages | 1, 5 | 1a, 5b |
| | Develop Formal Agreements w/ Utility Providers | 2 | 2e |
| | Develop Inter-local Agreements | 1, 4 | 1b, 4e |
| | Evaluation of Emergency Routes | 2 | 2c |
| | Comprehensive Training | 3 | 3b |
| E. Property Protection | | | |
| | Elevation Grant Program | 5 | 5a |
| | Flood Mitigation Acquisition Program | 5 | 5a |
| | Critical Facility Review | 1, 2 | 1a, 2b, 2d |
| F. Structural Projects | | | |
| | 425 Drainage Projects | 7 | 7b-c |

7.4 Addressing Known Risks and Vulnerabilities

The process of selecting initiatives to mitigate known threats to hazards began with a simple brainstorming exercise by the members of the DMC. Committee members also consulted personnel from within their respective agency or organization. The resulting list is part wish-list and part a reflection of the threats

to Greenville County. It is difficult to remove from memory recent events and the damage that resulted. Therefore, this list is an indication of the problems that Greenville County needs to address, based on complaints, cost of repairs, and perceived future needs.

It is the intention of the DMC to continue to improve the existing policy framework for Greenville County so that they will be able to more effectively manage the community's vulnerabilities to future disasters. An analysis of the current policy framework is included in Section 6 of this plan. Shortfalls in the number of policies addressing identified higher risk hazards can be addressed by implementing non-structural initiatives intended to modify or enhance current plans, policies and programs. The proposed modifications to the listed policies and programs are additional documentation of the DMC's efforts to achieve its established goals and objectives.

7.5 Plan Implementation and Maintenance Procedures

This portion of Section 7 discusses the manner in which the HMP will continue to be implemented and maintained over time. "Plan implementation" is considered as the implementation of the proposed mitigation initiatives now included in the plan. "Plan maintenance" is considered to be the process by which the Greenville County DMC will continue to update, improve and expand the mitigation planning process. It also includes the technical analyses needed for the process to propose more mitigation initiatives for incorporation into the plan. "Plan maintenance" further includes the group's activities to monitor implementation of the plan; to evaluate the effectiveness of implemented mitigation initiatives; and, to continually strive to engage the community in the planning process. The basic elements of the DMC's actions to implement and maintain the plan are also described in the DMC's operating procedures (see Section 4).

7.5.1 Plan Implementation Responsibility and Schedules

As noted above, implementation of the HMP is basically through implementation of the approved mitigation initiatives incorporated into the plan. As these initiatives are implemented over the years, the facilities, systems and neighborhoods of the participating jurisdictions will become less vulnerable to the impacts of future disasters, and the communities of Greenville County will become increasingly more disaster resistant.

Pursuant to the planning process, the individual agencies and organizations that have been assigned responsibility for the mitigation initiatives incorporated into the plan are responsible for their implementation when the resources or opportunity to do so become available. In most cases, this means that the responsible agencies identify the most feasible funding source (e.g., a state or federal grant program, the agency's budgetary process, etc.); make application to

the funding source or otherwise allocate funds; and, upon receipt of funding, take the necessary steps to actually implement the project. In other cases, this may mean that, should a unique opportunity for implementation of an initiative arise, e.g., upon receipt of unexpected funds, immediately after a disaster event, etc., the agency can proceed with implementation of the initiative.

The DMC encourages representatives of the agencies and organizations responsible for a proposed initiative to associate it with one or more potential funding sources. The purpose of this is to facilitate implementation of a proposed initiative by the sponsoring agency by indicating the starting point for seeking funding for implementation.

While the actual responsibility for implementation of a mitigation initiative lies with the responsible agency or department, the DMC as a cooperative organization has a substantial involvement in plan implementation and can assist with the coordinating and scheduling of the implementation of approved mitigation initiatives.

Mitigation initiatives are re-evaluated as to their continuing value annually and following a major disaster. The purpose of this re-evaluation is to assure that a proposed mitigation initiative remains a valuable component of the plan, and to determine if unique or unanticipated conditions warrant extra efforts to implement the initiative.

7.5.2 Plan Maintenance and Monitoring

Mitigation planning is a dynamic process that must be continually adjusted to account for changes in the community and to further refine the information, judgments and proposals documented in the multi-jurisdictional mitigation plan. The process used by the DMC to maintain the plan consists primarily of four functions.

- 1) Continue to expand and improve the mitigation plan by accomplishing additional technical analyses, such as vulnerability assessments and post-event analysis of disasters, etc.
- 2) Continue to expand participation in the planning process by implementing public information programs and by inviting expanded participation by the private sector.
- 3) Routinely monitor implementation of the initiatives in the plan until each is completed and in-place. Assess their actual effectiveness following the next relevant disaster event.

- 4) Issue an updated HMP for use by the participating organizations and to inform the community. When appropriate, submit the HMP to state and federal agencies for approval pursuant to the Disaster Mitigation Act of 2000. This portion of Section 7 describes implementation of these four activities by the DMC to maintain the Greenville County Mitigation Plan.

The technical analyses conducted by the County will be an ongoing effort to continually assess the hazards threatening the community, the vulnerabilities to those hazards, and program framework to control those vulnerabilities. When indicated, the technical analysis also includes formulating proposed mitigation initiatives to eliminate or minimize the identified vulnerabilities. The County has completed the vulnerability assessment based on the best available information. As this process continues and additional data is gathered the DMC will be better equipped to provide more detailed analyses.

In the next planning cycles, the DMC will continue to assess the vulnerabilities of facilities and planning areas. Vulnerability assessments are fundamental to identifying needed mitigation initiatives to propose for incorporation into the plan, and as this process is continued, additional mitigation initiatives will be proposed for incorporation into the plan as necessary. Vulnerability assessment will include a review of the policy and program framework of the County with emphasis on the adequacy of this framework to control the vulnerabilities of the community.

The second type of activity is the continuation of expanded participation in the DMC and the mitigation planning process. The current participants in the planning and the level of their participation are addressed in Section 3 of the plan. Gaining additional participation in the planning process is also part of the public information and community outreach component of the plan. The planned public information activities are discussed in Section 5.

The third category of plan maintenance activities that will be undertaken by the Greenville County DMC will be to monitor the implementation of mitigation initiatives. The DMC documents the efforts to fund the initiative, to conduct required studies, and to obtain any needed permits, as well as to estimate the time remaining to complete design, needed studies and purchasing or construction. When an initiative is completed, this fact is documented for inclusion in the next HMP Update. The current status of initiative implementation is discussed in Section 5 and Section 8 of this 2015 HMP Update.

The DMC will conduct an annual review of mitigation initiative effectiveness based on disaster events that occurred during the previous year. As time passes and disaster events occur, this will enable the DMC to accumulate information on the success of mitigation efforts.

Monitoring of the effectiveness of plan implementation and maintenance also involves assessing the effectiveness of the mitigation goals and objectives established for the planning process. As noted above, the DMC established general goals and a number of specific objectives to guide the participants in the mitigation planning process. The DMC's attempts to address the established objectives, with the intent of achieving the associated mitigation goals for the community, is a key measure of the effectiveness of the continuing plan maintenance and plan implementation. Table 8-7 in section 8 documents the DMC's efforts to achieve the established goals and objectives through the implementation of associated proposed mitigation initiatives. As these initiatives are implemented, and monitored for their effectiveness in future disasters, the DMC will be able to determine the overall success of their mitigation planning effort. In future planning cycles, these goals will be reviewed and re-evaluated to ensure they are still relevant to the unique needs of the community and continue to address current and expected conditions.

The fourth category of plan maintenance activities is to actually incorporate the results of technical analyses, including the development of new mitigation initiatives and to publish the next 5 year cycle HMP Update. The DMC will continue to engage the public in the planning process to expand direct participation in the planning, and to insure that the DMC reflects the community interests. In order to complete this category of plan maintenance activity, the participants will use the general planning cycle provided in the next section.

7.5.3 Current Planning Cycle Outline

Major aspects of the Planning Cycle beginning in 2010 and ending in 2014 are listed below:

- The DMC will meet as necessary and at least annually
- Mitigation initiatives received from DMC members and outside organizations, neighborhood groups, and businesses will be evaluated at the annual meeting
- The DMC will perform an annual review of any ongoing initiatives to determine if they should be continued, deleted or modified
- Annually, new initiatives may be introduced and, if approved, will be implemented as soon as feasible based upon funding and other constraints

The planned date for release of the next edition of the Greenville County Multi-jurisdictional Hazard Mitigation Plan Update is January 2015. The Update will be approved by County Council and the governing bodies of the participating

municipal jurisdictions. The tentative schedule for development of the 2015 HMP Update is outlined on the following table which was presented to the DMC in the October 2013 meeting.

**Table 7-2
Tentative 2015 HMP Update Development Timeline**

| Month & Year | Activity |
|-------------------------|--|
| October 2013 | Hold DMC meeting; review mitigation goals and initiatives; review timeline for 2015 HMP update development |
| February 2014 | Finalize first draft of HMP after receiving input from all participating jurisdictions |
| March 2014 | Host first public meeting to include all participating jurisdictions |
| April 2014 | Complete second draft incorporating, as appropriate, comments and suggestions from public meeting |
| April 2014 | Provide second draft to SCEMD for review. |
| June 2014 | Make revisions to HMP based upon SCEMD comments |
| July 2014 | Submit HMP update to FEMA through SCEMD |
| September 2014 | Complete any FEMA required revisions |
| October 2014 | Resubmit HMP to FEMA for "approval pending adoption" |
| November 2014 | Present HMP in a public meeting and obtain Council(s) resolution for adoption |
| December 2014 | Receive FEMA approval to restart 5 year plan cycle |
| January 2015 | Begin new plan cycle |

7.5.4 Implementation through Existing Plans and Programs

One of the most effective HMP implementation measures is to propose and implement initiatives that will coordinate with other community plans, policies, and programs. By including personnel from a variety of departments in the hazard mitigation planning process, concepts derived from the planning process will be spread throughout County departments such as; public works, stormwater management, GIS, and planning. Mitigation activities initiated by this plan have been incorporated into the Community Rating System (CRS) plan and vice versa. Elements of the Hazard Mitigation Plan have been incorporated into the Greenville County Emergency Operations Plan by the Greenville County Office of Emergency Management.

The County's hazard mitigation effort is enhanced through our participation in the National Flood Insurance Program and our enforcement of the Flood Damage Prevention Ordinance. Also, this effort is supported by other County planning mechanisms and programs including those listed in the following table. As described in the Appendices, municipal jurisdictions participating in this HMP also have programs in place that enhance their mitigation efforts.

**Table 7-3
County Plans and Programs Supporting Hazard Mitigation**

| Plan or Program | Description |
|-----------------------------|--|
| County Comprehensive Plan | The comprehensive plan is a policy document that is adopted by County Council to serve as a guide for future decisions on growth. Provides significant information on County services, transportation corridors, municipalities, mapping, etc. that is used in developing and evaluating mitigation initiatives. Zoning is a major component that considers natural resource protection and flood hazard area development. |
| Capital Improvement Program | Five (5) year program providing framework for funding non-recurring capital improvement projects, including those related to hazard mitigation (e.g., bridge upgrades, flood prone property acquisition, solid waste facilities). |

| Plan or Program | Description |
|-------------------------------|---|
| Emergency Operations Plan | This plan is the result of the all-hazards emergency management program designed to address many types of hazards including severe weather, flooding, hazardous materials, earthquakes, terrorism, and technological incidents. |
| Stormwater Management Program | The stormwater management program is administered through the Greenville County Land Development Division. This program addresses all aspects of stormwater management including runoff and water quality issues. Stormwater runoff rates, drainage easements and stream buffers, as well as detention pond design and maintenance, relate directly to flood control. |
| Land Development Regulations | These regulations address all aspects of land development including but not limited to drainage, transportation, natural areas, commercial structures and residential subdivisions. Their primary goal is to provide for orderly development considering both human and environmental factors. They help to minimize flood damage and ensure access to emergency services in developed areas. |
| | |

Continued Public Involvement

The DMC will continue efforts to develop and implement a program to engage the community in the mitigation planning process and to provide it with mitigation-related information and education. The DMC invites public comments and recommendations regarding mitigation goals; planning priorities; and, the unique needs of each community.

Public information activities that have been completed or are planned by the organizations making up the Greenville County DMC are listed in Section 5.5 of this plan. Each of these activities continues to engage the community in the

planning process through the presentation of a specific topic or program related to or relevant for, hazard mitigation.

Specifically, the mitigation initiatives summary is available for public review on the Planning and Code Compliance section of the County website. The website also contains general information on this summary and a discussion of the availability of the entire HMP for public review. Public input on these documents is invited and contact information is given.

Greenville County

Multi-jurisdictional Hazard Mitigation Plan Update

Section Eight

MITIGATION INITIATIVES UPDATE

This section provides an overview of mitigation initiatives implemented during the 2010 Multi-Jurisdictional Hazard Mitigation Plan cycle. Initiatives include those contained in the 2010 HMP Update and those proposed during the 2010 plan cycle. Table 8-7 contains a full list of mitigation initiatives considered by Greenville County; the Hazard Mitigation Plan Cycle in which they were introduced; and, their current status.

8.1 Introduction

Mitigation initiatives form the fundamental mechanism for the implementation of the HMP. That is, when the resources and opportunity to do so become available, the sponsoring organization implements an initiative to address the vulnerabilities of the facilities, systems and planning areas that have been identified through the mitigation planning process. Mitigation initiatives described in this section were developed originally for the 2010 HMP Update; however, two additional initiatives were proposed during the 2010 HMP cycle.

8.2 Initiatives Incorporated into the 2010 HMP Update

The compilation of initiatives is based on a prioritization that was conducted by the Initiative Ranking Committee, a sub-group of the DMC overseeing the development of the 2010 HMP Update. The proposed initiatives discussed in this section are specific mitigation actions and projects considered to reduce the effects of each hazard” pursuant to §201.6(c)(3)(ii) of the federal regulations.

As specified in the procedures given in Section 4 of the plan, each proposed mitigation initiative was subjected to a review and analysis by the DMC. The purpose of this review and analysis was to ensure that an initiative proposed by a participating organization or community group was based on an adequate level of technical analysis; that all needed information about the proposal was presented; that any assumptions utilized were reasonable and logical; that the proposal was consistent with the goals and objectives of the DMC; and, that it was addressing identified vulnerabilities of the community or shortfalls in the communities’ mitigation policy framework. The Initiative Ranking Committee’s review and analysis process was focused on ensuring the technical validity of the proposal and on making a judgment whether or not the initiative would be technically effective and cost-beneficial. This review also helped to determine if

the proposed initiative was duplicative or in conflict with other proposed initiatives, or if its implementation would have an adverse affect in another jurisdiction. If necessary, the proposal was returned to the sponsoring organization for revision.

When the Initiative Ranking Committee reached a favorable judgment regarding the proposal, a recommendation was made to the DMC that it be adopted for incorporation into the HMP. The DMC reviewed the proposal for other concerns, such as its consistency with other community-based plans, programs and political policies. If appropriate, the DMC formally approved the proposal and its incorporation into the plan. In this way, each mitigation initiative was only incorporated into the plan after satisfactorily undergoing a “peer review” process considering both technical validity and policy compliance.

A description and the current status of each initiative is provided in the 2010 Plan Cycle Annual Mitigation Initiatives Progress Report in Appendix E. Some of the listed initiatives were introduced in the 2005 HMP, but not fully executed. They were re-introduced for the 2010 Update. The initiatives are divided into six categories: Prevention, Public Education & Awareness, Natural Resources Protection, Emergency Services, Property Protection, and Structural Projects. Table 8-7 contains a full list of mitigation initiatives considered by Greenville County; the Hazard Mitigation Plan Cycle in which they were introduced; and, their current status.

In addition to the proposed initiatives identified below, the County has also developed a “Debris Management Plan.” The Council resolution for the Debris Management Plan is provided in Appendix B.

Table 8-2
Initiative Priority Score Numeric Classification System

| Priority Criterion | Numeric Score |
|--|----------------------|
| Strategy Effectiveness | |
| No affect on Risk or Hazard | 0 |
| Affects several structures within the County | 1 |
| Affects many structures within the County | 2 |
| Affects most structures within the County | 3 |
| Percentage of Population Benefited | |
| Less than 10% benefited | 0 |
| 10% to 50% benefited | 1 |
| 51% to 75% benefited | 2 |
| Greater than 75% benefited | 3 |
| Time to Implement | |

| | |
|--|---|
| Cannot be implemented | 0 |
| Longer than one year | 1 |
| Within one year | 2 |
| Immediate | 3 |
| Time to Impact | |
| Cannot be implemented | 0 |
| Longer than one year | 1 |
| Within one year | 2 |
| Immediate | 3 |
| Cost to County | |
| Completely Unaffordable | 0 |
| Expensive, but manageable | 1 |
| Cost is easily managed | 2 |
| Little to no cost | 3 |
| Cost to Others | |
| Completely Unaffordable | 0 |
| Expensive, but manageable | 1 |
| Cost is easily managed | 2 |
| Little to no cost | 3 |
| Funding Source | |
| No known funding source available | 0 |
| Requires outside funding | 1 |
| Requires budget consideration | 2 |
| Within existing county budget | 3 |
| Community Support | |
| Opposed by the entire community | 0 |
| Acceptable only to those affected by the project | 1 |
| Some community opposition | 2 |
| Acceptable community wide | 3 |
| Project Feasibility | |
| Not possible | 0 |
| Accomplished with extensive design and planning | 1 |
| Accomplished with some design and planning | 2 |
| Easily accomplished | 3 |

Mitigation initiatives that relate to the National Flood Insurance Program (NFIP) are prioritized and evaluated with consideration to that program. Greenville County continues to participate in the Community Rating System (CRS) program, and is a Cooperating Technical Partner with DHS-FEMA, supplying detailed watershed studies throughout various areas of the County.

The results of the initiative rankings are listed below in Table 8-3, Initiative Priority Ranking. **Items listed in grey, omitted from the ranking process, are new initiatives; on-going County programs; or, were deemed to be necessary for immediate consideration without regard to ranking. Initiatives in bold type were deleted from further consideration during the 2010 HMP cycle.**

Benefit to Cost Ratio

A key analytical measure commonly used in vulnerability assessments is the benefit to cost ratio, which expresses the estimated benefits, in dollars, in comparison to the estimated costs to implement and maintain the proposed mitigation initiative. For an initiative to be considered “cost effective,” the dollar value of the benefits derived needs to exceed the costs to implement and maintain the initiative, or, in other words, the benefit to cost ratio should be greater than 1.0. Benefits to cost ratios were used in the Flood Mitigation Acquisition Program to procure a grant under the Pre-Disaster Mitigation grant program. This grant provided for the removal of five (5) flood prone structures from the flood hazard area. These structures were located on Berryhill Road and Northside Circle in Greenville County.

| Table 8-3, Initiative Priority Ranking | Project Description | Strategy Effectiveness | Population Impacted | Time to Implement | Time to Impact | Cost to County | Funding Source | Cost to Others | Community Support | Project Feasibility | Point Total | Project Priority |
|---|---|-----------------------------------|--------------------------------|------------------------------|---------------------------|---------------------------|---------------------------|-----------------------|------------------------------|--------------------------------|--------------------|-----------------------------|
| A. Prevention | | | | | | | | | | | | |
| | Brushy Creek Study | | | | | | | | | | | |
| | Rocky Creek Study | | | | | | | | | | | |
| | Upper Reedy Study | | | | | | | | | | | |
| | Gilder Creek Study | | | | | | | | | | | |
| | Grove Creek Study | | | | | | | | | | | |
| | Bridge/Culvert Analysis | 2 | 1 | 1 | 1 | 1 | 1 | 1.5 | 2 | 1 | 11.5 | 18 |
| | County Severe Weather Safety Manual | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 24 | 2 |
| B. Public Education & Awareness | | | | | | | | | | | | |
| | Flood Pool Elevations | | | | | | | | | | | |
| | Enhance Hazards Education | 3 | 2 | 2 | 1 | 2 | 3 | 3 | 3 | 2 | 21 | 9 |
| | Realtor Flood Hazard Education | | | | | | | | | | | |
| | Pre-prepared Hazard Info Ads | 3 | 3 | 1.5 | 3 | 1 | 3 | 3 | 3 | 2 | 22.5 | 5 |
| | Flood Signs | 2 | 1.5 | 1.5 | 2 | 1 | 1 | 2 | 2 | 3 | 16 | 12 |
| | Weather Stations | 2 | 2 | 2 | 3 | 2 | 3 | 3 | 3 | 2 | 22 | 6 |
| | FIRM Updates | 2 | 1 | 1 | 3 | 1 | 3 | 2 | 1.5 | 1 | 15.5 | 13 |
| | Enhance GIS Database | 2 | 1 | 1 | 2 | 1 | 3 | 1.5 | 2 | 2 | 15.5 | 14 |
| C. Natural Resources Protection | | | | | | | | | | | | |
| | Stream Crossing Debris Removal | 1.5 | 1 | 2 | 3 | 1.5 | 3 | 2 | 3 | 3 | 20 | 10 |
| D. Emergency Services | | | | | | | | | | | | |
| | Early Warning System | 1 | 1.5 | 1 | 3 | 2 | 2.5 | 2 | 3 | 1 | 17 | 11 |
| | Gates at Flooded Intersections | 1 | 0 | 2 | 3 | 1 | 3 | 2 | 2 | 1.5 | 15.5 | 15 |
| | Improve Radio Communications | 1.5 | 1 | 1 | 3 | 1 | 1 | 1 | 3 | 1 | 13.5 | 16 |
| | Post-disaster Review Meetings | 1 | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 24 | 3 |
| | Installation of River Gages | 2 | 2 | 2 | 3 | 2 | 3 | 2 | 3 | 2 | 21 | 8 |
| | Develop Formal Agreements w/ Utility Providers | | | | | | | | | | | |
| | Develop Inter-local Agreements | | | | | | | | | | | |
| | Evaluation of Emergency Routes | | | | | | | | | | | |
| | Communications Protocol | 3 | 3 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 26 | 1 |
| | EMD Training | 2 | 2.5 | 1.5 | 3 | 3 | 3 | 3 | 3 | 2 | 23 | 4 |
| E. Property Protection | | | | | | | | | | | | |
| | Dwelling Elevation Program | | | | | | | | | | | |
| | Flood Mitigation Acquisition Program | | | | | | | | | | | |
| | Critical Facility Review | 2 | 2 | 1 | 3 | 3 | 3 | 2.5 | 3 | 2 | 21.5 | 7 |
| | Relocate Fire Station(s)/EMS | 0.5 | 0 | 1 | 3 | 0.5 | 2.5 | 2 | 2 | 1 | 12.5 | 17 |
| F. Structural Projects | | | | | | | | | | | | |
| | 425 Drainage Projects | | | | | | | | | | | |

8.4 Initiatives by Hazard

The table below presents the mitigation initiatives that have been proposed to address the identified hazards posing the most risk to Greenville County, as determined by the DMC. As described in section 6 of this plan, the hazards are ranked based on risk from high to low as winter storms, floods, tornadoes/high winds, drought/heat wave, thunderstorms, wildfires, dam failure and earthquakes. This section is also another example of how the planning approach used by Greenville County has effectively used the hazard identification and risk estimation process to guide formulation of proposed initiatives.

Table 8-4
Initiatives by Primary Hazard Mitigated

| Initiative Description by Hazard | |
|---------------------------------------|--|
| A. Winter Storms | |
| | Develop Formal Agreements w/ Utility Providers |
| | Pre-prepared Hazard Info Ads |
| | Enhance GIS Database |
| | Improve Radio Communications |
| | Post-disaster Review Meetings |
| | Evaluation of Emergency Routes |
| | Communications Protocol |
| | EMD Training |
| | Critical Facility Review |
| B. Floods | |
| | Brushy Creek Study |
| | Rocky Creek Study |
| | Upper Reedy River Study |
| | Gilder Creek Study |
| | Grove Creek Study |
| | Bridge/Culvert Analysis |
| | Weather Stations |
| | Flood Pool Elevations |
| | Realtor Flood Hazard Education |
| | Flood Signs |
| | FIRM Updates |
| | Stream Crossing Debris Removal |
| Gates at Flooded Intersections | |
| | Installation of River Gages |
| | Develop Inter-local Agreements |
| | Dwelling Elevation Program |
| | Flood Mitigation Acquisition Program |
| | 425 Drainage Projects |

| |
|--------------------------------------|
| C. Tornado/High Winds |
| Early Warning System |
| D. Drought/Heat Wave |
| Enhanced Hazards Education |
| E. Thunderstorms |
| County Severe Weather Manual |
| F. Wildfires |
| Relocate Fire Station(s)/ EMS |
| H. Dam Failure |
| Enhanced Hazards Education |
| G. Earthquakes |

Table 8-5 lists all mitigation activities, and parties responsible for implementation:

Table 8-5
Responsible Parties for Initiative Implementation

| Initiative Description | Responsible Party |
|--|---|
| A. Prevention | |
| Brushy Creek Study | USACE, Floodplain Administrator, Planning Commission |
| Rocky Creek Study | USACE, Floodplain Administrator, Planning Commission |
| Upper Reedy Study | Floodplain Administrator, Public Works |
| Gilder Creek Study | Floodplain Administrator, Public Works |
| Grove Creek Study | Floodplain Administrator, Public Works |
| Bridge/Culvert Analysis | Floodplain Administrator, Public Works |
| County Severe Weather Manual | Risk Manager |
| B. Public Education & Awareness | |
| Flood Pool Elevations | Floodplain Administrator, GIS, NRCS |
| Enhance Hazards Education | Floodplain Administrator, GIS, Public Works Dept., Emergency Management Div., USDA-NRCS, Soil & Water Conservation District, Government Affairs |
| Realtor Flood Hazard Education | Floodplain Administrator |
| Pre-prepared Hazard Info Ads | Floodplain Administrator, Government Affairs |
| Flood Signs | Floodplain Administrator, Public Works |
| Weather Stations | Floodplain Administrator, National Weather Service, Public Works |
| FIRM Updates | Floodplain Administrator, GIS |
| Enhance GIS Database | Floodplain Administrator, GIS |

| | |
|--|--|
| C. Natural Resources Protection | |
| Stream Crossing Debris Removal | NRCS |
| D. Emergency Services | |
| Early Warning System | Floodplain Administrator, National Weather Service |
| Gates at Flooded Intersections | Public Works, Fire Department |
| Improve Radio Communications | Emergency Management, Public Works |
| Post-disaster Review | Emergency Management, Public Works |
| Installation of River Gages | Floodplain Administrator, National Weather Service, Public Works |
| Develop Formal Agreements w/ Utility Providers | Public Works |
| Develop Inter-local Agreements | Codes Enforcement |
| Evaluation of Emergency Routes | Public Works, Fire Department |
| Communications Protocol | Public Works |
| EMD Training | Emergency Services |
| E. Property Protection | |
| Dwelling Elevation Program | Floodplain Administrator |
| Critical Facility Review | LEPC |
| Flood Mitigation Acquisition Program | Floodplain Administrator, Public Works |
| Relocate Fire Station(s)/EMS | Fire Department |
| F. Structural Projects | |
| 425 Drainage Projects | Engineering |

8.5 Potential Funding Sources

Each initiative incorporated in the Greenville County Mitigation Plan Update has been ranked considering the ability to fund it, either within County budget or from outside funding sources. The DMC developed a subset of the potential funding sources for the approved initiatives. Potential funding sources are assigned to initiatives by their respective “Primary Area”, as necessary, regarding the likely funding source. These designations are shown in Table 8-6.

Some funding sources may no longer be available, while others may have come into existence since 2015 HMP Update was prepared. It is the expectation of the DMC that the agencies and organizations that sponsored a specific initiative would utilize the information given in this report to pursue funding opportunities to implement the initiative.

**Table 8-6
Initiative Funding Sources**

| Initiative Description | Funding Source Primary Area |
|--|--------------------------------------|
| A. Prevention | |
| Brushy Creek Study | County |
| Rocky Creek Study | County |
| Upper Reedy Study | County |
| Gilder Creek Study | County |
| Grove Creek Study | County |
| Bridge/Culvert Analysis | County |
| County Severe Weather Manual | County |
| B. Public Education & Awareness | |
| Flood Pool Elevations | County |
| Enhance Hazards Education | County, Available Material |
| Realtor Flood Hazard Education | County |
| Pre-prepared Hazard Info Ads | County, Public Service Announcements |
| Flood Signs | County, Grants |
| Weather Stations | County, Grants |
| FIRM Updates | FEMA |
| Enhance GIS Database | County |
| C. Natural Resources Protection | |
| Stream Crossing Debris Removal | County, NRCS |
| D. Emergency Services | |
| Early Warning System | County, Grants |
| Gates at Flooded Intersections | County, Grants |
| Improve Radio Communications | County, Grants |
| Post-disaster Review Meetings | County |
| Installation of River Gages | County, NWS, Grants |
| D. Emergency Services | |
| Develop Formal Agreements w/ Utility Providers | County |
| Develop Inter-local Agreements | County |
| Evaluation of Emergency Routes | County |
| EMD Training | County, Grants, FEMA |
| E. Property Protection | |
| Dwelling Elevation Program | County, FEMA |
| Critical Facility Review | County, Grants |
| Flood Mitigation Acquisition Program | County, Grants |
| Relocate Fire Station(s)/EMS | County |
| F. Structural Projects | |
| 425 Drainage Projects | County |

8.6 Mitigation Initiatives Status – 2015 HMP Update

Table 8-7 summarizes the status of all initiatives at the time of 2015 HMP Update preparation. This table associates each initiative with the Hazard Mitigation Plan

Cycle where it was first introduced and indicates whether the initiative is complete, ongoing, under review or **deleted** from further consideration.

Table 8-7
Mitigation Initiatives Status – 2015 HMP Update

| Initiative Description | Hazard Mitigation Plan Cycle | Status |
|--|------------------------------|-----------------------|
| A. Prevention | | |
| Brushy Creek Study | 2010 | Complete |
| Rocky Creek Study | 2010 | Complete |
| Upper Reedy Study | 2005 | Complete |
| Gilder Creek Study | 2005 | Complete |
| Grove Creek Watershed | 2015 | Ongoing |
| Bridge/Culvert Analysis | 2010 | Ongoing |
| County Severe Weather Manual | 2010 | Complete |
| B. Public Education & Awareness | | |
| Flood Pool Elevations | 2010 | Complete |
| Enhance Hazards Education | 2010 | Ongoing |
| Realtor Flood Hazard Education | 2010 | Ongoing |
| Pre-prepared Hazard Info Ads | 2010 | Ongoing |
| Flood Signs | 2010 | Ongoing |
| Weather Stations | 2010 | Installation Complete |
| FIRM Updates | 2005 | Pending |
| Enhance GIS Database | 2005 | Ongoing |
| C. Natural Resources Protection | | |
| Stream Crossing Debris Removal | 2005 | Complete |
| D. Emergency Services | | |
| Early Warning System | 2010 | Pending |
| Gates at Flooded Intersections | 2010 | Deleted |
| Improve Radio Communications | 2010 | Under Review |
| Post-disaster Review Meetings | 2010 | Ongoing |
| Installation of River Gages | 2010 | Complete |
| Develop Formal Agreements w/ Utility Providers | 2010 | Complete |
| Develop Inter-local Agreements | 2010 | Complete |
| Evaluation of Emergency Routes | 2010 | Ongoing |
| Communications Protocol | 2010 | Ongoing |
| Comprehensive Training Strategy | 2010 | Ongoing |
| E. Property Protection | | |
| Dwelling Elevation Program | 2005 | Ongoing |
| Critical Facility Review | 2010 | Complete |
| Flood Mitigation Acquisition Program | 2010 | Ongoing |
| Relocate Fire Station(s)/EMS | 2010 | Deleted |
| F. Structural Projects | | |
| 425 Drainage Projects | 2010 | Ongoing |

Appendix A – Local Mitigation Plan Review Tool

APPENDIX A:

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

| | | |
|---|---|--------------------------------------|
| Jurisdiction: Greenville County; City of Greenville; City of Ft. Inn; City of Simpsonville; City of Mauldin | Title of Plan: Greenville County Multi-Jurisdictional Hazard Mitigation Plan | Date of Plan: January 2015 |
| Local Point of Contact: | Address: | |
| Title: Floodplain Administrator | 301 University Ridge, Suite 4100 Greenville, SC 29601-3660 | |
| Agency: Greenville County Codes Enforcement | | |
| Phone Number: 864-467-7523 | E-Mail: JBishop@greenvillecounty.org | |

| | | |
|--|---|--------------|
| State Reviewer: Melissa Potter | Title: State Hazard Mitigation Officer | Date: |
|--|---|--------------|

| | | |
|---|---------------|--------------|
| FEMA Reviewer: | Title: | Date: |
| Date Received in FEMA Region <i>(insert #)</i> | | |
| Plan Not Approved | | |
| Plan Approvable Pending Adoption | | |
| Plan Approved | | |

SECTION 1: REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been ‘Met’ or ‘Not Met.’ The ‘Required Revisions’ summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is ‘Not Met.’ Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

| 1. REGULATION CHECKLIST | | Location in Plan (section and/or page number) | Met | Not Met |
|---|--|---|-----|------------|
| Regulation (44 CFR 201.6 Local Mitigation Plans) | | | | |
| ELEMENT A. PLANNING PROCESS (* See Appendices J –M for specific municipal information) | | | | |
| A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1)) | Sec.1, Sec. 3.2; 3.3; 7.5.3 Appendix C | | | |
| A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2)) | Sec. 3.2 Appendix C | | | |
| A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1)) | Sec. 5.5 Appendix C | | | |
| A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3)) | Sec. 4.3; 6.2 | | | |
| A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii)) | Sec. 5.5, 7.5 Appendix C | | | |
| A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i)) | Sec. 7.5.1 – 7.5.4 | | | |
| <u>ELEMENT A: REQUIRED REVISIONS</u> | | | | |

| 1. REGULATION CHECKLIST | | Location in Plan (section and/or page number) | Met | Not Met |
|--|--|---|-----|------------|
| Regulation (44 CFR 201.6 Local Mitigation Plans) | | | | |
| ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT | | | | |
| (* See Appendices J – M for specific municipal information) | | | | |
| B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i)) | Sec. 6.2 Appendices G, H & I | | | |
| B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i)) | Sec. 6.1, 6.2 & 6.3 | | | |
| B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii)) | Sec. 6.2; 6.4; 6.5 | | | |
| B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii)) | Sec. 6.5.1 | | | |
| ELEMENT B: REQUIRED REVISIONS | | | | |
| ELEMENT C. MITIGATION STRATEGY (* See Appendices J – M for specific municipal information) | | | | |
| C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3)) | Sec. 7.5.4 | | | |
| C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii)) | Sec. 5.3 Sec. 6.5.1 Sec. 7.2 "4)f" | | | |
| C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i)) | Sec. 7.2 | | | |
| C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii)) | Sec. 7.3 Sec. 8 | | | |
| C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii)) | Sec. 8.2 – 8.5 | | | |
| C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii)) | Sec. 7.5.4 | | | |
| ELEMENT C: REQUIRED REVISIONS | | | | |

| 1. REGULATION CHECKLIST | | Location in Plan (section and/or page number) | Met | Not Met |
|--|------------------------|---|-----|------------|
| Regulation (44 CFR 201.6 Local Mitigation Plans) | | | | |
| ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only) | | | | |
| D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3)) | Sec. 6.5.4 | | | |
| D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3)) | Sec. 8.6 Appendix E | | | |
| D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3)) | Sec. 6.5.4 | | | |
| <u>ELEMENT D: REQUIRED REVISIONS</u> | | | | |
| ELEMENT E. PLAN ADOPTION | | | | |
| E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5)) | | | | |
| E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5)) | | | | |
| <u>ELEMENT E: REQUIRED REVISIONS</u> | | | | |
| ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA) | | | | |
| F1. | | | | |
| F2. | | | | |
| <u>ELEMENT F: REQUIRED REVISIONS</u> | | | | |

SECTION 2: PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

- 1) *A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
- 2) *The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
- 3) *A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

Element D: Plan Update, Evaluation, and Implementation (*Plan Updates Only*)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

| MULTI-JURISDICTION SUMMARY SHEET | | | | | | | | | | | | |
|----------------------------------|-------------------|--|----------|-----------------|-------|-------|------------------------|---|---------------------------|--|---------------------|--------------------------|
| # | Jurisdiction Name | Jurisdiction Type (city/borough/ township/ village, etc.) | Plan POC | Mailing Address | Email | Phone | Requirements Met (Y/N) | | | | | |
| | | | | | | | A. Planning Process | B. Hazard Identification & Risk Assessment | C. Mitigation Strategy | D. Plan Review, Evaluation & Implementation | E. Plan Adoption | F. State Requirements |
| 1 | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | |

| MULTI-JURISDICTION SUMMARY SHEET | | | | | | | | | | | | |
|----------------------------------|-------------------|--|----------|-----------------|-------|-------|---------------------------|--|------------------------------|--|------------------------|--|
| # | Jurisdiction Name | Jurisdiction Type (city/borough/ township/ village, etc.) | Plan POC | Mailing Address | Email | Phone | Requirements Met (Y/N) | | | | | |
| | | | | | | | A. Planning Process | B. Hazard Identification & Risk Assessment | C. Mitigation Strategy | D. Plan Review, Evaluation & Implementation | E. Plan Adoption | F. St a t e R e q u i r e - m e n t s |
| 6 | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | |

| MULTI-JURISDICTION SUMMARY SHEET | | | | | | | | | | | | |
|----------------------------------|-------------------|--|----------|-----------------|-------|-------|---------------------------|--|------------------------------|--|------------------------|---|
| # | Jurisdiction Name | Jurisdiction Type (city/borough/ township/ village, etc.) | Plan POC | Mailing Address | Email | Phone | Requirements Met (Y/N) | | | | | |
| | | | | | | | A. Planning Process | B. Hazard Identification & Risk Assessment | C. Mitigation Strategy | D. Plan Review, Evaluation & Implementation | E. Plan Adoption | F. St a t e R e q u i r e m e n t s |
| 16 | | | | | | | | | | | | |
| 17 | | | | | | | | | | | | |
| 18 | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

Appendix B – Greenville County Hazard Mitigation Plan Resolutions

STATE OF SOUTH CAROLINA)
)
COUNTY OF GREENVILLE)

RESOLUTION No. 1365

WHEREAS, the health and safety of all County citizens are threatened by potential natural disasters, which are caused by flood events, winter ice storms, tornadoes and other natural disasters, Greenville County Council deems it a public necessity to receive the Revisions to the Greenville County Hazard Mitigation Plan, which identifies measures for the safeguarding of Greenville County citizens lives and property from the imminent hazard of natural disasters.

THEREFORE, BE IT RESOLVED, That Greenville County Council hereby approves the revisions to the Greenville County Hazard Mitigation Plan.

BE IT FURTHER RESOLVED, that from time to time this Plan may be revised, and that such revision shall be approved by the Greenville County Council.

ADOPTED This 5th Day of January 2010, in Greenville County, South Carolina.

GREENVILLE COUNTY COUNCIL

By: 

Herman G. Kirven, Jr., Chairman

By: 

Joseph M. Kernell, County Administrator

ATTEST:

By: 

Theresa B. Kizer, Clerk to County Council
Greenville County, South Carolina

STATE OF SOUTH CAROLINA)
)
COUNTY OF GREENVILLE)

No. 1118

RESOLUTION

WHEREAS, the health and safety of all County citizens are threatened by potential natural disasters, which are caused by flood events, winter ice storms, tornadoes and other natural disasters, Greenville County Council deems it a public necessity to receive the Greenville County Hazard Mitigation Plan, which identifies measures for the safeguarding of Greenville County citizens' lives and property from the imminent hazard of natural disasters.

THEREFORE, BE IT RESOLVED, that Greenville County Council hereby approves the Greenville County Mitigation Plan ("Plan") and supports the efforts and recommendations in the Plan.

BE IT FURTHER RESOLVED, in order to facilitate the actions outlined in the Plan are based on "if and when funding" becomes available for such projects, either from County funds or outside funding sources.


BE IT FURTHER RESOLVED, that when funding sources are procured that a request shall be made to the Greenville County Council of the proposed action to implement initiatives outlined in the Plan.

BE IT FURTHER RESOLVED, that from time to time this Plan may be revised, and that such revisions shall be approved by the Greenville County Council.


ADOPTED This 13th Day of December 2004, in Greenville County, South Carolina.

GREENVILLE, COUNTY COUNCIL

By: 
Phyllis Henderson, Chairman

By: 
Joseph Kernell, County Administrator

ATTEST:

By: 
Theresa B. Kizer, Clerk to County Council
Greenville County, South Carolina

RESOLUTION No. 1327

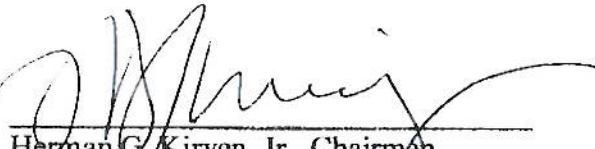
**A RESOLUTION TO ADOPT THE GREENVILLE COUNTY DEBRIS
MANAGEMENT PLAN.**

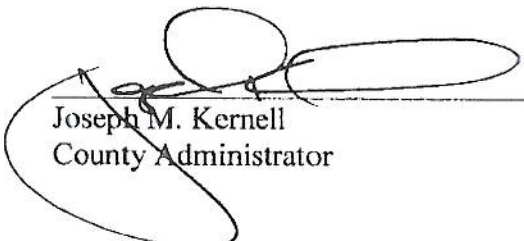
WHEREAS, the proper collection and disposal of debris created by natural disasters is crucial to protect the health and safety of all County citizens and such planned debris management is necessary to ensure fiscal responsibility and receive additional FEMA funds that may be allocated for certain natural disasters, Greenville County Council deems it a public necessity to receive the Greenville County Debris Management Plan, which identifies measures for the safe, efficient management of debris created by these disasters.

THEREFORE, BE IT RESOLVED, that Greenville County Council hereby approves the Greenville County Debris Management Plan.


BE IT FURTHER RESOLVED, that from time to time this Plan may be revised, and that such revision shall be approved by the Greenville County Council.

ADOPTED This 17th day of February 2009, in Greenville County, South Carolina.


Herman G. Kirven, Jr., Chairman
Greenville County Council


Joseph M. Kernell
County Administrator

ATTEST:


Theresa B. Kizer
Clerk to Council

Appendix C – Outreach Activities Documentation

APPENDIX C-1
DMC MEETING ROSTERS

James, Brenda

Distribution List Name: Hazard Mitigation Committee

Members:

| | | |
|---------------------------|---|-----------------------------------|
| Abraham, Ed | ed.abraham@gvltec.edu | |
| Barber, Teresa | Tbarber@greenvillecounty.org | |
| Bentley, Chip | bentley@scacog.org | |
| Bristow, Charles | cbristow@ethox.com | |
| Carter, Joe | jcarter@simpsonvillepublicworks.org | - rejected email |
| Case, Roger | roger.case@fountaininn.org | Sville Public Works |
| Chapman, Jessica | jchapman@greenvillesc.gov | 110 Woodside Park Dr. |
| Cooper, Lori | lori.cooper@fountaininn.org | Sville 29681 |
| Crawford, Jay | jcrawford@simpsonvillepublicworks.org | 967-9531 |
| Dawson, Sonya | SDawson@greenvillecounty.org | |
| Edwards, Warren | wedwards@greenvillecounty.org | |
| Estep, Lance | lestep@greenvillecounty.org | |
| Fiuzat, Abbas | hydro_tech@bellsouth.net | |
| Gabric, Larry | larry.gabric@noaa.gov | |
| Gamble, Hesha | HGamble@greenvillecounty.org | |
| Gardner, John | jgardner@mauldincitysc.com | |
| Gracely, Dianna | dianna@travelersrestsc.com | |
| Graham, Steve | sgraham@boilingspringsfd.org | |
| Gucker, Paula | PGucker@greenvillecounty.org | |
| Hall, Robert | RoHall@greenvillecounty.org | |
| Hamel, Kim | khamel@mauldincity.sc.com | -mail returned - 234-3475 |
| James, Brenda | bjames@greenvillecounty.org | mauldin City Bus + Dev. |
| Lawrence, Steward | slawrence@greenvillecounty.org | 5 E Butler Rd. Services |
| Marett, Jay | JMarett@greenvillecounty.org | mauldin 29662 |
| Mihalic, Bob | bmihalic@greenvillecounty.org | |
| Muthukrishnan, Suresh | suresh.muthukrishnan@furman.edu | |
| Newton, Lynne | lynne.newton@sc.usda.gov | |
| O'Kelly, Ritch | rokelly@onealinc.com | |
| Papin, Marcia | MPapin@greenvillecounty.org | |
| Park, Scott | spark@greenvillecounty.org | |
| Robertson, Kirsten | kirobertson@greenvillecounty.org | |
| Sturey, Tony | anthony.sturey@noaa.gov | |
| Sutton, Mark | msutton@greenvillecounty.org | |
| Sykes, Bill | bsykes@h2l.com | |
| Tanner, Pat | patricia.tanner@noaa.gov | |
| Taylor, Chief Ken | sgfd605@msn.com | |
| Tollison, Mark | MTollison@greenvillecounty.org | |
| Usher, Todd | info@hbaofgreenville.com | |
| Vinson, Eric | EVinson@greenvillecounty.org | |
| Wilson, Gene | gene.wilson@gvltec.edu | |
| Wortkoetter, Judy | JWortkoetter@greenvillecounty.org | |
| Zaragoza, John | jzaragoza@greenvillecounty.org | - Email acct doesn't exist EMS |

Sign In Roster

Subject: Multi-Hazard Mitigation Committee Meeting
Conference Room B - County Square

Date: November 9, 2010

| NAME - PLEASE PRINT | Organization/Employer | PHONE | Email |
|---------------------|----------------------------------|----------|--------------------------------|
| Brenda Arflin | Bxl Cantry Codes Enf. | 467-7357 | barflin@greenvillecounty.org |
| Keith Drummond | " " " | 467-7495 | Kdrummond@greenvillecounty.org |
| Robert Hall | " " " | 467-7523 | rohall@greenvillecounty.org |
| Lori Cooper | FT. INN | 409-3334 | lori.cooper@fountaininn.org |
| MIKE WATKINS * | MMULDIW Public works | 346-7825 | mwatkins@mmuldiwcitysc.com |
| Duncan Harrison | Gvl County Solid Waste | 268-0226 | SHARRISON@greenvillecounty.org |
| GEORGE WILSON | GVL TECH | 250-8251 | GEORGE.WILSON@GVLTECH.EDU |
| Bill Soper | H2L Consulting Eng'ns | 233-8844 | bsoper@H2L.com |
| PAT TANNER | NAT'L WEATHER SVC. | 848-1332 | patricia.tanner@noaa.gov |
| CHRIS HOANE | " | " | |
| Teresa Barber | Greenville County | 467-7459 | tbarber@greenvillecounty.org |
| KEVIN COLLINS | GREENVILLE COUNTY | 467-7547 | KCOLLINS@greenvillecounty.org |
| Brian Godfrey | Greenville County | 467-7318 | bgodfrey@greenvillecounty.org |
| Kachel Ethun | Greenville County Emergency Mgmt | 467-2680 | rethun@greenvillecounty.org |
| Jay Macett | " | " | jmacett@greenvillecounty.org |
| Paula Gucker | G'ville Pub Wks | 467-7007 | pgucker@greenvillecounty.org |
| Hesha Gamble | Greenville Co. Pub Works | 467-4612 | hgamble@greenvillecounty.org |
| Dean Campbell | County Planning's OFF. | 467-7114 | dcampbell@greenvillecounty.org |
| MARK SUTTON | GC EQ-1-1 | 467-5928 | MSUTTON@greenvillecounty.org |

Date: November 9, 2010

**Subject: Multi-Hazard Mitigation Committee Meeting
Conference Room B - County Square**

[illegible]

Multi-Hazard Mitigation Committee
Attendance Sheet
Meeting Date - OCTOBER 26, 2011

| Name (Please Print) | Organization/Employer | Phone Number |
|---------------------|--|------------------|
| Brenda H Arlin | Gvl Cty Codes | 467-7357 |
| Keith E Drummond | Gvl Cty Codes | 467-7495 |
| Mollie D. Parsons | Gvl Cty Codes | 467-7001 |
| Robert Hall | Gvl Cty Codes | 467-7523 |
| Eric Hedrick | Cornerstone Contractors Greenville ^{HBA of} | 288-4959 |
| Teresa Barber | Gvl Cty Codes | 467-7459 |
| GEORGE H MISCALL | VEC | 908-9999 |
| Lori Cooper | FT INN | 409-3334 |
| Roger Case | FT INN | 409-3334 |
| Tom R. ZARASOZA | G.C. EMS | 467-7435 |
| PAT JENNIFER | G.C. OEM | 449-3549 |
| Michael Day | Hance Builders Assn | 254-0133 |
| KIRSTEN ROBERSON | GC SOIL & WATER | 467-2755 ext 110 |
| Hesha Gamble | Engineering & Maintenance | 467-4612 |
| Jay Moret | GC OEM | 467-2680 |
| SAT WENDE KEO | GC Emergency Maint | 467-2680 |
| PAT TANNER | NATIONAL WEATHER SERVICE | 879 1085 |
| Andy Walthers | LDD | 467-2882 |
| PAL SIKES | VEC | 233-8844 |
| | | |
| | | |

Sign In Roster
October 31, 2012

[illegible]

| SIGN IN ROSTER | | Multi-Hazard Mitigation Plan Update | | DATE: October 24, 2013 | |
|---------------------|-------------------------|-------------------------------------|--|------------------------|--|
| Name (Please Print) | Address | Phone | E-Mail | | |
| Jay Maret | | 467-2680 | JMaret@greenvillecounty.org | | |
| Bill Sykes | H2L Construction Eng'rs | 483-2292 | bsykes@H2L.com | | |
| Jay Crawford | City of Simpsonville | 962-5723 | j Crawford@simpsonvillepublicworks.org | | |
| Marcia Papin | County of Greenville | 213-9672 | mpapin@greenv.ilecounty.org | | |
| Lori Cooper | FT. Inn | 409-3334 | lori.cooper@fountaininn.org | | |
| Roger Pose | FT. Inn | 409-3334 | roger.pose@fountaininn.org | | |
| Sonya Dawson | Subdivision Admin/4600 | 467-5764 | | | |
| Christian Crear | City of Greenville | 467-8892 | ccrear@greenville.sc.gov | | |
| Steward Lawrence | | 467-7547 | SLawrence@greenvillecounty.org | | |
| KIRSTEN ROBERTSON | COUNTY OF GREENVILLE | 467-2755 | KIRSTENROBERTSON@greenvillecounty.org | | |
| WARREN EDWARDS | HUMAN RESOURCES | 467-7318 | wedwards@greenvillecounty.org | | |
| Mollie Parsons | County of Greenville | 467-7001 | mparsons@greenvillecounty.org | | |

| SIGN IN ROSTER | | Multi-Hazard Mitigation Plan Update | | DATE: October 24, 2013 | |
|---------------------|----------------------|-------------------------------------|--------------------------------|------------------------|--|
| Name (Please Print) | Address | Phone | E-Mail | | |
| Robert Hall | County Sq Floodplain | 467-7523 | Robert@greenvillecounty.org | | |
| Teresa Barber | Greenville County | 467-7459 | Harber@greenvillecounty.org | | |
| Laver Ester | Greenville County | 467-7373 | lesteg@greenvillecounty.org | | |
| Bula Gueker | G'ville Co. | 467-7007 | pgalleg@ | | |
| Hesha Gamble | " | 467-4612 | hgamble | | |
| Kim Hornel | Mauldin | 234-3475 | khornel@mauldin-city-sc.com | | |
| Eric Venson | Greenville Co | 467-7281 | evinson@ | | |
| Bobo Mihalic | Greenville County | | bmmihalic@greenvillecounty.org | | |
| PAT TANNER | OSP drive | 864 842 9970 | PATRICIA.TANNER@NOVA.A.COV | | |
| | | | | | |
| | | | | | |
| | | | | | |

APPENDIX C-2

COMMUNITY OUTREACH MEETINGS LOG

COMMUNITY OUTREACH MEETINGS LOG

Community Rating System and Multi-Jurisdictional Hazard Mitigation Plan

2006 – 2014

| DATE | PRESENTERS | ORGANIZATION | CONTENT |
|---------------|--|---|---|
| 9/22/06 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. |
| 09/28/06 | Woolpert Keith Drummond Paula Gucker | Workshop for County Council | Presented Mitigation Action Plan for Brushy Creek and Lake Fairfield. Also, discussed general flooding and mitigation issues. Council members questioned staff and consultant regarding proposed solutions. Approximately 75 members of public attended. |
| 10/2/06 | Keith Drummond Robert Hall Paula Gucker | Public Service, Planning and Development Committee | Presented and discussed changes to the Greenville County Flood Damage Prevention Ordinance. Staff answered questions of the committee, particularly with regard to substantial damage and repetitive loss. Approximately 30 members of public and staff attended. |
| 2/13/07 | Robert Hall Paula Gucker Nancy Sue H2L | Lake Fairfield and Interested Citizens (101 attending) | Presented plan for road closures due to flooding. Discussed floodprone property acquisition program. Answered general questions regarding flooding, Flood Damage Prevention and Stormwater Ordinances. |
| 3/8 – 3/11/07 | Codes Enf. CFM Staff | 2007 Home Show Palmetto Expo Center | Displayed floodplain information and FIRMS. Answered questions regarding floodplain and explained how to obtain additional information. |
| 3/14/07 | Robert Hall Paula Gucker Nancy Sue H2L | Lake Fairfield and Interested Citizens (approx. 70 attending) | Presented plan for road closures due to flooding. Discussed floodprone property acquisition program, including most recent flood study and report. Answered general questions regarding flooding, Flood Damage Prevention and Stormwater Ordinances. |
| 9/20/07 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. Approximately 10-20 members of the public attend on average. Meeting customarily lasts 1-1 1/2 hours. |
| 9/20/07 | Jeff Ward Paula Gucker Robert Hall Keith Drummond | Kingsgate Property Owners Phase IA Acquisitions | Presented property acquisition program for structures in the SFHA. Also, discussed general flooding and mitigation issues. Approximately 20 members of public attended. |

FLOODPLAIN OUTREACH MEETINGS LOG

Community Rating System and Multi-Jurisdictional Hazard Mitigation Plan

2006 – 2014

| DATE | PRESENTERS | ORGANIZATION | CONTENT |
|----------|---|--|---|
| 10/16/07 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. Approximately 10-20 members of the public attend on average. Meeting customarily lasts 1-1 1/2 hours. |
| 11/8/07 | Woolpert Robert Hall Paula Gucker | Gilder Creek Watershed Community Organization | Presented and discussed the Gilder Creek Watershed Study to be conducted. Also, answered general stormwater and floodplain questions. Citizens were requested to report past flooding problems so that the information can be used in the watershed study. |
| 11/15/07 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. Approximately 10-20 members of the public attend on average. Meeting customarily lasts 1-1 1/2 hours. |
| 12/13/07 | Woolpert Keith Drummond Robert Hall Paula Gucker | Upper Reedy River Watershed Community Organizations and Citizens | Presented and discussed the Upper Reedy River Watershed Study to be conducted. Also, answered general stormwater and floodplain questions. Citizens were requested to report past flooding problems so that the information can be used in the watershed study. |
| 1/17/08 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. Approximately 10-20 members of the public attend on average. Meeting customarily lasts 1-1 1/2 hours. |
| 2/21/08 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. Approximately 10-20 members of the public attend on average. Meeting customarily lasts 1-1 1/2 hours. |
| 3/6-9/08 | All Certified Floodplain Managers | Southern Home and Garden Show (Presented by the Home Builders Association) | Large annual event presented by the Home Builders Association. Answered floodplain and flood insurance questions; provided information through FEMA/Greenville County printed material. |

FLOODPLAIN OUTREACH MEETINGS LOG

Community Rating System and Multi-Jurisdictional Hazard Mitigation Plan

2006 – 2014

| DATE | PRESENTERS | ORGANIZATION | CONTENT |
|---------|---------------------------------|---|---|
| 3/20/08 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. Approximately 10-20 members of the public attend on average. Meeting customarily lasts 1-1 1/2 hours. |
| 4/6/08 | Keith Drummond Teresa Barber | Riverwalk Homeowners Association Meeting | Overview of Codes Enforcement services. Because this community borders Gilder Creek, floodplain issues were discussed including our floodplain ordinance; flood insurance; current Gilder Creek study and creek maintenance. A general overview of the NFIP was presented, including flood maps and how they may be obtained. |
| 4/17/08 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. Approximately 10-20 members of the public attend on average. Meeting customarily lasts 1-1 1/2 hours. |
| 5/16/08 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. Approximately 10-20 members of the public attend on average. Meeting customarily lasts 1-1 1/2 hours. |
| 7/8/08 | Robert Hall | SC Society of Professional Land Surveyors | Provided 1 hour of instruction in floodplain management. Discussed variety of issues including NFIP, flood insurance, BFE determination, LOMA/LOMR, floodplain applications/permitting, elevation certificates. |
| 7/14/08 | Robert Hall | Friends of the Reedy River | Pre-development meeting attended by members of Planning Commission, Robert Hall, Friends of the Reedy River, consultants and developers. The developers are proposing a subsidized housing development in a portion of SFHA of the Reedy River. |
| 7/17/08 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. Approximately |

FLOODPLAIN OUTREACH MEETINGS LOG

Community Rating System and Multi-Jurisdictional Hazard Mitigation Plan

2006 – 2014

| DATE | PRESENTERS | ORGANIZATION | CONTENT |
|----------|---|--|--|
| | | | 10-20 members of the public attend on average. Meeting customarily lasts 1-1 1/2 hours but this meeting lasted 2 full hours. |
| 8/21/08 | Kim Petrillo | Judson Community Meeting | Ms. Petrillo attended the Neighborhood Watch/Monthly community meeting held in Judson at the YMCA usually held on the third Thursday of the month. Discussed floodplain issues with regard to tributaries of the Reedy River that flow through the community. Approximately 10-20 members of the public attend on average. Meeting lasted 1-1 1/2 hours. |
| 9/30/08 | Teresa Barber and Keith Drummond | Berea Neighborhood Association Meeting | Ms. Barber and Mr. Drummond attended the community to discuss issues in the area. Multiple subjects were covered including general code enforcement and floodplain. The meeting lasted approximately 2 hours and had about 15 persons attending. |
| 10/2/08 | Kim Petrillo | Greenville County Human Relations Commission Board Meeting | Ms. Petrillo attended the board meeting to answer questions that the members had about code enforcement. Multiple topics were covered including floodplain. The session with Ms. Petrillo lasted 45 minutes and there were about 7 persons in attendance. |
| 10/23/08 | Woolpert, Inc. Keith Drummond, Paula Gucker, Robert Hall | Upper Reedy Watershed Citizens Meeting/Presentation | Preliminary results of the Upper Reedy Watershed study were presented to the public. Included a general discussion of floodplain issues, FIRMS, impact to structures, flood insurance, etc. |
| 1/22/09 | Woolpert, Inc. Keith Drummond, Paula Gucker, Robert Hall | Gilder Creek Watershed Citizens Meeting /Presentation | Results of Gilder Creek Watershed study were presented to the public. Included a general discussion of floodplain issues, FIRMS, impact to structures, flood insurance, etc. |
| 1/28/09 | Woolpert, Inc. Keith Drummond, Paula Gucker, Robert Hall | Longforest Acres Property Owners | Presented property acquisition program for structures in the SFHA. Also, discussed general flooding and mitigation issues. Approximately 20 members of public attended. |
| 1/29/09 | Woolpert, Inc. Keith Drummond, Paula Gucker, Robert Hall | Lake Fairfield Property Owners | Presented property acquisition program for structures in the SFHA. Also, discussed general flooding and mitigation issues. Approximately 15 members of public attended. |
| 2/19/09 | Keith Drummond, Paula Gucker, Robert Hall Public Works Staff | Rocky Creek Watershed Study Meeting with Affected Homeowners | Discussed the NFIP, Flood Insurance Rate Maps, Rocky Creek Watershed Study, and Flood Insurance. Handouts were provided, including information on FI Grandfather Rules. |

FLOODPLAIN OUTREACH MEETINGS LOG

Community Rating System and Multi-Jurisdictional Hazard Mitigation Plan

2006 – 2014

| DATE | PRESENTERS | ORGANIZATION | CONTENT |
|-----------------|---|--|--|
| 3/5-3/8 2009 | All Certified Floodplain Managers | Southern Home and Garden Show (Presented by the Home Builders Association) | Large annual event presented by the Home Builders Association. Answered floodplain and flood insurance questions; provided information through FEMA/Greenville County printed material. |
| 5/26/09 | Keith Drummond Woolpert | Hazard Mitigation Committee | Final committee review of Hazard Mitigation Plan. Members represented various departments and agencies including emergency management, planning, codes, land development, national weather service, municipalities, county public works and engineering consultants. |
| 7/28/09 | Teresa Barber | Berea Area Home Owners | Meeting was held at the GC Library on Hwy 25 North. Handouts and discussion of floodplain issues were provided. Approximately 50 members of the public attended this meeting. Meeting lasted 2 hours. |
| 8/13/09 | Teresa Barber | Lake Forest Area Home Owners | Meeting was held at Aldersgate United Methodist Church. Handouts and discussion of floodplain issues were provided. Approximately 100 members of the public attended this meeting. Meeting lasted 2 hours. |
| 9/10/2009 | Keith Drummond Teresa Barber | Sterling Area Home Owners | Meeting was held at the Sterling Community Center. Handouts and discussion of floodplain issues were provided. Approximately 15 members of the public attended this meeting. Meeting lasted 1 hour. |
| 2/4/2010 | Paula Gucker Keith Drummond Robert Hall | Del Norte Homeowners | Meeting was held at County Square with a group of about 20 homeowners to discuss acquisition of their homes, which are located in the Special Flood Hazard Area of Brushy Creek. This acquisition program and the Brushy Creek Study are mitigation initiative contained in the Multi-jurisdictional Hazard Mitigation Plan (MJHMP). A questions and answer session regarding the acquisition initiative was provided. |
| 3/23/2010 | Paula Gucker Keith Drummond Robert Hall | Buncombe Park Homeowners | Meeting was held at County Square with a group of about 20 homeowners to discuss acquisition of their homes, which are located in the Special Flood Hazard Area of Langston Creek. This acquisition program and the Upper Reedy River Study are mitigation initiatives contained in the MJHMP. A questions and answer session regarding the acquisition initiative was provided. |
| 7/23/2010 | Paula Gucker Keith Drummond Robert Hall | Lake Fairfield Homeowners | Discussed Lake Fairfield floodplain restoration area. Lake Fairfield is within the Brushy Creek study area, a mitigation initiative under the Multi-jurisdictional Hazard Mitigation Plan. |

COMMUNITY OUTREACH MEETINGS LOG

Community Rating System and Multi-Jurisdictional Hazard Mitigation Plan

2006 – 2014

| DATE | PRESENTERS | ORGANIZATION | CONTENT |
|-----------|---|---|---|
| 7/20/2010 | Keith Drummond | Foothills Resource Council | Meeting with USDA, Soil Conservation District, local environmental groups about out flood mitigation program |
| 8/25/2010 | Paula Gucker Keith Drummond Robert Hall | Del Norte Homeowners Northside Heights Homeowners | Meeting was held at County Square with a group of about 20 homeowners to discuss acquisition of their homes, which are located in the Special Flood Hazard Area of Brushy Creek. This acquisition program and the Upper Reedy River Study are mitigation initiatives contained in the MJHMP. A questions and answer session regarding the acquisition initiative was provided. |
| 11/9/2010 | Robert Hall Keith Drummond | Disaster Mitigation Committee | Discussed hazard mitigation activities and objectives for all natural hazards but primarily those related to flooding. Issues included map modernization, critical facilities, emergency response, public education, flood signage, drainage projects and flood prone structures acquisition. Approximately 20 members of the committee attended. |
| 1/21/2011 | Keith Drummond John McLeod | Home Builders Association of Greenville | Discussed code enforcement issues and the status of our revised Flood Insurance Rate Maps. Also discussed the new product, Flood Risk Map, and general floodplain services offered by the County. FIRM updates is a mitigation initiative under the MJHMP. Opportunity for HBA input into the mapping process was discussed. |
| 2/3/2011 | Paula Gucker Keith Drummond Robert Hall | Del Norte, Kingsgate and Lake Forest Homeowners | Meeting was held at County Square with a group of 11 homeowners to discuss acquisition of their homes, which are located in the 1% SFHA of Brushy Creek. This acquisition program and the Brushy Creek Study are mitigation initiatives contained in the Multi-jurisdictional Hazard Mitigation Plan (MJHMP). A question and answer session regarding the acquisition initiative was provided. |
| 5/5/2011 | Keith Drummond Teresa Barber | Grove Station Community Piedmont, SC | Discussed services offered by the Floodplain Administrator's office, such as SFHA determinations, revised FIRMS and floodplain development permits. |
| 5/25/2011 | Paula Gucker Keith Drummond Robert Hall | Del Norte Homeowners Association | Meeting held in subdivision to review acquisition program progress and discuss floodplain issues of concern to the homeowners association. |
| 8/18/2011 | Paula Gucker Keith Drummond Robert Hall | Homeowners in Brushy Creek North, Mountain Creek North and Upper Reedy Watersheds | Meeting was held at County Square with a group of 15 homeowners to discuss acquisition of their homes, which are located in the 1% SFHA of the listed watersheds. This acquisition program and the Brushy Creek/Upper Reedy River Watershed Studies are mitigation initiatives contained in the Multi-jurisdictional Hazard Mitigation Plan (MJHMP). A question and answer session regarding the acquisition initiative was provided. |

COMMUNITY OUTREACH MEETINGS LOG

Community Rating System and Multi-Jurisdictional Hazard Mitigation Plan

2006 – 2014

| DATE | PRESENTERS | ORGANIZATION | CONTENT |
|----------|--|---|---|
| 9/27/11 | Keith Drummond Patty Wright | Greenville Technical College Residential Builders Licensing Group | Meeting held at Greenville Technical College with approximately 30 individuals involved in residential builder licensing. Floodplain issues were discussed relative to the residential building code. |
| 10/11/11 | Robert Hall | South Carolina Surveyors Foothills Chapter | Robert Hall made a presentation to 17 surveyors on floodplain issues including the NFIP; map modernization; letters of map change; and flood insurance. The FIRM update mitigation initiative (MJHMP) was discussed, including the appeal process and opportunity for comment. |
| 10/26/11 | Robert Hall Keith Drummond Teresa Barber | Disaster Mitigation Committee | Discussed hazard mitigation activities and objectives for all natural hazards but primarily those related to flooding. Issues included map modernization, critical facilities, emergency response, public education, flood signage, drainage projects and flood prone structures acquisition. |
| 11/16/11 | Robert Hall | South Carolina Surveyors Spartanburg | Robert Hall made a presentation to 9 surveyors on floodplain issues including the NFIP; map modernization; letters of map change; and flood insurance. |
| 12/14/11 | Robert Hall Keith Drummond Teresa Barber Kim Petrillo Patty Wright | Preliminary DFIRM Community Coordination Meeting | Greenville County CFMs, along with FEMA and SCDNR representatives, held a meeting for County residents to review new draft DFIRMS. Residents questions were answered by CFMS and a FEMA flood insurance representative. Residents informed about the appeal process and opportunity to comment on the new Flood Insurance Study. |
| 2/15/12 | Robert Hall Keith Drummond Paula Gucker | Property Owners Flood Prone Structures Acquisition Program Del Norte and Kingsgate Subdivisions | Discuss flood issues related to potential acquisition of homes located in the SFHA. Answered questions regarding acquisition, flood maps, insurance, etc. This acquisition program and the Brushy Creek Study are mitigation initiatives contained in the Multi-jurisdictional Hazard Mitigation Plan (MJHMP). A question and answer session regarding the acquisition initiative was provided. |

COMMUNITY OUTREACH MEETINGS LOG

Community Rating System and Multi-Jurisdictional Hazard Mitigation Plan

2006 – 2014

| DATE | PRESENTERS | ORGANIZATION | CONTENT |
|------------|--|--|---|
| 10/31/2012 | Robert Hall Keith Drummond | Disaster Mitigation Committee | Discussed hazard mitigation activities and objectives for all natural hazards but primarily those related to flooding. Issues included map modernization, critical facilities, emergency response, public education, flood signage, drainage projects and flood prone structures acquisition. R. Hall delivered a powerpoint presentation to review natural hazards and summarize mitigation objectives achieved to date. Twenty five (25) members of the committee attended the meeting. |
| 11/13/12 | Robert Hall Herb Yingling Skip Limbaker | SC Professional Appraisers Coalition (SCPAC) | Discussed various issues related to codes enforcement including zoning, building codes and floodplain management. Floodplain issues discussed included NFIP overview; flood maps; new flood study; flood insurance; and, flood mitigation (structure acquisition program). There were approximately 18 SCPAC members in attendance. |
| 2/28/13 | Robert Hall Patty Wright Paula Gucker Jeff Ward & Associates | Various Property Owners part of Structure Acquisition Program | Meeting was held at County Square with a group of 5 homeowners to discuss acquisition of their homes, which are located in the 1% SFHA. This acquisition program and the associated watershed studies are mitigation initiatives contained in the Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). A question and answer session regarding the acquisition initiative was provided. |
| 5/22/13 | Herb Yingling Skip Limbaker | Commercial Realtors Greater Greenville Association of Realtors | Discussed various issues related to codes enforcement including zoning, building codes and floodplain management. Floodplain issues discussed included NFIP overview; flood maps; new flood study; flood insurance; and, flood mitigation (structure acquisition program). There were approximately 45 GGAR members in attendance. |
| 8/13/13 | Robert Hall | Registered Land Surveyors Foothills Chapter | Powerpoint presentation to registered land surveyors providing an overview of the NFIP; CRS; flood insurance requirements; local ordinance; LOMR-F. Also gave a summary of information contained in the new Flood Insurance Study. |
| 10/22/13 | Herb Yingling Lance Estep | Commercial Realtors | Meeting included a discussion of the Building Code requirements in Greenville County. Also discussed floodplain issues and distributed a web page with links to floodplain management information (permitting, code compliance, flood insurance, hazard mitigation, etc.) |
| 10/24/2013 | Robert Hall Jay Marett | Disaster Mitigation Committee | Discussed 2015 Multi-jurisdictional Hazard Mitigation Plan Update preparation including an assessment of response to previous year's hazards. Received an update on flood damage to the City of Mauldin and status of grant application for structure acquisition. DMC members were |

COMMUNITY OUTREACH MEETINGS LOG

Community Rating System and Multi-Jurisdictional Hazard Mitigation Plan

2006 – 2014

| DATE | PRESENTERS | ORGANIZATION | CONTENT |
|------|------------|--------------|--|
| | | | tasked to review and comment on draft HMP. Also asked to update mitigation objectives by offering corrections, deletions or additions. |
| | | | |

Note: Floodplain information is available from the permits counter on a continuous basis. Flood insurance information provided with each external floodplain verification request.

APPENDIX C-3

HAZARD MITIGATION PLANNING MEETING MINUTES

Greenville County Hazard Mitigation Planning Meeting

Greenville County Square

March 21, 2013

Attendees:

Robert Hall, Greenville County
Teresa Barber, Greenville County
Jay Marett, Greenville County
Lori Cooper, Fountain Inn
Kim Hamel, City of Mauldin

John Laux, City of Simpsonville
Jay Crawford, City of Simpsonville
David Garner, SCEMD
Charlotte Foster, SCEMD
Melissa Potter, SCEMD

Minutes:

- I. Introductions
 - a. Greenville County hosted a meeting to discuss the next local mitigation plan update.
 - b. Greenville County, Fountain Inn, City of Mauldin, City of Simpsonville, and State Emergency Management were present.
- II. Review of Existing Plans
 - a. The following jurisdictions have a FEMA approved local hazard mitigation plan:
 - i. Greenville County (unincorporated)
 - ii. City of Greenville
 - iii. City of Simpsonville
 - iv. City of Greer
 - b. The following jurisdictions are looking to write a mitigation plan:
 - i. Fountain Inn
 - ii. City of Mauldin
 - c. Expiration Dates:
 - i. Greenville County (1/13/2015)
 - ii. City of Greenville (7/15/2015)
 - iii. City of Greer (11/7/2015)
 - iv. City of Simpsonville (10/11/2015)
- III. Mitigation Plan Update options
 - a. The options for the next local mitigation plan update include:
 - i. Continue to update separate single jurisdiction plans
 - ii. Join with the County to form a Multi-jurisdictional plan
 - b. The advantages to joining with the County include:
 - i. Having a singular, cohesive plan that represents all jurisdictions within Greenville
 - ii. Meet federal requirements for all jurisdictions to be eligible for pre- and post-disaster mitigation dollars.

- iii. Divide up responsibilities in times of tight budgets and lack of personnel
 - iv. The County is going to have a county-wide hazard vulnerability assessment completed this year. It will include all of the existing municipalities. Using this document will reduce the overall effort for the plan update process.
 - c. The disadvantages to joining include:
 - i. Potentially being held back by any jurisdiction who does not provide data and information in a timely manner
 - ii. One entity would have to be the “keeper” of the plan to organize the final product.
 - d. All representatives present at the meeting agreed to work together and transition to a multijurisdictional plan. The plan would likely be a base plan that laid out the mitigation planning process, jurisdiction participation, county profile, and risk assessment. Individual jurisdiction information, mitigation goals, and actions, would be included in an appendix.
 - e. Greenville County would reach out to the other jurisdictions (Travelers Rest and City of Greer) to gauge their interest in joining the plan as well.

IV. Transitioning to a Multi-Jurisdictional Plan

- a. Changing the existing single jurisdiction plans into a multi-jurisdictional plan will require:
 - i. A joint planning effort
 - 1. Will have to show planning partners from each jurisdiction
 - 2. Explain how the jurisdictions helped in the plan update
 - ii. All jurisdictions will have to be represented in the risk assessment
 - iii. Each jurisdiction will have to list its own mitigation goals
 - iv. Each jurisdiction will have to provide a new or update list of mitigation actions.
 - 1. This is a “wish list” of mitigation plans, projects, and initiatives that the jurisdiction would like to see completed if funding were to become available.
 - 2. For each hazard type addressed, each municipality will have to include a least two mitigation actions.
 - v. Each municipality will have to adopt the plan
- b. Public Meetings
 - i. FEMA requires that the community host at least 2 public meetings about the plan update.
 - ii. The first one must be completed before FEMA reviews the draft plan.
 - iii. The second one can be when the municipalities adopt the plan in a public meeting (town/city/county council)
 - iv. Documentation must be included that shows that each municipality advertised the meeting to the public and that the meeting was held.

V. New FEMA requirements for this update

- a. There is a new crosswalk this year called the “Plan Review Tool”

- b. The new Digital Flood Insurance Rate Maps (DFIRMS) must be included in the plan
- c. FEMA would also like to see any mitigation suggestions included that came out of the RiskMAP products.

VI. Next Steps

- a. The group agreed to provide Greenville County (Robert Hall) with written confirmation that they will join a Greenville County Multi-jurisdictional Hazard Mitigation Plan no later than May 1st, 2013.
- b. Another meeting will be held in the near future to outline each jurisdiction's role in the plan update process and set deadlines to meet milestone.
- c. Any jurisdiction that does not meet deadlines may be removed from the plan. They will be able to join at a later date as an "add-on jurisdiction" when they have all of their information for the plan.

VII. Contact information

- a. To join the multi-jurisdictional plan, please contact Robert Hall at RoHall@greenvillecounty.org
- b. For more information on the meeting or mitigation planning questions, please contact Melissa Potter at mpotter@emd.sc.gov.

Greenville County Hazard Mitigation Planning Meeting

Greenville County Square

November 6, 2013

Attendees

Robert Hall, Greenville County
Kim Hamel, City of Mauldin
Jay Crawford, City of Simpsonville

Purpose

Greenville County hosted a meeting to discuss the HMP Update preparation. The Plan Review Tool (PRT) was used to review the jurisdictional draft plans. The City of Ft. Inn was unable to attend due to a personnel emergency. Greenville County provided a meeting summary to the City via Lori Cooper.

Meeting Highlights

The draft HMP is expected to be complete by March 1, 2014 in preparation for the initial public meeting.

Two public meetings are required. The first meeting will be County-wide to include all jurisdictions. Each jurisdiction will publicize the meeting and document the publicity. The second public meeting will be held after FEMA "approves plan pending adoption by resolution." Each jurisdiction will hold the second meeting in conjunction with obtaining resolution for the HMP. Both public meetings must be documented for the HMP and copies of the resolutions will be placed in the HMP.

Jurisdictions will place their respective plans in the Appendix (J – M) designated in the main Table of Contents. HMPs should have a Table of Contents and section/ subsection numbers. This will facilitate references in the Plan Review Tool and make it easier for reviewers to find information.

The County plan will include the main PRT as Appendix A. Each jurisdiction will have the main PRT to use when developing their individual plans. A copy of each jurisdiction specific PRT will be placed with the jurisdictional plan. Jurisdictions will reference information in their own plan like the following example or something similar: (Appendix L, Sec. 1).

Each jurisdiction will review the sections to make sure information required by the PRT and the "How To" guide is present. Where necessary, each jurisdiction will add specific information for their area.

Each jurisdiction should respond to Items B4, C2, D3, E1 and E2 within their plan. All PRT items must be addressed, either by referencing the main plan or within the jurisdictional plan.

APPENDIX C-4
PUBLIC MEETINGS DOCUMENTATION

Appendix D – Hazard Events Data Summary

FLOOD - SHELDUS

| HAZARD ID | BEGIN DATE | END DATE | HAZARD TYPE | FIPS CODE | INJURIES | FATALITIES | PROPERTY DAMAGE | CROP DAMAGE | REMARKS |
|-----------|------------|------------|----------------------------|-----------|----------|------------|-----------------|-------------|---------------------------------|
| 8908767 | 3/1/1964 | 3/31/1964 | Flooding | 45045 | 0 | 0 | 108.7 | 108.7 | Flooding |
| 8562666 | 3/1/1966 | 3/5/1966 | Flooding | 45045 | 0 | 0 | 1086.96 | 1086.96 | FLOODING |
| 9001284 | 12/14/1972 | 12/17/1972 | Flooding - Severe Storm | 45045 | 0 | 0 | 227.27 | 227.27 | Heavy rains, flooding |
| 8625851 | 2/3/1973 | 2/3/1973 | Flooding | 45045 | 0 | 0 | 1086.96 | 1.09 | FLOODING |
| 8973704 | 6/16/1973 | 6/22/1973 | Flooding - Severe Storm | 45045 | 0 | 0 | 172.41 | 17.24 | Heavy Rain, Flash Flooding |
| 9004114 | 12/31/1973 | 12/31/1973 | Flooding | 45045 | 0 | 0 | 83.33 | 0 | Flash Flooding |
| 8724204 | 3/12/1975 | 3/18/1975 | Flooding - Severe Storm | 45045 | 0 | 0 | 1086.96 | 108.7 | Heavy Rains, Flooding |
| 8728831 | 9/18/1975 | 9/18/1975 | Flooding - Lightning - Sev | 45045 | 1.5 | 0.5 | 250000 | 2500 | HEAVY RAINS AND FLASH FLO |
| 9012595 | 10/17/1975 | 10/17/1975 | Flooding - Severe Storm | 45045 | 0 | 0 | 384.62 | 0 | Rain and flash flooding |
| 8636432 | 5/28/1976 | 5/29/1976 | Flooding | 45045 | 2.33 | 0.67 | 166666.67 | 1666.67 | Flash Flood |
| 8638920 | 10/7/1976 | 10/7/1976 | Flooding - Severe Storm | 45045 | 0 | 0 | 50000 | 500 | Heavy Rains, Flash Flooding |
| 8638922 | 10/8/1976 | 10/9/1976 | Flooding - Severe Storm | 45045 | 0.33 | 0 | 83333.33 | 8333.33 | Heavy Rains, Flash Flooding |
| 8638949 | 10/9/1976 | 10/19/1976 | Flooding | 45045 | 0 | 0 | 10869.57 | 10869.57 | Flood |
| 9040180 | 9/16/1977 | 9/16/1977 | Flooding - Severe Storm | 45045 | 0 | 0 | 250 | 0 | Thunderstorm, flooding, and win |
| 9038378 | 10/25/1977 | 10/26/1977 | Flooding | 45045 | 0 | 0 | 1666.67 | 166.67 | Flash Flood |
| 8646593 | 11/5/1977 | 11/6/1977 | Flooding - Severe Storm | 45045 | 0 | 0 | 25000 | 0 | Heavy Rain, Flash Flood |
| 8648512 | 1/25/1978 | 1/26/1978 | Flooding - Wind | 45045 | 0 | 0 | 10869.57 | 1.09 | Wind, Flash Flood |
| 9041619 | 1/26/1978 | 1/31/1978 | Flooding | 45045 | 0 | 0 | 1086.96 | 0 | Flooding |
| 8653752 | 8/6/1978 | 8/7/1978 | Flooding - Severe Storm | 45045 | 0 | 0 | 125000 | 1250 | Heavy Rain, Flood |
| 8708174 | 6/2/1979 | 6/2/1979 | Flooding - Severe Storm | 45045 | 0 | 0 | 50000 | 500 | Thunderstorm, Heavy Rain |
| 9054246 | 11/2/1979 | 11/2/1979 | Flooding | 45045 | 0 | 0 | 166.67 | 166.67 | Flash Flooding |
| 8719377 | 3/15/1980 | 3/31/1980 | Flooding | 45045 | 0 | 0 | 1086.96 | 1086.96 | Flood |
| 8718642 | 8/8/1980 | 8/8/1980 | Flooding - Wind | 45045 | 0 | 0 | 1086.96 | 108.7 | wind, flood |
| 9066790 | 1/1/1982 | 1/14/1982 | Flooding | 45045 | 0 | 0 | 227.27 | 22.73 | Flooding |
| 9077073 | 5/26/1982 | 5/26/1982 | Flooding - Severe Storm | 45045 | 0 | 0 | 500 | 0 | Heavy Rains, Flash Flooding |
| 8740412 | 3/17/1983 | 3/17/1983 | Coastal - Flooding - Seve | 45045 | 0 | 0 | 10869.6 | 1086.96 | Wind, Rain, Flooding, Beach Ero |
| 8747243 | 12/6/1983 | 12/6/1983 | Flooding - Wind | 45045 | 0 | 0 | 1282.05 | 12.82 | Flood, Wind |
| 9075277 | 1/10/1984 | 1/10/1984 | Flooding - Severe Storm | 45045 | 0 | 0 | 714.29 | 71.43 | Heavy Rains, Flash Flooding |
| 9075766 | 2/13/1984 | 2/14/1984 | Flooding - Severe Storm | 45045 | 0 | 0 | 833.33 | 83.33 | Heavy Rains, Flooding |
| 8660990 | 2/27/1984 | 2/27/1984 | Flooding - Severe Storm | 45045 | 0 | 0 | 1086.96 | 10.87 | Rain/Wind/Flood |
| 9078061 | 5/6/1984 | 5/6/1984 | Flooding - Hail | 45045 | 0 | 0 | 500 | 5000 | Hail, Flooding |
| 9078760 | 6/29/1984 | 6/29/1984 | Flooding - Severe Storm | 45045 | 0 | 0 | 5000 | 500 | Rain, Flooding |
| 8665575 | 7/12/1984 | 7/12/1984 | Flooding - Lightning - Win | 45045 | 2 | 0 | 50000 | 0 | Lightning/Wind/Flood |
| 9079464 | 7/13/1984 | 7/14/1984 | Flooding | 45045 | 0 | 0 | 5000 | 0 | Flooding |
| 9079465 | 7/15/1984 | 7/15/1984 | Flooding - Severe Storm | 45045 | 0 | 0 | 5000 | 0 | Heavy Rains, Flash Flooding |
| 8665615 | 7/26/1984 | 7/26/1984 | Flooding - Severe Storm | 45045 | 0.07 | 0 | 1086.96 | 10.87 | Wind/Rain/Flood |
| 9112227 | 2/1/1985 | 2/1/1985 | Flooding - Severe Storm | 45045 | 0 | 0 | 500 | 0 | Heavy Rain, Flash Flood |
| 9259479 | 5/12/1985 | 5/12/1985 | Flooding - Hail - Wind | 45045 | 0 | 0 | 5000 | 0 | Wind, Hail, Flash Flooding |
| 8673395 | 8/16/1985 | 8/18/1985 | Flooding - Severe Storm | 45045 | 0 | 0 | 6250 | 6250 | Flood/Rain |
| 9085448 | 6/10/1986 | 6/11/1986 | Flooding | 45045 | 0 | 0 | 5000 | 0 | Flash Flooding |
| 9087179 | 7/15/1989 | 7/15/1989 | Flooding | 45045 | 0 | 0 | 5000 | 0 | Flash Flood |
| 9087824 | 8/1/1989 | 8/1/1989 | Flooding | 45045 | 0 | 0 | 5000 | 0 | Flash Flood |
| 9089169 | 10/1/1989 | 10/1/1989 | Flooding | 45045 | 0 | 0 | 500 | 0 | Flash Flooding |
| 8762257 | 3/17/1990 | 3/17/1990 | Flooding | 45045 | 0 | 0 | 50000 | 0 | Flash Flood |
| 8697013 | 7/30/1991 | 7/30/1991 | Flooding | 45045 | 0 | 0 | 50000 | 0 | Flash Flood |
| 9270381 | 1/1/1993 | 1/31/1993 | Flooding | 45045 | 0 | 0 | 10869.57 | 217397.3 | Flooding |
| 79125 | 7/19/1993 | 7/19/1993 | Flooding | 45045 | 0 | 0 | 50000 | 0 | Flash Flood |
| 86959 | 8/17/1994 | 8/17/1994 | Flooding | 45045 | 0 | 0 | 50000 | 500000 | FLOOD/FLASH FLOOD |
| 96340 | 2/16/1995 | 2/16/1995 | Flooding | 45045 | 0 | 0 | 15000 | 0 | FLOODS |
| 103101 | 8/26/1995 | 8/26/1995 | Flooding | 45045 | 5 | 1 | 5000000 | 0 | FLOODS |
| 103109 | 8/27/1995 | 8/27/1995 | Flooding | 45045 | 0 | 0 | 2500000 | 0 | FLOODS |
| 48615 | 7/24/1997 | 7/24/1997 | Flooding | 45045 | 0 | 0 | 100000 | 0 | FLOODS |
| 115465 | 1/7/1998 | 1/8/1998 | Flooding | 45045 | 0 | 0 | 50000 | 0 | FLOOD |
| 180519 | 6/30/2002 | 6/30/2002 | Flooding | 45045 | 0 | 0 | 50000 | 0 | |
| 180503 | 3/20/2003 | 3/20/2003 | Flooding | 45045 | 0 | 0 | 1000000 | 0 | |
| 180513 | 8/7/2003 | 8/7/2003 | Flooding | 45045 | 0 | 0 | 10000 | 0 | |
| 180497 | 7/29/2004 | 7/29/2004 | Flooding | 45045 | 0 | 0 | 3500000 | 0 | |
| 209652 | 9/7/2004 | 9/7/2004 | Flooding | 45045 | 0 | 0 | 8000 | 0 | Flash Flood |
| 209651 | 9/7/2004 | 9/8/2004 | Flooding | 45045 | 0 | 0 | 15000 | 0 | Flood |
| 209791 | 9/9/2004 | 9/10/2004 | Flooding | 45045 | 0 | 0 | 50000 | 0 | Flood |
| 210858 | 9/27/2004 | 9/27/2004 | Flooding | 45045 | 0 | 0 | 20000 | 0 | Flash Flood |
| 400191 | 7/7/2005 | 7/7/2005 | Flooding | 45045 | 0 | 0 | 300000 | 0 | Flash Flood |
| 9033904 | 12/2/2009 | 12/2/2009 | Flooding | 45045 | 0 | 0 | 1000 | 0 | Flash Flood |
| 9240386 | 6/1/2010 | 6/1/2010 | Flooding | 45045 | 0 | 0 | 20000 | 0 | |

DROUGHT - SHELDUS

| HAZARD ID | BEGIN DATE | END DATE | POSTAL CODE | FIPS CODE | INJURIES | FATALITIES | PROPERTY DAMAGE | CROP DAMAGE | REMARKS |
|-----------|------------|------------|-------------|-----------|----------|------------|-----------------|-------------|----------------------|
| 8644861 | 7/1/1977 | 7/31/1977 | SC | 45045 | 0 | 0 | 1086.96 | 108695.65 | Drought, Heat |
| 8650392 | 4/1/1978 | 4/13/1978 | SC | 45045 | 0 | 0 | 10.87 | 1086.96 | Dry Weather |
| 8654187 | 10/1/1978 | 10/31/1978 | SC | 45045 | 0 | 0 | 108.7 | 1086.96 | Drought, Dry Weather |
| 8664774 | 6/1/1984 | 6/20/1984 | SC | 45045 | 0 | 0 | 0 | 1086.96 | Drought |
| 9093678 | 4/1/1986 | 4/30/1986 | SC | 45045 | 0 | 0 | 0 | 128.21 | Drought |
| 8677841 | 5/1/1986 | 5/31/1986 | SC | 45045 | 0 | 0 | 0 | 10869.57 | Drought |
| 8678442 | 6/1/1986 | 6/30/1986 | SC | 45045 | 0 | 0 | 1086.96 | 10869.57 | Drought |
| 9102148 | 6/1/1986 | 6/30/1986 | SC | 45045 | 0 | 0 | 1086.96 | 10869.57 | Drought |
| 9102358 | 7/1/1986 | 7/31/1986 | SC | 45045 | 0 | 0 | 108695.65 | 1086956.52 | Drought |
| 8689188 | 2/1/1988 | 2/28/1988 | SC | 45045 | 0 | 0 | 10.87 | 1086.96 | Drought |
| 8690344 | 6/1/1988 | 6/30/1988 | SC | 45045 | 0 | 0 | 1086.96 | 10869.57 | Drought |
| 8690827 | 7/1/1988 | 7/31/1988 | SC | 45045 | 0 | 0 | 108.7 | 1086.96 | Drought |
| 8691462 | 8/1/1988 | 8/31/1988 | SC | 45045 | 0 | 0 | 1.39 | 1388.89 | Drought |
| 79095 | 7/1/1993 | 7/31/1993 | SC | 45045 | 0 | 0 | 5739130.43 | 0 | Drought, Hot Weather |
| 86923 | 5/1/1994 | 5/31/1994 | SC | 45045 | 0 | 0 | 0 | 1086956.52 | DROUGHT |
| 96393 | 5/1/1995 | 5/31/1995 | SC | 45045 | 0 | 0 | 0 | 434782.61 | DROUGHT |

WILDFIRE - SHELDUS

| HAZARD ID | BEGIN DATE | END DATE | HAZARD TYPE | COUNTY | FIPS_CODE | INJURIES | FATALITIES | PROPERTY DAMAGE | CROP DAMAGE | REMARKS |
|-----------|------------|-----------|-------------|------------|-----------|----------|------------|-----------------|-------------|--------------|
| 8562667 | 3/15/1966 | 3/31/1966 | Wildfire | Greenville | 45045 | 0 | 0 | 10869.57 | 0 | FOREST FIRES |
| 8669730 | 3/1/1985 | 3/21/1985 | Wildfire | Greenville | 45045 | 0 | 0 | 10869.57 | 108695.65 | Fire |
| 8670784 | 4/1/1985 | 4/30/1985 | Wildfire | Greenville | 45045 | 0 | 0 | 108.7 | 10869.6 | Fire |

WINTER STORMS - SHELDUS

| HAZARD ID | BEGIN DATE | END DATE | HAZARD TYPE | FIPS_CODE | INJURIES | FATALITIES | PROPERTY_DAMAGE | CROP_DAMAGE | REMARKS |
|-----------|------------|------------|-----------------------|-----------|----------|------------|-----------------|-------------|--|
| 8514553 | 3/2/1960 | 3/2/1960 | Winter Weather | 45045 | 0 | 0.06 | 2777.78 | 0 | SNOW, ICE |
| 8514068 | 3/9/1960 | 3/11/1960 | Winter Weather | 45045 | 0 | 0 | 1428.57 | 0 | SNOW, SLEET, ICE |
| 8524952 | 1/25/1961 | 1/26/1961 | Winter Weather | 45045 | 0 | 0 | 1086.96 | 108.7 | ICE STORM |
| 8880963 | 2/3/1961 | 2/4/1961 | Winter Weather | 45045 | 0 | 0 | 108.7 | 0 | Glaze |
| 8889538 | 1/1/1962 | 1/1/1962 | Winter Weather | 45045 | 0 | 0 | 277.78 | 0 | Ice and Snow |
| 8538806 | 12/31/1963 | 1/1/1964 | Winter Weather | 45045 | 0.57 | 0 | 10869.57 | 1086.96 | ICE |
| 8903001 | 1/12/1964 | 1/13/1964 | Winter Weather | 45045 | 0.86 | 0 | 238.1 | 0 | Ice |
| 8908721 | 3/30/1964 | 3/31/1964 | Winter Weather | 45045 | 0 | 0 | 0 | 108695.65 | Killing freeze |
| 8562668 | 1/26/1966 | 1/27/1966 | Winter Weather | 45045 | 0 | 0.03 | 14285.71 | 0 | ICE, SNOW |
| 8562669 | 1/29/1966 | 1/30/1966 | Winter Weather | 45045 | 0 | 0.15 | 0 | 10869.57 | SEVERE COLD-ICE AND SNOE |
| 8906093 | 3/17/1967 | 3/19/1967 | Winter Weather | 45045 | 0 | 0 | 0 | 277777.78 | Cold wave |
| 8580756 | 1/9/1968 | 1/13/1968 | Severe Storm/Thunde | 45045 | 0 | 0 | 15625 | 1.56 | rain, sleet, snow, and freezing rain |
| 8587312 | 2/15/1969 | 2/17/1969 | Winter Weather | 45045 | 0 | 0 | 10638.3 | 1063829.79 | SNOW, SLEET AND FREEZING RA |
| 8934111 | 12/25/1969 | 12/25/1969 | Winter Weather | 45045 | 0 | 0 | 10 | 100 | Freezing rain |
| 8838163 | 1/8/1970 | 1/9/1970 | Winter Weather | 45045 | 0 | 2 | 108.7 | 1.09 | Severe Freeze |
| 8838783 | 11/24/1970 | 11/25/1970 | Winter Weather | 45045 | 0 | 0 | 1.09 | 1.09 | Severe freeze |
| 8951246 | 1/8/1971 | 1/9/1971 | Winter Weather | 45045 | 0 | 0 | 384.62 | 384.62 | Freezing Rain |
| 8607802 | 3/25/1971 | 3/25/1971 | Winter Weather | 45045 | 0.67 | 0.39 | 27777.78 | 27.78 | SNOWSTORM |
| 8607803 | 12/3/1971 | 12/3/1971 | Severe Storm/Thunde | 45045 | 0 | 0 | 10869.57 | 10869.57 | SNOW, SLEET, FREEZING RAIN, |
| 8618069 | 4/1/1972 | 4/30/1972 | Winter Weather | 45045 | 0 | 0 | 0 | 56818.18 | COLD SPELL |
| 8625850 | 1/7/1973 | 1/8/1973 | Winter Weather | 45045 | 0 | 0 | 10869.57 | 108695.65 | SNOW & ICE |
| 8625852 | 2/9/1973 | 2/10/1973 | Winter Weather | 45045 | 0 | 0.2 | 108695.65 | 0 | SNOWSTORM |
| 8625854 | 4/11/1973 | 4/12/1973 | Winter Weather | 45045 | 0 | 0 | 0 | 27777.78 | FROST & FREEZE |
| 9004104 | 12/20/1973 | 12/20/1973 | Winter Weather | 45045 | 0 | 0 | 38.46 | 0 | Freezing Rain |
| 8632666 | 3/18/1974 | 3/18/1974 | Winter Weather | 45045 | 0 | 0 | 0 | 833.33 | FREEZE |
| 8632671 | 10/3/1974 | 10/4/1974 | Winter Weather | 45045 | 0 | 0 | 1282.05 | 0 | FROST, FREEZE |
| 8723023 | 2/3/1975 | 2/4/1975 | Winter Weather | 45045 | 0 | 0 | 2777.78 | 277.78 | Ice Storm |
| 8724158 | 3/2/1975 | 3/3/1975 | Winter Weather | 45045 | 0 | 0 | 0 | 1086.96 | Low Temperatures |
| 9006816 | 1/1/1977 | 1/31/1977 | Winter Weather | 45045 | 0 | 0 | 108.7 | 108.7 | Unusual Cold Weather |
| 9015450 | 1/1/1977 | 1/31/1977 | Winter Weather | 45045 | 0 | 0 | 108.7 | 108.7 | Unusual cold weather |
| 9041589 | 1/13/1978 | 1/13/1978 | Winter Weather | 45045 | 0 | 0 | 416.67 | 0 | Snow, Sleet, Freezing Rain |
| 9045750 | 3/2/1978 | 3/3/1978 | Winter Weather | 45045 | 0 | 0 | 384.62 | 0 | Snow, Freezing Rain |
| 8712384 | 2/6/1979 | 2/6/1979 | Winter Weather | 45045 | 0 | 0 | 166666.67 | 166.67 | snow, sleet, ice |
| 8708175 | 2/17/1979 | 2/18/1979 | Winter Weather | 45045 | 0 | 0 | 10869.6 | 108.7 | snow, sleet, freezing rain |
| 9055227 | 1/4/1980 | 1/4/1980 | Winter Weather | 45045 | 0 | 0 | 100 | 100 | Snowstorm |
| 9055238 | 1/30/1980 | 1/31/1980 | Winter Weather | 45045 | 0 | 0 | 263.16 | 263.16 | Freezing Rain |
| 8718688 | 2/5/1980 | 2/6/1980 | Winter Weather | 45045 | 0 | 0 | 10869.57 | 108.7 | Snowstorm over most of State exce |
| 8718510 | 2/9/1980 | 2/9/1980 | Winter Weather | 45045 | 0 | 0 | 8333.33 | 83.33 | Snowstorm |
| 8719331 | 3/1/1980 | 3/2/1980 | Winter Weather | 45045 | 0 | 0 | 1086.96 | 1086.96 | snow, freezing rain, drizzle and sleet |
| 9105542 | 3/13/1980 | 3/13/1980 | Winter Weather | 45045 | 0 | 0 | 833.33 | 833.33 | Sleet and snow |
| 9056284 | 12/23/1980 | 12/23/1980 | Winter Weather | 45045 | 0 | 0 | 22.73 | 0 | Freezing Rain |
| 9064398 | 2/1/1981 | 2/1/1981 | Winter Weather | 45045 | 0 | 0 | 27.78 | 0 | Freezing rain and sleet |
| 9115645 | 12/21/1981 | 12/21/1981 | Winter Weather | 45045 | 0 | 0 | 833.33 | 0 | Freezing Rain, Sleet |
| 8660151 | 12/31/1981 | 12/31/1981 | Winter Weather | 45045 | 0 | 0 | 8333.33 | 0 | Freezing Rain, Sleet |
| 8846412 | 1/11/1982 | 1/11/1982 | Winter Weather | 45045 | 0.09 | 0 | 108.7 | 108.7 | hard freeze |
| 8736907 | 1/12/1982 | 1/12/1982 | Winter Weather | 45045 | 0 | 0 | 1786 | 176 | Snow/sleet/freezing rain |
| 8736908 | 2/26/1982 | 2/27/1982 | Winter Weather | 45045 | 0 | 0 | 1087 | 0 | snow/sleet/glaze |
| 8736909 | 3/27/1982 | 3/27/1982 | Winter Weather | 45045 | 0 | 0 | 0 | 108696 | Extreme Cold |
| 8736910 | 4/7/1982 | 4/7/1982 | Winter Weather | 45045 | 0 | 0 | 0 | 1250000 | frost/freeze |
| 9070455 | 4/23/1982 | 4/24/1982 | Winter Weather | 45045 | 0 | 0 | 0 | 10.87 | Frost Freeze |
| 9117877 | 12/19/1982 | 12/19/1982 | Winter Weather | 45045 | 0 | 0 | 83.33 | 0 | Freezing Rain |
| 8739124 | 1/21/1983 | 1/21/1983 | Winter Weather | 45045 | 0 | 0 | 1086.96 | 10.87 | Freezing Rain, Sleet, Snow |
| 8739658 | 2/5/1983 | 2/6/1983 | Winter Weather | 45045 | 0 | 0 | 8333.33 | 0 | Snow, Freezing Rain |
| 9066401 | 3/24/1983 | 3/24/1983 | Wind - Winter Weath | 45045 | 0 | 0 | 108.7 | 1.09 | Winter Storm, Wind, Snow |
| 8741248 | 4/17/1983 | 4/18/1983 | Winter Weather | 45045 | 0 | 0 | 0 | 1086956.52 | Extreme Cold |
| 9074692 | 12/22/1983 | 12/22/1983 | Winter Weather | 45045 | 0 | 0 | 416.67 | 0 | Freezing Rain |
| 8747286 | 12/25/1983 | 12/25/1983 | Winter Weather | 45045 | 0 | 0.59 | 10869.57 | 10869.57 | Extreme Cold |
| 8747348 | 12/30/1983 | 12/31/1983 | Winter Weather | 45045 | 0 | 0.04 | 1086.96 | 108.7 | Extreme Cold |
| 8660384 | 1/13/1984 | 1/13/1984 | Winter Weather | 45045 | 0 | 0 | 1785.71 | 178.57 | Freezing Rain/Glaze |
| 9075753 | 2/6/1984 | 2/6/1984 | Winter Weather | 45045 | 0 | 0 | 277.78 | 0 | Snow |
| 9081766 | 12/5/1984 | 12/6/1984 | Winter Weather | 45045 | 0 | 0 | 83.33 | 0 | Freezing Rain |
| 9101872 | 1/4/1985 | 1/4/1985 | Winter Weather | 45045 | 0 | 0 | 125 | 0 | Freezing rain |
| 9101882 | 1/17/1985 | 1/17/1985 | Winter Weather | 45045 | 0 | 0 | 27.78 | 0 | Freezing rain |
| 8667807 | 1/20/1985 | 1/24/1985 | Winter Weather | 45045 | 0 | 0.33 | 10869.57 | 1086.96 | Extreme Cold/Snow |
| 9101900 | 1/28/1985 | 1/28/1985 | Winter Weather | 45045 | 0 | 0 | 277.78 | 0 | Snow/sleet |
| 9112231 | 2/5/1985 | 2/5/1985 | Winter Weather | 45045 | 0 | 0 | 833.33 | 0 | Freezing Rain, Glaze |
| 8668856 | 2/11/1985 | 2/12/1985 | Hail - Severe Storm/I | 45045 | 0 | 0 | 1086.96 | 1.09 | Wind/Snow/Hail/ThunderStorms |
| 8669777 | 3/19/1985 | 3/19/1985 | Winter Weather | 45045 | 0 | 0 | 0 | 1086.96 | Frost/Freeze |
| 8670809 | 4/10/1985 | 4/10/1985 | Winter Weather | 45045 | 0 | 0 | 0 | 83333.33 | Extreme Cold |
| 9262525 | 12/26/1985 | 12/26/1985 | Winter Weather | 45045 | 0 | 0 | 1666.67 | 166.67 | Cold |
| 8675367 | 1/27/1986 | 1/28/1986 | Winter Weather | 45045 | 0 | 0 | 1086.96 | 10.87 | Cold |
| 9092341 | 2/14/1986 | 2/14/1986 | Winter Weather | 45045 | 0 | 0 | 7.14 | 0 | Snow |
| 8676789 | 3/22/1986 | 3/23/1986 | Winter Weather | 45045 | 0 | 0 | 0 | 1086.96 | Cold |
| 8677213 | 4/23/1986 | 4/24/1986 | Winter Weather | 45045 | 0 | 0 | 0 | 1086.96 | Frost, Freeze |
| 9099415 | 11/14/1986 | 11/14/1986 | Winter Weather | 45045 | 0 | 0 | 50 | 0 | Freezing Rain |
| 9099312 | 1/1/1987 | 1/1/1987 | Winter Weather | 45045 | 0 | 0 | 71.43 | 0 | Heavy Snow |
| 9099333 | 1/22/1987 | 1/22/1987 | Winter Weather | 45045 | 0 | 0 | 263.16 | 26.32 | Heavy Snow and Sleet |
| 8682358 | 1/25/1987 | 1/25/1987 | Winter Weather | 45045 | 0 | 0 | 8333.33 | 83.33 | Ice Storm |

WINTER STORMS - SHELDUS

| HAZARD ID | BEGIN DATE | END DATE | HAZARD TYPE | FIPS_CODE | INJURIES | FATALITIES | PROPERTY_DAMAGE | CROP_DAMAGE | REMARKS |
|-----------|------------|------------|----------------------|-----------|----------|------------|-----------------|-------------|----------------------------|
| 9102103 | 2/16/1987 | 2/16/1987 | Winter Weather | 45045 | 0 | 0 | 2631.58 | 263.16 | Ice Storm |
| 8684922 | 4/1/1987 | 4/1/1987 | Winter Weather | 45045 | 0 | 0 | 0 | 1250 | Freeze |
| 9102720 | 4/3/1987 | 4/3/1987 | Winter Weather | 45045 | 0 | 0 | 1666.67 | 0 | Heavy Snow |
| 9107955 | 10/1/1987 | 10/31/1987 | Winter Weather | 45045 | 0 | 0 | 0 | 108.7 | Cold Weather |
| 8688774 | 1/7/1988 | 1/11/1988 | Winter Weather | 45045 | 0 | 0 | 10869.57 | 0 | Snow, Ice/Sleet |
| 9118542 | 3/14/1988 | 3/17/1988 | Winter Weather | 45045 | 0 | 0 | 108.7 | 0 | Low Temperature |
| 8850810 | 3/16/1988 | 3/16/1988 | Winter Weather | 45045 | 0 | 1 | 0 | 0 | hypothermia, (M65P) |
| 9119530 | 4/20/1988 | 4/20/1988 | Winter Weather | 45045 | 0 | 0 | 0 | 26.32 | Frost |
| 9082387 | 1/14/1989 | 1/14/1989 | Winter Weather | 45045 | 0 | 0 | 3.85 | 0 | Freezing Drizzle |
| 8769167 | 2/17/1989 | 2/19/1989 | Severe Storm/Thunder | 45045 | 0 | 0 | 10869.6 | 0 | Severe Storm-Ice/Sleet |
| 8769213 | 2/23/1989 | 2/23/1989 | Severe Storm/Thunder | 45045 | 0 | 0 | 1086.96 | 0 | Severe Storm-Snow |
| 8750294 | 4/12/1989 | 4/12/1989 | Winter Weather | 45045 | 0 | 0 | 2631.58 | 0 | Freeze |
| 8750655 | 5/8/1989 | 5/8/1989 | Winter Weather | 45045 | 0 | 0 | 0 | 4166.67 | Frost |
| 8851577 | 12/21/1989 | 12/21/1989 | Winter Weather | 45045 | 0 | 1 | 0 | 0 | extreme cold |
| 8769305 | 12/22/1989 | 12/22/1989 | Winter Weather | 45045 | 0.07 | 0.13 | 108695.65 | 0 | Extreme Cold |
| 8753743 | 12/22/1989 | 12/25/1989 | Winter Weather | 45045 | 0 | 2 | 14285.71 | 0 | Extreme Cold (M56P) (F800) |
| 8769259 | 12/22/1989 | 12/22/1989 | Winter Weather | 45045 | 0.09 | 0.15 | 10869.57 | 0 | Extreme Cold |
| 8762806 | 3/21/1990 | 3/21/1990 | Winter Weather | 45045 | 0 | 0 | 0 | 212765.96 | Freeze |
| 9290835 | 12/27/1990 | 12/28/1990 | Winter Weather | 45045 | 0 | 0 | 62.5 | 0 | Freezing Rain, Sleet |
| 8852128 | 1/16/1991 | 1/16/1991 | Winter Weather | 45045 | 0 | 1 | 0 | 0 | Cold M66? |
| 73420 | 12/10/1992 | 12/10/1992 | Winter Weather | 45045 | 0 | 0.11 | 16666.67 | 0 | Ice Storm |
| 73423 | 12/27/1992 | 12/28/1992 | Winter Weather | 45045 | 0 | 0.11 | 18518.52 | 18518.52 | Ice Storm |
| 9276096 | 2/25/1993 | 2/26/1993 | Winter Weather | 45045 | 0 | 0 | 625 | 0 | Ice storm, snow |
| 86885 | 2/11/1994 | 2/11/1994 | Winter Weather | 45045 | 0 | 0 | 26315.79 | 0 | ICE STORM |
| 96277 | 1/6/1995 | 1/6/1995 | Winter Weather | 45045 | 0 | 0 | 10000 | 0 | FREEZING RAIN |
| 103185 | 12/27/1995 | 12/27/1995 | Winter Weather | 45045 | 0 | 1 | 0 | 0 | COLD |
| 63177 | 1/6/1996 | 1/6/1996 | Winter Weather | 45045 | 0 | 0 | 7142.86 | 0 | WINTER STORM |
| 63178 | 1/7/1996 | 1/7/1996 | Winter Weather | 45045 | 0 | 0 | 7142.86 | 0 | WINTER STORM |
| 63192 | 1/12/1996 | 1/12/1996 | Winter Weather | 45045 | 0 | 2 | 0 | 0 | EXTREME COLD |
| 63194 | 3/8/1996 | 3/8/1996 | Winter Weather | 45045 | 0 | 0 | 0 | 166666.67 | EXTREME COLD |
| 63193 | 12/25/1996 | 12/25/1996 | Winter Weather | 45045 | 0 | 2 | 0 | 0 | COLD |
| 48640 | 1/9/1997 | 1/9/1997 | Winter Weather | 45045 | 0 | 0 | 40000 | 0 | ICE STORM |
| 35976 | 1/2/1999 | 1/3/1999 | Winter Weather | 45045 | 0 | 0 | 2000000 | 0 | ICE STORM |
| 180529 | 12/4/2002 | 12/5/2002 | Winter Weather | 45045 | 0 | 0 | 9090909.09 | 0 | |
| 180498 | 2/26/2004 | 2/27/2004 | Winter Weather | 45045 | 0 | 0 | 237500 | 0 | |
| 405327 | 12/15/2005 | 12/15/2005 | Winter Weather | 45045 | 0 | 0 | 300000 | 0 | Ice Storm |
| 8825507 | 4/8/2007 | 4/8/2007 | Winter Weather | 45045 | 0 | 0 | 0 | 83333.33 | Frost/Freeze |

SEVERE STORMS/ THUNDERSTORMS - SHELDS

| HAZARD ID | BEGIN DATE | END DATE | HAZARD TYPE | FIPS_CODE | INJURIES | FATALITIES | PROPERTY DAMAGE | CROP DAMAGE | REMARKS |
|-----------|------------|------------|---|-----------|----------|------------|-----------------|-------------|--|
| 8877579 | 6/5/1960 | 6/5/1960 | Hail - Severe Storm/Thunder Storm | 45045 | 2 | 0 | 250 | 0 | Thunderstorm and Hail |
| 8884161 | 8/15/1960 | 8/15/1960 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 500 | 0 | Thunderstorm |
| 8859036 | 2/24/1961 | 2/24/1961 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 142.86 | 0 | Wind and Rain |
| 8524953 | 6/20/1961 | 6/21/1961 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 16666.67 | 16666.67 | HEAVY RAIN |
| 8892728 | 12/10/1961 | 12/13/1961 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 833.33 | 0 | Heavy rains |
| 8538807 | 3/5/1963 | 3/6/1963 | Severe Storm/Thunder Storm | 45045 | 0 | 0.17 | 8333.33 | 0 | RAINSTORM |
| 8538804 | 3/12/1963 | 3/13/1963 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 8333.33 | 0 | RAINSTORM |
| 8900234 | 8/13/1963 | 8/13/1963 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 833.33 | 0 | Thunderstorm |
| 8542979 | 4/6/1964 | 4/8/1964 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 83333.33 | 83333.33 | HEAVY RAINS |
| 8547069 | 10/4/1964 | 10/6/1964 | Severe Storm/Thunder Storm | 45045 | 0 | 0.02 | 10869.57 | 10869.57 | RAINSTORM |
| 8546906 | 10/15/1964 | 10/16/1964 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 0 | 1086.96 | RAINSTORM |
| 8877687 | 5/20/1965 | 5/20/1965 | Hail - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm, Hail |
| 8881999 | 6/8/1965 | 6/16/1965 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 0 | 10869.57 | Locally heavy rains |
| 8884413 | 7/1/1965 | 7/31/1965 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 108.7 | 0 | Wind, heavy rain, hail |
| 8896696 | 2/13/1966 | 2/13/1966 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 108.7 | 0 | wind and rain |
| 8860127 | 6/29/1966 | 6/29/1966 | Hail - Lightning - Severe Storm/Thunder S | 45045 | 0 | 0.5 | 2500 | 250 | Thunderstorm, hail and lightning |
| 8907480 | 8/19/1966 | 8/19/1966 | Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 500 | 0 | Lightning, rain |
| 8907481 | 8/26/1966 | 8/26/1966 | Hail - Lightning - Severe Storm/Thunder S | 45045 | 0 | 0 | 50 | 0 | Hail, lightning, rain |
| 8569732 | 8/20/1967 | 8/25/1967 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 10869.57 | 108.7 | RAIN |
| 8580756 | 1/9/1968 | 1/13/1968 | Severe Storm/Thunder Storm - Winter W | 45045 | 0 | 0 | 15625 | 1.56 | rain, sleet, snow, and freezing rain |
| 8924301 | 5/13/1968 | 5/13/1968 | Severe Storm/Thunder Storm | 45045 | 1 | 0 | 50 | 0 | Thunderstorm |
| 8936303 | 8/8/1968 | 8/8/1968 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm, windstorm |
| 8925870 | 5/23/1969 | 5/23/1969 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 2500 | 0 | High winds, thunderstorms, rain |
| 8928039 | 6/8/1969 | 6/8/1969 | Hail - Lightning - Severe Storm/Thunder S | 45045 | 0 | 0 | 2500 | 250 | Thunderstorms, wind, hail, and lightning |
| 8866655 | 6/24/1969 | 6/24/1969 | Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 1 | 0 | 0 | Thunderstorms, lightning |
| 8587313 | 9/19/1969 | 9/19/1969 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 50000 | 0 | RAINSTORM |
| 8969021 | 8/2/1970 | 8/2/1970 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm, high winds |
| 8596859 | 9/19/1970 | 9/19/1970 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 0 | THUNDERSTORM, HIGH WINDS |
| 8954315 | 3/15/1971 | 3/15/1971 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 108.7 | 0 | Thunderstorms, high winds |
| 8607803 | 12/3/1971 | 12/3/1971 | Severe Storm/Thunder Storm - Wind - W | 45045 | 0 | 0 | 10869.57 | 10869.57 | SNOW, SLEET, FREEZING RAIN, RAIN |
| 8840045 | 6/6/1972 | 6/6/1972 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 2500 | 0 | Thunderstorms, rain, high winds |
| 8618071 | 8/7/1972 | 8/7/1972 | Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 50000 | 0 | THUNDERSTORMS, RAIN, HIGH WINDS |
| 9001284 | 12/14/1972 | 12/17/1972 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 227.27 | 227.27 | Heavy rains, flooding |
| 8625853 | 5/20/1973 | 5/20/1973 | Hail - Lightning - Severe Storm/Thunder S | 45045 | 0 | 0 | 238.1 | 2380.95 | HAIL, WIND, RAIN, ELECTRICAL |
| 8973704 | 6/16/1973 | 6/22/1973 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 172.41 | 17.24 | Heavy Rain, Flash Flooding |
| 8986659 | 8/29/1973 | 8/29/1973 | Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 25 | 2.5 | Wind, Rain, Electrical |
| 9007605 | 8/4/1974 | 8/4/1974 | Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 0 | 35.71 | Rain, lightning |
| 8974658 | 1/25/1975 | 1/25/1975 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 108.7 | 0 | Squall line |
| 8724204 | 3/12/1975 | 3/18/1975 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 1086.96 | 108.7 | Heavy Rains, Flooding |
| 9010578 | 7/14/1975 | 7/14/1975 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 14.71 | 1.47 | Wind, rain |
| 8728427 | 8/27/1975 | 8/27/1975 | Lightning - Severe Storm/Thunder Storm | 45045 | 0.05 | 0 | 1315.79 | 13.16 | Lightning, HIGH WIND, THUNDERSTORM |
| 9012412 | 9/5/1975 | 9/5/1975 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 454.55 | 454.55 | Thunderstorm, wind, hail |
| 8728831 | 9/18/1975 | 9/18/1975 | Flooding - Lightning - Severe Storm/Thun | 45045 | 1.5 | 0.5 | 250000 | 2500 | HEAVY RAINS AND FLASH FLOODING |
| 9012424 | 9/23/1975 | 9/23/1975 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 1250 | 0 | Heavy rains |
| 9012595 | 10/17/1975 | 10/17/1975 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 384.62 | 0 | Rain and flash flooding |
| 9020369 | 7/26/1976 | 7/27/1976 | Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 384.62 | 38.46 | Lightning, wind, rain |
| 9020382 | 7/29/1976 | 7/29/1976 | Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 384.62 | 3.85 | Lightning, wind, rain |
| 9022131 | 8/13/1976 | 8/13/1976 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm, high wind |
| 8638920 | 10/7/1976 | 10/7/1976 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 50000 | 500 | Heavy Rains, Flash Flooding |
| 8638922 | 10/8/1976 | 10/9/1976 | Flooding - Severe Storm/Thunder Storm | 45045 | 0.33 | 0 | 83333.33 | 8333.33 | Heavy Rains, Flash Flooding |
| 9037767 | 3/31/1977 | 3/31/1977 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10.87 | 0 | High winds, heavy rains |
| 9040110 | 9/7/1977 | 9/7/1977 | Severe Storm/Thunder Storm | 45045 | 0.17 | 0 | 416.67 | 4.17 | Heavy rain |
| 9040145 | 9/7/1977 | 9/7/1977 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 108.7 | 10.87 | Thunderstorms, high winds, heavy rain |
| 9040180 | 9/16/1977 | 9/16/1977 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 250 | 0 | Thunderstorm, flooding, and wind |
| 9040182 | 9/27/1977 | 9/27/1977 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorms, high winds, heavy rain |
| 9038367 | 10/1/1977 | 10/1/1977 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 38.46 | 0 | Thunderstorm, High Winds |
| 8646593 | 11/5/1977 | 11/6/1977 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 25000 | 0 | Heavy Rain, Flash Flood |
| 9039075 | 12/5/1977 | 12/5/1977 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 10.87 | 0 | thunderstorm |
| 9044606 | 4/13/1978 | 4/13/1978 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 357.14 | 0 | Severe Thunderstorm |
| 9045681 | 5/24/1978 | 5/24/1978 | Hail - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 3.57 | 357.14 | Thunderstorm Hail |
| 8653752 | 8/6/1978 | 8/7/1978 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 125000 | 1250 | Heavy Rain, Flood |
| 9054767 | 3/23/1979 | 3/23/1979 | Severe Storm/Thunder Storm | 45045 | 1.33 | 0 | 16666.67 | 0 | Severe Thunderstorm |
| 8713152 | 5/22/1979 | 5/22/1979 | Hail - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 500 | 50000 | Hail, Heavy Rain, Thunderstorms |
| 8708174 | 6/2/1979 | 6/2/1979 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 50000 | 500 | Thunderstorm, Heavy Rain |
| 9110792 | 5/31/1981 | 5/31/1981 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 250 | 0 | Thunderstorm |
| 9070501 | 4/26/1982 | 4/27/1982 | Hail - Lightning - Severe Storm/Thunder S | 45045 | 0 | 0 | 10.87 | 10.87 | Thunderstorm, Wind, Lightning, Hail |
| 9077015 | 5/16/1982 | 5/16/1982 | Hail - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 200 | 20 | Heavy Rain, Hail, Thunderstorms |
| 9077050 | 5/17/1982 | 5/17/1982 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 13.89 | 138.89 | Thunderstorms, High Winds, hail |
| 9077073 | 5/26/1982 | 5/26/1982 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 500 | 0 | Heavy Rains, Flash Flooding |
| 8736911 | 6/10/1982 | 6/10/1982 | Hail - Lightning - Severe Storm/Thunder S | 45045 | 0.2 | 0 | 121951.22 | 121951.22 | Hail/Lightning/Rain/Wind |
| 9081047 | 6/17/1982 | 6/17/1982 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 5000 | 0 | Rain |
| 8846859 | 7/29/1982 | 7/29/1982 | Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 1 | 5000 | 0 | rain, lightning |
| 8740412 | 3/17/1983 | 3/17/1983 | Coastal - Flooding - Severe Storm/Thund | 45045 | 0 | 0 | 10869.6 | 1086.96 | Wind, Rain, Flooding, Beach Erosion |
| 9071637 | 7/20/1983 | 7/20/1983 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | High Winds, Thunderstorm |
| 9071638 | 7/21/1983 | 7/21/1983 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 8747209 | 12/3/1983 | 12/4/1983 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1923.08 | 192.31 | Wind, Heavy Rain |
| 9075277 | 1/10/1984 | 1/10/1984 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 714.29 | 71.43 | Heavy Rains, Flash Flooding |
| 9075766 | 2/13/1984 | 2/14/1984 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 833.33 | 83.33 | Heavy Rains, Flooding |
| 8660990 | 2/27/1984 | 2/27/1984 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 1086.96 | 10.87 | Rain/Wind/Flood |
| 9078422 | 3/5/1984 | 3/6/1984 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 83.33 | 83.33 | Heavy Rain, Flooding |
| 8664820 | 6/20/1984 | 6/20/1984 | Hail - Lightning - Severe Storm/Thunder S | 45045 | 0 | 0 | 1086.96 | 108.7 | Rain/Hail/Lighting/Wind |
| 9078760 | 6/29/1984 | 6/29/1984 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 5000 | 500 | Rain, Flooding |
| 9079465 | 7/15/1984 | 7/15/1984 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 5000 | 0 | Heavy Rains, Flash Flooding |
| 8665615 | 7/26/1984 | 7/26/1984 | Flooding - Severe Storm/Thunder Storm | 45045 | 0.07 | 0 | 1086.96 | 10.87 | Wind/Rain/Flood |
| 9112227 | 2/1/1985 | 2/1/1985 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 500 | 0 | Heavy Rain, Flash Flood |
| 8666856 | 2/11/1985 | 2/12/1985 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 1086.96 | 1.09 | Wind/Snow/Hail/Thunderstorms |

SEVERE STORMS/ THUNDERSTORMS - SHELDS

| HAZARD ID | BEGIN DATE | END DATE | HAZARD TYPE | FIPS_CODE | INJURIES | FATALITIES | PROPERTY DAMAGE | CROP DAMAGE | REMARKS |
|-----------|------------|------------|---|-----------|----------|------------|-----------------|-------------|-------------------------------------|
| 8673395 | 8/16/1985 | 8/18/1985 | Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 6250 | 6250 | Flood/Rain |
| 9092337 | 2/6/1986 | 2/6/1986 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 9103529 | 5/1/1987 | 5/1/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 50 | Thunderstorm Wind |
| 9103545 | 5/4/1987 | 5/4/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9103561 | 5/28/1987 | 5/28/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9104460 | 6/1/1987 | 6/1/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9104481 | 6/24/1987 | 6/24/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Wind |
| 9104483 | 6/24/1987 | 6/24/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9104482 | 6/24/1987 | 6/24/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50 | 0 | Thunderstorm Wind |
| 9106477 | 7/5/1987 | 7/5/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50 | 0 | Thunderstorm Wind |
| 9106530 | 7/30/1987 | 7/30/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50 | 0 | Thunderstorm Wind |
| 9690803 | 7/16/1988 | 7/16/1988 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 50 | Severe Storm-Wind |
| 9268422 | 7/21/1988 | 7/21/1988 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm wind |
| 9256579 | 8/1/1988 | 8/1/1988 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50 | 0 | Thunderstorm Wind |
| 8789167 | 2/17/1989 | 2/19/1989 | Severe Storm/Thunder Storm - Winter W | 45045 | 0 | 0 | 10869.6 | 0 | Severe Storm-Ice/Sleet |
| 8769213 | 2/23/1989 | 2/23/1989 | Severe Storm/Thunder Storm - Winter W | 45045 | 0 | 0 | 1086.96 | 0 | Severe Storm-Snow |
| 8750284 | 4/4/1989 | 4/4/1989 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 500000 | 0 | Thunderstorm Winds, Hail |
| 8750282 | 4/4/1989 | 4/4/1989 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 50000 | 0 | Thunderstorm Winds, Hail |
| 9084584 | 4/4/1989 | 4/4/1989 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9085286 | 5/5/1989 | 5/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds |
| 9085287 | 5/5/1989 | 5/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 8751223 | 6/5/1989 | 6/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 0 | Thunderstorm Winds |
| 8751224 | 6/5/1989 | 6/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 0 | Thunderstorm Winds |
| 9086161 | 6/5/1989 | 6/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds |
| 9086164 | 6/5/1989 | 6/5/1989 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds, Hail |
| 9086166 | 6/5/1989 | 6/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds |
| 9086171 | 6/5/1989 | 6/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 9086182 | 6/15/1989 | 6/15/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 9086201 | 6/20/1989 | 6/20/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds |
| 9087194 | 7/30/1989 | 7/30/1989 | Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind and Lightning |
| 9087825 | 8/1/1989 | 8/1/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9090236 | 11/15/1989 | 11/15/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Wind |
| 9263547 | 2/10/1990 | 2/10/1990 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Wind |
| 9263559 | 2/10/1990 | 2/10/1990 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 8764038 | 4/10/1990 | 4/10/1990 | Severe Storm/Thunder Storm - Wind | 45045 | 4 | 0 | 50000 | 0 | Thunderstorm Winds |
| 9265045 | 4/10/1990 | 4/10/1990 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 8768186 | 7/1/1990 | 7/1/1990 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 50000 | 50000 | Hail, Thunderstorm Winds |
| 9283420 | 7/1/1990 | 7/1/1990 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind, Hail |
| 9286697 | 8/9/1990 | 8/9/1990 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9287614 | 9/10/1990 | 9/10/1990 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Wind, Hail |
| 8696721 | 6/1/1991 | 6/1/1991 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 1 | 100000 | 0 | Thunderstorm Winds, Hail |
| 9285055 | 3/10/1992 | 3/10/1992 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | thunderstorm winds |
| 70468 | 6/9/1992 | 6/9/1992 | Severe Storm/Thunder Storm | 45045 | 0 | 0 | 50000 | 0 | Heavy Rain |
| 71219 | 7/21/1992 | 7/21/1992 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 0 | Thunderstorm Winds |
| 9276092 | 2/21/1993 | 2/21/1993 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 50 | 0 | Thunderstorm winds, hail |
| 79120 | 7/8/1993 | 7/8/1993 | Hail - Severe Storm/Thunder Storm - Win | 45045 | 0 | 0 | 200000 | 0 | Thunderstorm Winds, Hail |
| 79126 | 7/19/1993 | 7/19/1993 | Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 500000 | 0 | Lightning, Rain |
| 9295897 | 3/27/1994 | 3/27/1994 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds |
| 86956 | 7/19/1994 | 7/19/1994 | Hail - Lightning - Wind | 45045 | 0 | 0 | 50000 | 0 | HAIL, THUNDERSTORM WINDS, LIGHTNING |
| 96322 | 1/14/1995 | 1/14/1995 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | THUNDERSTORM WIND |
| 96448 | 5/28/1995 | 5/28/1995 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 2000 | 0 | THUNDERSTORM WIND |
| 96480 | 6/9/1995 | 6/9/1995 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 52000 | 0 | THUNDERSTORM WIND |
| 96494 | 6/10/1995 | 6/10/1995 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 25000 | 0 | THUNDERSTORM WIND |
| 63180 | 1/19/1996 | 1/19/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 15000 | 0 | TSTM WIND |
| 63181 | 3/15/1996 | 3/15/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 3 | 1 | 550000 | 0 | TSTM WIND |
| 63184 | 3/16/1996 | 3/16/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 15000 | 0 | TSTM WIND |
| 63185 | 4/20/1996 | 4/20/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 15000 | 0 | TSTM WIND |
| 63186 | 4/26/1996 | 4/26/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | TSTM WIND |
| 63187 | 6/4/1996 | 6/4/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | TSTM WIND |
| 63176 | 6/20/1996 | 6/20/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 1 | 18000 | 0 | TSTM WIND |
| 63188 | 7/14/1996 | 7/14/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 15000 | 0 | TSTM WIND |
| 63189 | 7/17/1996 | 7/17/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 20000 | 0 | TSTM WIND |
| 63190 | 8/24/1996 | 8/24/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | TSTM WIND |
| 63191 | 9/7/1996 | 9/7/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 20000 | 0 | TSTM WIND |
| 48671 | 7/24/1997 | 7/24/1997 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 25000 | 0 | THUNDERSTORM WIND |
| 48670 | 7/28/1997 | 7/28/1997 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | THUNDERSTORM WIND |
| 115508 | 5/27/1998 | 5/27/1998 | Severe Storm/Thunder Storm - Wind | 45045 | 3 | 0 | 0 | 0 | THUNDERSTORM WIND |
| 115533 | 6/19/1998 | 6/19/1998 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 20000 | 0 | THUNDERSTORM WIND |
| 36004 | 6/10/1999 | 6/10/1999 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | TSTM WIND |
| 36011 | 7/6/1999 | 7/6/1999 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | TSTM WIND |
| 36031 | 8/1/1999 | 8/1/1999 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 65000 | 0 | THUNDERSTORM WIND |
| 21901 | 4/3/2000 | 4/3/2000 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | THUNDERSTORM WIND |
| 21908 | 5/25/2000 | 5/25/2000 | Severe Storm/Thunder Storm - Wind | 45045 | 2 | 0 | 0 | 0 | THUNDERSTORM WIND |
| 21933 | 7/22/2000 | 7/22/2000 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 130000 | 0 | THUNDERSTORM WIND |
| 21953 | 11/9/2000 | 11/9/2000 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | THUNDERSTORM WIND |
| 180518 | 6/4/2002 | 6/4/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 3000 | 0 | |
| 180520 | 6/30/2002 | 6/30/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | |
| 180521 | 7/1/2002 | 7/1/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | |
| 180522 | 7/10/2002 | 7/10/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | |
| 180523 | 8/17/2002 | 8/17/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 25000 | 0 | |
| 180525 | 11/11/2002 | 11/11/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | |
| 180526 | 11/11/2002 | 11/11/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | |
| 180501 | 2/4/2003 | 2/4/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | |
| 180503 | 5/2/2003 | 5/2/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 3000 | 0 | |
| 180507 | 5/2/2003 | 5/2/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 2000 | 0 | |
| 180509 | 5/16/2003 | 5/16/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | |

SEVERE STORMS/ THUNDERSTORMS - SHELDUS

| HAZARD ID | BEGIN DATE | END DATE | HAZARD TYPE | FIPS_CODE | INJURIES | FATALITIES | PROPERTY DAMAGE | CROP DAMAGE | REMARKS |
|-----------|------------|-----------|-----------------------------------|-----------|----------|------------|-----------------|-------------|--------------------------|
| 180510 | 7/29/2003 | 7/29/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | |
| 180512 | 8/4/2003 | 8/4/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | |
| 180514 | 8/16/2003 | 8/16/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 300000 | 0 | |
| 180495 | 7/5/2004 | 7/5/2004 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 150000 | 0 | |
| 180496 | 7/5/2004 | 7/5/2004 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | |
| 208913 | 8/20/2004 | 8/20/2004 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 2000 | 0 | Thunderstorm Wind |
| 216381 | 4/22/2005 | 4/22/2005 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 25000 | 0 | THUNDERSTORM WIND |
| 216382 | 4/22/2005 | 4/22/2005 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | THUNDERSTORM WIND |
| 397989 | 6/6/2005 | 6/6/2005 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | Thunderstorm Wind |
| 8809506 | 8/20/2006 | 8/20/2006 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 1 | 0 | 0 | Thunderstorm Wind (G50) |
| 8830281 | 6/25/2007 | 6/25/2007 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | Thunderstorm Wind (50EG) |
| 8830284 | 6/30/2007 | 6/30/2007 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 3000 | 0 | Thunderstorm Wind (55EG) |
| 8944696 | 7/21/2008 | 7/21/2008 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500000 | 0 | Thunderstorm Wind (65EG) |
| 8944703 | 7/29/2008 | 7/29/2008 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | Thunderstorm Wind (65EG) |
| 9323341 | 6/21/2011 | 6/21/2011 | Severe Storm/Thunder Storm - Wind | 45045 | 1 | 0 | 0 | 0 | |

TORNADOES/ HIGH WINDS - SHELDS

| HAZARD ID | BEGIN DATE | END DATE | HAZARD TYPE | FIPS CODE | INJURIES | FATALITIES | PROPERTY DAMAGE | CROP DAMAGE | REMARKS |
|-----------|------------|------------|---|-----------|----------|------------|-----------------|-------------|--|
| 8512256 | 2/18/1960 | 2/18/1960 | Hail - Wind | 45045 | 0 | 0 | 142.86 | 0 | WINDSTORMS, HAIL |
| 8859036 | 2/24/1961 | 2/24/1961 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 142.86 | 0 | Wind and Rain |
| 8969327 | 2/25/1961 | 2/25/1961 | Wind | 45045 | 0 | 0 | 108.7 | 0 | High Winds |
| 8892030 | 11/23/1961 | 11/23/1961 | Wind | 45045 | 0 | 0 | 108.7 | 0 | Windstorm |
| 8538805 | 5/16/1963 | 5/16/1963 | Hail - Wind | 45045 | 0 | 0 | 0 | 2777.78 | HAIL AND WINDSTORM |
| 8902891 | 1/20/1964 | 1/20/1964 | Wind | 45045 | 0.02 | 0 | 108.7 | 0 | Windstorm |
| 8913899 | 6/21/1964 | 6/21/1964 | Tornado | 45045 | 0 | 0 | 5000 | 0 | Tornado |
| 8884413 | 7/1/1965 | 7/31/1965 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 108.7 | 0 | Wind, heavy rain, hail |
| 8884365 | 7/19/1965 | 7/19/1965 | Hail - Lightning - Wind | 45045 | 0 | 0 | 108.7 | 10.87 | Hail, lightning, wind |
| 8896696 | 2/13/1966 | 2/13/1966 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 108.7 | 0 | wind and rain |
| 8911039 | 5/2/1967 | 5/2/1967 | Tornado | 45045 | 0 | 0 | 5000 | 0 | Small Tornado |
| 8915756 | 7/12/1967 | 7/12/1967 | Tornado | 45045 | 0 | 0 | 5000 | 0 | Small Tornado |
| 8919370 | 3/22/1968 | 3/22/1968 | Wind | 45045 | 0 | 0 | 1666.67 | 0 | Windstorm |
| 8934826 | 7/28/1968 | 7/28/1968 | Wind | 45045 | 0 | 0 | 2500 | 0 | Windstorm |
| 8936303 | 8/8/1968 | 8/8/1968 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm, windstorm |
| 8925870 | 5/23/1969 | 5/23/1969 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 2500 | 0 | High winds, thunderstorms, rain |
| 8928039 | 6/8/1969 | 6/8/1969 | Hail - Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 2500 | 250 | Thunderstorms, wind, hail, and lightning |
| 8969021 | 8/2/1970 | 8/2/1970 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm, high winds |
| 8958589 | 9/19/1970 | 9/19/1970 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 0 | THUNDERSTORM, HIGH WINDS |
| 8954315 | 3/15/1971 | 3/15/1971 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 108.7 | 0 | Thunderstorms, high winds |
| 8607803 | 12/3/1971 | 12/3/1971 | Severe Storm/Thunder Storm - Wind - Winter | 45045 | 0 | 0 | 10869.57 | 10869.57 | SNOW, SLEET, FREEZING RAIN, RAIN |
| 9003744 | 3/2/1972 | 3/2/1972 | Wind | 45045 | 0 | 0 | 1666.67 | 0 | Wind |
| 8840045 | 6/6/1972 | 6/6/1972 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 2500 | 0 | Thunderstorms, rain, high winds |
| 8618071 | 8/7/1972 | 8/7/1972 | Lightning - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 0 | THUNDERSTORMS, RAIN, HIGH WINDS |
| 8969257 | 3/31/1973 | 3/31/1973 | Tornado | 45045 | 0 | 0 | 2500 | 0 | Tornado |
| 8625853 | 5/20/1973 | 5/20/1973 | Hail - Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 238.1 | 2380.95 | HAIL, WIND, RAIN, ELECTRICAL |
| 127801 | 5/27/1973 | 5/27/1973 | Tornado | 45045 | 15.33 | 0 | 166666.66 | 16666.66 | Tornado |
| 8972103 | 5/27/1973 | 5/27/1973 | Tornado | 45045 | 0 | 0 | 2500 | 250 | Tornado |
| 8972105 | 5/28/1973 | 5/28/1973 | Tornado | 45045 | 0 | 0 | 500 | 0 | Tornado |
| 8972121 | 5/28/1973 | 5/29/1973 | Hail - Lightning - Wind | 45045 | 0.11 | 0 | 185.19 | 185.19 | Hail, wind, electrical |
| 8988659 | 8/29/1973 | 8/29/1973 | Lightning - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 25 | 2.5 | Wind, Rain, Electrical |
| 9001983 | 11/21/1973 | 11/21/1973 | Wind | 45045 | 0 | 0 | 147.06 | 0 | Windstorm |
| 8632665 | 3/21/1974 | 3/21/1974 | Lightning - Wind | 45045 | 0.15 | 0 | 1086.96 | 108.7 | HIGH WINDS & ELECTRICAL |
| 8632667 | 3/29/1974 | 3/29/1974 | Hail - Lightning - Wind | 45045 | 0 | 0 | 1190.48 | 1190.48 | WIND, HAIL, ELECTRICAL |
| 9006200 | 3/30/1974 | 3/30/1974 | Hail - Wind | 45045 | 0 | 0 | 0 | 38.46 | High winds and hail |
| 8632668 | 4/2/1974 | 4/2/1974 | Lightning - Wind | 45045 | 0.83 | 0 | 833.33 | 83.33 | WIND, LIGHTNING |
| 8632669 | 4/3/1974 | 4/3/1974 | Hail - Wind | 45045 | 0.5 | 0 | 8333.33 | 833.33 | HAIL, WIND |
| 8632670 | 4/8/1974 | 4/8/1974 | Lightning - Wind | 45045 | 0 | 0 | 1388.89 | 1.39 | WIND, ELECTRICAL |
| 9010347 | 11/20/1974 | 11/20/1974 | Wind | 45045 | 0 | 0 | 238.1 | 0 | Wind |
| 8978724 | 3/7/1975 | 3/7/1975 | Hail - Lightning - Wind | 45045 | 0 | 0 | 142.86 | 0 | wind, lightning, and hail |
| 130686 | 3/24/1975 | 3/24/1975 | Tornado | 45045 | 4 | 0 | 25000 | 0 | Tornado |
| 8724250 | 3/24/1975 | 3/24/1975 | Hail - Lightning - Wind | 45045 | 0.3 | 0 | 1086.96 | 10.87 | Wind, Lightning, Hail |
| 8725822 | 5/10/1975 | 5/10/1975 | Hail - Lightning - Wind | 45045 | 0 | 0 | 2777.78 | 2777.78 | Hail, Wind, Lightning |
| 8725855 | 5/15/1975 | 5/15/1975 | Lightning - Wind | 45045 | 0 | 0 | 1086.96 | 10.87 | Wind, Lightning |
| 9007907 | 6/5/1975 | 6/5/1975 | Hail - Wind | 45045 | 0 | 0 | 384.62 | 38.46 | Wind, hail |
| 9007933 | 6/15/1975 | 6/15/1975 | Hail - Lightning - Wind | 45045 | 0 | 0 | 147.06 | 147.06 | Lightning, wind, hail |
| 8726467 | 6/18/1975 | 6/18/1975 | Hail - Lightning - Wind | 45045 | 0 | 0 | 10.87 | 1086.96 | Wind, Lightning, Hail |
| 9007966 | 6/19/1975 | 6/19/1975 | Hail - Lightning - Wind | 45045 | 0 | 0 | 185.19 | 185.19 | Lightning, wind, hail |
| 8727426 | 7/4/1975 | 7/4/1975 | Hail - Lightning - Wind | 45045 | 0 | 0 | 1428.57 | 14285.71 | WIND, HAIL, LIGHTNING |
| 9010578 | 7/14/1975 | 7/14/1975 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 14.71 | 1.47 | Wind, rain |
| 8728427 | 8/27/1975 | 8/27/1975 | Lightning - Severe Storm/Thunder Storm - Wind | 45045 | 0.05 | 0 | 1315.79 | 13.16 | Lightning, HIGH WIND, THUNDERSTORM |
| 9012412 | 9/5/1975 | 9/5/1975 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 454.55 | 454.55 | Thunderstorm, wind, hail |
| 9013888 | 12/31/1975 | 12/31/1975 | Wind | 45045 | 0 | 0 | 108.7 | 0 | Strong winds |
| 8980226 | 2/18/1976 | 2/18/1976 | Wind | 45045 | 0 | 0 | 384.62 | 38.46 | Wind |
| 8636425 | 5/11/1976 | 5/11/1976 | Hail - Lightning - Wind | 45045 | 0 | 0 | 555.56 | 555.56 | Hail, High Winds, Lightning |
| 9020369 | 7/26/1976 | 7/27/1976 | Lightning - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 384.62 | 38.46 | Lightning, wind, rain |
| 9020382 | 7/29/1976 | 7/29/1976 | Lightning - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 384.62 | 3.85 | Lightning, wind, rain |
| 9022131 | 8/13/1976 | 8/13/1976 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm, high wind |
| 9037721 | 3/18/1977 | 3/18/1977 | Wind | 45045 | 0 | 0 | 10.87 | 10.87 | High Winds |
| 9037767 | 3/31/1977 | 3/31/1977 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10.87 | 0 | High winds, heavy rains |
| 9040404 | 4/4/1977 | 4/4/1977 | Wind | 45045 | 0 | 0 | 108.7 | 10.87 | Strong Winds |
| 9043963 | 6/6/1977 | 6/6/1977 | Hail - Lightning - Wind | 45045 | 0.02 | 0 | 108.7 | 1086.96 | Wind, lightning, hail |
| 8644083 | 6/19/1977 | 6/19/1977 | Hail - Lightning - Wind | 45045 | 0 | 0 | 2500 | 25000 | Hail Storm, Lightning, Wind |
| 8644815 | 7/14/1977 | 7/14/1977 | Lightning - Wind | 45045 | 0 | 0 | 1086.96 | 10.87 | Wind, Lightning |
| 9040145 | 9/7/1977 | 9/7/1977 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 108.7 | 10.87 | Thunderstorms, high winds, heavy rain |
| 9040180 | 9/16/1977 | 9/16/1977 | Flooding - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 250 | 0 | Thunderstorm, flooding, and wind |
| 9040182 | 9/27/1977 | 9/27/1977 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorms, high winds, heavy rain |
| 8648512 | 1/25/1978 | 1/26/1978 | Flooding - Wind | 45045 | 0 | 0 | 10869.57 | 1.09 | Wind, Flash Flood |
| 128791 | 3/23/1979 | 3/23/1979 | Tornado | 45045 | 2 | 0 | 500000 | 0 | Tornado |
| 8715104 | 2/25/1980 | 2/25/1980 | Wind | 45045 | 0 | 0.04 | 1087 | 0 | Windstorm |
| 128700 | 4/13/1980 | 4/13/1980 | Tornado | 45045 | 2.5 | 0 | 250000 | 0 | Tornado |
| 9098139 | 7/4/1980 | 7/4/1980 | Lightning - Wind | 45045 | 1 | 0 | 1666.67 | 166.67 | Lightning and windstorm |
| 8719402 | 7/10/1980 | 7/10/1980 | Lightning - Wind | 45045 | 0 | 0 | 12500 | 1250 | wind, lightning |
| 8718642 | 8/8/1980 | 8/8/1980 | Flooding - Wind | 45045 | 0 | 0 | 1086.96 | 108.7 | wind, flood |
| 8655576 | 3/16/1981 | 3/16/1981 | Wind | 45045 | 0 | 0 | 1086.96 | 1.09 | High Winds |
| 9070428 | 4/3/1982 | 4/3/1982 | Wind | 45045 | 0 | 0 | 2500 | 0 | High Winds |
| 9070501 | 4/26/1982 | 4/27/1982 | Hail - Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 10.87 | 10.87 | Thunderstorm, Wind, Lightning, Hail |
| 9070750 | 5/17/1982 | 5/17/1982 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 13.89 | 138.89 | Thunderstorms, High Winds, hail |
| 8736911 | 6/10/1982 | 6/10/1982 | Hail - Lightning - Severe Storm/Thunder Storm | 45045 | 0.2 | 0 | 121951.22 | 121951.22 | Hail/Lightning/Rain/Wind |
| 8740412 | 3/17/1983 | 3/17/1983 | Coastal - Flooding - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 10869.6 | 1086.96 | Wind, Rain, Flooding, Beach Erosion |
| 9066401 | 3/24/1983 | 3/24/1983 | Wind - Winter Weather | 45045 | 0 | 0 | 108.7 | 1.09 | Winter Storm, Wind, Snow |
| 9071637 | 7/20/1983 | 7/20/1983 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | High Winds, Thunderstorm |
| 9071638 | 7/21/1983 | 7/21/1983 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 8743203 | 7/25/1983 | 7/25/1983 | Lightning - Wind | 45045 | 0 | 0 | 1086.96 | 10.87 | Wind, Lightning |
| 8744162 | 8/23/1983 | 8/23/1983 | Lightning - Wind | 45045 | 0 | 0 | 1428.57 | 0 | Wind, Lightning |
| 8747209 | 12/3/1983 | 12/4/1983 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1923.08 | 192.31 | Wind, Heavy Rain |
| 8747243 | 12/6/1983 | 12/6/1983 | Flooding - Wind | 45045 | 0 | 0 | 1282.05 | 12.82 | Flood, Wind |

TORNADOES/ HIGH WINDS - SHELDS

| HAZARD ID | BEGIN DATE | END DATE | HAZARD TYPE | FIPS CODE | INJURIES | FATALITIES | PROPERTY DAMAGE | CROP DAMAGE | REMARKS |
|-----------|------------|------------|---|-----------|----------|------------|-----------------|-------------|-------------------------------------|
| 8660990 | 2/27/1984 | 2/27/1984 | Flooding - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1086.96 | 10.87 | Rain/Wind/Flood |
| 9076449 | 3/8/1984 | 3/8/1984 | Wind | 45045 | 0 | 0 | 108.7 | 10.87 | High Winds |
| 8661932 | 3/28/1984 | 3/28/1984 | Hail - Wind | 45045 | 0 | 0 | 50000 | 50000 | Hail/Wind |
| 9077584 | 4/14/1984 | 4/14/1984 | Lightning - Wind | 45045 | 0 | 0 | 500 | 0 | Wind, Lightning |
| 9077567 | 4/14/1984 | 4/14/1984 | Hail - Wind | 45045 | 0 | 0 | 178.57 | 178.57 | Hail, Wind |
| 9077598 | 4/30/1984 | 4/30/1984 | Hail - Wind | 45045 | 0 | 0 | 5000 | 500 | Hail, Wind |
| 8664820 | 6/20/1984 | 6/20/1984 | Hail - Lightning - Severe Storm/Thunder Storm | 45045 | 0 | 0 | 1086.96 | 108.7 | Rain/Hail/Lightning/Wind |
| 8665575 | 7/12/1984 | 7/12/1984 | Flooding - Lightning - Wind | 45045 | 2 | 0 | 50000 | 0 | Lightning/Wind/Flood |
| 8665615 | 7/26/1984 | 7/26/1984 | Flooding - Severe Storm/Thunder Storm - Wind | 45045 | 0.07 | 0 | 1086.96 | 10.87 | Wind/Rain/Flood |
| 9081330 | 11/10/1984 | 11/10/1984 | Wind | 45045 | 0 | 0 | 100 | 0 | High Wind |
| 8668856 | 2/11/1985 | 2/12/1985 | Hail - Severe Storm/Thunder Storm - Wind - Wind | 45045 | 0 | 0 | 1086.96 | 1.09 | Wind/Snow/Hail/ThunderStorms |
| 9259054 | 4/7/1985 | 4/7/1985 | Wind | 45045 | 0 | 0 | 5000 | 0 | Wind |
| 9259479 | 5/12/1985 | 5/12/1985 | Flooding - Hail - Wind | 45045 | 0 | 0 | 5000 | 0 | Wind, Hail, Flash Flooding |
| 8672297 | 6/2/1985 | 6/2/1985 | Hail - Wind | 45045 | 0 | 0 | 8333.33 | 8333.33 | Hail/Wind |
| 8672335 | 6/7/1985 | 6/7/1985 | Hail - Wind | 45045 | 0 | 0 | 1086.96 | 108.7 | Hail/Wind |
| 9230289 | 7/13/1985 | 7/13/1985 | Wind | 45045 | 0 | 0 | 5000 | 0 | Wind |
| 9092337 | 2/6/1986 | 2/6/1986 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 9095444 | 6/8/1986 | 6/8/1986 | Wind | 45045 | 0 | 0 | 50 | 0 | Wind |
| 9095458 | 6/24/1986 | 6/24/1986 | Wind | 45045 | 0 | 0 | 50 | 0 | Wind |
| 9096753 | 7/14/1986 | 7/14/1986 | Wind | 45045 | 0 | 0 | 500 | 0 | Wind |
| 9096754 | 7/15/1986 | 7/15/1986 | Wind | 45045 | 0 | 0 | 50 | 0 | Wind |
| 9100669 | 2/8/1987 | 2/8/1987 | Wind | 45045 | 0 | 0 | 714.29 | 0 | High Winds |
| 9103529 | 5/1/1987 | 5/1/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 50 | Thunderstorm Wind |
| 9103545 | 5/4/1987 | 5/4/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9103561 | 5/28/1987 | 5/28/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9104460 | 6/1/1987 | 6/1/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9104481 | 6/24/1987 | 6/24/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Wind |
| 9104483 | 6/24/1987 | 6/24/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9104482 | 6/24/1987 | 6/24/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50 | 0 | Thunderstorm Wind |
| 9106477 | 7/5/1987 | 7/5/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50 | 0 | Thunderstorm Wind |
| 9106530 | 7/30/1987 | 7/30/1987 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50 | 0 | Thunderstorm Wind |
| 9117373 | 2/27/1988 | 2/27/1988 | Wind | 45045 | 0 | 0 | 10.87 | 0 | Strong Wind |
| 8690803 | 7/16/1988 | 7/16/1988 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 50 | Severe Storm-Wind |
| 9286422 | 7/21/1988 | 7/21/1988 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm wind |
| 9256579 | 8/1/1988 | 8/1/1988 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50 | 0 | Thunderstorm Wind |
| 9257797 | 11/5/1988 | 11/5/1988 | Wind | 45045 | 0 | 0 | 161.29 | 0 | High Wind |
| 9257816 | 11/5/1988 | 11/5/1988 | Wind | 45045 | 0 | 0 | 50 | 0 | High Wind |
| 8748030 | 1/3/1989 | 1/3/1989 | Wind | 45045 | 0 | 0 | 1096.96 | 1.09 | High Wind |
| 9082373 | 1/3/1989 | 1/3/1989 | Wind | 45045 | 0 | 0 | 50 | 0 | High Wind |
| 8750284 | 4/4/1989 | 4/4/1989 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500000 | 0 | Thunderstorm Winds, Hail |
| 8750282 | 4/4/1989 | 4/4/1989 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 0 | Thunderstorm Winds, Hail |
| 9034584 | 4/4/1989 | 4/4/1989 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9085286 | 5/5/1989 | 5/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds |
| 9085287 | 5/5/1989 | 5/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 8751223 | 6/5/1989 | 6/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 0 | Thunderstorm Winds |
| 8751224 | 6/5/1989 | 6/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 0 | Thunderstorm Winds |
| 9086161 | 6/5/1989 | 6/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds |
| 9086164 | 6/5/1989 | 6/5/1989 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds, Hail |
| 9086166 | 6/5/1989 | 6/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds |
| 9086171 | 6/5/1989 | 6/5/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 9086182 | 6/15/1989 | 6/15/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 9086201 | 6/20/1989 | 6/20/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds |
| 9087194 | 7/30/1989 | 7/30/1989 | Lightning - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind and Lightning |
| 9087825 | 8/1/1989 | 8/1/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9090236 | 11/15/1989 | 11/15/1989 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Wind |
| 8760850 | 2/10/1990 | 2/10/1990 | Tornado | 45045 | 0 | 0 | 50000 | 0 | Tornado (F1) |
| 9263547 | 2/10/1990 | 2/10/1990 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Wind |
| 9263559 | 2/10/1990 | 2/10/1990 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 8764038 | 4/10/1990 | 4/10/1990 | Severe Storm/Thunder Storm - Wind | 45045 | 4 | 0 | 50000 | 0 | Thunderstorm Winds |
| 9265045 | 4/10/1990 | 4/10/1990 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Winds |
| 8768186 | 7/1/1990 | 7/1/1990 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 50000 | Hail, Thunderstorm Winds |
| 9283420 | 7/1/1990 | 7/1/1990 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind, Hail |
| 9286697 | 8/9/1990 | 8/9/1990 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | Thunderstorm Wind |
| 9287614 | 9/10/1990 | 9/10/1990 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Wind, Hail |
| 8696721 | 6/1/1991 | 6/1/1991 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 1 | 100000 | 0 | Thunderstorm Winds, Hail |
| 9285055 | 3/10/1992 | 3/10/1992 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500 | 0 | thunderstorm winds |
| 71219 | 7/21/1992 | 7/21/1992 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50000 | 0 | Thunderstorm Winds |
| 9276092 | 2/21/1993 | 2/21/1993 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 50 | 0 | Thunderstorm winds, hail |
| 79120 | 7/8/1993 | 7/8/1993 | Hail - Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 200000 | 0 | Thunderstorm Winds, Hail |
| 9295897 | 3/27/1994 | 3/27/1994 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | Thunderstorm Winds |
| 9296431 | 3/28/1994 | 3/28/1994 | Tornado | 45045 | 0 | 0 | 500 | 0 | Tornado (F0) |
| 86956 | 7/19/1994 | 7/19/1994 | Hail - Lightning - Wind | 45045 | 0 | 0 | 50000 | 0 | HAIL, THUNDERSTORM WINDS, LIGHTNING |
| 96322 | 1/14/1995 | 1/14/1995 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | THUNDERSTORM WIND |
| 96349 | 3/8/1995 | 3/8/1995 | Wind | 45045 | 0 | 0 | 13000 | 0 | HIGH WINDS |
| 96448 | 5/28/1995 | 5/28/1995 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 2000 | 0 | THUNDERSTORM WIND |
| 96480 | 6/9/1995 | 6/9/1995 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 52000 | 0 | THUNDERSTORM WIND |
| 96494 | 6/10/1995 | 6/10/1995 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 25000 | 0 | THUNDERSTORM WIND |
| 137916 | 10/5/1995 | 10/5/1995 | Tornado | 45045 | 0 | 0 | 75000 | 0 | SIMPSONVILLE |
| 103180 | 11/1/1995 | 11/1/1995 | Wind | 45045 | 0 | 0 | 35714.29 | 0 | HIGH WINDS |
| 63179 | 1/18/1996 | 1/18/1996 | Wind | 45045 | 0 | 0 | 166.67 | 0 | HIGH WIND |
| 63180 | 1/19/1996 | 1/19/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 15000 | 0 | TSTM WIND |
| 63181 | 3/15/1996 | 3/15/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 3 | 1 | 550000 | 0 | TSTM WIND |
| 63184 | 3/16/1996 | 3/16/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 15000 | 0 | TSTM WIND |
| 63185 | 4/20/1996 | 4/20/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 15000 | 0 | TSTM WIND |
| 63186 | 4/26/1996 | 4/26/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | TSTM WIND |
| 63187 | 6/4/1996 | 6/4/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | TSTM WIND |
| 63176 | 6/20/1996 | 6/20/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 1 | 18000 | 0 | TSTM WIND |

TORNADOES/ HIGH WINDS - SHELDUS

| HAZARD ID | BEGIN DATE | END DATE | HAZARD TYPE | FIPS_CODE | INJURIES | FATALITIES | PROPERTY_DAMAGE | CROP_DAMAGE | REMARKS |
|-----------|------------|------------|-----------------------------------|-----------|----------|------------|-----------------|-------------|--------------------------|
| 63188 | 7/14/1996 | 7/14/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 15000 | 0 | TSTM WIND |
| 63189 | 7/17/1996 | 7/17/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 20000 | 0 | TSTM WIND |
| 63190 | 8/24/1996 | 8/24/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | TSTM WIND |
| 63191 | 9/7/1996 | 9/7/1996 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 20000 | 0 | TSTM WIND |
| 137917 | 9/16/1996 | 9/16/1996 | Tornado | 45045 | 0 | 0 | 15000 | 0 | |
| 48641 | 5/13/1997 | 5/13/1997 | Wind | 45045 | 6 | 0 | 3000 | 0 | GUSTY WINDS |
| 48671 | 7/24/1997 | 7/24/1997 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 25000 | 0 | THUNDERSTORM WIND |
| 48670 | 7/28/1997 | 7/28/1997 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | THUNDERSTORM WIND |
| 115471 | 2/3/1998 | 2/3/1998 | Wind | 45045 | 0 | 0 | 10000 | 0 | HIGH WIND |
| 115508 | 5/27/1998 | 5/27/1998 | Severe Storm/Thunder Storm - Wind | 45045 | 3 | 0 | 0 | 0 | THUNDERSTORM WIND |
| 115533 | 6/19/1998 | 6/19/1998 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 20000 | 0 | THUNDERSTORM WIND |
| 36004 | 6/10/1999 | 6/10/1999 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | TSTM WIND |
| 36011 | 7/6/1999 | 7/6/1999 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | TSTM WIND |
| 36031 | 8/1/1999 | 8/1/1999 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 65000 | 0 | THUNDERSTORM WIND |
| 21901 | 4/3/2000 | 4/3/2000 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | THUNDERSTORM WIND |
| 21908 | 5/25/2000 | 5/25/2000 | Severe Storm/Thunder Storm - Wind | 45045 | 2 | 0 | 0 | 0 | THUNDERSTORM WIND |
| 21933 | 7/22/2000 | 7/22/2000 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 130000 | 0 | THUNDERSTORM WIND |
| 21953 | 11/9/2000 | 11/9/2000 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | THUNDERSTORM WIND |
| 180517 | 3/10/2002 | 3/10/2002 | Wind | 45045 | 0 | 0 | 1000 | 0 | |
| 180518 | 6/4/2002 | 6/4/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 3000 | 0 | |
| 180520 | 6/30/2002 | 6/30/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | |
| 180521 | 7/1/2002 | 7/1/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | |
| 180522 | 7/10/2002 | 7/10/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | |
| 180523 | 8/17/2002 | 8/17/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 25000 | 0 | |
| 180524 | 11/11/2002 | 11/11/2002 | Tornado | 45045 | 0 | 0 | 250000 | 0 | |
| 180525 | 11/11/2002 | 11/11/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | |
| 180526 | 11/11/2002 | 11/11/2002 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | |
| 180528 | 11/11/2002 | 11/11/2002 | Tornado | 45045 | 0 | 0 | 2000 | 0 | |
| 180501 | 2/4/2003 | 2/4/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | |
| 180502 | 2/23/2003 | 2/23/2003 | Wind | 45045 | 2 | 0 | 50000 | 0 | |
| 180506 | 5/2/2003 | 5/2/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 3000 | 0 | |
| 180507 | 5/2/2003 | 5/2/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 2000 | 0 | |
| 180509 | 5/16/2003 | 5/16/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | |
| 180510 | 7/29/2003 | 7/29/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | |
| 180512 | 8/4/2003 | 8/4/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | |
| 180514 | 8/16/2003 | 8/16/2003 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 300000 | 0 | |
| 180499 | 3/7/2004 | 3/7/2004 | Wind | 45045 | 0 | 0 | 10909.09 | 0 | |
| 180500 | 3/7/2004 | 3/7/2004 | Wind | 45045 | 0 | 0 | 2000 | 0 | |
| 180495 | 7/5/2004 | 7/5/2004 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 150000 | 0 | |
| 180496 | 7/5/2004 | 7/5/2004 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | |
| 208913 | 8/20/2004 | 8/20/2004 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 2000 | 0 | Thunderstorm Wind |
| 209650 | 9/7/2004 | 9/7/2004 | Wind | 45045 | 0 | 0 | 5000 | 0 | High Wind |
| 210293 | 9/16/2004 | 9/17/2004 | Wind | 45045 | 0 | 0 | 7500 | 0 | High Wind |
| 216371 | 4/2/2005 | 4/2/2005 | Wind | 45045 | 0 | 0 | 11666.66 | 0 | HIGH WIND |
| 216381 | 4/22/2005 | 4/22/2005 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 25000 | 0 | THUNDERSTORM WIND |
| 216382 | 4/22/2005 | 4/22/2005 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 5000 | 0 | THUNDERSTORM WIND |
| 397989 | 6/6/2005 | 6/6/2005 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 1000 | 0 | Thunderstorm Wind |
| 8818630 | 7/3/2006 | 7/3/2006 | Wind | 45045 | 0 | 0 | 1000 | 0 | Strong Wind |
| 8809506 | 8/20/2006 | 8/20/2006 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 1 | 0 | 0 | Thunderstorm Wind (G50) |
| 8830281 | 6/25/2007 | 6/25/2007 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | Thunderstorm Wind (50EG) |
| 8830284 | 6/30/2007 | 6/30/2007 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 3000 | 0 | Thunderstorm Wind (55EG) |
| 8873326 | 4/15/2008 | 4/15/2008 | Wind | 45045 | 0 | 0 | 2000 | 0 | Dust Devil |
| 8944696 | 7/21/2008 | 7/21/2008 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 500000 | 0 | Thunderstorm Wind (65EG) |
| 8944703 | 7/29/2008 | 7/29/2008 | Severe Storm/Thunder Storm - Wind | 45045 | 0 | 0 | 10000 | 0 | Thunderstorm Wind (65EG) |
| 8948232 | 8/26/2008 | 8/26/2008 | Tornado | 45045 | 0 | 0 | 50000 | 0 | Tornado (EF1) |
| 9017237 | 1/7/2009 | 1/7/2009 | Wind | 45045 | 0 | 0 | 16666.67 | 0 | High wind |
| 9323341 | 6/21/2011 | 6/21/2011 | Severe Storm/Thunder Storm - Wind | 45045 | 1 | 0 | 0 | 0 | |
| 9427434 | 4/5/2012 | 4/5/2012 | Wind | 45045 | 0 | 0 | 20000 | 0 | NCDC Strong Wind |

GREENVILLE COUNTY HAZARD EVENTS DAMAGE SUMMARY

JANUARY 2010 PLAN CYCLE

| Date | Type of Event | Comments |
|------------------------|---|--|
| 3/29/10 | Thunderstorms; high wind; hail; rain | Hail to 1.25 in diam.; wind gusts to 60 mph; some property damage |
| 6/15/10 | Thunderstorms; high wind; flooding; hail | Wind gusts to 70 mph; rain rates at 2 – 5 in/hr and 4 in totals; structures damaged by falling trees and lightning strike. Approx. 2,000 customers without power; some power lines down. Localized flooding at Poinsett and Rutherford Roads as well as White Horse Road and Hwy. 183. |
| 7/26/10 | Thunderstorms; high wind; hail; heavy rain | Trees and power lines down causing structural damage and power disruption. |
| 10/26/10 | Thunderstorms with damaging wind; tornado | Eight tornados hit western carolinas including one near Tigerville in Greenville County. Trees snapped off and uprooted. Some minor structural damage and boat docks flipped on Chinquapin Lake. Peak wind speeds estimated at 80 mph. |
| 11/29/10 & 11/30/10 | Intermittent rain and thunderstorms; tornados confirmed in neighboring counties | Rainfall totals ranged from 2 to 3.5 inches. Tornados confirmed in Pickens County (Easley) and Laurens County (Gray Court). |
| 1/9/11 & 1/10/11 | Snow and ice storm | Accumulations of snow and ice ranged from 6 to 10 inches. Hazardous driving conditions through 1/13/2011. Power outages; temporary airport closure; schools closed most of the week. |
| 3/5/11 & 3/6/11 | Heavy rain; flooding | Approximately 2.5 to 3.25 inches of rainfa+ll in a 24 hour period. Hammett Bridge Rd. was closed temporarily due to flooding. |
| 3/9/11 | Heavy rain | Approximately 1 to 3 inches of rainfall causing high water on the Reedy River at Highway 418 (10.5' above gage datum). |

GREENVILLE COUNTY HAZARD EVENTS DAMAGE SUMMARY

JANUARY 2010 PLAN CYCLE

| | | |
|--|---|--|
| 4/4/11 & 4/5/11 | Severe thunderstorms; hail; high winds | Hail; wind gusts to 60 mph; regionally, widespread power outages with fallen trees and downed power lines/poles. |
| 6/15/11 6/16/11 6/19/11 6/20/11 | Severe thunderstorms; hail; high winds; heavy rain WEBEOC operational on 6/16/2011 | Heavy thunderstorms with high winds in excess of 60 mph; hail to 1.5" diam.; structural damage, downed trees and power outages; Codes Dept. activated damage response teams; severe structural damage concentrated in Anderson Ridge/Roper Mountain/Bennett's Bridge Road areas; 196 structures surveyed; 4 homes declared unsafe; vinyl siding, roofs and windows were destroyed in majority of homes surveyed. Evening of June 20, 2011 severe thunderstorms across southern portion of County; downed trees and power lines; occupied recreational vehicle crushed by falling tree – occupant transported to local hospital. |
| 6/22/11 | Severe thunderstorms; high winds | Wind gusts to 70 mph; downed trees and power lines; some structural damage; Highway 253 blocked from Cedar Lane Road to Old Buncombe Rd. By next morning Duke Power reported 2,800 homes in GC still without power. |
| 4/12/12 | Oak Grove Lake Dam Breach | Around 2:30 pm Greenville County and Greenville County Recreation District received calls reporting low water levels at Oak Grove Lake Park. County, State and Rec District officials arrived on-site to assess the situation. There was a wide whirlpool between the vertical standpipe and the earthen dam. Water was observed leaving the lake through the spillway at full capacity. Some erosion of the earthen dam occurred as well as sloughing of the northernmost island. By 8:30 pm the lake had completely drained. No downstream flooding of homes or property occurred. |
| 7/31/12 | Severe thunderstorms; heavy rain; flooding | A strong band of storms moved across Greenville County from west to east. Over 3 inches of rain fell with rainfall intensities reaching 3.5 inches per hour in some locations. The NWS noted road flooding at several locations: Bridwell Rd @ Enoree Rd. and |

GREENVILLE COUNTY HAZARD EVENTS DAMAGE SUMMARY

JANUARY 2010 PLAN CYCLE

| | | |
|-----------|---------------------------------------|---|
| 1/17/13 | Heavy rain; minor snowfall | <p>Stockton Rd @ Brushy Creek Rd. Yard flooding observed along Welcome Avenue due to storm drain issues.</p> <p>A stalled, very moist frontal zone extended from northern Georgia...eastward through the southern upstate of South Carolina into central North Carolina. Low pressure developed along the front over Georgia early Thursday and intensified as it moved east through central South Carolina. The low produced a cold, heavy rain across the area. The Reedy River overflowed its banks. No roads were closed due to flooding; however, there were some fallen trees and minor power outage.</p> |
| 1/30/13 | Thunderstorms; heavy rain; high winds | <p>Flooding at Old Grove Rd and Edwards Mill Road were reported by the National Weather Service. There were downed trees and loss of power in some subdivisions. Rainfall rates exceeded 9 in/hr at some locations.</p> |
| 6/5/2013 | Flooding; heavy rain | <p>Heavy rains swept across Greenville County on June 5 causing some road and yard flooding. The Rocky Creek, Brushy Creek and Gilder Creek watersheds received a large amount of rain causing flooding on Suber Rd, Garlington Rd, Camelot Drive and Neely Ferry Rd. A bridge failure occurred at Neely Ferry Rd. Some rain gages in the County recorded 3.75 inches of rain and numerous complaints were received regarding stormwater drain overflow.</p> |
| 7/8/2013 | Flooding; heavy rain | <p>Heavy rains swept across Greenville County on July 8 causing some road and yard flooding. Approximately 4.6 inches of rain was recorded at the Mauldin High School rain gage. Several homes along Libby Lane were flooded. Some road and bridge damage occurred, including a sinkhole on Harness Trail.</p> |
| 10/6/2013 | Flooding; heavy rain | <p>Heavy rain occurred primarily in the southern portion of the County in the early morning hours of October 6. Approximately 4.85 inches of rain was recorded at 2 rain gages in the Gilder Creek Watershed. Minor flooding of some roads occurred.</p> |

Appendix E – 2010 Plan Cycle Annual Mitigation Initiatives Progress Reports



County of Greenville

"... At Your Service"

Office of the Floodplain Administrator
864 467 7523

September 20, 2010

The Honorable H. G. Kirven, Jr., Chairman, Greenville County Council
301 University Ridge
Greenville, South Carolina 29601

Mr. Joseph M. Kernell, County Administrator
Greenville County South Carolina
301 University Ridge
Greenville, South Carolina 29601

Re: Greenville County Flood Hazard Mitigation Plan Update

Gentlemen:

Greenville County participates in the Community Rating System (CRS) of the National Flood Insurance Program. This program commitment enhances public safety and property protection while providing our flood insurance policyholders with a premium discount. The County Flood Hazard Mitigation Plan is incorporated in the Multi-Jurisdictional Hazard Mitigation Plan (Plan) adopted by County Council in January 2010. This Flood Hazard Mitigation Plan Update is an annual review that is transmitted to the local governing body; the State Flood Mitigation Program Administrator; the media; and, the general public in accordance with CRS program requirements. This report will be transmitted to the media through the County Governmental Affairs Coordinator. The Plan and this update are available in the Codes Enforcement Department for public review. This annual report is designed to document and evaluate progress toward implementing the flood hazard mitigation objectives of the Plan.

Greenville County is threatened by a number of natural hazards that include floods resulting from our exposure to severe thunderstorms and tropical storm systems. These hazards endanger the health and safety of the population of the community, jeopardize its economic vitality, and imperil environmental quality. Due to the importance of avoiding or minimizing our vulnerability to flooding, public and private sector interests of Greenville County joined together to implement a comprehensive flood hazard mitigation effort that began with the planning process documented in the Multi-Jurisdictional Hazard Mitigation Plan.

The Plan's primary goals are designed to ensure the following with regard to flood hazard:

- The safety of the citizens of the Greenville County
- Protection of real and personal property
- Adequate emergency equipment access to affected properties
- The ongoing economic viability of the community before, during and after a flood event
- The continuity of County government operations

- An awareness of flooding impact on new development
- Provision for adequate regulation to protect floodplains
- Development of preparedness plans to effectively manage a flood related emergency

The attached table contains a summary of Plan objectives and a description of progress made in completing those objectives. Recommendations for new objectives and/or revisions to current objectives will be discussed by the Disaster Mitigation Committee (DMC) in our upcoming meeting on November 9, 2010.

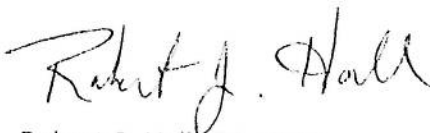
Initially, mitigation objectives were prioritized based upon several factors including effectiveness, funding, time to implement, cost, community support and feasibility. Nine (9) of the objectives, depicted with bold type on the attached table, were determined to be ongoing and thus, were not prioritized. Significant progress has been made for this group of objectives and specifically for the watershed studies, acquisition program, flood pool elevations and 425 drainage projects. Other objectives initiated within the last year include: bridge/culvert analysis, flood signs, weather stations, enhanced GIS database, river gage installation and comprehensive training. Given the five (5) year time frame for the current Plan, the level of effort expended thus far in meeting objectives is deemed to be ahead of schedule. As discussed in the Plan, these objectives may be revised, expanded or deleted as determined necessary by the DMC.

Greenville County staff is committed to achieving the flood hazard mitigation goals outlined in our Plan. We appreciate the support of Council, County Administration and our DMC members as we work together to make Greenville County a more disaster resistant community.

Sincerely,



Keith E. Drummond, CBO, CFM, MCP
Manager, Codes Enforcement



Robert J. Hall, PE, CFM
Floodplain Administrator

Enclosures

Copy: South Carolina Department of Natural Resources, Flood Mitigation Programs
Ms. Paula Gucker, Assistant County Administrator for PublicWorks
Mr. Bob Mihalic, Governmental Affairs Coordinator
Chrono File (Public Review)

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2010

| Objective Description | Activities Completed |
|--|---|
| A. Prevention | |
| Brushy, Rocky, Upper Reedy & Gilder Studies | All studies have been completed and submitted to FEMA for Physical Map Revisions. Draft revised flood risk maps, based upon these studies, are scheduled to be submitted to County in Fall 2010 as part of the nationwide map modernization program. |
| Bridge/Culvert Analysis | <p>A component of the completed watershed studies was analysis of County bridges and culverts. Numerous bridges have been upgraded as a result of that analysis to provide safer crossings with regard to structural integrity and overtopping potential. Also, some bridges located outside the watershed study areas have been upgraded.</p> <p>Completed projects include: Ellesmere Dr @ Brushy Creek; Taylors Rd @ Cane Creek; Hodgens Dr. @ Reedy River; Jonesville Rd @ Peters Creek; Vinson Dr. @ Little Creek; League Road @ Horsepen Creek; Riverbend Rd @ Reedy River; and, Coach Hill Drive @ Rocky Creek (pending).</p> <p>Additional bridges are targeted for replacement by Pubic Works.</p> |
| County Severe Weather Manual | A County Severe Weather Manual has not been prepared and will be discussed at the upcoming November meeting. |
| B. Public Education and Awareness | |
| Flood Pool Elevations | County has identified 9 watershed district impoundments with easements to "top of dam" elevations. Codes Department enforces a "no-build" restriction within these easements. The easement layer has been added to GIS but access is restricted currently. The County Attorney's office is evaluating the information for public release. |
| Enhance Hazards Education. | <p>Flood Insurance Rate Maps and various flood related publications are located in the South Carolina Room of the County Library main branch. These materials are checked annually.</p> <p>In 2010 five (5) meetings with County citizens and environmental groups have been held where floodplain information was provided. This effort is ongoing as part of our CRS outreach program.</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2010

| Objective Description | Activities Completed |
|--|---|
| | <p>Information on flood hazards, Elevation Grant Program and flood insurance was sent to 110 homeowners living in "repetitive loss" flood hazard areas.</p> <p>A "speaker's bureau" has not been developed; however, Codes Enforcement personnel routinely include floodplain information in meetings with homeowners. Additionally, information is provided to County residents in person, by telephone and through e-mail.</p> |
| Realtor Flood Hazard Education | <p>Flood hazard information has been distributed to the Greater Greenville Realtors Association for inclusion on their website. We continue to meet with realty offices and agents.</p> |
| Pre-prepared Hazard Information Advertisements | <p>Telephone directory yellow pages have several pages devoted to severe weather preparation and survival. Hazards include thunderstorms, tornados and flooding.</p> <p>The National Weather Service (NWS) and local TV stations have severe weather alerts and information on their websites. Television and radio stations offer NWS special broadcasts for severe weather. Greenville County is an established Storm Ready Community.</p> <p>The need for additional advertisement, if any, will be discussed at the upcoming Disaster Mitigation Committee (DMC) meeting.</p> |
| Flood Signs | <p>County purchased 18 Turn Around Don't Drown signs and posted 3 as permanent signage. Remaining signs will be used on barriers at flooded intersections as required.</p> <p>Sign usage will be discussed at the upcoming meeting.</p> |
| Weather Stations | <p>County has installed 10 rain gages in support of the NPDES permit monitoring program. These gages were placed in strategic locations across the County and provide continuous rainfall data. This data can be accessed online by the public as well as governmental agencies at "gcfieldnet.woolpert.com. Rain gage data is useful for flood prediction and post event evaluation. Five (5) additional weather stations are planned for this budget year.</p> <p>Additional weather stations are internet accessible via wunderground.com and at usgs.gov.</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2010

| Objective Description | Activities Completed |
|--|---|
| FIRM Updates | <p>FEMA is in the process of revising hazard risk maps for the community. Greenville County has been chosen as one of the first counties in the state for development of "Multi-Hazard" Risk Maps as opposed to Flood Insurance Rate Maps. For flooding, our new maps will include data from the 4 major watershed studies as well as FEMA limited detail studies for selected A zone floodplains. Additional areas may be studied subject to time and budget constraints. The scoping meeting for the current map revision process was held in January 2009. The initial target date for County receipt of draft hazard risk maps was September 2010.</p> <p>Once the new maps have gone through the mandatory review process, an amendment to the Flood Damage Prevention Ordinance will be submitted to Council for enactment to recognize the new maps as part of our regulation.</p> |
| Enhance GIS Database. | <p>With regard to flooding, layers have been added to the GIS database including a protected layer for watershed easements and GPATS (transportation) setbacks. Also, topographic information has been updated using Light Detection and Ranging (LIDAR) data. Current FEMA floodplain layers will be updated when the new hazard risk maps have been finalized; have gone through the appeal/comment period; and, have been adopted into the County Flood Damage Prevention Ordinance. This will take an estimated 1 – 2 years.</p> |
| C. Natural Resources Protection | |
| Stream Crossing Debris Removal | <p>Twenty seven (27) stream crossings which contain debris have been identified in the Plan. Progress on this objective will be discussed at the upcoming meeting.</p> |
| D. Emergency Services | |
| Early Warning System | <p>The reverse 911 system has been discussed as a means to notify citizens within an area impacted or potentially impacted by events such as accidental chemical releases, flooding or high winds.</p> <p>Progress on this objective will be discussed at the upcoming meeting.</p> |
| Gates at Flooded Intersections | <p>No progress has been made on placing permanent gates at potentially flooded intersections. Discussion on whether or not this is a viable objective will be discussed at the upcoming meeting. There is a liability issue</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2010

| Objective Description | Activities Completed |
|--|---|
| | associated with this approach and we plan to propose an amendment that would substitute temporary barricades for permanent gates. |
| Improve Radio Communications | The Emergency Operations Center, Sheriff's Office, Codes Enforcement, Solid Waste and some Fire Districts have access to the SC PAL 800 System, a shared public safety radio system. |
| Post-disaster Review Meetings | Post disaster review meetings will be held as required. |
| Installation of River Gages | River gages have been installed at four locations on the Reedy River and one location each on Brushy Creek and Gilder Creek. Data from these gages is available to the public and government agencies online at gcfieldnet.woolpert.com . Three (3) additional gages are planned for this budget year. The USGS maintains several river gages in the County and access is available online through USGS.gov . |
| Develop Formal Agreements with Utility Providers | <p>This objective addresses development of formal agreements with the County and electric utility providers to restore power to critical facilities first after a severe event.</p> <p>Progress on this objective will be discussed at the upcoming meeting.</p> |
| Develop Inter-local Agreements | <p>This objective addresses agreements between municipalities and the NWS to share information on development or changes that may affect a downstream community. Currently, a statewide mutual aid agreement is in place.</p> <p>This objective also includes notification by the County to NWS of homes that are removed from the floodplain. The most recent list of homes acquired was submitted in September 2010.</p> <p>Progress on this objective will be discussed at the upcoming meeting.</p> |
| Evaluation of Emergency Routes | <p>This objective was designed to improve the ability of emergency services to access those in need. Preferably, more than one access route would be available to impacted communities.</p> <p>Progress on this objective will be discussed at the upcoming meeting.</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2010

| Objective Description | Activities Completed |
|--------------------------------------|--|
| Communications Protocol | The Emergency Operations Center (WEB-EOC) has been revised and updated to enhance communications and cooperation during a natural hazards disaster response. Training on this system is ongoing. |
| Comprehensive Training Strategy | <p>This objective is designed to identify positions throughout the County related to natural hazard response and provide appropriate training.</p> <p>The County provides continuous training opportunities for employees that enhance our ability to provide the services required by our citizens and help to keep employees safe while on the job. Recently, many personnel completed OSHA 10-Hour General Industry Training. The Codes Enforcement Department has 7 Certified Floodplain Managers on staff that receive 16 Continuing Education Credits bi-annually.</p> <p>Additional training completed and opportunities will be discussed at the upcoming meeting.</p> |
| E. Property Protection | |
| Dwelling Elevation Grant Program | The last request for funds under this program was July 2007 for a substantial improvement on Hillbrook Drive. In September 2010, information on this program was mailed to 110 homeowners located in areas where repetitive loss flood insurance claims have been filed. The program is ongoing. |
| Flood Mitigation Acquisition Program | Since 2007 the County has implemented a program to acquire flood prone structures identified in the Brushy Creek and Upper Reedy River Watershed studies. To date, 83 structures have been acquired and the majority have been removed from site. This represents approximately 40 acres of land returned to floodplain use in perpetuity. This program has helped the County reduce the number of repetitive loss structures from 42 to 26 and has improved safety from flood events for our citizens as well as emergency response personnel. |
| Critical Facility Review | County critical facilities (e.g., hospitals, fire depts., police depts., and schools) are identified in Appendix H of the Plan. This objective seeks to have a detailed site investigation of certain facilities (i.e, emergency shelters) performed to determine if they are designed and constructed to withstand potential disasters. The Volunteer Service Corp. has evaluated the adequacy of several disaster shelters in the County. Further progress on this objective will be discussed at the upcoming meeting. |

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2010

| Objective Description | Activities Completed |
|--|---|
| Relocate Fire Station(s)/EMS | <p>This objective seeks to identify fire stations that are located in or near floodplains and to determine the impact of a major flood event on their operation. This objective also notes several stations that may be impacted by ice storms or a high hazard dam breach.</p> <p>Progress on this objective will be discussed at the upcoming meeting.</p> |
| F. Structural Projects | |
| Neighborhood Drainage Improvement Projects (NDIP) | <p>These are prioritized projects that seek to upgrade roads and crossings to reduce localized flooding. The project list is maintained by the County Engineer and includes all known flooding problem areas.</p> <p>Current and recently completed projects include:</p> <p>4th St. Extension Culvert Replacement Vedado Lane Culvert Replacement Berkley Avenue Drainage Improvements Beaver Dam Road Drainage Improvements – New Road</p> <p>Proposed projects include:</p> <p>E Carolina St. Culvert Replacement Satterfield Drive Culvert Replacement</p> |
| | |



Codes Enforcement Division

Robert Hall, PE, CFM
Floodplain Administrator
rohall@greenvillecounty.org
(864) 467-7523
www.greenvillecounty.org

September 1, 2011

The Honorable H. G. Kirven, Jr., Chairman, Greenville County Council
301 University Ridge
Greenville, South Carolina 29601

Mr. Joseph M. Kernell, County Administrator
Greenville County South Carolina
301 University Ridge
Greenville, South Carolina 29601

Re: Greenville County Flood Hazard Mitigation Plan Update

Gentlemen:

Greenville County participates in the Community Rating System (CRS) of the National Flood Insurance Program. This program commitment enhances public safety and property protection while providing our flood insurance policyholders with a premium discount. The County Flood Hazard Mitigation Plan is incorporated into the Multi-Jurisdictional Hazard Mitigation Plan (Plan) adopted by County Council in January 2010. This Flood Hazard Mitigation Plan Update is an annual review that is transmitted to the local governing body; the State Flood Mitigation Program Administrator; the media; and, the general public in accordance with CRS program requirements. This report will be transmitted to the media through the County Governmental Affairs Coordinator. The Plan and this update are available in the Codes Enforcement Department for public review. This annual report is designed to document and evaluate progress toward implementing the flood hazard mitigation objectives of the Plan.

Greenville County is threatened by a number of natural hazards that include floods resulting from our exposure to severe thunderstorms and tropical storm systems. These hazards endanger the health and safety of the population of the community, jeopardize its economic vitality, and imperil environmental quality. Due to the importance of avoiding or minimizing our vulnerability to flooding, public and private sector interests of Greenville County joined together to implement a comprehensive flood hazard mitigation effort that began with the planning process documented in the Multi-Jurisdictional Hazard Mitigation Plan.

The Plan's primary goals are designed to ensure the following with regard to flood hazard:

- The safety of the citizens of Greenville County
- Protection of real and personal property
- Adequate emergency equipment access to affected properties

- The ongoing economic viability of the community before, during and after a flood event
- The continuity of County government operations
- Provision for adequate regulation to protect floodplains
- Development of preparedness plans to effectively manage a flood related emergency

The attached table contains a summary of Plan objectives and a description of progress made in completing those objectives. Recommendations for new objectives and/or revisions to current objectives will be discussed by the Disaster Mitigation Committee (DMC) in our next scheduled meeting.

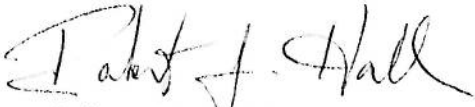
Initially, mitigation objectives were prioritized based upon several factors including effectiveness, funding, time to implement, cost, community support and feasibility. Significant progress has been made for most objectives, especially the structure acquisition program, bridge/culvert replacements, neighborhood drainage improvement projects, weather stations and Flood Insurance Rate Map revisions. The DMC recommended that two objectives, *Gates at Flooded Intersections* and *Fire Station Relocation*, be deleted from further consideration as described in the table. Given the five (5) year time frame for the current Plan, the level of effort expended thus far in meeting objectives is deemed to be ahead of schedule.

Greenville County staff is committed to achieving the flood hazard mitigation goals outlined in our Plan. We appreciate the support of Council, County Administration and our DMC members as we work together to make Greenville County a more disaster resistant community.

Sincerely,



Keith E. Drummond, CBO, CFM, MCP
Manager, Codes Enforcement



Robert J. Hall, PE, CFM
Floodplain Administrator

Enclosures

Copy: South Carolina Department of Natural Resources, Flood Mitigation Programs
Ms. Paula Gucker, Assistant County Administrator for Public Works
Mr. Bob Mihalic, Governmental Affairs Coordinator
Chrono File (Public Review)

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Multi-Hazard Plan Mitigation Objectives Progress Report

September 2011

| Objective Description | Activities Completed |
|---|--|
| A. Prevention | |
| Brushy Creek, Rocky Creek, Upper Reedy River & Gilder Creek Watershed Studies | All studies have been completed and submitted to FEMA for Physical Map Revisions. Draft revised flood risk maps based upon these studies are scheduled to be submitted to the County in Fall 2011 as part of the nationwide map modernization program. We are working on minor amendments to the models for two watershed studies to meet FEMA study protocol. These amendments will be submitted to FEMA for implementation during the 90 day appeal period. |
| Bridge/Culvert Replacements | <p>Bridge/Culvert replacements completed since the 2010 annual report include:</p> <p>Bridgeport Dr. @ Brushy Creek Coach Hills Dr. @ Rocky Creek Davidson Rd. @ Reedy River Tributary Foot Hills Rd. @ Reedy River Pilot Rd. @ Reedy River Tributary Riley Smith Rd. @ Rocky Creek Pennington Rd. @ Lake Robinson Tributary (ongoing)</p> <p>Additional bridges/culverts are targeted for replacement by Pubic Works. These replacements improve structural integrity of the crossing and reduce road overtopping potential during a flood event.</p> |
| County Severe Weather Manual | The Disaster Mitigation Committee (DMC) will address this activity during the next scheduled meeting. The Floodplain Administrator and County Safety and Health Coordinator have discussed the manual contents and goals. |
| B. Public Education and Awareness | |
| Flood Pool Elevations | The Greenville County Soil and Water Conservation District coordinated with the County GIS Department to include the 9 watershed district impoundment easements as a layer on GIS. This layer is available for public review and is used by codes to restrict development within the easements. |
| Enhance Hazards Education. | Flood Insurance Rate Maps (FIRM) and various flood related publications are located in the South Carolina Room of the County Library main branch. These materials are checked annually for CRS recertification and new FIRMs will be supplied when finalized. |

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2011

| Objective Description | Activities Completed |
|--|---|
| | <p>This year, four (4) meetings with County citizens and environmental groups have been held where floodplain information was provided. This effort is ongoing as part of our CRS outreach program.</p> <p>Information on flood hazards, Elevation Grant Program and flood insurance was sent to 107 homeowners living in "repetitive loss" flood hazard areas.</p> |
| Realtor Flood Hazard Education | <p>Flood hazard information has been distributed to the Greater Greenville Realtors Association for inclusion on their website. We continue to meet with realty offices and agents as requested.</p> |
| Pre-prepared Hazard Information Advertisements | <p>Telephone directory yellow pages have several pages devoted to severe weather preparation and survival. Hazards include thunderstorms, tornados and flooding.</p> <p>The National Weather Service (NWS) and local TV stations have severe weather alerts and information on their websites. Television and radio stations offer NWS special broadcasts for severe weather. Greenville County is an established Storm Ready Community.</p> <p>The need for additional advertisement, if any, will be discussed at the next meeting.</p> |
| Flood Signs | <p>Flood hazard warning signs are posted at strategic locations throughout the County. Also, we have 15 Turn Around Don't Drown signs available for use at flooded intersections when required. Public works will post these signs when barricading flooded roads.</p> |
| Weather Station | <p>County has installed 10 rain gages in support of the NPDES permit monitoring program. These gages were placed in strategic locations across the County and provide continuous rainfall data. This data can be accessed online by the public as well as governmental agencies at "gcfieldnet.woolpert.com."</p> <p>Four (4) Davis Instruments weather stations have been installed at County facilities in Travelers Rest, Oneal, Oaklawn and Greenville. These locations provide a good overview of weather condition over the entire County. Access to weather data for each location will be available via the County website. Weather data from these stations will be useful for flood prediction, emergency management operations and routine public works operation. A flood gage installation on Mtn. Creek Church Rd is proposed for 2012 at the time of bridge replacement.</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2011

| Objective Description | Activities Completed |
|--|--|
| FIRM Updates | <p>FEMA is in the process of revising hazard risk maps for the community. Greenville County has been chosen as one of the first counties in the state for development of "Multi-Hazard" Risk Maps. In May 2011, County received a preliminary Flood Risk Report (4/29/11) from the FEMA contractor, AECOM. After reviewing the report, County personnel participated in a phone conference with AECOM to comment and offer suggestions for improvement. This report will target the relative risk to a property location within the Special Flood Hazard Area as well as provide an assessment of overall flood risk.</p> <p>FEMA is continuing preparation of the revised Flood Insurance Rate Maps. In July 2011, AECOM submitted a list of streams in the Upper Reedy River and Gilder Creek watersheds that need revised modeling information to meet FEMA mapping protocol. County has contracted to provide this information during the mapping appeal period. AECOM has indicated that County will receive draft FIRMs in the fall of 2011.</p> |
| Enhance GIS Database. | <p>The County GIS Department has included a layer for the 9 watershed district impoundment easements on the Internet Mapping System. This layer, along with our updated topographic information using Light Detection and Ranging (LIDAR) data, has significantly improved our ability to locate new structures out flood hazard areas.</p> <p>When finalized and adopted into our Ordinance, the new FIRM digital layer will be incorporated into the Internet Mapping System.</p> |
| C. Natural Resources Protection | |
| Stream Crossing Debris Removal | <p>Progress on this objective will be discussed at the next meeting. The County continues to remove downed trees on County owned properties in areas of special flood hazard.</p> |
| D. Emergency Services | |
| Early Warning System | <p>A vendor has been selected for implementation of this objective, scheduled for the last quarter of 2011. Also, see <i>Communications Protocol</i> below.</p> |
| Gates at Flooded Intersections | <p>The DMC has recommended deletion of this objective and use of temporary barricades as needed. Flood warning signs will be used along with the barricades.</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2011

| Objective Description | Activities Completed |
|--|---|
| Improve Radio Communications | The DMC has recommended the continued use of cell phones as a viable means of communication. Improvements to this system, if any, will be discussed at the next meeting. |
| Post-disaster Review Meetings | Post disaster review meetings will be held as required. A severe spring storm event in June 2011 necessitated activation of damage assessment teams. A post-disaster meeting was held after this event. |
| Installation of River Gages | <p>River gages have been installed at four locations on the Reedy River and one location each on Brushy Creek and Gilder Creek. Data from these gages is available to the public and government agencies online at gcfieldnet.woolpert.com.</p> <p>One additional river gage is proposed for Mountain Creek Church Rd. in conjunction with the bridge replacement, scheduled for 2012.</p> |
| Develop Formal Agreements with Utility Providers | Greenville County has a Preferred Customer agreement with the electric utility provider to restore power to critical facilities first after a severe weather event. |
| Develop Inter-local Agreements | <p>This objective addresses agreements between municipalities and the NWS to share information on development or changes that may affect a downstream community. Currently, a statewide mutual aid agreement is in place.</p> <p>This objective also includes notification by the County to NWS of homes that are removed from the floodplain. The most recent list of homes acquired was submitted in August 2011.</p> |
| Evaluation of Emergency Routes | This objective was designed to improve the ability of emergency services to access those in need. The County Engineer has reviewed ingress and egress routes with regard to critical facilities. |
| Communications Protocol | <p>The Emergency Operations Center (WEB-EOC) has been revised and updated to enhance communications and cooperation during a natural hazards disaster response. Training on this system is ongoing.</p> <p>Greenville County Council passed an Ordinance (No. 4295) to enact a Hazardous Substance User Fee that will be used by the Local Emergency Planning Committee (LEPC). Funds generated by this Ordinance will be used in part for long term planning and development of a county-wide notification system.</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2011

| Objective Description | Activities Completed |
|--------------------------------------|--|
| Comprehensive Training Strategy | <p>This objective is designed to identify positions throughout the County related to natural hazard response and provide appropriate training.</p> <p>The County provides continuous employee training opportunities that enhance our ability to provide the services required by our citizens and help to keep employees safe while on the job. The Health and Safety Coordinator conducts department audits in order to determine the types of training needed. One additional Codes Enforcement employee obtained certification as a floodplain manager (CFM) in 2011.</p> <p>The National Weather Service offers offsite training for 911 operators.</p> |
| E. Property Protection | |
| Dwelling Elevation Grant Program | <p>The County will provide up to \$7,500 to elevate homes that meet certain flooding criteria. In September 2011, information on this program was mailed to 107 homeowners located in areas where repetitive loss flood insurance claims have been filed. The program is ongoing.</p> |
| Flood Mitigation Acquisition Program | <p>Since 2007 the County has implemented a program to acquire flood prone structures identified in the Brushy Creek and Upper Reedy River Watershed studies. To date, 99 structures have been acquired and the majority have been removed from site. This represents approximately 45 acres of land returned to floodplain use in perpetuity. This program has helped the County reduce the number of repetitive loss structures from 42 to 26 and has improved safety from flood events for our citizens as well as emergency response personnel. We are attempting to acquire an additional 5 repetitive loss structures this year.</p> |
| Critical Facility Review | <p>County critical facilities (e.g., hospitals, fire depts., police depts., and schools) are identified in Appendix H of the Plan. The Volunteer Service Corp. has evaluated the adequacy of several disaster shelters in the County. This evaluation was performed to determine if these shelters were designed and constructed to withstand potential disasters.</p> |
| Relocate Fire Station(s)/EMS | <p>The DMC determined this objective to be cost prohibitive and recommended its deletion.</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

September 2011

| Objective Description | Activities Completed |
|---|---|
| | |
| F. Structural Projects | |
| Neighborhood Drainage Improvement Projects (NDIP) | <p>NDIP projects seek to upgrade roads and crossings to reduce localized flooding. The project list is maintained by the County Engineer and includes all known flooding problem areas.</p> <p>Locations of current and recently completed drainage projects include:</p> <p>Milford Church Road Vine Street Ridge Road Extension Brown Road Poole @ Pennington Road Roberts Road @ Tanner Road</p> |
| | |



Office of the Floodplain Administrator

Robert Hall, PE, CFM
Floodplain Administrator
rohall@greenvillecounty.org
(864) 467-7523
www.greenvillecounty.org

August 27, 2012

The Honorable H. G. Kirven, Jr., Chairman, Greenville County Council
301 University Ridge
Greenville, South Carolina 29601

Mr. Joseph M. Kernell, County Administrator
Greenville County South Carolina
301 University Ridge
Greenville, South Carolina 29601

Re: Greenville County Flood Hazard Mitigation Plan Update

Gentlemen:

Greenville County participates in the Community Rating System (CRS) of the National Flood Insurance Program. This program commitment enhances public safety and property protection while providing our flood insurance policyholders with a premium discount. The County Flood Hazard Mitigation Plan is incorporated into the Multi-Jurisdictional Hazard Mitigation Plan (Plan) adopted by County Council in January 2010. This Flood Hazard Mitigation Plan Update is an annual review that is transmitted to the local governing body; the State Flood Mitigation Program Administrator; the media; and, the general public in accordance with CRS program requirements. This report will be transmitted to the media through the County Governmental Affairs Coordinator. The Plan and this update are available in the Codes Enforcement Department for public review. This annual report is designed to document and evaluate progress toward implementing the flood hazard mitigation objectives of the Plan.

Greenville County is threatened by a number of natural hazards that include floods resulting from our exposure to severe thunderstorms and tropical storm systems. These hazards endanger the health and safety of the community, jeopardize its economic vitality, and imperil environmental quality. Due to the importance of avoiding or minimizing our vulnerability to flooding, public and private sector interests of Greenville County joined together to implement a comprehensive flood hazard mitigation effort that began with the planning process documented in the Multi-Jurisdictional Hazard Mitigation Plan.

The Plan's primary goals are designed to ensure the following with regard to flood hazard:

- The safety of the citizens of Greenville County
- Protection of real and personal property


- Adequate emergency equipment access to affected properties
- The ongoing economic viability of the community before, during and after a flood event
- The continuity of County government operations
- Provision for adequate regulation to protect floodplains
- Development of preparedness plans to effectively manage a flood related emergency

The attached table contains a summary of Plan objectives and a description of progress made in completing those objectives. Recommendations for new objectives and/or revisions to current objectives will be discussed by the Disaster Mitigation Committee (DMC) in our October meeting.


Initially, mitigation objectives were prioritized based upon several factors including effectiveness, funding, time to implement, cost, community support and feasibility. Significant progress has been made for most objectives, especially the structure acquisition program, bridge/culvert replacements, neighborhood drainage improvement projects and weather station installation. All of the flood study data generated by the County was provided to a FEMA contractor for incorporation into our new Flood Insurance Study (FIS). This new study will provide detailed flood zone information for a major portion of the County. Also, we have initiated a comprehensive study of the Grove Creek Watershed that will provide valuable floodplain and water quality data. Given the five (5) year time frame for the current Plan, the level of effort expended thus far in meeting objectives is deemed to be ahead of schedule.

Greenville County staff is committed to achieving the flood hazard mitigation goals outlined in our Plan. We appreciate the support of Council, County Administration and our DMC members as we work together to make Greenville County a more disaster resistant community.

Sincerely,



Keith E. Drummond, CBO, CFM, MCP
Director, Planning and Code Compliance



Robert J. Hall, PE, CFM
Floodplain Administrator

Enclosure

Copy: South Carolina Department of Natural Resources, Flood Mitigation Programs
Ms. Paula Gucker, Asst. County Administrator for Community Planning & Development
Mr. Bob Mihalic, Governmental Affairs Coordinator
Chrono File (Public Review)

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Multi-Hazard Plan Mitigation Objectives Progress Report

August 27, 2012

| Objective Description | Activities Completed |
|--|---|
| A. Prevention | |
| <p>Brushy Creek, Rocky Creek, Upper Reedy River & Gilder Creek Watershed Studies</p> <p><u>New Study</u></p> <p>Grove Creek Stormwater Master Plan</p> | <p>All studies were submitted to FEMA and have been incorporated into the new Flood Insurance Study for Greenville County. County residents were allowed to preview the new study in December 2011 and submit appeals during a 90 day appeal period that ended July 20, 2012.</p> <p>Currently, we are awaiting the Letter of Final Determination from FEMA that will indicate the effective date for the new study. The County will have six months to incorporate the new study into our Flood Damage Prevention Ordinance.</p> <p>In June 2012, the County initiated a Stormwater Master Plan study of the Grove Creek Watershed located southwest of the City of Greenville. A Letter of Map Revision will be prepared for this study upon completion so that the data can be incorporated into the FEMA Flood Insurance Rate Maps covering this area. Mitigation alternatives will be presented in the final report for areas determined to be at risk for significant flooding.</p> |
| Bridge/Culvert Replacements | <p>Bridge/Culvert replacements completed in 2012 include:</p> <p>New Circle Rd @ Reedy River Tributary Blacks Dr. @ Rocky Creek Greybridge Rd. @ Baker Creek Mountain Creek Church Rd @ Mountain Creek Trib. 1 Pennington Rd. @ Lake Robinson Tributary</p> <p>Additional bridges/culverts are targeted for replacement by Pubic Works. These replacements improve structural integrity of the crossing and reduce road overtopping potential during a flood event.</p> |
| County Severe Weather Manual | This objective has not been addressed and will be discussed during the next scheduled meeting. |
| B. Public Education and Awareness | |
| Flood Pool Elevations | The nine (9) Greenville County Soil and Water Conservation District impoundment easements are available for public review on GIS. The parcel viewer layer name is GCSWCD Impoundment Easement. |

Multi-Hazard Plan Mitigation Objectives Progress Report

August 27, 2012

| Objective Description | Activities Completed |
|--------------------------------|---|
| | <p>located under Zoning/Special Assessment. Development within the easements is restricted and this information is reviewed during the building permit application process. The Floodplain Administrator maintains a database for these impoundments that includes flood and easement boundary elevation information.</p> |
| Enhance Hazards Education | <p>Flood Insurance Rate Maps (FIRM) and various flood related publications are located in the South Carolina Room of the County Library main branch. These materials are checked annually for CRS recertification. Additional information on the County's new Flood Insurance Study (FIS) will be supplied when finalized.</p> <p>Since September 2011, six (6) meetings with County citizens and various groups have been held where floodplain information was provided. This effort is ongoing as part of our Community Rating System (CRS) outreach program.</p> <p>Information on flood hazards, the Elevation Grant Program and flood insurance was sent to 90 homeowners living in "repetitive loss" flood hazard areas.</p> <p>A public meeting was held in December 2011 to roll out the draft flood insurance study for incorporated and unincorporated areas of the County. Information regarding the appeal period for the new Greenville County Flood Insurance Study (FIS) was submitted to the SC Society of Professional Engineers – Piedmont Branch; Greater Greenville Realtors Association; and, the SC Association of Professional Land Surveyors - Foothills Branch. Notifications of the appeal period were placed on the County website and local newspaper.</p> <p>Informational brochures on flooding, in both English and Spanish, were provided to the public in the Planning and Code Compliance Department. These brochures included information such as flood preparation, insurance, response to flooding and increased cost of compliance coverage.</p> |
| Realtor Flood Hazard Education | <p>Flood hazard information has been distributed to the Greater Greenville Realtors Association for inclusion on their website. The association was notified regarding the appeal period for the new FIS and provided with information required to access the draft FIS. The Floodplain Administrator routinely responds to individual realtor requests for information on floodplain</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

August 27, 2012

| Objective Description | Activities Completed |
|--|---|
| | management issues, including floodplain verifications. |
| Pre-prepared Hazard Information Advertisements | <p>The Greenville County Office of Emergency Management has a new web page containing a wealth of information including an excellent section on potential natural hazards to County citizens. A link is provided to the County Emergency Operations Plan, a comprehensive emergency planning document.</p> <p>The telephone directory contains Severe Weather Planner information that includes Red Cross contact information. Natural hazards addressed include thunderstorms, tornados and flooding.</p> <p>The National Weather Service (NWS) and local TV stations have severe weather alerts and information on their websites. Television and radio stations offer NWS special broadcasts for severe weather. Greenville County is an established Storm Ready Community. The NWS website contains "Awareness Materials" under the Storm Ready website for the following natural hazards: thunderstorms, tornados, hurricanes, floods and winter weather.</p> <p>The County web page contains links to flood hazard information under the Floodplain Management tab of the Department of Planning and Code Compliance.</p> |
| Flood Signs | <p>Flood hazard warning signs are posted at strategic locations throughout the County. Also, we have 15 Turn Around Don't Drown signs available for use at flooded intersections when required. Public works will post these signs when barricading flooded roads.</p> <p>A partial list of roads flooded during previous flood events (1995 and 2004) includes:</p> <ul style="list-style-type: none"> - Hammett Road - Log Shoals Road - Dukeland Drive - N Chastain Drive - Del Norte Subdivision Roads - Batesville Road - Old Spartanburg Rd at Riverside High - East Georgia Road - Hopkins Road - Gibbs Shoals Road - Cedar Falls Road - Holland Ford Road - Woodville Road |

Multi-Hazard Plan Mitigation Objectives Progress Report

August 27, 2012

| Objective Description | Activities Completed |
|-----------------------|--|
| | These areas will be monitored during potential flood events using rain/flood gage information, NWS announcements and/or field observation. |
| Weather Station | <p>County has installed 10 rain gages in support of the NPDES permit monitoring program. These gages were placed in strategic locations across the County and provide continuous rainfall data. This data can be accessed online by the public as well as governmental agencies at "http://gcfieldnet.woolpert.com. The username and password is "public."</p> <p>Five (5) Davis Instruments weather stations have been installed at County facilities in Travelers Rest, Oneal, Oaklawn, Animal Care Services and County Square. These locations provide a good overview of weather condition over the entire County. Weather data from these stations will be useful for flood prediction, emergency management operations and routine public works operation. The stations can be accessed via the internet at www.weatherlink.com. Click on the WeatherLink Station Map and type in Greenville, SC to obtain the Greenville County station locations and data links. The County Floodplain Administrator has additional information on these stations if required.</p> |
| FIRM Updates | The FEMA contractor is continuing preparation of the revised Flood Insurance Rate Maps for Greenville County. The 90 day statutory appeal period for the new Flood Insurance Study was completed from April 20 to July 20, 2012. One appeal was filed for a portion of Rocky Creek near the intersection of Highway 14 and Batesville Road. After FEMA issues the Letter of Final Determination we will initiate the process of incorporating the study into our Ordinance. |
| Enhance GIS Database. | <p>The County GIS Department has included a layer for the nine (9) watershed district impoundment easements on the Internet Mapping System. This layer, along with our updated topographic information using Light Detection and Ranging (LIDAR) data and our 2012 aerial photography, has significantly improved our ability to locate new structures out of flood hazard areas. Also, this information is used to assist citizens in assessing their need for flood insurance and in making real estate purchase decisions.</p> <p>When finalized and adopted into our Ordinance, the new FIRM digital layer will be incorporated into the Internet Mapping System for public use.</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

August 27, 2012

| Objective Description | Activities Completed |
|--|---|
| C. Natural Resources Protection | |
| Stream Crossing Debris Removal | The County continues to remove downed trees on County owned properties in areas of special flood hazard. Also, County maintains drainage areas on our right of ways as required. Areas under and immediately adjacent to existing bridges and culverts are cleaned and reworked to accommodate replacement structures. |
| D. Emergency Services | |
| Early Warning System | The County Early Warning System is in development with a projected completion date of Spring 2013. |
| Gates at Flooded Intersections | The DMC has recommended deletion of this objective and use of temporary barricades as needed. Flood warning signs will be used along with the barricades. |
| Improve Radio Communications | Greenville E911 is currently considering a County-wide radio network available to County agencies. |
| Post-disaster Review Meetings | <p>During the June 2011 storm event, inspectors were deployed and debriefed at the end of each day. The Palmetto 800 radio system was used to send information back to the Codes Enforcement Emergency Operations Room. Data was uploaded to the EMD WebEOC as received. Codes and EMD personnel met after the event to generate a final report for FEMA.</p> <p>This process will be used as necessary for similar future events.</p> |
| Installation of River Gages | <p>River gages have been installed at four locations on the Reedy River and one location each on Brushy Creek and Gilder Creek. Data from these gages is available to the public and government agencies online at gcfieldnet.woolpert.com. The username and password for this site is "public".</p> <p>One additional stream gage is being installed on the Mountain Creek Church Road bridge over Mountain Creek Tributary I. A Memorandum of Understanding between Greenville County and the National Weather Service (NWS) has been completed. The NWS will provide the gage equipment and County will install the support unit as well as procuring the telephone line for the gage. This unit should be functional by the end of September 2012.</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

August 27, 2012

| Objective Description | Activities Completed |
|--|--|
| Develop Formal Agreements with Utility Providers | Greenville County has a Preferred Customer agreement with the electric utility provider to restore power to critical facilities first after a severe weather event. |
| Develop Inter-local Agreements | <p>This objective addresses agreements between municipalities and the NWS to share information on development or changes that may affect a downstream community. Currently, a statewide mutual aid agreement is in place.</p> <p>The County notifies NWS of homes that are removed from the floodplain under our acquisition program. The most recent list of homes acquired was submitted in August 2012</p> <p>The County and NWS have Memorandums of Understanding for sharing data from County rain/stream gages. Also, an MOU is in place for the Mountain Creek Church Road stream gage where the gage equipment was supplied by the NWS.</p> |
| Evaluation of Emergency Routes | This objective was designed to improve the ability of emergency services to access those in need. The County Engineer has reviewed ingress and egress routes with regard to critical facilities. A system of public works vehicles and equipment has been developed to accompany emergency response vehicles as necessary during disaster events or inclement weather. |
| Communications Protocol | <p>The Emergency Operations Center (WEB-EOC) has been revised and updated to enhance communications and cooperation during a natural hazards disaster response. Training on this system is ongoing. EMD is working on getting fire departments and municipalities trained to use WEB-EOC.</p> <p>Greenville County Council passed an Ordinance (No. 4295) to enact a Hazardous Substance User Fee that will be used by the Local Emergency Planning Committee (LEPC). Funds generated by this Ordinance will be used in part for long term planning and development of a county-wide notification system. Over two years of fees have been collected and will be used to procure the Early Warning System.</p> |
| Comprehensive Training Strategy | <p>This objective is designed to identify positions throughout the County related to natural hazard response and provide appropriate training.</p> <p>The County provides continuous employee training opportunities that enhance our ability to provide the</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

August 27, 2012

| Objective Description | Activities Completed |
|--------------------------------------|--|
| | <p>services required by our citizens and help to keep employees safe while on the job. The Health and Safety Coordinator conducts department audits in order to determine the types of training needed.</p> <p>One additional Codes Enforcement employee obtained certification as a floodplain manager (CFM) in 2012, bringing the total number of CFMs to nine (9). All senior staff positions and senior disaster assessment positions are CFMs.</p> <p>The National Weather Service offers offsite training for 911 operators.</p> |
| E. Property Protection | |
| Dwelling Elevation Grant Program | <p>The County will provide up to \$7,500 to elevate homes that meet certain flooding criteria. In August 2012, information on this program was mailed to 90 homeowners located in areas where repetitive loss flood insurance claims have been filed. The program is ongoing.</p> |
| Flood Mitigation Acquisition Program | <p>Since 2007 the County has implemented a program to acquire flood prone structures identified in the Brushy Creek and Upper Reedy River Watershed studies. To date, 111 structures have been acquired and removed from site. This represents over 51 acres of land returned to floodplain use in perpetuity. This program has helped the County reduce the number of repetitive loss structures from 42 to 22 and has improved safety from flood events for our citizens as well as emergency response personnel. We are attempting to acquire additional repetitive loss structures as we proceed with the program.</p> <p>We have initiated another watershed study in the Grove Creek Watershed. This study includes a risk assessment to determine if any structures in this watershed may have a high risk of flooding. If so, the acquisition and removal option will be evaluated for those structures.</p> |
| Critical Facility Review | <p>County critical facilities (e.g., hospitals, fire depts., police depts., and schools) are identified in Appendix H of the Plan. The Volunteer Service Corp. has evaluated the adequacy of several disaster shelters in the County. This evaluation was performed to determine if these shelters were designed and constructed to withstand potential disasters.</p> |

Multi-Hazard Plan Mitigation Objectives Progress Report

August 27, 2012

| Objective Description | Activities Completed |
|---|---|
| Relocate Fire Station(s)/EMS | The DMC determined this objective to be cost prohibitive and recommended its deletion. |
| F. Structural Projects | |
| Neighborhood Drainage Improvement Projects (NDIP) | <p>NDIP projects seek to upgrade roads and crossings to reduce localized flooding. The project list is maintained by the County Engineer and includes all known flooding problem areas.</p> <p>Locations of current and recently completed drainage projects include:</p> <p>Michaux Drive Vine Street Devenger Place/Overton Ivy Trail Bennington Way Pinckney Street Pinehurst Street Providence Square</p> |



Office of the Floodplain Administrator

Robert Hall, PE, CFM
Floodplain Administrator
rohall@greenvillecounty.org
(864) 467-7523
www.greenvillecounty.org

August 19, 2013

The Honorable Bob Taylor, Chairman, Greenville County Council
301 University Ridge
Greenville, South Carolina 29601

Mr. Joseph M. Kernell, County Administrator
Greenville County South Carolina
301 University Ridge
Greenville, South Carolina 29601

Re: Greenville County Flood Hazard Mitigation Plan Update (2013)

Gentlemen:

Greenville County participates in the Community Rating System (CRS) of the National Flood Insurance Program. This program commitment enhances public safety and property protection while providing our flood insurance policyholders with a premium discount. The County Flood Hazard Mitigation Plan is incorporated into the Multi-Jurisdictional Hazard Mitigation Plan (Plan) adopted by County Council in January 2010. This Flood Hazard Mitigation Plan Update is an annual review that is transmitted to the local governing body; the State Flood Mitigation Program Administrator; the media; and, the general public in accordance with CRS program requirements. This report will be transmitted to the media through the County Governmental Affairs Coordinator. The Plan and this update are available in the Floodplain Administrator's Office for public review. This annual report is designed to document and evaluate progress toward implementing the flood hazard mitigation objectives of the Plan.

Greenville County is threatened by natural hazards that include floods resulting from our exposure to severe thunderstorms and tropical storm systems. These hazards endanger the health and safety of the community, jeopardize its economic vitality, and imperil environmental quality. Due to the importance of avoiding or minimizing our vulnerability to flooding, public and private sector interests of Greenville County joined together to implement a comprehensive flood hazard mitigation effort that began with the planning process documented in the Multi-Jurisdictional Hazard Mitigation Plan.

The Plan's primary goals are designed to ensure the following with regard to flood hazard:

- The safety of Greenville County citizens
- Protection of real and personal property

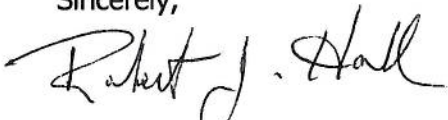
- Adequate emergency equipment access to affected properties
- The ongoing economic viability of the community before, during and after a flood event
- The continuity of County government operations
- Provision for adequate regulation to protect floodplains
- Development of preparedness plans to effectively manage a flood related emergency

The attached table contains a summary of Plan initiatives and a description of progress made in completing them. Also, the table indicates if the initiative is complete, ongoing, under review or has been deleted from further consideration. Recommendations for new initiatives and revisions to current initiatives will be discussed by the Disaster Mitigation Committee (DMC) in our October meeting.

Initially, mitigation initiatives were prioritized based upon several factors including effectiveness, funding, time to implement, cost, community support and feasibility. Significant progress has been made for most initiatives, especially the structure acquisition program, bridge/culvert replacements and neighborhood drainage improvement projects. All of the flood study data generated by the County was provided to a FEMA contractor for incorporation into our new Flood Insurance Study (FIS). This new FIS, which is expected to become effective in the first quarter of 2014, will provide detailed flood zone information for a major portion of the County. Also, we are nearing completion on a comprehensive study of the Grove Creek Watershed that will provide valuable floodplain and water quality data. Given the five (5) year time frame for the current Plan, the level of effort expended in meeting initiatives is deemed to be on schedule.

Greenville County staff is committed to achieving the flood hazard mitigation goals outlined in our Plan. We appreciate the support of Council, County Administration and our DMC members as we work together to make Greenville County a more disaster resistant community.

Sincerely,



Robert J. Hall, PE, CFM
Floodplain Administrator

Enclosure

Copy: South Carolina Department of Natural Resources, Flood Mitigation Programs
Ms. Paula Gucker, Asst. County Administrator for Community Planning & Development
Mr. Bob Mihalic, Governmental Affairs Coordinator
Mr. Lance Estep, Director of Planning and Code Compliance
Codes Enforcement Chrono File (Public Review)

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Multi-Jurisdictional Hazard Mitigation Plan Initiatives Progress Report

August 2013

| Initiative Description | Activities |
|--|--|
| A. Prevention | |
| <p>Brushy Creek, Rocky Creek, Upper Reedy River & Gilder Creek Watershed Studies</p> <p><u>New Study</u></p> <p>Grove Creek Stormwater Master Plan</p> <p>(Ongoing)</p> | <p>All studies were submitted to FEMA and have been incorporated into the new Flood Insurance Study for Greenville County. County residents were allowed to preview the new study in December 2011 and submit appeals during a 90 day appeal period that ended July 20, 2012.</p> <p>In June 2012, the County initiated a Stormwater Master Plan study of the Grove Creek Watershed located southwest of the City of Greenville. The field work and preliminary study model are complete. Preliminary data indicates that a minor number of existing structures are located within the modeled Special Flood Hazard Area. A Letter of Map Revision will be prepared for this study upon completion so that the data can be incorporated into the FEMA Flood Insurance Rate Maps covering this area. Mitigation alternatives will be presented in the final report for areas and road crossings determined to be at risk for significant flooding.</p> <p>In April 2012, the Oak Grove Lake dam breached, releasing all of the water in the lake over a short period of time. No major flooding occurred as a result of the breach. However, in order to repair the dam, the County was required to perform a Dam Breach Analysis to determine potential impact to downstream properties. Results show that a breach occurring with the reservoir filled to the top of dam will be contained within the existing "500 year" floodplain. Repairs to the dam were initiated in 2013 and should be complete in 2014.</p> |
| <p>Bridge/Culvert Replacements</p> <p>(Ongoing)</p> | <p>Bridge/Culvert replacements completed since October 2012 include:</p> <p>Jamison Mill Road @ Jamison Mill Creek Lakeview Circle @ Reedy River Tributary 10 Lyons Drive @ Graze Creek Terrace Lane @ Graze Creek</p> <p>Additional bridges/culverts are targeted for replacement by Pubic Works in 2014. These replacements improve structural integrity of the crossing and reduce road overtopping potential during a flood event.</p> |

Multi-Jurisdictional Hazard Mitigation Plan Initiatives Progress Report

August 2013

| Initiative Description | Activities |
|--|--|
| <p>County Severe Weather Manual</p> <p>(Under Review)</p> | <p>At the October 2012 meeting, the County Safety and Health Coordinator agreed to review existing employee safety information and determine if a severe weather manual is needed to supplement the existing program. The status of this initiative will be reviewed in the Disaster Mitigation Committee (DMC) meeting to be held in October 2013.</p> |
| <p>B. Public Education and Awareness</p> | |
| <p>Flood Pool Elevations</p> <p>(Complete)</p> | <p>The nine (9) Greenville County Soil and Water Conservation District impoundment easements are available for public review on GIS. The parcel viewer layer name is GCSWCD Impoundment Easement, located under Zoning/Special Assessment. Development within the easements is restricted and this information is reviewed during the building permit application process. The Floodplain Administrator maintains a database for these impoundments that includes flood and easement boundary elevation information.</p> |
| <p>Enhance Hazards Education</p> <p>(Ongoing)</p> | <p>Flood Insurance Rate Maps (FIRM) and various flood related publications are located in the South Carolina Room of the County Library main branch. These materials are checked annually for CRS recertification. In May 2013, a complete set of CRS required FEMA floodplain publications was given to the County Library for use as public reference material. Additional information on the County's new Flood Insurance Study (FIS) will be supplied when finalized.</p> <p>Since October 2012, several meetings with County citizens and various groups (e.g., appraisers, commercial realtors, developers) have been held where floodplain information was provided. This effort is ongoing as part of our Community Rating System (CRS) outreach program.</p> <p>In August 2013, information on flood hazards, the Elevation Grant Program and flood insurance was sent to 86 homeowners living in "repetitive loss" flood hazard areas.</p> <p>In November 2012, floodplain information for Residential and Commercial Contractors was developed and placed on the County website. This information targeted issues important to contractors and included: flood zones; Flood Damage Prevention Ordinance; permitting; inspections; and, flood insurance.</p> |

Multi-Jurisdictional Hazard Mitigation Plan Initiatives Progress Report

August 2013

| Initiative Description | Activities |
|--|---|
| | <p>Informational brochures on flooding, in both English and Spanish, are provided to the public in the Planning and Code Compliance Department. These brochures include information such as flood preparation, insurance, response to flooding and increased cost of compliance coverage.</p> |
| <p>Realtor Flood Hazard Education (Ongoing)</p> | <p>Flood hazard information has been distributed to the Greater Greenville Realtors Association for inclusion on their website. The association was notified regarding the appeal period for the new FIS and provided with information required to access the draft FIS. The Floodplain Administrator routinely responds to individual realtor requests for information on floodplain management issues, including floodplain verifications.</p> |
| <p>Pre-prepared Hazard Information Advertisements (Ongoing)</p> | <p>The Greenville County Office of Emergency Management has created a new web page containing a wealth of information including an excellent section on potential natural hazards to County citizens. Numerous links are provided, including a link to the County Emergency Operations Plan, a comprehensive emergency planning document.</p> <p>The telephone directory contains Severe Weather Planner information that includes FEMA, Red Cross and Local Emergency Management contact information. Natural hazards addressed include thunderstorms, tornados and flooding.</p> <p>The National Weather Service (NWS) and local TV stations have severe weather alert and related information on their websites. Television and radio stations offer NWS special broadcasts for severe weather. Greenville County is an established Storm Ready Community. The NWS website contains "Awareness Materials" under the Storm Ready website for the following natural hazards: thunderstorms, tornados, hurricanes, floods and winter weather.</p> <p>The County web page contains links to flood hazard information under the Floodplain Management tab of the Department of Planning and Code Compliance. A section for Residential and Commercial Contractors was added in late 2012. Additional stormwater, water quality and flood information is contained in the Land Development section of the County web page.</p> |

Multi-Jurisdictional Hazard Mitigation Plan Initiatives Progress Report

August 2013

| Initiative Description | Activities |
|-----------------------------------|--|
| Flood Signs (Ongoing) | <p>Flood hazard warning signs are posted at strategic locations throughout the County. Also, we have 15 Turn Around Don't Drown signs available for use at flooded intersections when required. Public works will post these signs when barricading flooded roads.</p> <p>A partial list of roads flooded during previous flood events (1995 and 2004) includes:</p> <ul style="list-style-type: none">- Hammett Road- Log Shoals Road- Dukeland Drive- N Chastain Drive- Del Norte Subdivision Roads- Batesville Road- Old Spartanburg Rd at Riverside High- East Georgia Road- Hopkins Road- Gibbs Shoals Road- Cedar Falls Road- Holland Ford Road- Woodville Road <p>These areas will be monitored during potential flood events using rain/flood gage information, NWS announcements and/or field observation.</p> |
| Weather Stations (Ongoing) | <p>Greenville County has installed 14 rain gages in support of the NPDES permit monitoring program. These gages were placed in strategic locations across the County and provide continuous rainfall data. Six (6) stream gage stations are installed on the Reedy and Enoree Rivers. The NWS has a direct link to this data that is used to assist in weather forecasting and hazardous weather alerts.</p> <p>Five (5) Davis Instruments weather stations have been installed at County facilities in Travelers Rest, Oneal, Oaklawn, Animal Care Services and University Ridge. These locations provide a good overview of weather condition over the entire County. Weather data from these stations will be useful for flood prediction, emergency management operations and routine public works operation. The stations can be accessed via the internet at www.weatherlink.com. Click on the WeatherLink Station Map and type in Greenville, SC to obtain the Greenville County station locations and data links. The County Floodplain Administrator has additional information on these stations if required.</p> |

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|--|--|
| | Links to the Davis instruments weather stations have been provided to the National Weather Service and to the Greenville County Fire Chiefs. |
| FIRM Updates (Pending) | <p>The FEMA contractor is continuing preparation of the revised Flood Insurance Rate Maps for Greenville County. The 90 day statutory appeal period for the new Flood Insurance Study was completed from April 20 to July 20, 2012. An appeal was filed for a portion of Rocky Creek near the intersection of Highway 14 and Batesville Road.</p> <p>Currently, we are awaiting the Letter of Final Determination (LFD) from FEMA that will indicate the effective date for the new study. We expect FEMA to issue the letter in the 3rd quarter 2013. The County will have six months from the date of the LFD to incorporate the new study into our Flood Damage Prevention Ordinance.</p> |
| Enhance GIS Database (Ongoing) | <p>The County GIS Department has included a layer for the nine (9) watershed district impoundment easements on the Internet Mapping System. This layer, along with our updated topographic information using Light Detection and Ranging (LIDAR) data and our 2012 aerial photography, has significantly improved our ability to locate new structures out of flood hazard areas. Also, this information is used to assist citizens in assessing their need for flood insurance and in making real estate purchase decisions.</p> <p>When finalized and adopted into our Ordinance, the new FIRM digital layer will be incorporated into the Internet Mapping System for public use.</p> |
| C. Natural Resources Protection | |
| Stream Crossing Debris Removal (Ongoing) | The County continues to remove downed trees on County owned properties in areas of special flood hazard. Also, the County maintains drainage areas on our right of ways as required. Areas under and immediately adjacent to existing bridges and culverts are cleaned and reworked to accommodate replacement structures. |

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| Initiative Description | Activities |
|---|--|
| D. Emergency Services | |
| Early Warning System (Pending) | The County has reviewed the Inter Call early warning system that allows messages to be sent internally or to target groups, including the general public, on a large scale. We will receive an update on the status of this system at the next DMC meeting. |
| Gates at Flooded Intersections (Deleted) | The DMC has recommended deletion of this initiative and use of temporary barricades as needed. Flood warning signs will be used along with the barricades. |
| Improve Radio Communications (Under Review) | This initiative is under review. |
| Post-disaster Review Meetings (Ongoing) | <p>During the June 2011 storm event, inspectors were deployed and debriefed at the end of each day. The Palmetto 800 radio system was used to send information back to the Codes Enforcement Emergency Operations Room. Data was uploaded to the EMD WEB-EOC as received. Codes and EMD personnel met after the event to generate a final report for FEMA.</p> <p>This process will be used as necessary for similar future events. Cell phones are used as the primary means of communication.</p> <p>Two EMD grants have been received. One grant was used to purchase a gas meter that is used by personnel required to enter hoarder houses. A PDA is used to provide location information that can be transmitted to the WEB-EOC. This equipment will be used as required during a natural hazard event response.</p> |
| Installation of River Gages (Complete) | River gages have been installed at four locations on the Reedy River and one location each on Brushy Creek and Gilder Creek. One additional stream gage has been installed on the Mountain Creek Church Road bridge over Mountain Creek Tributary 1. A Memorandum of Understanding between Greenville County and the National Weather Service (NWS) has been completed. The NWS provided the gage equipment and maintains the gage. County installed the support unit and procured the telephone line for the gage. |
| Develop Formal Agreements with Utility Providers (Complete) | Greenville County has a Preferred Customer agreement with the electric utility provider to restore power to critical facilities first after a severe weather event. |

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| Initiative Description | Activities |
|--|---|
| <p>Develop Inter-local Agreements</p> <p>(Complete)</p> | <p>This initiative addresses agreements between municipalities and the NWS to share information on development or changes that may affect a downstream community. Currently, a statewide mutual aid agreement is in place.</p> <p>The County notifies NWS of homes that are removed from the floodplain under our acquisition program. The County and NWS have Memorandums of Understanding for sharing data from County rain/stream gages. Also, an MOU is in place for the Mountain Creek Church Road stream gage where the gage equipment was supplied by the NWS.</p> |
| <p>Evaluation of Emergency Routes</p> <p>(Ongoing)</p> | <p>This initiative was designed to improve the ability of emergency services to access those in need. The County Engineer has reviewed ingress and egress routes with regard to critical facilities. A system of public works vehicles and equipment has been developed to accompany emergency response vehicles as necessary during disaster events or inclement weather. Additional routes will be evaluated as the need arises.</p> |
| <p>Communications Protocol</p> <p>(Ongoing)</p> | <p>The Emergency Operations Center (WEB-EOC) has been revised and updated to enhance communications and cooperation during a natural hazards disaster response. Training on this system is ongoing. EMD is working on getting fire departments and municipalities trained to use WEB-EOC.</p> <p>Greenville County Council passed an Ordinance (No. 4295) to enact a Hazardous Substance User Fee that will be used by the Local Emergency Planning Committee (LEPC). Funds generated by this Ordinance will be used in part for long term planning and development of a county-wide notification system.</p> |
| <p>Comprehensive Training Strategy</p> <p>(Ongoing)</p> | <p>This initiative is designed to identify positions throughout the County related to natural hazard response and provide appropriate training.</p> <p>The County provides continuous employee training opportunities that enhance our ability to provide the services required by our citizens and help to keep employees safe while on the job. At the request of a Department Manager, the Health and Safety Coordinator conducts department audits in order to determine the types of training needed.</p> |

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| Initiative Description | Activities |
|---|---|
| | <p>The Planning and Code Compliance Department employs eight (8) Certified Floodplain Managers (CFM). All senior staff positions and senior disaster assessment positions are CFMs.</p> <p>The National Weather Service offers offsite training for 911 operators.</p> <p>EMD staff receives routine outside training and provide training to other County staff. Recent training includes the EOC Operations and Planning for All Hazards presented by the Texas Engineering Extension Service in cooperation with DHS-FEMA.</p> |
| E. Property Protection | |
| <p>Dwelling Elevation Grant Program</p> <p>(Ongoing)</p> | <p>The County will provide up to \$7,500 to elevate homes that meet certain flooding criteria. In August 2013, information on this program was mailed to 86 homeowners located in areas where repetitive loss flood insurance claims have been filed.</p> |
| <p>Critical Facility Review</p> <p>(Complete)</p> | <p>County critical facilities (e.g., hospitals, fire depts., police depts., and schools) have been identified. The Volunteer Service Corp. has evaluated the adequacy of several disaster shelters in the County. This evaluation was performed to determine if these shelters were designed and constructed to withstand potential disasters.</p> |
| <p>Flood Mitigation Acquisition Program</p> <p>(Ongoing)</p> | <p>Since 2007 the County has implemented a program to acquire flood prone structures identified in the Brushy Creek and Upper Reedy River Watershed studies. As of July 1, 2013 the County has acquired 120 structures that have been removed from the floodplain. This represents approximately 55 acres of land returned to floodplain use in perpetuity. This program has helped the County reduce the number of repetitive loss structures from 43 to 22 and has improved safety from flood events for our citizens as well as emergency response personnel. We are attempting to acquire additional repetitive loss structures as we proceed with the program.</p> <p>We have initiated another watershed study in the Grove Creek Watershed. This study includes a risk assessment to determine if any structures in this watershed may have a high risk of flooding. If so, the acquisition and removal option will be evaluated for those structures.</p> |
| <p>Relocate Fire Station(s)/EMS</p> <p>(Deleted)</p> | <p>The DMC determined this initiative to be cost prohibitive and recommended its deletion.</p> |

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| Initiative Description | Activities |
|---|--|
| | |
| F. Structural Projects | |
| Neighborhood Drainage Improvement Projects (NDIP) (Ongoing) | <p>NDIP projects seek to upgrade roads and crossings to reduce localized flooding. The project list is maintained by the County Engineer and includes all known flooding problem areas.</p> <p>Locations of recently completed and proposed drainage projects include:</p> <p>Berkley Avenue Beaver Dam Road Roberts Road/ Tanner Road Garrison Road – Phase III Milford Church Road Harness Trail Camelot Drive Riddle Road</p> |

Appendix F – Critical Facilities

HOSPITALS

| Name | Address | City | State | Zip Code | TM # |
|---------------------------------|-------------------------|----------------|-------|------------|---------------|
| ROGER C. PEACE REHAB HOSPITAL | 701 GROVE ROAD | GREENVILLE | SC | 29605-4295 | 0101000100200 |
| ST. FRANCIS HEALTH SYSTEM | ONE ST. FRANCIS DRIVE | GREENVILLE | SC | 29601-3207 | 0113000906400 |
| SHRINERS HOSPS FOR CHILDREN | 950 WEST FARIS ROAD | GREENVILLE | SC | 29605-4277 | 0101000100200 |
| NORTH GREENVILLE MED CAMPUS | 809 N. MAIN STREET | TRAVELERS REST | SC | 29690 | 0506060100104 |
| GREER MEMORIAL HOSPITAL | 830 S. BUNCOMBE ROAD | GREER | SC | 29650 | G006000200500 |
| CAROLINA CENTER FOR BEHAVIORAL | 2700 EAST PHILLIPS ROAD | GREER | SC | 29650-4816 | 0530050101313 |
| GREENVILLE MEMORIAL HOSPITAL | 701 GROVE ROAD | GREENVILLE | SC | 29605-4295 | 0101000100200 |
| HILLCREST HOSPITAL | 729 SE MAIN STREET | SIMPSONVILLE | SC | 29681-3280 | 0323010100102 |
| PATEWOOD MEMORIAL HOSPITAL | 175 PATEWOOD ROAD | GREENVILLE | SC | 26915 | 0543020101101 |
| ST. FRANCIS - EASTSIDE HOSPITAL | 125 COMMONWEALTH DRIVE | GREENVILLE | SC | 26915 | 0543010100106 |

EMERGENCY FACILITIES

| Name | Address | City | State | Zip Code | TM# |
|------------------------------------|------------------------|----------------|-------|------------|----------------|
| GOWENSVILLE VOLUNTEER FIRE DEP | 2201 W HIGHWAY 14 | LANDRUM | SC | 29356 | 062101010130 |
| LAKE CUNNINGHAM FIRE DEPT ALL | 2802 MCELHANEY RD | TIGERVILLE | SC | 29688 | 0631020101800 |
| NORTH GREENVILLE FIRE DISTRICT | 596 N HODGENS CIRCLE | TRAVELERS REST | SC | 29690 | 0506030104500 |
| RIVERFALLS FIRE DEPT NON-EMERG | 602 RIVER FALLS ROAD | MARIETTA | SC | 29661-9607 | 0675020105205 |
| SLATER-MARIETTA FIRE DEPT BUSI | 3001 GEER HIGHWAY | MARIETTA | SC | 29661 | 0514080104801 |
| TIGERVILLE FIRE DEPT | 2605 HIGHWAY 414 | TIGERVILLE | SC | 29688 | 0650040100702 |
| GREENVILLE COUNTY SHERIFFS DEP | 4 McGEE STREET | GREENVILLE | SC | 29601 | 0039010100100 |
| MAULDIN POLICE DEPT BUSINESS | 9 E BUTLER RD | GREENVILLE | SC | 29601 | M003010201000 |
| NORFOLK SOUTHERN CORP POLICE D | 1120 W WASHINGTON ST | GREENVILLE | SC | 29601-1344 | 0025000100700 |
| POLICE DEPT EMERGENCIES | 103 W POINSETT ST | GREER | SC | 29650-1940 | G025000100800 |
| POLICE DEPT NON-EMERGENCY | 6711 STATE PARK RD | TRAVELERS REST | SC | 29690-1831 | 0485000100101 |
| BELMONT FIRE & SANITATION DEPT | 701 FORK SHOALS ROAD | GREENVILLE | SC | 29605 | 0420000100203 |
| BEREA FIRE DEPT | 54 OLD HUNTS BRIDGE RD | GREENVILLE | SC | 29611 | 0507010100101 |
| BOILING SPRINGS FIRE DEPT ALL | 2015 HUDSON RD | GREER | SC | 29650 | 053802010070 |
| DONALDSON CENTER FIRE SERVICE | PERIMETER RD | GREENVILLE | SC | 29601 | 0400020100101 |
| DUNKLIN FIRE DEPT | 1026 DUNKLIN BRIDGE | HONEA PATH | SC | 29654 | 0579020101501 |
| FIRE DEPT FIRE ALARMS ONLY PARKER | 107 CEDAR LANE RD | GREENVILLE | SC | 29601-1058 | 0149001200101 |
| FIRE DEPT FIRE ALARMS ONLY PEL | 2761 S HIGHWAY 14 | GREER | SC | 29650-9002 | 0528030100704 |
| FIRE DEPT FIRE ALARMS ONLY TAY | 3335 WADE HAMPTON BLVD | TAYLORS | SC | 29687-2901 | T002000104004 |
| FIRE DEPT FOR OTHER PURPOSES PIEDM | 2119 STATE PARK RD | GREENVILLE | SC | 29609-1607 | P0330000101301 |
| FIRE DEPT FOR OTHER PURPOSES T | 405 BRUSHY CREEK RD | GREENVILLE | SC | 29601 | 0538030100100 |
| FIRE DEPT FOR OTHER PURPOSES W | 2815 WADE HAMPTON BLVD | TAYLORS | SC | 29687-2711 | P015040100205 |
| FIRE DEPTS FIRE ALARMS ONLY MA | 300 ROCKY CREEK RD | MAULDIN | SC | 29662 | 0547030100112 |
| FIRE TRAVELERS REST NON-EMERGE | 117 N POINSETT HWY | TRAVELERS REST | SC | 29690-1819 | 0490000300800 |
| GREER FIRE DEPT | 1985 HOOD ROAD | GREER | SC | 29650 | G006000301104 |
| GREER FIRE DEPT NON-EMERGENCY | 103 W POINSETT ST | GREER | SC | 29650-1940 | G0250000100800 |
| PIEDMONT PARK FIRE DEPT TO REP | 52 EAST DARBY RD | GREENVILLE | SC | 29601 | 0499020102300 |
| WADE HAMPTON FIRE DEPT FIRE CH | 33 PINE KNOLL DR | GREENVILLE | SC | 29609-3233 | 0275000200200 |
| GREENVILLE CO. EMD AGENCY | 206 S MAIN ST | GREENVILLE | SC | 29602 | 0059000401000 |
| FOUNTAIN INN POLICE DEPARTMENT | 300 N MAIN ST | FOUNTAIN INN | SC | 29644-1604 | 0356000400100 |
| SIMPSONVILLE POLICE DEPT DISPA | 405 E CURTIS ST | SIMPSONVILLE | SC | 29681-2664 | 0316000100401 |
| BELMONT FIRE & SANITATION DEPT | 1 FORK SHOALS RD | GREENVILLE | SC | 29605-2701 | 0391000100500 |
| EAST SIMPSONVILLE FIRE DEPT AL | 839 HWY 14 | SIMPSONVILLE | SC | 29680 | 0542020103303 |
| FIRE DEPT FIRE ALARMS ONLY GAN | 1331 WHITE HORSE RD | GREENVILLE | SC | 29605-4942 | 0378000100200 |
| FIRE DEPT FOR OTHER PURPOSES MAULI | 802 MILLER RD | MAULDIN | SC | 29662 | M009050109300 |
| FOUNTAIN INN FIRE DEPARTMENT A | 124 N MAIN ST | FOUNTAIN INN | SC | 29644 | 03570000201100 |
| MAULDIN FIRE DEPT OFFICE | 9 E BUTLER ST | MAULDIN | SC | 29662 | M003010201000 |
| SIMPSONVILLE FIRE DEPT OFFICE | 403 E CURTIS ST | SIMPSONVILLE | SC | 29681-2664 | 0316000100401 |
| SOUTH GREENVILLE FIRE DISTRICT | 8305 AUGUSTA RD | PELZER | SC | 29669 | 0593040102902 |

SCHOOLS IN GREENVILLE COUNTY

| Name | Address | City | State | Zip Code | Tax Map Number |
|-----------------------------------|-------------------------------|----------------|--------------|-----------------|-----------------------|
| GREENVILLE SCHL. DIST. HIGH SCH | 2151 FEW'S CHAPEL RD | TIGERVILLE | SC | 29688 | 635010101701 |
| GREENVILLE SCHOOL DISTRICT ELE | 4221 N HIGHWAY 14 GRER | TIGERVILLE | SC | 29688 | 630020100300 |
| GREENVILLE SCHOOL DISTRICT ELE | 601 SLATER RD | TRAVELERS REST | SC | 29690 | 515010102600 |
| GREENVILLE SCHOOL DISTRICT ELE | 25 TIGERVILLE ELEM SCHOOL RD | TAYLORS | SC | 29687-7039 | 630030100700 |
| GREENVILLE SCHOOL DISTRICT ELE | 2423 E TYGER BRIDGE RD | GREER | SC | 29651-8868 | 634020100100 |
| GREENVILLE SCHOOL DISTRICT ELE | 200 HAWKINS RD | TRAVELERS REST | SC | 29690-8869 | 503020103401 |
| GREENVILLE SCHOOL DISTRICT HIG | 100 BLASSINGAME RD | TRAVELERS REST | SC | 29690 | WG02020100400 |
| GREENVILLE SCHOOL DISTRICT MID | | TIGERVILLE | SC | 29688 | |
| NORTH GREENVILLE COLLEGE | 101 BOULEVARD AVE | TIGERVILLE | SC | 29688 | 650040100500 |
| ACADEMY OF ARTS MINISTRIES THE | 525 TAYLORS RD | TAYLORS | SC | 29687-3060 | T034010304900 |
| AMERICAN BAPTIST THEOLOGICAL | 107 FLEMING ST | GREENVILLE | SC | 29607-2111 | G011000200800 |
| ARMY U S ARMY RESERVE 3288 USA | 2201 LAURENS RD | GREENVILLE | SC | 29607-3223 | 258000300101 |
| ART GALLERY & MUSEUM OF BOB JO | 1700 WADE HAMPTON BLVD | GREENVILLE | SC | 29609-5052 | 281000100100 |
| AUGUSTA ROAD BAPTIST CHURCH WE | 1823 AUGUSTA RD | GREENVILLE | SC | 29605-2991 | 217000400400 |
| BEREA CHRISTIAN SCHOOL | 710 PERRY RD | GREENVILLE | SC | 29609-3530 | 168000202900 |
| BETH'EL BAPTIST CHURCH CHURCH O | 403 SULPHUR SPRINGS RD | GREENVILLE | SC | 29611-1697 | B009010103000 |
| CAMPERDOWN ACADEMY | 501 HOWELL RD | GREENVILLE | SC | 29615-2028 | 541030100303 |
| CHRIST CHURCH EPISCOPAL | 10 N CHURCH ST | GREENVILLE | SC | 29601-2864 | 44000203300 |
| CHRIST CHURCH EPISCOPAL SCHL P | 10 N CHURCH ST | GREENVILLE | SC | 29601-2809 | 44000203300 |
| CALVARY CHRISTIAN SCHOOL | 101 CALVARY ST | GREER | SC | 29650-1801 | G0090104300 |
| CONE ELEMENTARY SCHOOL | 500 GRIDLEY ST | GREENVILLE | SC | 29609-4369 | 149000100300 |
| EMMANUEL ACADEMY | 106 DUPONT DR | GREENVILLE | SC | 29607-1183 | 189030400302 |
| FAITH CHRISTIAN ACADEMY & PRES | 21 E FARIS RD | GREENVILLE | SC | 29605-1729 | 203000905900 |
| FIRST EVANGELICAL CHURCH SCHOO | 230 DAVIDSON RD | GREENVILLE | SC | 29609-1306 | 455000103500 |
| FIRST PRESBYTERIAN CHURCH WEEK | 200 W WASHINGTON ST | GREENVILLE | SC | 29601-2639 | 49000100700 |
| FULLER NORMAL INDUSTRIAL INSTI | 901 ANDERSON RD | GREENVILLE | SC | 29601-4103 | 107001201600 |
| FURMAN UNIVERSITY FOR TELE ASS | 3300 POINSETT HWY | GREENVILLE | SC | 29613-0001 | 470000100500 |
| GREENVILLE SCHL. DIST. ELEM SCHL | 1006 W PARKER RD | GREENVILLE | SC | 29611-3423 | 143000100101 |
| GREENVILLE SCHL. DIST. FOR TEL. A | | GREENVILLE | SC | 29601 | |
| GREENVILLE SCHL. DIST. HIGH SCH | 515 BERE A DR | GREENVILLE | SC | 29611-2110 | B013010102000 |
| GREENVILLE SCHL. DIST. HIGH SCH | 2725 ANDERSON RD | GREENVILLE | SC | 29611-5942 | 248000200701 |
| GREENVILLE SCHL. DIST. HIGH SCH | 700 BRUSHY CREEK RD - IKES RD | TAYLORS | SC | 29687-3882 | 541010101100 |
| | 700 BRUSHY CREEK RD - IKES RD | TAYLORS | SC | 29687-3882 | 541010101200 |
| GREENVILLE SCHL. DIST. MIDDLE SC | 301 CHANDLER RD | GREER | SC | 29651-1218 | G019000100201 |
| GREENVILLE SCHOOL BUS MAINTENA | 341 HALTON RD | GREENVILLE | SC | 29607-3405 | 260000101501 |
| GREENVILLE SCHOOL DISTRICT ARE | | GREER | SC | 29650 | |
| GREENVILLE SCHOOL DISTRICT ELE | 302 MCALISTER RD | GREENVILLE | SC | 29607-2514 | 199030100101 |
| GREENVILLE SCHOOL DISTRICT ELE | 6350 MOUNTAIN VIEW RD | TAYLORS | SC | 29687-6932 | 649030101100 |
| GREENVILLE SCHOOL DISTRICT ELE | 100 ALL STAR WAY | GREENVILLE | SC | 29615-3602 | 540020103600 |
| GREENVILLE SCHOOL DISTRICT ELE | 1200 PARKINS MILL RD | GREENVILLE | SC | 29607-3643 | 270010100601 |
| GREENVILLE SCHOOL DISTRICT ELE | 302 PERRY RD | GREENVILLE | SC | 29609-3420 | 170000101600 |
| GREENVILLE SCHOOL DISTRICT ELE | 412 WILTON ST | GREENVILLE | SC | 29609-5536 | 6000300300 |
| GREENVILLE SCHOOL DISTRICT ELE | 424 SUMMIT DR | GREENVILLE | SC | 29609-4821 | 185000200300 |

SCHOOLS IN GREENVILLE COUNTY

| Name | Address | City | State | Zip Code | Tax Map Number |
|--------------------------------|------------------------------|----------------|-------|------------|----------------|
| GREENVILLE SCHOOL DISTRICT ELE | 108 TRYON ST | GREER | SC | 29650-1440 | |
| GREENVILLE SCHOOL DISTRICT ELE | 105 EASTBOURNE RD | GREENVILLE | SC | 29611-3122 | B014000100108 |
| GREENVILLE SCHOOL DISTRICT ELE | 36 E WELCOME RD | GREENVILLE | SC | 29611-5775 | 249000100100 |
| GREENVILLE SCHOOL DISTRICT ELE | 209 WEST RD | GREER | SC | 29650-2423 | |
| GREENVILLE SCHOOL DISTRICT ELE | MONTAGUE RD | GREENVILLE | SC | 29601 | |
| GREENVILLE SCHOOL DISTRICT ELE | 100 BLYTHE DR | GREENVILLE | SC | 29605-2055 | 212000400800 |
| GREENVILLE SCHOOL DISTRICT ELE | 100 WINYAH ST | GREENVILLE | SC | 29605-1836 | 215000700100 |
| GREENVILLE SCHOOL DISTRICT ELE | 104 FARRS BRIDGE RD | GREENVILLE | SC | 29611-1904 | B007000100100 |
| GREENVILLE SCHOOL DISTRICT ELE | 1601 W BRAMLETT RD | GREENVILLE | SC | 29611-4007 | 129000200100 |
| GREENVILLE SCHOOL DISTRICT ELE | 20 MARTIN DR | GREENVILLE | SC | 29611-6732 | B005010100300 |
| GREENVILLE SCHOOL DISTRICT ELE | 2003 E LEE RD | TAYLORS | SC | 29687-3543 | T033000103500 |
| GREENVILLE SCHOOL DISTRICT ELE | 310 S BATESVILLE RD | GREER | SC | 29650-3568 | 534020103401 |
| GREENVILLE SCHOOL DISTRICT ELE | 750 BRUSHY CREEK RD | TAYLORS | SC | 29687-3882 | |
| GREENVILLE SCHOOL DISTRICT ELE | 925 N FRANKLIN RD | GREENVILLE | SC | 29609-2707 | 162000200401 |
| GREENVILLE SCHOOL DISTRICT ELE | MONTAUE RD | GREENVILLE | SC | 29601 | |
| GREENVILLE SCHOOL DISTRICT ELE | OLD PIEDMONT HWY (625) | GREENVILLE | SC | 29601 | WG01010301600 |
| GREENVILLE SCHOOL DISTRICT ELE | OLD PIEDMONT HWY (625) | GREENVILLE | SC | 29601 | WG01010301700 |
| GREENVILLE SCHOOL DISTRICT ELE | 200 DUNCAN CHAPEL RD | GREENVILLE | SC | 29609-2124 | 434000100400 |
| GREENVILLE SCHOOL DISTRICT ELE | 1720 E NORTH ST | GREENVILLE | SC | 29607-1457 | 193020500400 |
| GREENVILLE SCHOOL DISTRICT ELE | 1720 E NORTH ST | GREENVILLE | SC | 29607-1457 | 193020500200 |
| GREENVILLE SCHOOL DISTRICT ELE | 1720 E NORTH ST | GREENVILLE | SC | 29607-1457 | 193020500100 |
| GREENVILLE SCHOOL DISTRICT ELE | 625 OLD PIEDMONT HWY | GREENVILLE | SC | 29605-4776 | |
| GREENVILLE SCHOOL DISTRICT ELE | 14 8TH ST | GREENVILLE | SC | 29611-5495 | 110000400700 |
| GREENVILLE SCHOOL DISTRICT ELE | 1592 GEER HWY TREES | TRAVELERS REST | SC | 29690 | 505040101601 |
| GREENVILLE SCHOOL DISTRICT ELE | 1606 GEER HWY TREES | TRAVELERS REST | SC | 29690 | 505030101501 |
| GREENVILLE SCHOOL DISTRICT ELE | 31 SHANNON DR (16 Berkshire) | GREENVILLE | SC | 29615-1509 | 277010700200 |
| GREENVILLE SCHOOL DISTRICT ELE | 421 DALLAS RD | GREENVILLE | SC | 29607-4703 | M011020201701 |
| GREENVILLE SCHOOL DISTRICT ELE | 4124 E NORTH ST EXT-Z | GREENVILLE | SC | 29601 | 541020101904 |
| GREENVILLE SCHOOL DISTRICT HIG | 1 VARDRY ST | GREENVILLE | SC | 29601-3585 | 87000200100 |
| GREENVILLE SCHOOL DISTRICT HIG | 505 N MAIN ST | GREER | SC | 29650-1639 | G016000601700 |
| GREENVILLE SCHOOL DISTRICT HIG | 61 ISBELL LN (158 Ridge) | GREENVILLE | SC | 29607-3724 | 2720001001602 |
| GREENVILLE SCHOOL DISTRICT HIG | 701 W BUTLER RD | GREENVILLE | SC | 29607-4837 | |
| GREENVILLE SCHOOL DISTRICT HIG | 1300 S SUBER RD | GREER | SC | 29650-0943 | 535030102704 |
| GREENVILLE SCHOOL DISTRICT HIG | 100 BLASSINGAME RD | GREENVILLE | SC | 29605-3304 | WG02020100400 |
| GREENVILLE SCHOOL DISTRICT MID | 339 LOWNDES AVE | GREENVILLE | SC | 29607-1498 | 1930205001 |
| GREENVILLE SCHOOL DISTRICT MID | 122 DEOYLEY AVE | GREENVILLE | SC | 29605-2106 | 222020303100 |
| GREENVILLE SCHOOL DISTRICT MID | 3801 OLD BUNCOMBE RD | GREENVILLE | SC | 29609-2599 | 161000101600 |
| GREENVILLE SCHOOL DISTRICT MID | 125 TWIN LAKE RD | GREENVILLE | SC | 29609-3913 | 274010100101 |
| GREENVILLE SCHOOL DISTRICT MID | 1606 GEER HWY | TRAVELERS REST | SC | 29690-9206 | 505030101501 |
| GREENVILLE SCHOOL DISTRICT MID | 710 IKES RD | TAYLORS | SC | 29687-3868 | 541010101100 |
| GREENVILLE SCHOOL DISTRICT MID | 900 WOODSIDE AVE | GREENVILLE | SC | 29611-4221 | 125000200100 |
| GREENVILLE SCHOOL DISTRICT MID | 44 MERRIWOOD DR | GREENVILLE | SC | 29611-7221 | 239050101200 |
| GREENVILLE SCHOOL DISTRICT SPE | 111 LAURENS RD | GREENVILLE | SC | 29607-1825 | 48000101700 |

SCHOOLS IN GREENVILLE COUNTY

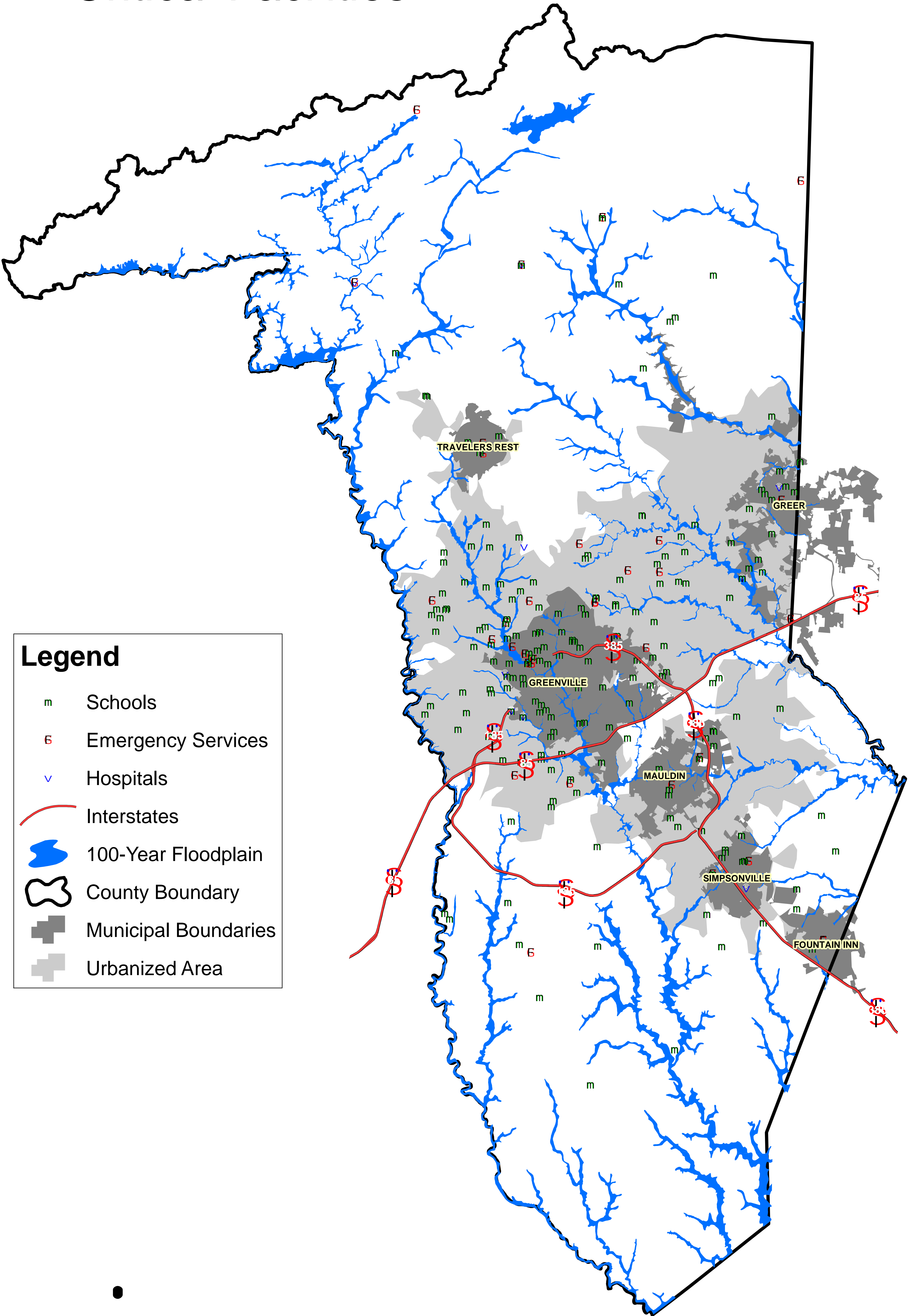
| Name | Address | City | State | Zip Code | Tax Map Number |
|--------------------------------|-------------------------------------|--------------|-------|------------|----------------|
| CORNERSTONE CHRISTIAN SCHOOL | 233 HARRISON BRIDGE RD | SIMPSONVILLE | SC | 29680-7132 | 331000100604 |
| FIRST BAPTIST CHURCH OF MAULDI | 150 S MAIN ST | MAULDIN | SC | 29662-2599 | M006020100900 |
| GRACE COVENANT KINDERGARTEN | 739 N MAIN ST | MAULDIN | SC | 29662-1917 | M008030100200 |
| GREENVILLE COUNTY SCHOOLS CHAP | 310 BENSON ST | SIMPSONVILLE | SC | 29681-2205 | 304000600100 |
| GREENVILLE SCHOOL DISTRICT ELE | 301 E DORCHESTER BLVD | GREENVILLE | SC | 29605-2436 | 371000700300 |
| GREENVILLE SCHOOL DISTRICT ELE | 3 CHURCH ST | PIEDMONT | SC | 29673-1002 | 616020102500 |
| GREENVILLE SCHOOL DISTRICT ELE | 400 FORK SHOALS RD | GREENVILLE | SC | 29605-5824 | 395000100202 |
| GREENVILLE SCHOOL DISTRICT ELE | 9130 AUGUSTA RD | PELZER | SC | 29669-9349 | 604040101200 |
| GREENVILLE SCHOOL DISTRICT ELE | 916 MCKELVEY RD | PELZER | SC | 29669-9277 | 578030101400 |
| GREENVILLE SCHOOL DISTRICT ELE | 853 LOG SHOALS RD | GREENVILLE | SC | 29607-5021 | M006030100600 |
| GREENVILLE SCHOOL DISTRICT ELE | 1220 OLD GROVE RD | PIEDMONT | SC | 29673-9225 | 608040100600 |
| GREENVILLE SCHOOL DISTRICT ELE | 101 W BUTLER RD | MAULDIN | SC | 29662-2534 | |
| GREENVILLE SCHOOL DISTRICT HIG | 150 WOODMONT SCHOOL RD | PIEDMONT | SC | 29673-9631 | 602020101601 |
| GREENVILLE SCHOOL DISTRICT MID | N FLAT ROCK RD | PIEDMONT | SC | 29673 | 602010104001 |
| GREENVILLE SCHOOL DISTRICT SPE | 1120 E BUTLER RD | GREENVILLE | SC | 29607-5908 | 546100100101 |
| HILLCREST HIGH SCHOOL | 3657 S INDUSTRIAL DR | SIMPSONVILLE | SC | 29681-3238 | |
| HILLCREST HIGH SCHOOL ATTENDAN | | SIMPSONVILLE | SC | 29680 | |
| HILLCREST MIDDLE SCHOOL | 510 GARRISON RD | SIMPSONVILLE | SC | 29681-2099 | 3000201703 |
| KEYBOARD ARTISTRY SCHOOL OF MU | 510 SE MAIN ST | SIMPSONVILLE | SC | 29681-3216 | 320000101100 |
| KIDDIE KAMPUS | 6120 AUGUSTA RD | GREENVILLE | SC | 29605-3654 | 3780001003100 |
| LA PETITE ACADEMY | 1518 WOODRUFF RD | GREENVILLE | SC | 29607-5742 | 547030102509 |
| MESSIAH LUTHERAN CHURCH | 1120 LOG SHOALS RD actual addr 1100 | MAULDIN | SC | 29662-2714 | M006030100101 |
| MT ZION CHRISTIAN CHURCH FELLO | 725 GARLINGTON RD | GREENVILLE | SC | 29615-5438 | 533030101301 |
| SCHOOLS BETHEL ELEMENTARY SCHO | 111 BETHEL CHURCH RD | SIMPSONVILLE | SC | 29680 | |
| SCHOOLS BETHEL ELEMENTARY SCHO | 111 BETHEL CHURCH RD | SIMPSONVILLE | SC | 29680 | |
| SCHOOLS BRYSON ELEMENTARY SCHO | 1102 HOWARD DR | SIMPSONVILLE | SC | 29681-4027 | 328000100100 |
| SCHOOLS BRYSON MIDDLE SCHOOL | 703 BRYSON DR | SIMPSONVILLE | SC | 29681-7115 | 328000100100 |
| SCHOOLS HILLCREST MIDDLE SCHO | 510 GARRISON RD | SIMPSONVILLE | SC | 29681-2052 | 3000201703 |
| SCHOOLS PLAIN ELEMENTARY SCHO | 506 NEELY FERRY RD | SIMPSONVILLE | SC | 29680-2703 | 574020101300 |
| SCHOOLS PLAIN ELEMENTARY SCHO | 506 NEELY FEERY RD | SIMPSONVILLE | SC | 29680 | 574020101300 |
| SCHOOLS SIMPSONVILLE ELEMENTAR | 305 E COLLEGE ST | SIMPSONVILLE | SC | 29681-2618 | |
| SHANNON FOREST CHRISTIAN SCHO | 829 GARLINGTON RD | GREENVILLE | SC | 29615-5440 | 533030100805 |
| SIMPSONVILLE ELEMENTARY SCHOOL | 305 E COLLEGE ST | SIMPSONVILLE | SC | 29681-2695 | |
| SOUTHEAST AREA OFFICE SPECIAL | 501 BOYD AVE | SIMPSONVILLE | SC | 29681-2249 | 306000101305 |
| TWINKLE KIDDLE KOLLEGE | 13 PECAN DR | GREENVILLE | SC | 29605-3729 | 381000201800 |

SCHOOLS IN GREENVILLE COUNTY

| Name | Address | City | State | Zip Code | Tax Map Number |
|--------------------------------|-----------------------------|--------------|--------------|-----------------|-----------------------|
| GREENVILLE SCHOOL DISTRICT SPE | 15 ENDEL ST | GREENVILLE | SC | 29611-4844 | 123001600900 |
| | 15 ENDEL ST | GREENVILLE | SC | 29611-4844 | 123001602000 |
| GREENVILLE SCHOOL DISTRICT SPE | 1613 W WASHINGTON ST | GREENVILLE | SC | 29601-1037 | 138000100300 |
| GREENVILLE SCHOOL DISTRICT SPE | 205 ANDERSON ST | GREENVILLE | SC | 29601-4020 | 82000201200 |
| GREENVILLE SCHOOL DISTRICT SPE | 349 LOOP ST | GREENVILLE | SC | 29609-4529 | 1760001002001 |
| GREENVILLE SCHOOL DISTRICT SPE | 718 GROVE RD | GREENVILLE | SC | 29605-4211 | |
| GREENVILLE SCHOOL DISTRICT SPE | 950 W FARIS RD | GREENVILLE | SC | 29605-4255 | |
| GREENVILLE SCHOOL DISTRICT SPE | ST MARK RD | TAYLORS | SC | 29687 | |
| GREENVILLE SCHOOL DISTRICT SPE | VOCATIONAL DR | GREENVILLE | SC | 29601 | 400020100500 |
| GREENVILLE SCHOOL DISTRICT SPE | 108 SCALYBARK RD | GREENVILLE | SC | 29609-1133 | 428000100200 |
| HAMPTON PARK CHRISTIAN SCH | 875 STATE PARK RD | GREENVILLE | SC | 29609-2981 | P039000101200 |
| HAYNSWORTH PRIVATE SCHOOL | 228 E PARK AVE | GREENVILLE | SC | 29601-1634 | 33000100100 |
| HOLMES COLLEGE OF THE BIBLE | 115 BRIGGS AVE | GREENVILLE | SC | 29601-1103 | 28000201300 |
| JOHN KNOX PRESBYTERIAN CHURCH | 35 SHANNON DR | GREENVILLE | SC | 29615-1509 | 277010700301 |
| LEE RD BAPTIST CH | 1503 E LEE RD | GREENVILLE | SC | 29601 | T032000100400 |
| LEE ROAD BAPTIST CHURCH WEEKDA | 1503 E LEE RD | TAYLORS | SC | 29687-3533 | T032000100400 |
| LIFETOUCH NATIONAL SCHOOL STUD | 417 S BUNCOMBE RD | GREER | SC | 29650-1209 | G00600100301 |
| LUTHERAN CHURCH OF OUR SAVIOUR | 2600 WADE HAMPTON BLVD | GREENVILLE | SC | 29615-1150 | P015090101600 |
| MITCHELL ROAD CHRISTIAN ACA | 207 MITCHELL RD | GREENVILLE | SC | 29615-2644 | 543030103502 |
| MONTESSORI SCHOOL OF GREENVILL | 305 PELHAM RD | GREENVILLE | SC | 29615-3110 | 279000200602 |
| NEW LIFE CHRISTIAN FELLOWSHIP | 212 ROPER MOUNTAIN ROAD EXT | GREENVILLE | SC | 29615-4893 | 593010101102 |
| OUR LADY OF THE ROSARY CATHOL | 2 JAMES DR | GREENVILLE | SC | 29605-2209 | 366000100800 |
| OVERBROOK BAPTIST CHURCH | 1705 E NORTH ST | GREENVILLE | SC | 29607-1456 | 189030300100 |
| POCKETFUL OF MIRACLES | 1300 BOILING SPRINGS RD | GREENVILLE | SC | 29601 | 533040101510 |
| SOUTHSIDE BAPTIST CHURCH | WOODRUFF RD & HWY 14 | GREENVILLE | SC | 29601 | 53930103400 |
| SOUTHSIDE CHRISTIAN SCHOOL | 2211 WOODRUFF RD | GREENVILLE | SC | 29601 | 539030102402 |
| ST ANTHONY CATHOLIC SCHOOL | 309 GOWER ST | GREENVILLE | SC | 29611-4999 | 76020101400 |
| ST JOSEPHS HIGH SCHOOL | 800 E WASHINGTON ST | GREENVILLE | SC | 29601-3037 | M01101010329 |
| ST MARYS CATHOLIC CHURCH SCHOO | 101 HAMPTON AVE | GREENVILLE | SC | 29601-1928 | 15000100901 |
| TABERNACLE BAPTIST CHURCH TABE | 3931 WHITE HORSE RD | GREENVILLE | SC | 29611-5599 | 242010102900 |
| TAYLORS FIRST BAPTIST CHURCH | PO BOX 6/200 W MAIN ST | TAYLORS | SC | 29687 | T0060000800201 |
| | PO BOX 6/200 W MAIN ST | TAYLORS | SC | 29687 | T0060000800201 |
| | PO BOX 6/200 W MAIN ST | TAYLORS | SC | 29687 | T004000300300 |
| TAYLORS SCHOOL BUS MAINTENANCE | HIGHWAY 290 | GREER | SC | 29652 | |
| TRINITY UNITED METHODIST CHURC | 2703 AUGUSTA ST | GREENVILLE | SC | 29605-1948 | 208000100100 |
| UNIVERSITY PLACE RETIREMENT CE | 1700 WADE HAMPTON BLVE | GREENVILLE | SC | 29601 | 275000400700 |
| UNUSUAL TOURS-BOB JONES UNIVER | 1700 WADE HAMPTON BLVD | GREENVILLE | SC | 29601 | 275000400700 |
| WEBSTER UNIVERSITY GREENVILLE | 250 COMMONWEALTH DR | GREENVILLE | SC | 29615-4846 | 543010100105 |
| WESTMINSTER PRESBYTERIAN CHURC | 2310 AUGUSTA RD | GREENVILLE | SC | 29605-1796 | 215000201300 |
| WESTMINSTER PRESBYTERIAN CHURC | 2310 AUGUSTA RD | GREENVILLE | SC | 29605-1796 | 215000201301 |
| BRYSON ELEMENTARY SCHOOL | 1102 HOWARD DR | GREENVILLE | SC | 29681-4099 | 328000100100 |
| BRYSON MIDDLE SCHOOL | 3657 S INDUSTRIAL DR | SIMPSONVILLE | SC | 29681-3295 | |
| CHRIST CHURCH EPISCOPAL SCH CA | 245 CAVALIER DR | GREENVILLE | SC | 29607-4290 | M014030100505 |

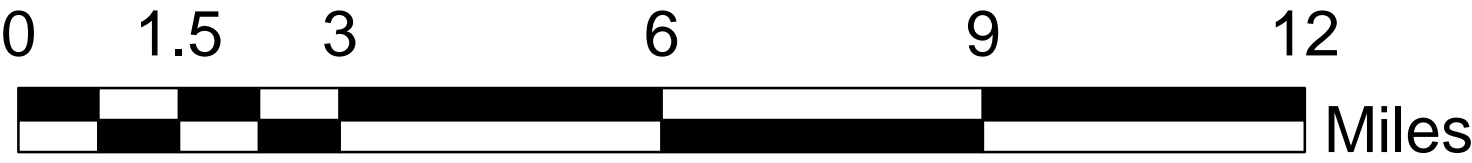
Appendix G – General Risk Assessment Maps

Greenville County Critical Facilities

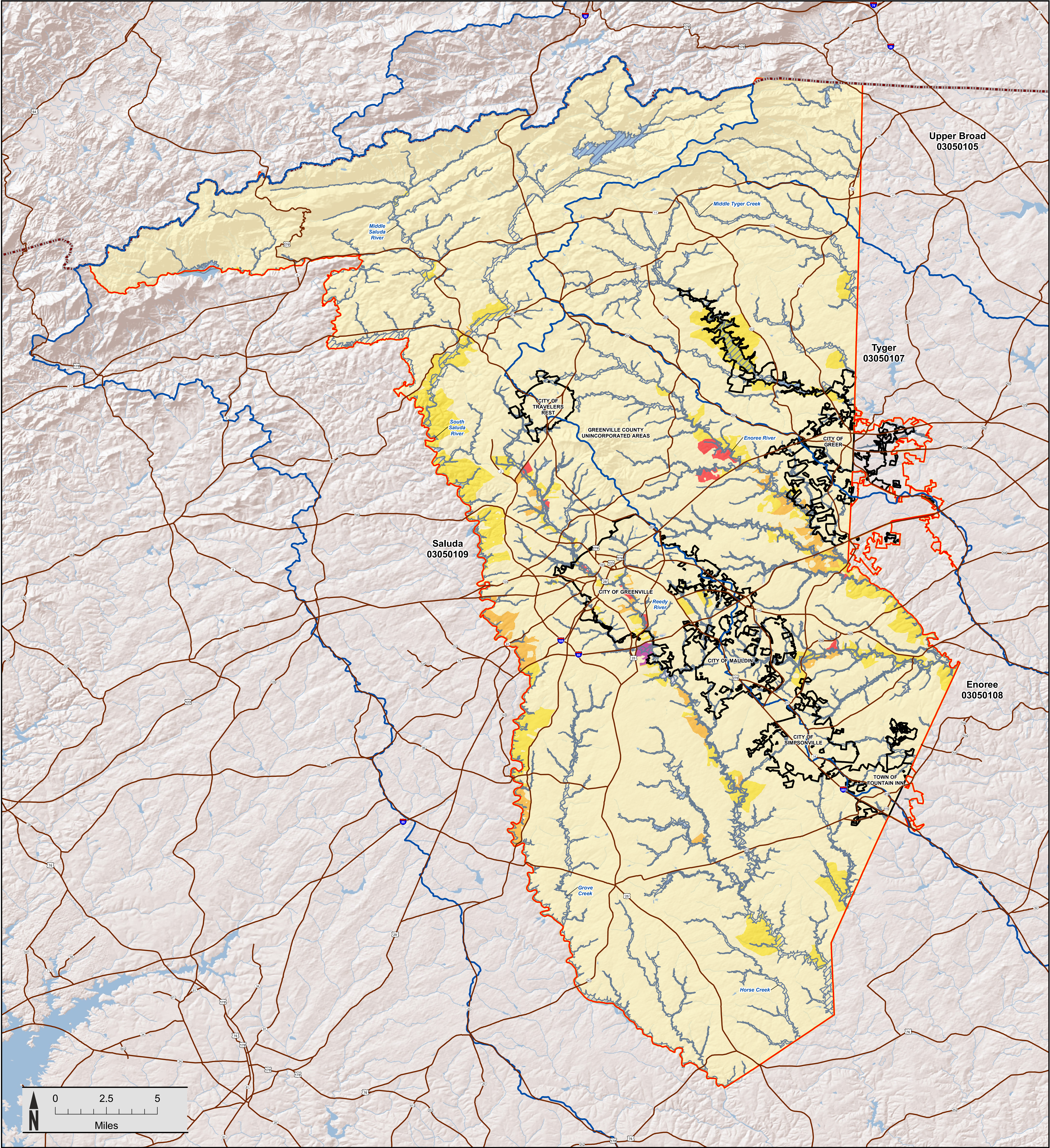


Legend

- m Schools
- E Emergency Services
- v Hospitals
- Interstates
- 100-Year Floodplain
- County Boundary
- Municipal Boundaries
- Urbanized Area



Flood Risk Map: Greenville County, SC

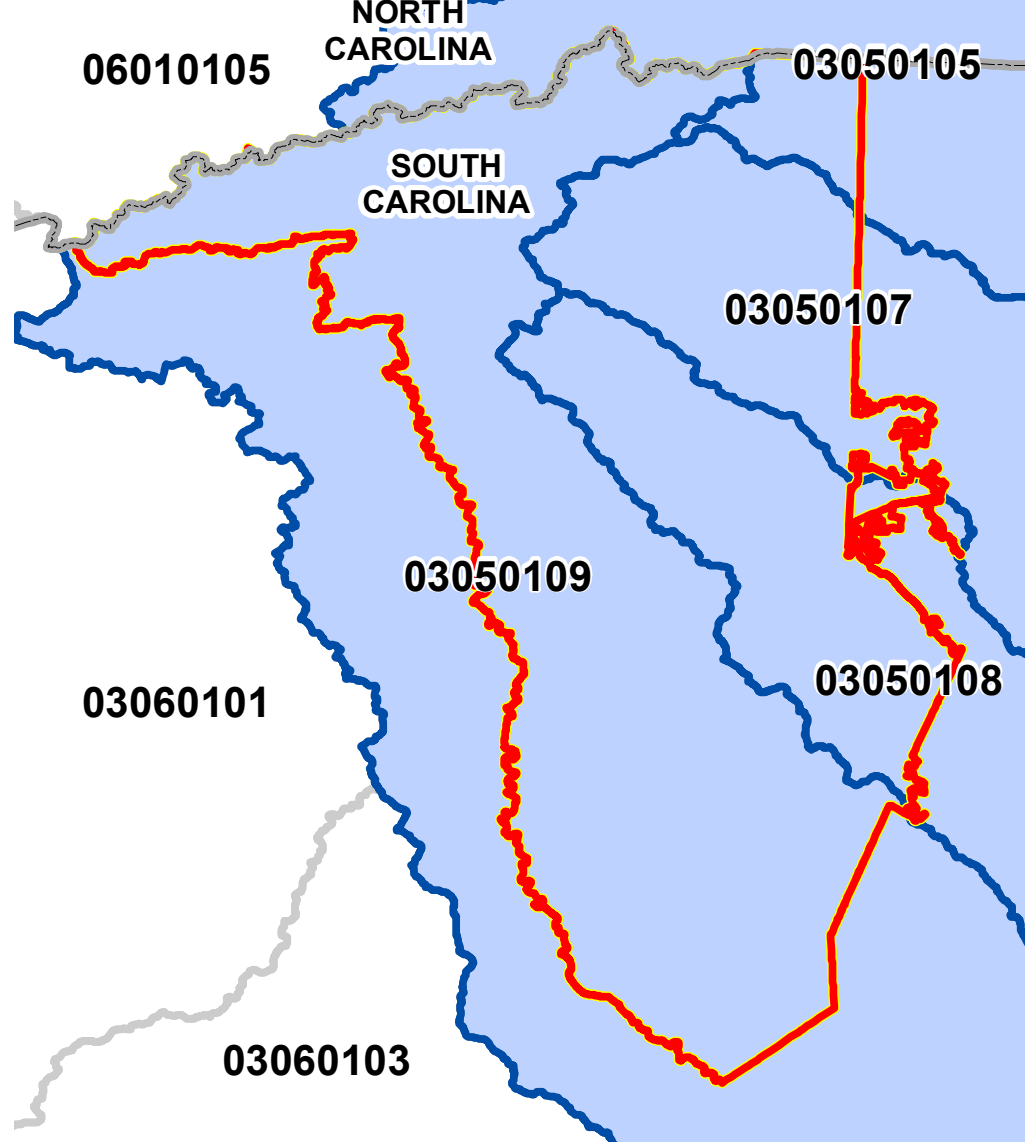


MAP SYMBOLOGY

| Base Data | Flood Data | Flood Risk | Areas of Mitigation Interest |
|--------------------|--------------------|------------|--|
| Corporate Limits | Rivers and Streams | Very Low | Accredited Levees* |
| Major Roads | Restudy Area | Low | Non-accredited Levees* |
| Watershed Boundary | New SFHA | Medium | Dams* |
| State Boundary | | High | Significant Land Use Changes* |
| | | Very High | Significant Hydraulic Embankments* |
| | | | Stream Flow Pinch Point* |
| | | | Past Claims Hot Spot* |
| | | | Key Emergency Routes Overtopped During Frequent Flooding Events* |
| | | | Other Flood Risk Areas* |
| | | | Areas of Mitigation Success* |

* Enhanced Product

WATERSHED LOCATOR



NATIONAL FLOOD INSURANCE PROGRAM

FRM FLOOD RISK MAP
GREENVILLE COUNTY, SC



FEMA

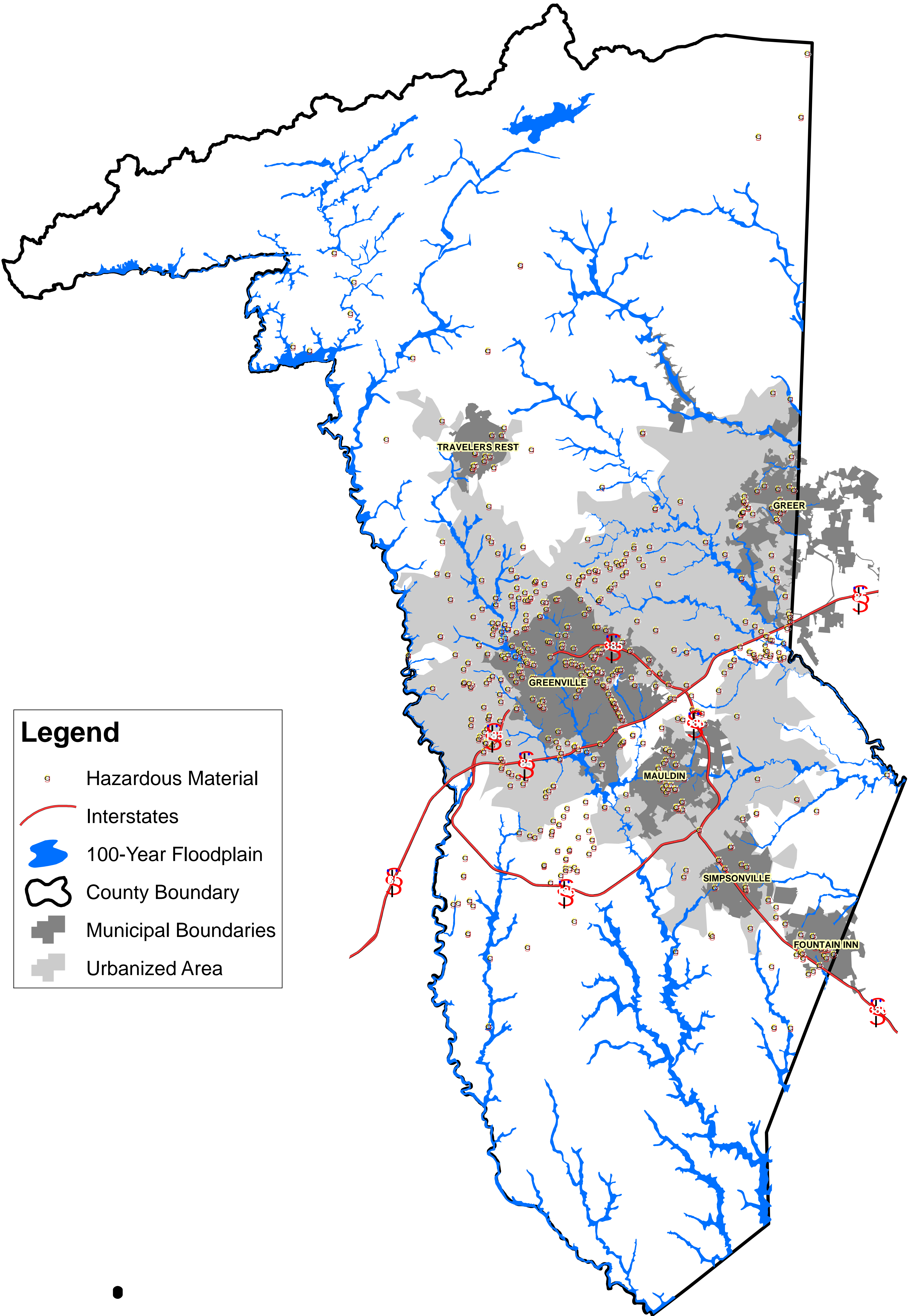
HUC-8 Code
03050109

For more information of data used for this map, please consult the Watershed USA Flood Risk Database and Flood Risk Report.




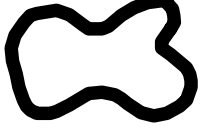


RELEASE DATE
04/29/2011

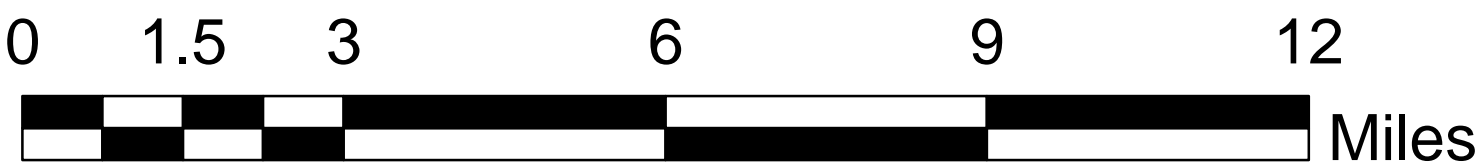
Greenville County

Hazardous Materials Locations



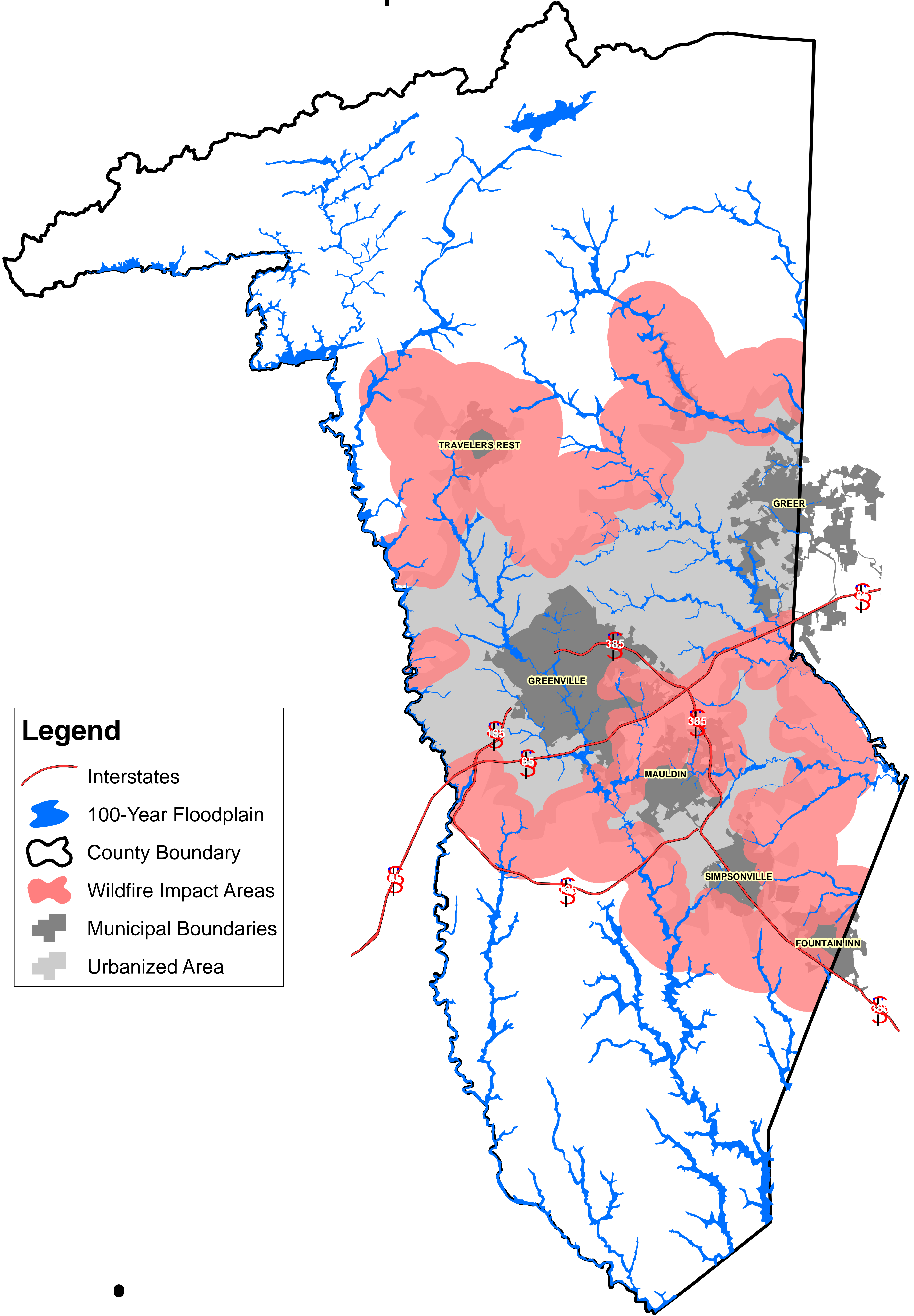
Legend

-  Hazardous Material
-  Interstates
-  100-Year Floodplain
-  County Boundary
-  Municipal Boundaries
-  Urbanized Area



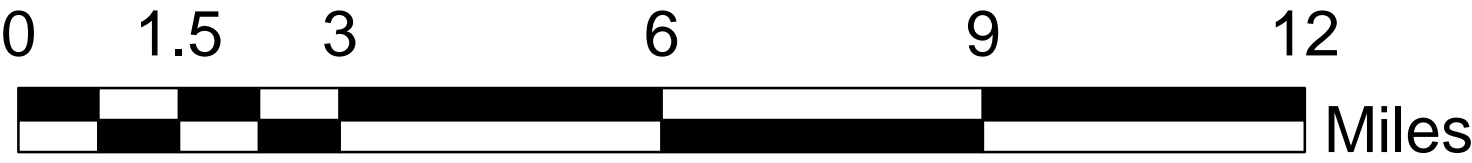
Greenville County

Potential Wildfire Impact Areas



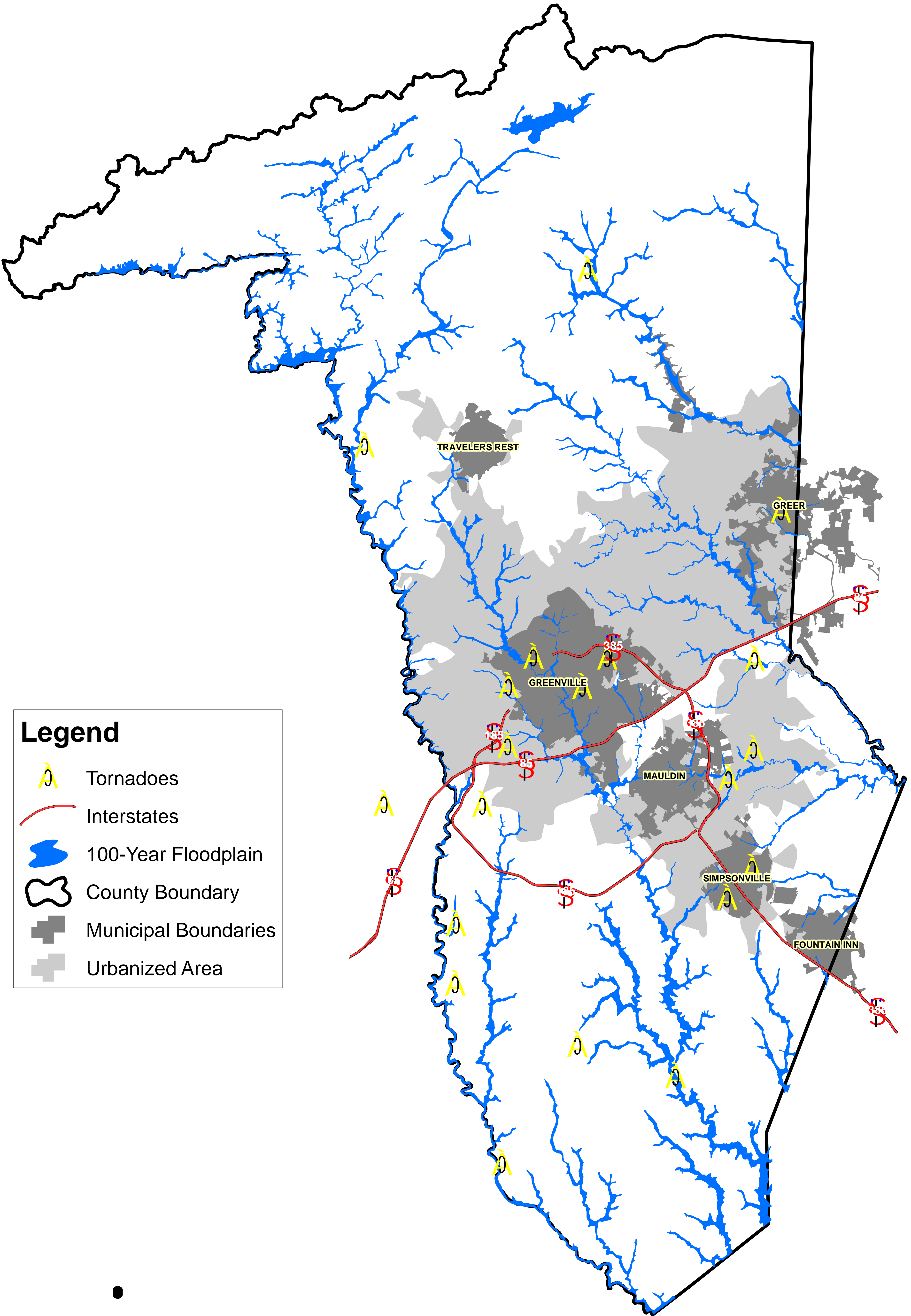
Legend

- Interstates
- 100-Year Floodplain
- County Boundary
- Wildfire Impact Areas
- Municipal Boundaries
- Urbanized Area



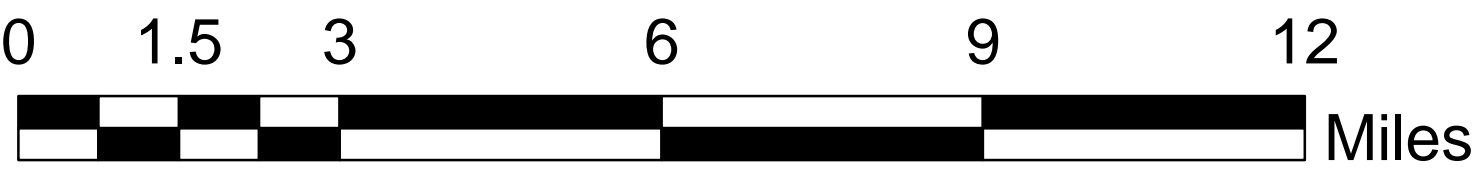
Greenville County

Tornadoes in the Last 50 Years



Legend

- Tornadoes
- Interstates
- 100-Year Floodplain
- County Boundary
- Municipal Boundaries
- Urbanized Area

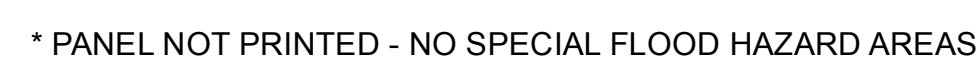


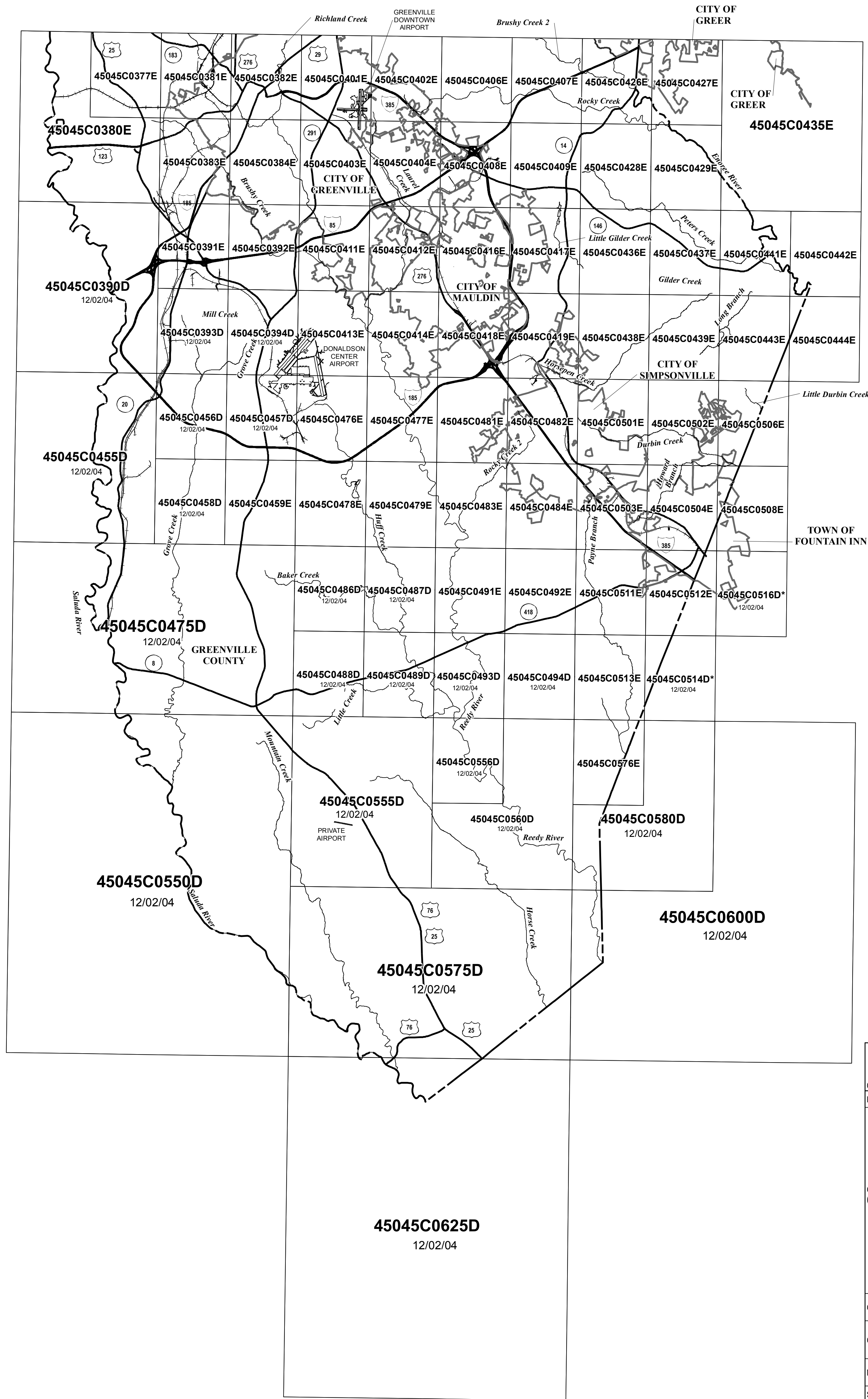
Appendix H – Preliminary Flood Insurance Study Map Index

This FIRM Index displays the map date for each FIRM panel at the time that this Index was printed. Because this Index may not be distributed to unaffected communities in subsequent revisions, users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center (MSC) website at <http://msc.fema.gov> or by calling the FEMA Map Information eXchange (FMIX) at (1-877-336-2627).

Future revisions to this FIRM Index will only be issued to communities that are located on FIRM panels being revised. This FIRM Index therefore remains valid for FIRM panels dated (date) or earlier. Please refer to the "MOST RECENT FIRM PANEL DATE" column in the [Listing of Communities](#) table to determine the most recent FIRM Index date for each community.

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





* PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS

MAP DATES

This FIRM Index displays the map date for each FIRM panel at the time that this Index was printed. Because this Index may not be distributed to unaffected communities in subsequent revisions, users may determine the current map date for each FIRM panel by visiting the FEMA Map Service Center (MSC) website at <http://msc.fema.gov> or by calling the FEMA Map Information eXchange (FMIX) at (1-877-336-2627).

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

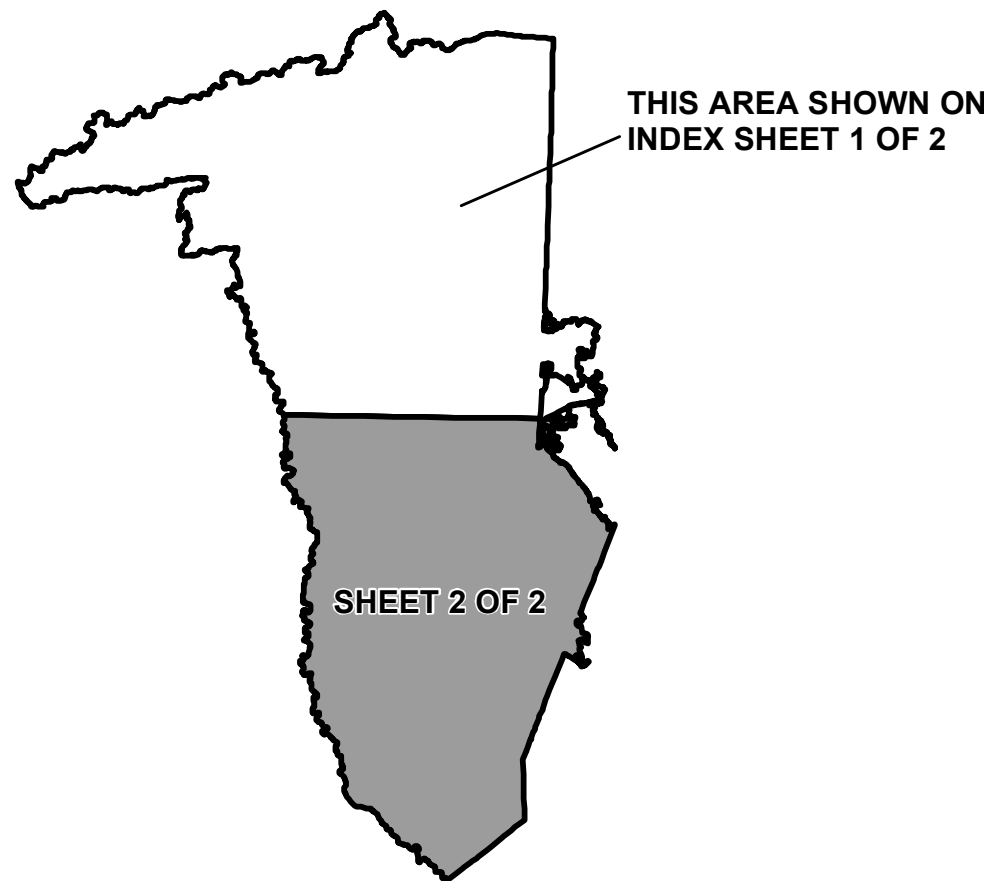
NOTE TO USER

Future revisions to this FIRM Index will only be issued to communities that are located on FIRM panels being revised. This FIRM Index therefore remains valid for FIRM panels dated (date) or earlier. Please refer to the "MOST RECENT FIRM PANEL DATE" column in the [Listing of Communities](#) table to determine the most recent FIRM Index date for each community.

NOTE TO USERS

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

GREENVILLE COUNTY, SC
INDEX LOCATOR DIAGRAM



MAP REPOSITORIES

(Maps available for reference only, not for distribution.)

FOUNTAIN INN, TOWN OF:
Fountain Inn Town Hall
200 North Main Street
Fountain Inn, South Carolina 29644

GREENVILLE COUNTY
(UNINCORPORATED AREAS):
Greenville County Codes Department
301 University Ridge
Suite 4100
Greenville, South Carolina 29601

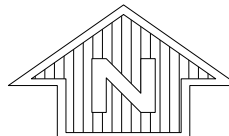
GREENVILLE, CITY OF:
Greenville City Hall
206 South Main Street
Greenville, South Carolina 29602

GREER, CITY OF:
Greer City Hall
106 South Main Street
Greer, South Carolina 29650

MAULDIN, CITY OF:
Mauldin City Hall
5 East Butler Road
Mauldin, South Carolina 29662

SIMPSONVILLE, CITY OF:
Simpsonville City Hall
118 Northeast Main Street
Simpsonville, South Carolina 29681

TRAVELERS REST, CITY OF:
Travelers Rest City Hall
6711 State Park Road
Travelers Rest, South Carolina 29690



LISTING OF COMMUNITIES

| COMMUNITY NAME | COMMUNITY NUMBER | LOCATED ON PANELS | INITIAL NFIP MAP DATE | INITIAL FIRM DATE | MOST RECENT FIRM PANEL DATE |
|---|------------------|--|-----------------------|--------------------|-----------------------------|
| FOUNTAIN INN, TOWN OF | 450209 | 0502, 0503, 0504, 0506, 0508, 0511, 0512, 0516* | JULY 23, 1976 | JUNE 17, 1986 | |
| GREENVILLE COUNTY (UNINCORPORATED AREAS) | 450089 | 0025*, 0050, 0065*, 0075, 0100*, 0125, 0150, 0175, 0200, 0205*, 0225, 0226, 0227, 0228, 0229, 0231, 0232, 0233, 0234, 0236, 0237, 0238, 0239, 0241, 0242, 0243, 0244, 0275, 0300, 0301*, 0302*, 0303*, 0304*, 0310*, 0311*, 0312, 0313*, 0314*, 0316*, 0317*, 0318*, 0319, 0326, 0327, 0328, 0329, 0331, 0332, 0333, 0334, 0336, 0337, 0338, 0339, 0341, 0342, 0343, 0344, 0351, 0353, 0354, 0358, 0361, 0362, 0363, 0364*, 0366*, 0368*, 0377, 0380, 0381, 0382, 0383, 0384, 0390, 0391, 0392, 0393, 0394, 0401, 0402, 0403, 0404, 0406, 0407, 0408, 0409, 0411, 0412, 0413, 0414, 0416, 0417, 0418, 0419, 0426, 0427, 0428, 0429, 0436, 0436, 0437, 0438, 0439, 0441, 0442, 0443, 0444, 0455, 0456, 0457, 0458, 0459, 0475, 0476, 0477, 0478, 0479, 0481, 0482, 0483, 0484, 0486, 0487, 0488, 0489, 0491, 0492, 0493, 0494, 0501, 0502, 0503, 0504, 0506, 0508, 0511, 0512, 0513, 0514*, 0516*, 0550, 0555, 0556, 0560, 0575, 0576, 0580, 0600, 0625 | NOVEMBER 19, 1976 | DECEMBER 2, 1980 | |
| GREENVILLE, CITY OF | 450091 | 0319, 0338, 0381, 0382, 0383, 0384, 0392, 0401, 0402, 0403, 0404, 0406, 0408, 0411, 0412, 0413, 0414 | JUNE 28, 1974 | FEBRUARY 1, 1980 | |
| GREER, CITY OF | 450200 | 0236, 0237, 0239, 0241, 0243, 0327, 0331, 0332, 0333, 0334, 0341, 0342, 0344, 0351, 0353, 0354, 0358, 0361, 0362, 0363, 0364*, 0366*, 0368*, 0426, 0427, 0435 | MAY 17, 1974 | SEPTEMBER 28, 1979 | |
| MAULDIN, CITY OF | 450198 | 0404, 0408, 0409, 0412, 0414, 0416, 0417, 0418, 0419, 0477 | AUGUST 16, 1974 | SEPTEMBER 29, 1978 | |
| SIMPSONVILLE, CITY OF | 450092 | 0419, 0438, 0481, 0482, 0483, 0484, 0501, 0502, 0503 | MAY 17, 1974 | SEPTEMBER 29, 1978 | |
| TRAVELERS REST, CITY OF | 450264 | 0302*, 0304*, 0310* | NOVEMBER 19, 1976 | DECEMBER 2, 1980 | |

* PANEL NOT PRINTED - NO SPECIAL FLOOD HAZARD AREAS
* MOST RECENT MAP INDEX

NATIONAL FLOOD INSURANCE PROGRAM

MAP INDEX

FIRM
FLOOD INSURANCE RATE MAP
GREENVILLE COUNTY,
SOUTH CAROLINA
AND INCORPORATED AREAS
(SEE LISTING OF COMMUNITIES TABLE)

SHEET 2 OF 2
MAP INDEX

PANELS PRINTED: 377, 380, 381, 382, 383, 384, 390, 391, 392, 393, 394, 401, 402, 403, 404, 406, 407, 408, 409, 411, 412, 413, 414, 416, 417, 418, 419, 426, 427, 428, 429, 435, 436, 437, 438, 439, 441, 442, 443, 444, 455, 456, 457, 458, 459, 475, 476, 477, 478, 479, 481, 482, 483, 484, 486, 487, 488, 489, 491, 492, 493, 494, 501, 502, 503, 504, 506, 508, 511, 512, 513, 550, 555, 556, 560, 575, 576, 580, 600, 625

(SEE SHEET 1 FOR ADDITIONAL PANELS PRINTED)



MAP NUMBER
45045CIND2B

MAP REVISED

Federal Emergency Management Agency

**Appendix I – Greenville County Hazards and Vulnerability Assessment
Project**

Greenville County HVA Project

Summary

The HVA project was designed to update the existing understanding of hazards and vulnerabilities within Greenville County. In order to gain a more in-depth assessment of the potential impact from events that may occur within Greenville County, an HVA was initiated in each municipality and for each university with a residential student population.

The project was funded by a grant from The South Carolina Department of Health and Environmental Control.

Each jurisdiction participating in the HVA project was provided the tools, resources, and initial facilitation to initiate the HVA process within the jurisdiction. The information gleaned from each workshop provided insight into the risks facing the County. The process was intended to stimulate additional participation in county-wide emergency management activities as well as create a platform for further development of emergency management processes within each jurisdiction.

The notable outcomes of the project include the identification of the highest risk hazards for the County, initiation of hazard assessment for each municipality and the largest colleges and universities, and gathering areas for improvement for emergency response and emergency management activities within Greenville County.

HVA Project Webinar Objectives

- Explain the HVA project to participating agencies
- Review the purpose, outcomes, and utilization of HVAs
- Provide an overview of best practices for conducting HVAs
- Prepare participating agencies for HVA workshops
- Provide dates and details regarding upcoming workshops

Greenville County HVA Workshop Objectives

- Review probable impacts to Greenville County and determine impacts that will require hazard analysis due to increased risk or high probability
- Utilize a hazard vulnerability assessment tool to establish the relative risk for the impacts requiring hazard analysis
- Determine areas within the hazard analysis that require additional input or research
- Provide a HVA foundation that can be built upon for future county projects requiring hazard assessment

College/University and Municipality Workshop Objectives

- Review the relative risk assigned to hazards within the County HVA workshop
- Review best practices and processes for conducting an HVA
- Analyze potential impacts to the entity and determine relative risk
- Establish gaps in emergency preparedness by the entity within the four phases of emergency management
- Provide a basic HVA for each entity so the entity can continue developing its own HVA

Workshop Dates

County – May 10
Fountain Inn – May 14
Greer – May 20
Bob Jones – May 21
Greenville Tech – May 24
City of Greenville – May 23
Travelers Rest and Furman University – May 28
Mauldin – May 29
Simpsonville – May 29

Process

Webinar: A county-wide HVA webinar served as the starting point for the HVA project. The webinar provided a preview of the project and reviewed the hazard assessment processes that would be utilized throughout the project. The educational portion of the webinar was intended to reduce the time required at each workshop to ensure participants were operating from a similar understanding of the objective and HVA process.

County Workshop: Following the webinar, a workshop was held to focus on establishing a current analysis of the highest risk hazards for Greenville County. The Greenville County Office of Emergency Management coordinated the invitation of agencies to represent Emergency Support Functions (ESFs) within the county's Emergency Operations Plan (EOP).

During the HVA workshop, the ESF representatives were asked to assess the probability of hazards, the potential impact that may result from each hazard, and the level of preparedness that exists within Greenville County and the upstate of SC region. In order to assess probability, the participants reviewed the historical occurrence of hazards, factors that indicate the possibility of an occurrence, and the subjective intuition of the participants based on their experience and knowledge within the County.

After examining the probability of hazards, the most probable hazards and the hazards that created the most concern among participants were evaluated to determine the relative risk. Using an electronic assessment scale, each hazard was examined individually. First, the potential impact was examined. Using a five point scale, participants determined the impact to humans, property, business, and critical infrastructure. Next, the level of preparedness was examined. The participants reviewed the preparedness within Greenville County as well as the "regional" preparedness. The hazard scale and explanations are included in this summary.

The challenge for completing the HVA was the geographic size of Greenville County. Some hazards may have a large physical or emotional impact within one area of the County but those hazards do not create a high relative risk score as a county-wide risk because of the relatively low county-wide impact. The size of the County allows for geographic separation of the population and resources and ultimately a lower probability of widespread impact. Many of the resources available to mitigate an impact are designed to support State and regional response. This availability enhances Greenville County's ability to absorb the consequences resulting from many of the potential impacts. Subjective review of the risks is still needed to help establish the impact that the emergency

management leadership and support agencies within Greenville County intuitively feel may occur as a result of an event occurring.

Municipality Workshops: Each municipality followed a similar process to assemble key personnel who understand the capabilities and vulnerabilities of the jurisdiction. A workshop was held with each municipality to initiate the examination of hazards and vulnerabilities. A similar assessment scale was utilized by each municipality. The completed HVAs were provided to the municipalities as a tool for future examination of hazards, vulnerabilities, and mitigation strategies.

College and University Workshops: Each institution of higher education that hosts a residential population was also provided an opportunity to participate in the development of a campus-specific HVA. A similar assessment tool was made available for use during a facilitated workshop. A majority of the higher education institutions chose to use the discussion and assessment tool as an opportunity to examine the plans, notification processes, training, and overall level of emergency management capability that exists within the institution. A summary of each discussion was provided to the institutions for ongoing development of emergency management programs on-campus.

Greenville County HVA Summary

The assessment tool completed during the county-wide HVA workshop provides a graph of the highest risk hazards. Mitigation strategies have not yet been developed for each. The highest risk events identified for the County were an ice storm, a snow storm creating 3-12 inches of snow, and a large release of a potentially deadly hazardous material.

The results of this HVA are similar to a hazard analysis conducted three years prior. The previous analysis revealed winter storms, a pipeline accident, the effects of a drought, and a hazardous materials event at a fixed facility as the highest risk events.

Agencies contributing to the HVA determined that a large release of a hazardous material, regardless of its origin (i.e. railroad, fixed facility, or transportation) would have the same impact on the county. A detailed analysis of hazardous materials threats would be required to determine the highest potential risk from a hazardous material within the county. The detailed analysis would look more closely at the location of specific hazardous materials in relation to population centers, the instances of accidents and safety violations related to each facility and entity handling hazardous materials, the geography surrounding the facilities and transport avenues, and the safeguards in place relative to each type of hazardous material.

Events such as a severe technology interruption and an active shooter event were considered because of specific considerations for each of these include the extreme reliance on technology and the high profile nature and emotional impact from a mass shooting event. Each of these was deemed to be a relatively low risk for the County. This does not discount that an agency or a region within the County could be highly impacted by one of these events.

Greenville County is home to a significant portion of the emergency management resources available within the Upstate of South Carolina. Other communities in the area with significant resources are less than two hours' drive. Greenville County is geographically well positioned to respond to and manage an event that can be mitigated through the allocation of resources. These resources may include first responder assets or support for utility providers.

The resource-rich environment of Greenville County has created opportunity and need for the County to develop emergency operations plans as well as plan to support emergency management activities across the region and statewide. These plans have assisted Greenville County in lowering the relative risk for hazards that may impact the citizens, property, businesses, and critical infrastructure within Greenville County.

Highest Risk Hazards: The justification behind the relative risk score for the top three hazards is based largely on the probability and the potential widespread impact. No single factor increased the risk of the events. For example, the number of injured people was a relatively low concern for an ice storm but the impact to business and critical infrastructure was relatively high. The probability of an ice storm creates a higher risk as well.

When assessing the threat from a snow storm, the historical probability indicates a more probable threat than a significant ice storm. However, the overall impact to businesses and critical infrastructure is less than an ice storm. These natural hazards carry a similar set of concerns and

impacts. Mitigation strategies focus on reducing the impact to utilities and coordination of emergency management support for sheltering and resource allocation as needed during an event.

The threat from a hazardous materials event carries a moderate probability based on historical events and the amount of hazardous materials stored, manufactured, transported, and utilized within the County. The risk factor associated with a hazardous material release in Greenville County is based on the impact. Greenville County has a well-coordinated and equipped hazardous materials response capability. Plans and exercises demonstrate the ability for Greenville County to access additional resources that exist within the region and State. The challenge in Greenville County is that a release of hazardous materials is likely to occur near a populated area. Notification of the population within an area of the County is problematic, despite some systems in place for mass notification. The potential human impact within Greenville County is relatively high. The probability and high human impact resulted in a high risk score.

Reduction of Risk

Key areas for improvement were identified by each participating agency as a mechanism to reduce the overall risk of the hazards analyzed. *The primary area for improvement was often summarized as a need for increased participation from the individuals and agencies that carry out the emergency management planning and response activities under the guidance of Greenville County Emergency Management.* The requisite planning, organized purchasing of equipment, well-exercised response and coordination activities, and most other areas for improvement all require input and participation to ensure the activities are completely effectively.

The HVA workshop participants, and agencies that contributed to the HVA independently, expressed the need for planning, training, and exercise activities with the caveat that Greenville County Emergency Management cannot conduct those activities alone. There was no criticism of the supporting agencies offered, only the concern that the time required was often not readily provided.

The areas for improvement noted during the HVA process include:

- *Interoperable communications system.* Greenville County has an outdated communications infrastructure that does not facilitate seamless interoperable communications. The need exists for updated infrastructure to overcome dissimilar equipment and to establish, among all emergency response and emergency management agencies, common channels/frequencies.
 - The system was described as lacking the ability for agencies to talk with one another. The weakness in the system is complicated by the lack of a county-wide communications plan that relies on common channels.
 - A statewide communications system exists but not all agencies have sufficient hardware to effectively participate on the system and no authority exists to drive state tactical channels.
 - Greenville County does not have a plan to overcome a dispatch or communication failure.
 - Although several agencies are impacted by the weaknesses of the communications system, there is no agency serving as the lead agency to lead the improvement planning and implementation.

- *Interoperable Communications Plan.* Although an interoperable communications system is needed, a plan is needed to guide the utilization of available communications resources and to be coordinated during use by a lead agency or individual.
- *Authority for communications.* Within Greenville County there is no agency that possesses the authority to organize, develop, and manage an interoperable communications system for the County.
- *County-wide incident management system and response plan.* A comprehensive incident management system and response plan is needed within Greenville County to define, guide, and assist with the management of all first responder and emergency support agencies. The county Emergency Operations Plan defines roles and expectations for support to the Emergency Operations Center.

The emergency response agencies work within the National Incident Management System and Incident Command System concepts. There is not a well defined plan that establishes an incident command structure when multiple agencies respond to an emergency.

- The management of assets and response activities within each Emergency Support Function are currently not outlined by an ESF management plan. A written plan that describes the identified assets, the process for requesting, the agency points of contact, a process for providing situational updates, and a formal process for requesting assets should be developed and exercised.
- *Exercise the EOC with multiple agencies.* The EOC process is periodically exercised but only a few key agencies participate. Most exercises within Greenville County focus on the response to the event scene. The recent exercises have not involved a significant focus on coordination with hospitals, extensive utilization and taxing of the EMS system, situation updates and allocation of resources through the EOC, and coordination of transport of patients.
 - The objectives for exercises should be focused on coordination among multiple agencies to support on-scene response and accomplish recovery actions.
- *Ownership of agency emergency management process and responsibility.* Each of the agencies supporting emergency management activities has consented to be prepared to carry out the agency's role during an emergency. This responsibility requires the development of capability and capacity to carry out the agency's role. The level of capability to manage an emergency cannot be increased without agencies taking ownership of emergency management and participating in planning, training, and exercise activities. Many agencies participate willingly when requested but do not take time to properly develop internal plans, train a sufficient number of staff, formalize relationships for partnering during emergencies, establish an inventory of accessible resources, institute a communications plan within the support function, or become proficient with established processes for tracking expenses and resources.

Hazard Assessment Scale

Probability:

- 0 = 70 – 100 years
- 1 = 30 – 70 years
- 2 = 12 – 30 years
- 3 = 7 – 12 years
- 4 = 2 – 7 years
- 5 = 0 – 2 years

Human Impact: Possibility of Death and Injury across the entire county

- 0 = Less than 10 with minor injuries, less than 5 significant injuries, and no deaths
- 1 = Less than 30 minor injuries, less than 20 significant injuries, and less than 5 deaths
- 2 = Less than 50 minor injuries, less than 40 significant injuries, and less than 10 deaths
- 3 = Less than 75 minor injuries, less than 50 significant injuries, and less than 15 deaths
- 4 = Less than 90 minor injuries, less than 75 significant injuries, and less than 20 deaths
- 5 = Less than 125 minor injuries, less than 100 significant injuries, and less than 25 deaths

Property Impact: Physical losses and damages to facilities and buildings that belong to the general public

- 0 = *Moderate* impact occurring in a *localized* area.
- 1 = *Significant* impact but only to a *localized* area.
- 2 = *Moderate* impact to a *region* within the county or *multiple localized* areas. A region is larger than a localized area but smaller than a widespread area.
- 3 = *Significant* impact to a *region* within the county or *multiple localized* areas.
- 4 = *Moderate* impact to a *widespread* area or the entire county.
- 5 = *Significant* impact to a *widespread* area or the entire county.

Business Impact: Interruption of services and/or business activities. This includes any impact that disrupts business activity within the county. A mild impact would affect the business but it could continue operating. A moderate impact means that the business is affected but only able to maintain basic business function with assistance or alternative methods of conducting operations. A severe impact means no business activity will take place.

- 0 = *Mild* impact to less than 20 businesses for *less than a week*. (Very small impact, very small number of businesses lasting only a day or two)
- 1 = A *mild* impact to less than 50 businesses. The impact may last up to two weeks. (Small impact but to a few more businesses but still not for very long)
- 2 = A *moderate* impact to up to 50 businesses. The impact is for a period up to a *month*. (A more significant impact but not severe. The businesses may be in a region or in several parts of the county. May last for several weeks but will end.)
- 3 = A *moderate* impact to 50 - 100 businesses for an *extended* period of time up to three months. (Not as many businesses are impacted but the impact is significant. The impact may last for weeks or months but will come to an end.)
- 4 = A *severe* impact to a *small number* of businesses for *weeks or several months*.

5 = A severe impact to a *large number* of businesses for a *long term*. (A large number of businesses will suffer a very significant impact. This impact may last for months or more than a year.)

Critical Facilities: These facilities include the jail, hospitals, facilities impacting production, treatment or distribution of water, sewer, and electricity, the 911 center, county office buildings, telecommunications facilities, fire departments, police departments, EMS facilities, and sites designated for use as emergency shelters. The terms mild, moderate, and severe used to describe business impact will apply here.

0 = one to three sites with a *mild* impact

1 = up to eight sites with a *mild* impact

2 = Less than five sites with a *moderate* impact and less than three additional sites with a mild impact

3 = Less than five sites with *moderate* impact, one with a severe impact

4 = Less than 10 sites with a *moderate* impact, up to three with a severe impact

5 = Five to eight sites with a severe impact

Agency Preparedness: Refers to the level of preparedness for each agency. This includes the identification of needs, how needs are being addressed, resources available, and the effectiveness of response and emergency management. When assessing multiple agencies, consider the agencies as a whole or consider the agencies that will be primary or lead when the event occurs.

0 = Very prepared. Sufficient capacity and capability exists.

1 = Prepared. Minor issues to address to improve capacity or capability.

2 = Needs have been identified. Moderate level of change needed to improve.

3 = Significant needs. Significant needs have been identified. Significant change required but change is taking place.

4 = Significant needs, not addressing. Significant needs exist but are not being addressed.

5 = Hazard not identified. The hazard impacts the agency but the agency has not identified the hazard so very limited capability or capacity exists to address the hazard.

Regional Preparedness: Refers to the level of preparedness within a geographic region. This refers to the capability and capacity that exists within a region to address an event. The regional preparedness reflects the community assets and ability to leverage those assets within the region.

0 = Very prepared. Sufficient capacity and capability exists.

1 = Prepared. Minor issues to address to improve capacity or capability.

2 = Needs have been identified. Moderate level of change needed to improve.

3 = Significant needs. Significant needs have been identified. Significant change required but change is taking place.

4 = Significant needs, not addressing. Significant needs exist but are not being addressed.

5 = Hazard not identified. The hazard impacts the region but the region has not identified the hazard so very limited capability or capacity exists to address the hazard.

| EVENT | PROBABILITY | SEVERITY = (MAGNITUDE - MITIGATION) | | | | | | RISK |
|---------------------------------------|-----------------------------------|---------------------------------------|------------------------------------|--|--|------------------------------------|----------------------------------|-------------------------|
| | | HUMAN IMPACT | PROPERTY IMPACT | BUSINESS IMPACT | CRITICAL FACILITIES | AGENCY PREPARED-NESS | REGIONAL PREPARED-NESS | |
| | <i>Likelihood this will occur</i> | <i>Possibility of death or injury</i> | <i>Physical losses and damages</i> | <i>Interruption of Business Activity</i> | <i>Disruption of critical services or businesses</i> | <i>Resources and Effectiveness</i> | <i>Community aid and support</i> | <i>Relative threat*</i> |
| NATURAL HAZARDS | | | | | | | | |
| 0-3" Snow | 5 | 1 | 0 | 0 | 1 | 1 | 1 | 13% |
| 3-12" Snow | 4 | 1 | 1 | 2 | 3 | 1 | 1 | 24% |
| >12" Snow | 2 | 2 | 2 | 3 | 3 | 1 | 1 | 16% |
| Ice Storm | 3 | 3 | 3 | 3 | 3 | 1 | 1 | 28% |
| Flash Flooding | 5 | 0 | 1 | 0 | 0 | 1 | 1 | 10% |
| Extended Rain Flooding | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 8% |
| Tornado EF0-EF2 | 4 | 1 | 1 | 1 | 1 | 1 | 2 | 19% |
| Tornado EF3-EF5 | | | | | | | | 0% |
| Microburst or Straightline Winds | | | | | | | | 0% |
| Tropical Storm/Hurricane (CAT 1, 2) | | | | | | | | 0% |
| Major Hurricane (CAT 3, 4, 5) | | | | | | | | 0% |
| Hurricane Reception (from evacuation) | | | | | | | | 0% |
| Major Wildfire | | | | | | | | 0% |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|-----|
| Earthquake | | | | | | | | 0% |
| Severe Thunderstorm | 5 | 0 | 1 | 1 | 0 | 0 | 0 | 7% |
| Severe Storm w/ Hail | | | | | | | | 0% |
| Pandemic | | | | | | | | 0% |
| Epidemic | | | | | | | | 0% |
| MAN MADE | | | | | | | | |
| Active Shooter | 1 | 1 | 0 | 0 | 1 | 2 | 3 | 5% |
| Civil Unrest/Riot | | | | | | | | 0% |
| Dam Failure | | | | | | | | 0% |
| Utilities Failure | | | | | | | | 0% |
| Nuclear Event Support | | | | | | | | 0% |
| Pipeline Failure | | | | | | | | 0% |
| Major Industrial Fire/Explosion | 3 | 1 | 1 | 1 | 1 | 1 | 1 | 12% |
| Transportation Accident - with Passengers | | | | | | | | 0% |
| Hospital Evacuation | | | | | | | | 0% |
| Terrorism Event with Mass Casualty | | | | | | | | 0% |
| Cyber Security/Technology Disruption | | | | | | | | 0% |

| HAZMAT | | | | | | | | |
|--------------------|---|---|---|---|---|---|---|-----|
| Large Leak, Deadly | 3 | 4 | 1 | 2 | 0 | 3 | 2 | 24% |
| | | | | | | | | 0% |
| | | | | | | | | 0% |

Risk = Probability x Severity Adapted from Kaiser Permanente Facility HVA and the British Columbia Hazard, Risk, and Vulnerability Assessment Tool

Appendix J – City of Greenville Hazard Mitigation Plan



City of Greenville

Multi-Hazard Mitigation Plan

May 2010



City of Greenville
Multi-Hazard Mitigation Plan

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Acronyms and Abbreviations

| | |
|----------------|---|
| CERT..... | Community Emergency Response Training |
| CFR..... | Code of Federal Regulations |
| CISM | Critical Incidents Stress Management |
| COG | City of Greenville |
| CRS..... | Community Rating System |
| DMA 2000 | Disaster Mitigation Act of 2000 |
| DMC | Disaster Mitigation Committee |
| DNR..... | SC Department of Natural Resources |
| EMS..... | Emergency Management Services |
| EPA..... | U.S. Environmental Protection Agency |
| FEMA | Federal Emergency Management Agency |
| FHMP | Flood Hazard Mitigation Program |
| FIRM..... | Flood Insurance Rate Map |
| GIS | Geographic Information System |
| HAZUS | Hazards U.S. |
| HAZMAT..... | Hazardous Material |
| NFIP | National Flood Insurance Program |
| NOAA | National Oceanic and Atmospheric Administration |
| NRCS | Natural Resources Conservation Services |
| NWS..... | National Weather Service |
| SCEMD | South Carolina Emergency Management Division |
| SHELDUS..... | Spatial Hazard Events and Losses Database for United States |
| USACE..... | U.S. Army Corps of Engineers |
| USGS | U.S. Geological Survey |

City of Greenville
Multi-Hazard Mitigation Plan

Section One

EXECUTIVE SUMMARY

In order for the City of Greenville to take advantage of certain future hazard mitigation grant programs, the City is required to prepare a Disaster Mitigation plan. Funding to prepare such a plan was made available, in part, by a grant from the Federal Emergency Management Agency (FEMA) through a State-Local Pre-Disaster Mitigation Grant Agreement with the South Carolina Emergency Management Division (SCEMD). Woolpert was contracted by the City to assist in the planning process.

The City of Greenville is threatened by a number of natural hazards. These hazards endanger the health and safety of the population of the community, jeopardize its economic vitality, and imperil the quality of its environment. Because of the importance of avoiding or minimizing the vulnerabilities to these hazards, the public and private sector interests of the City of Greenville have joined together to create the City of Greenville Disaster Mitigation Committee (DMC) to undertake a comprehensive planning process that has culminated in the publication of this document: "The City of Greenville Multi-Hazard Mitigation Plan." This City of Greenville Multi-Hazard Mitigation Plan builds upon previous research, planning and analysis performed for The Greenville County Multi-jurisdictional Hazard Mitigation Plan (Revised 2009).

The development of this plan was placed under the direction of the City Environmental Engineers, in particular Jessica Chapman, P.E., Assistant City Engineer. All meetings were facilitated by Mrs. Chapman, and portions of the meetings were conducted by the Consultant, Woolpert, represented by Trevor Gauron, P.E. and Richard Washington Jr., CFM. Key participants, organizations, and agencies involved in the development of this plan are the city agencies of Public Works, City Council, and Public Safety. A complete list of participants can be found in Section Three. The City of Greenville DMC has also actively engaged the community at large in the mitigation planning process, undertaking several efforts to solicit the community's opinions and recommendations regarding mitigation needs and the topics covered in the plan.

Planning Process

The agreement between the City and SCEMD detailed the planning approach as follows:

- Meet the criteria described in the Disaster Mitigation Act of 2000 and for receiving credit under the Community Rating System program
- Address flooding, tornados/high winds, earthquakes, wildfires, drought/heat wave, severe storms/thunderstorms and winter/ice storms. Follow the ten (10) step Federal Emergency Management Agency (FEMA) planning process as outlined below.

1. **Organize:** Create the DMC and develop a schedule for project completion.
2. **Public Involvement:** Insure that the general public has an opportunity to provide input into the planning process.
3. **Coordination:** Coordinate with appropriate individuals and organizations to insure adequate representation at various meetings.
4. **Hazard Assessment:** Address the five hazards listed above including; review of existing plans, review of past events and claims data, and obtain input from committee members and the public.
5. **Problem Assessment:** Review available information regarding the impact of hazards on public health and safety, infrastructure and property damage. Where possible, the impacts on property should be measured in dollar losses. Optional efforts included; utilizing HAZUS earthquake and flood/wind to determine expected extent of damages and performing a facilities inventory. (Due to limited resources, and at the discretion of the DMC, these options were not performed in this planning cycle.)
6. **Goal Setting:** Establish goals and objectives for the plan.
7. **Mitigation Activities:** Determine mitigation activities relative to the five hazards being considered and the unique characteristics of the City of Greenville. The following six basic mitigation strategies were to be considered; 1) Preventive measures, 2) Property protection, 3) Natural Resource Protection, 4) Emergency Services, 5) Structural projects, and 6) Public Information.
8. **Draft Plan:** Prepare a draft plan containing a description of the planning process, the hazard assessment and problem analysis, the goals, and a summary of possible and appropriate measures. The draft plan is to reviewed and open to comment during a public meeting.
9. **Final Plan:** The final plan will be prepared considering comments from the internal review and the public.
10. **Implementation:** The plan should be adopted by City Council and the DMC should be available for reviewing and revising the plan from time to time.

To date, Tasks 1 – 7 have been completed and the draft plan is being prepared for review and approval. *A copy of the council resolution adopting this plan will be attached to indicate that Tasks 8 and 9 have been completed.* Task 10 is an on-going activity.

Mitigation Initiatives

In general, decisions regarding potential impacts of hazards and potential mitigation initiatives came from the DMC. Input was also solicited from a variety of other groups representing homeowners, business owners, emergency response organizations and industrial leaders. Ranking of initiatives was based on a point system and each initiative was scored by DMC. The results can be found in Section 8 of this document.

A mechanism has also been established by the DMC to regularly update the plan. This process includes soliciting additional mitigation initiatives, evaluating response to recent disasters, and tracking the progress of those initiatives already reviewed and approved.

Goals and Objectives

The DMC has established eight (8) goals in the Mitigation Plan. These goals revolved mainly around providing education to the public and government officials, improving communications and response activities and protecting structures. Specific objectives were established for each goal and as initiatives were approved, it was noted which objective would be met by that initiative.

It is also the goal of the City of Greenville to become a part of the Greenville County Multi-jurisdictional multi-hazard plan in their next update, therefore, this plan is structured similarly to aid in the process.

Summary

Disaster Mitigation Planning is not a one time project, but rather an on-going process. The City of Greenville started the process in 2009 and will continue to update the plan as scheduled to keep their plan updated and relevant. Obtaining a resolution from the City of Greenville Council and approval of the plan from the South Carolina Flood Mitigation Program will reaffirm the City's efforts to reduce damages and loss of life from future natural disasters.

City of Greenville
Multi-Hazard Mitigation Plan
Section Two
INTRODUCTION AND PURPOSE

Introduction

The City of Greenville Disaster Mitigation Committee (DMC) has been established to make the population, neighborhoods, businesses and institutions of the community more resistant to the impacts of future disasters. The DMC has been undertaking a comprehensive, evaluation of the vulnerabilities of the community to future natural hazards in order to identify ways to make the communities of the planning area more resistant to their impacts. This document reports the results of that planning process.

Purpose

The City of Greenville Multi-Hazard Mitigation Plan and its underlying planning process are intended by the DMC to serve many purposes. These include the following:

Provide a Methodical, Substantive Approach to Mitigation Planning

The approach utilized by the City of Greenville DMC relies on a methodical process to identify vulnerabilities to future disasters and to propose the mitigation initiatives necessary to avoid or minimize those vulnerabilities. These include interviews, research, data collection, draft(s) and review(s) of plan, community involvement, work sessions, and implementation. Each step in the process builds upon the previous step, so that there is a high level of assurance that the mitigation initiatives proposed by the participants have a valid basis for both their justification and priority for implementation. One key purpose of this plan is to document that process and to present its results to the community.

Enhance Public Awareness and Understanding

The DMC is interested in finding ways to make the community as a whole more aware of the natural hazards that threaten the public health and safety, the economic vitality of businesses, and the operational capability of important facilities and institutions. The plan identifies the hazards threatening the City of Greenville and provides an assessment of the relative level of risk they pose. The plan also includes a number of proposals of ways to avoid or minimize those vulnerabilities. This information will be very helpful to individuals that wish to understand how the community could become safer from the impacts of future disasters.

The DMC and its member organizations, has and will continue to conduct a number of community outreach and public information programs. The purpose of

these is to engage the community as a whole in the local mitigation planning process, in order to shape the goals, priorities, and content of the plan, as well as to provide information and education to the public regarding ways to be more protected from the impacts of future disasters. The DMC has been, and will continue to be, active in communicating with the public and engaging interested members of the community in the planning process.

Create a Decision Tool for Management

The City of Greenville Multi-Hazard Mitigation Plan provides information needed by the managers and leaders of local government, business and industry, community associations, and other key institutions and organizations to take actions to address vulnerabilities to future disasters. It also provides proposals for specific projects and programs that are needed to eliminate or minimize the risks to specific hazards. The plan is based on the best available data, which although limited in many regards, provides a solid foundation for hazard planning and mitigation and future improvements.

These proposals, called “mitigation initiatives” in the plan, have been justified on the basis of their economic benefits using a uniform technical analysis. These initiatives have also been prioritized. This approach is intended to provide a decision tool for the management of participating organizations and agencies regarding why the proposed mitigation initiatives should be implemented, which should be implemented first, and the economic and public welfare benefits of doing so.

Promote Compliance with State and Federal Program Requirements

There are a number of state and federal grant programs, policies, and regulations that encourage or even mandate local government to develop and maintain a comprehensive hazard mitigation plan. This plan is specifically intended to assist the participating local governments to comply with these requirements, and to enable them to more fully and quickly respond to state and federal funding opportunities for mitigation-related projects. Because the plan defines, justifies, and prioritizes mitigation initiatives that have been formulated through a technically valid hazard analysis and vulnerability assessment process, the participating organizations are better prepared to more quickly and easily develop the necessary grant application materials for seeking state and federal funding.

Enhance Local Policies for Hazard Mitigation Capability

A component of the hazard mitigation planning process conducted by the City of Greenville DMC is the analysis of the existing policy, program, and regulatory basis for control of growth and development, as well as the functioning of key facilities and systems. This process involves cataloging the current mitigation-related policies of local government so that they can be compared against the hazards that threaten the jurisdiction and the relative risks these hazards pose to the community. When the risks posed to the community by a specific hazard are not adequately addressed in the community’s policy or regulatory framework, the potential impacts of future disasters can be even more severe. Therefore, the

planning process utilized by the DMC supports evaluation of the adequacy of the community's policies and programs in light of the level of risk posed by specific hazards. This evaluation supports and justifies efforts to propose enhancements in the policy basis that could or should be promulgated by the City to create a more disaster-resistant future for the community.

The following sections of the City of Greenville Multi-Hazard Mitigation Plan present the detailed information to support these purposes. The remainder of the plan describes the planning organization developed by the DMC, as well as its approach to managing the planning process. The plan provides a description of the mitigation-related characteristics of City of Greenville, such as its land uses and population growth trends, the mitigation-related policies already in-place, identified critical facilities present in the community, and if there are properties that have been repetitively damaged by past disasters. The plan then summarizes the results of the hazard identification and vulnerability assessment process, and addresses the adequacy of the current policy basis for hazard management by City of Greenville and participating organizations. The plan also documents the structural and non-structural mitigation initiatives to address the identified vulnerabilities. The plan further addresses the mitigation goals and objectives established by the DMC and the actions to be taken to maintain, expand and refine the City of Greenville Mitigation Plan and the planning process. Finally, the past and planned efforts of the DMC to engage the entire community in the mitigation planning process are documented.

City of Greenville
Multi-Hazard Mitigation Plan
Section Three
DISASTER MITIGATION COMMITTEE ORGANIZATION

Introduction

The City of Greenville's Disaster Mitigation Committee (DMC) is made up of a number of city agencies, community organizations, and institutions. This section discusses the organizational structure used to complete the planning process. Also provided is a summary of the current status of planning activities by the participants documenting the level of participation by the City's DMC.

On a regular basis, the DMC will meet to discuss this plan and refine as necessary its contents and direction. In these meetings, the committee will review mitigation activities that are on going or planned. This meeting will allow the members of the committee to continually reflect upon the mitigation plan and its appropriateness to each organization and agency's individual needs and expectations.

Any desired changes to the mitigation plan will be considered by the group and agreed upon. These changes will then be presented to the City Council for review. The Council can reject, accept, or ask for revisions to the proposed changes.

In addition, the DMC will schedule meetings with the public as necessary if changes to the mitigation plan occur. It is also a function of the mitigation committee to coordinate and exchange information with their respective agency or department.

Participating Organizations

A total of 15 public/private organizations are supporting the planning process. (It is intended that the number of participating organizations and groups will continue to grow in future planning cycles.) The agencies and organizations currently participating in the hazard mitigation planning process are listed on page 3.4.

The Disaster Mitigation Committee Organizational Structure

The DMC encourages participation by all interested agencies, organizations, and individuals. The organization is intended to represent a partnership between the public and private sector of the community, working together to create a disaster resistant community. The proposed mitigation initiatives developed by the DMC and listed in this plan, when implemented, are intended to make the entire community safer from the impacts of future disasters, for the benefit of every individual, neighborhood, business and institution.

The responsibilities and duties of the DMC are detailed in the operating procedures, which are provided in the next section. This section summarizes the roles of the different components of the DMC and describes the participation that has actually occurred during the planning period covered by this document.

The Committee represents key city organizations participating in the planning process, and is the group that makes the official decisions regarding the planning process. The Committee serves as the official liaison to their respective agency and the community. Most importantly for this document, however, is the DMC's role to approve proposed mitigation initiatives for incorporation into the plan, for determining the priorities for implementation of those initiatives, and for removing or terminating initiatives that are no longer desirable for implementation.

The DMC also coordinates the actual technical analyses and planning activities that are fundamental to development of this plan. These activities may include conducting the hazard identification and vulnerability assessment processes, as well as receiving and coordinating the mitigation initiatives proposed for incorporation into this plan. The coordinating process undertaken constitutes a "peer review" of the proposed mitigation initiatives submitted for incorporation into the plan. Through the peer review, each proposed initiative is to be reviewed for its consistency with the goals and objectives established for the planning process and its relationship to identified hazards and defined vulnerabilities to those hazards. The peer review incorporated into the City's planning process also strives to assure the following: Assumptions used by the organization to develop the proposal are reasonable; Proposal's would not conflict with or duplicate other proposed initiatives; Initiatives specifically address risk to a hazard(s); Proposals are feasible and consistent with known requirements; and that proposals, if implemented, would not cause harm or disruption to adjacent jurisdictions.

City agencies and local organizations are the key to accomplishing the planning process. The effort begins with developing a community profile of the City to document the basic characteristics of the community that are relevant to controlling the impacts of disasters. Then vulnerability assessments are conducted of key facilities, systems and neighborhoods to define how these may be vulnerable to the impacts of all types of disasters. Finally, the City uses the vulnerability assessments to formulate and characterize mitigation initiatives that they could implement if the resources to do so became available. Once these proposed initiatives are reviewed and coordinated, the DMC can then decide to formally approve them by vote in order to incorporate them into the Multi-Hazard Mitigation Plan. As soon as a proposed mitigation initiative is approved, it is sent to the City Council for their approval. Once accepted by the Council, it is considered to be officially a part of the Multi-Hazard Mitigation Plan, and expected to be implemented as soon as the resources and/or opportunity to do so becomes available.

The DMC is also responsible for coordinating the efforts to involve the community at large in the mitigation planning process, and to promote mitigation-related educational program in the community. More detailed information regarding the public information and community outreach activities involved in the development and implementation of this plan are provided in Section 5.

As of the publishing of this plan, the DMC has conducted three (3) meetings to gather information and another to prioritize initiatives, all of which were open to the public. A summary of these meetings is as follows:

- Start-Up Meeting August 17, 2009
 - Committee members introduced
 - Consultant introduced
 - Committee was introduced to the purpose and use of a Hazard Mitigation Plan.
- Committee Meeting October 12, 2009
 - Review of New Initiative ideas
 - Discussion of the Ranking Criteria/Prioritization List
 - Prioritization of Initiatives
- Follow-Up meeting October 13, 2009
 - A community-wide meeting was called to solicit ideas from Greenville residents.
 - Meeting was ended due to no attendance by the public.
- Final Meeting December 18, 2009
 - Review of Multi-Hazard Mitigation Draft

The DMC has benefited from the assistance and support of its members. A listing the members and their committee affiliation is provided below. It is important to note that participation in the Committee is not limited in any manner, and all members of the community, whether representing the public or private sector, are welcome to participate. As described in Section 7, which discusses the maintenance and updating of the plan, the group intends to continue its efforts to engage more members of the community in the planning process.

City of Greenville Disaster Mitigation Committee

| Name | Organization | Email Address |
|---------------------|---|---------------------------------|
| Jessica Chapman | City of Greenville (COG) Floodplaining Management | jchapman@greenville.sc.gov |
| Bryan Morris | Greenville County School District | bmorris@greenvill.K12.sc.us |
| Rick Richardson | Harper Corporation | rrichardson@HarperCorp.com |
| Alan Johnson | Caliber Engineering | Ajohnson@CaliberEngineering.com |
| Scott Taylor | BB&T | scott.taylor@bbandt.com |
| Frank Wingate | Palmetto Bank | fwingate@palmettobank.com |
| David Crigler | Prudential C. Dan Joyner Realtors | dcrigler@cdanjoyner.com |
| Bill Misiaveg | Carolina Holdings | bmisiaveg@choldings.com |
| Mike McNicholas | Carolina Holdings | m.mcnicholas@choldings.com |
| John Cessarich | WFF4 | jcessarich@wyff4.com |
| Dale Gilbert | WFF4 | dgilbert@wyff4.com |
| Larry Gabric | National Weather Service | larry.gabric@noaa.gov |
| Lynne Newton | USDA NRCS | lynne.newton@sc.usda.gov |
| Stacey Coulter | Spa at the West End | staceycoulter@charter.net |
| Jerry Chapman | Duke Energy | jchapman@duke-energy.com |
| Maria Cox | SC DNR | coxmdnr@dnr.sc.gov |
| Keith Drummond | Greenville County Codes Enforcement | kdrummond@greenvillecounty.org |
| Robert Hall | Greenville County Floodplain Coordinator | rohall@greenvillecounty.org |
| Ed Marr | COG Public Works | emarr@greenvillesc.gov |
| Brian Watson | COG Public Works | bwatson@greenvillesc.gov |
| Tommy McDowell | COG Emergency Services | tmcdowell@greenvillesc.gov |
| Amy Ryberg Doyle | COG Council Member | adoyle@greenville.sc.gov |
| Kevin Pulis | COG Engineering | kpulis@greenville.sc.gov |
| Johnny Wasson | COG Building Codes | jwasson@greenville.sc.gov |
| Jean Pool | COG Planning and Zoning | jpool@greenville.sc.gov |
| Dean Elliott | COG Police Dept | delliott@greenville.sc.gov |
| Jackie Jones | Resident | jjones@phoenixcenter.org |
| Rev. Vardry Fleming | Resident | |
| Sylvia Palmer | Resident | |

City of Greenville
Multi-Hazard Mitigation Plan
Section Four
OPERATING PROCEDURES

Introduction

This section of the City of Greenville Multi-Hazard Mitigation Plan describes the characteristics of the Disaster Mitigation Committee (DMC) and basic procedures for conducting the planning process.

The Disaster Mitigation Committee's Operating Procedures

These procedures involve both a technical approach to the planning and an organizational methodology for incorporating mitigation initiatives into the City of Greenville Multi-Hazard Mitigation Plan. The same planning process and technical approach was followed for the development of the Greenville County Multi-jurisdictional Hazard Mitigation Plan.

The planning process was started with the development of the DMC as an organization and obtaining participation from key organizations and institutions. The planning work conducted to update this document relies heavily on the expertise and authorities of the participating agencies and organizations, rather than on detailed scientific or engineering studies. The DMC is confident that because of their role in the community the best judgment of the participating individuals, and the use of readily available information, can achieve a level of detail in the analysis that is adequate for purposes of local mitigation planning. As the planning process described herein continues, more detailed and costly scientific studies of the mitigation needs of the community can be defined as initiatives for incorporation into the plan and implemented as resources become available to do so.

Establishing the planning schedule

The DMC initially established a planning schedule for development of this document in cooperation with the South Carolina Emergency Management Division (SCEMD). At the outset of the planning period, the DMC defined the goals that the planning process is attempting to achieve, as well as the specific objectives within each goal that will help to focus the planning efforts. (The goals and objectives established by the City of Greenville DMC for this planning period, as well as the anticipated plan maintenance schedule, are described in Section 7 of this plan.)

Conducting the needed analyses and then formulating proposed mitigation initiatives to avoid or minimize known vulnerabilities of the community to future disasters is an enormous effort, and one that must take place over a long period of time. Therefore, for any one planning period, the goals and objectives set by the DMC are intended to help focus the effort of the participants, for example, by directing attention to certain types of facilities or planning areas, or by

emphasizing implementation of selected types of proposed mitigation initiatives. The approach used by the DMC is intended to use these priorities to continue, during each planning cycle, to assess more planning areas and facilities, to develop more proposed mitigation initiatives to address the results of those assessments, to strive to implement previously proposed mitigation initiatives, and to further engage the public and the community in the planning process.

Hazard Identification and Risk Estimation

The DMC identified hazards that threaten all or portions of the community. The DMC also used general information to estimate the relative risk of the various hazards as an additional method to focus their analysis and planning efforts. The DMC compared the likelihood or probability that a hazard will impact an area, as well as the consequences of that impact to public health and safety, property, the economy, and the environment. This comparison of the consequences of an event with its probability of occurrence is a measure of the risk posed by that hazard to the community. The DMC compares the estimated relative risks of the different hazards it has identified to highlight which hazards should be of greatest concern during the upcoming mitigation planning process.

Information resources regarding hazard identification and risk estimation, although limited, are available. The planners have attempted to incorporate consideration of hazard specific maps, including floodplain delineation maps, whenever applicable, and have attempted to avail themselves of GIS-based analyses of hazard areas and the locations of critical facilities, infrastructure components, and other properties located within the defined hazard areas. Section 6 in the plan gives the specific results and conclusions reached from this effort for the planning area as a whole including notation of the available reference materials utilized in the analysis.

Estimating the relative risk of different hazards is followed by an assessment of the types of physical or operational impacts potentially resulting from a hazard event. Two methods are available to the DMC to assess the communities' vulnerabilities to future disasters.

Vulnerability Assessment

The first avenue is a methodical, qualitative examination of the vulnerabilities of important facilities, systems and planning areas to the impacts of future disasters. For the participating organizations, this is done by the individuals most familiar with the facility, system or planning area through a guided, objective assessment process. The process ranks both the hazards to which the facility, system or planning area is most vulnerable, as well as the consequences to the community should it be disrupted or damaged by a disaster. This process typically results in identification of specific vulnerabilities that can be addressed by specific mitigation initiatives that could be proposed and incorporated into this plan. As an associated process, the DMC also reviews past experiences with disasters to see if those events highlighted the need for specific mitigation initiatives based on the type or location of damage they caused. Again, these experiences can result in the formulation and characterization of specific mitigation initiatives for incorporation into the plan.

The second avenue for assessment of community vulnerabilities involves comparison of the existing policy, program and regulatory framework to control growth, development and facility operations in a manner that minimizes vulnerability to future disasters. The DMC members can assess the existing codes, plans, and programs to compare City provisions and requirements against the hazards posing the greatest risk to the community. If indicated, the City of Greenville can then propose development of additional codes, plans or policies as mitigation initiatives for incorporation into the City of Greenville Multi-Hazard Mitigation Plan for future implementation when it is appropriate to do so.

Due to limited resources during this planning period, the DMC chose not to proceed with Method 1 - a critical facilities assessment. This type of detailed technical assessment is listed as a potential mitigation initiative and will be conducted as funds and resources come available.

Developing Hazard Mitigation Initiatives

This process enables the DMC participants to highlight the most significant vulnerabilities, again to assist in prioritizing specific hazard mitigation initiatives to eliminate or minimize those vulnerabilities. Once the highest priorities are defined, the DMC can identify specific mitigation initiatives for the plan that would eliminate or minimize those vulnerabilities.

The procedure used in this plan update involved describing the initiative, relating it to one of the goals and objectives established by the DMC, and justifying its implementation on the basis of its economic benefits and/or protection of public health and safety, as well as valuable or irreplaceable environmental or cultural resources. A simple “benefit to cost” ratio was established for each initiative to demonstrate that it would indeed be worthwhile to pursue when or if the resources to do so become available. A more detailed benefit to cost ratio will need to be prepared as funds become available to ensure that a proper ratio is met. Each proposed mitigation initiative was also “prioritized” for implementation in a consistent manner.

In characterizing a mitigation initiative for incorporation into the DMC’s plan, it is important to recognize that the level of analysis has been intentionally designed to be appropriate for this stage in the planning process. That is, it is the interest of the DMC to have a satisfactory level of confidence that a proposed mitigation initiative, when it is implemented, will be cost effective, feasible to implement, acceptable to the community, and technically effective in its purpose. To do this, the technical analyses conducted, including the development of a simple benefit to cost ratio for each proposal, have been based on a straightforward, streamlined approach, relying largely on the informed judgment of experienced local officials. The analyses, including the benefit to cost ratio, have not been specifically designed to meet the known or anticipated requirements of any specific state or federal funding agency, due largely to the fact that such requirements can vary with the agency and type of proposal. Therefore, at the point when the organization proposing the initiative is applying for funding from any state or federal agency, or from any other public or private funding source,

that organization will then address the specific informational or analytical requirements of the funding agency.

Each mitigation initiative proposed for incorporation into the plan update is formulated by the DMC for consideration by the City for future implementation.

Developing the Local Mitigation Plan

Once a proposed mitigation initiative has been developed, the information used to characterize the initiative is submitted to the DMC for review. At this point, an initiative is considered to be a “pending initiative” that is being processed for incorporation into the plan, when it then becomes an “approved initiative.”

On receipt of a pending initiative the DMC evaluates the merits of the proposal and the validity of the judgments and assumptions that went into its characterization, as well as considers its potential for conflict with other programs or interests. The DMC also assures that the proposal is consistent with the goals and objectives established for the planning period and confirms that it would not duplicate or harm a previously submitted proposal. If there is such a difficulty with a proposed initiative, it is returned to the submitting organization for revision or reconsideration.

Once an initiative has been reviewed, coordinated, and is satisfied regarding its merit, it is brought before the Committee, which votes to incorporate the proposed initiative into the strategy. Upon approval, the proposed initiative is then considered to be officially part of the mitigation plan.

The City of Greenville mitigation planning process first objectively prioritizes proposed mitigation initiatives using an objective, fixed set of criteria, but has the flexibility to adjust the implementation schedule of the initiatives to respond to unique or unanticipated conditions.

Approval of the Current Edition of the Plan

On a periodic basis, the City of Greenville Multi-Hazard Mitigation Plan is to be submitted to the City Council for review, modification if needed, and approval or adoption. To facilitate this action, Section 6 of this plan provides City information, hazard and vulnerability assessment, and proposed initiatives.

Following adoption or approval of the plan, the respective agencies and organizations will continue to implement the plan, to expand its scope, continue its analyses, and take other such continuing action to maintain the planning process. This includes action by the Committee to routinely incorporate proposed mitigation initiatives into the plan, without the necessity to also continuously solicit the formal approval of the plan by the City Council.

It is intended that the City of Greenville Multi-Hazard Mitigation Plan will be submitted to the City Council approximately every five years for review and formal adoption or approval. This document is a draft plan that, pending finalization will be submitted for approval. Evidence of approval of this edition of the mitigation plan is provided in Appendix F of this plan. It is important to

emphasize that this document represents a “snapshot” of the planning process and is prepared as a current document for use by the planning group, the community, and state and federal authorities.

Implementation of Approved Mitigation Initiatives

Once incorporated into the City of Greenville Multi-Hazard Mitigation Plan, the agency or organization proposing the initiative becomes responsible for its implementation. This may mean developing a budget for the effort, or making application to state and federal agencies for financial support for implementation. This approach holds each department accountable for proper and timely implementation of the mitigation initiatives. The DMC is responsible for overall coordination of these efforts. The current status of implementation of mitigation initiatives incorporated into the plan is discussed in the next section.

In this plan implementation process, the DMC continues to monitor the implementation status of initiatives, to assign priorities for implementation and to take other such actions to support and coordinate implementation of initiatives by the involved organizations. In reality, it is the implementation of proposed initiatives, along with other actions by the organizations participating in the planning to maintain, refine and expand the technical analyses used in the planning, that constitutes the process to implement the mitigation plan.

Benefits of the Planning Process

It is important to emphasize that the procedure used by the DMC is based on the following important concepts:

- A multi-organizational planning group establishes specific goals and objectives to address the community’s vulnerabilities to all types of hazards.
- The planning procedure utilizes a logical process of hazard identification, risk evaluation and vulnerability assessment, as well as review of past disaster events, that is consistently applied by all participants through the use of common evaluation criteria.
- Mitigation initiatives are proposed for incorporation into the plan.
- The process encourages participants to propose specific mitigation initiatives that are feasible to implement and clearly directed at reducing specific vulnerabilities to future disasters.
- Proposed mitigation initiatives are characterized in a substantive manner, suitable for this level of planning, to assure their cost effectiveness and technical merit.
- All mitigation initiatives to be incorporated into the plan are prioritized in accordance with eight objectives, comprehensive criteria that are used by all participating departments.
- The plan is periodically reviewed and adopted to ensure that the mitigation actions taken by their organizations are consistent with each community’s larger vision and goals, as well as their overall unique needs and circumstances.

City of Greenville
Multi-Hazard Mitigation Plan

Section Five

PROGRESS IN PLAN IMPLEMENTATION

Introduction

This section discusses the current status of implementation of the City of Greenville Multi-Hazard Mitigation Plan. There are several aspects of plan implementation that need to be addressed:

- The status of promulgation or formal adoption of the plan by the City Council,
- The activities of the Disaster Mitigation Committee (DMC) to engage the public and the community at large in the mitigation planning process
- The DMC's priorities for implementation of approved mitigation initiatives now incorporated into the plan, and
- A discussion of how recent disaster experience has illustrated the need for and success of the City of Greenville Multi-Hazard Mitigation Plan.

Status of Plan Promulgation and Approval

Promulgation and approval of the plan is a very important step in assuring its implementation. As was discussed in the previous section, the plan will be presented to the City of Greenville Council for approval and official acceptance as the Multi-Hazard Mitigation Plan.

As the City of Greenville DMC continues its planning efforts in the future, it is intended that additional updates of the mitigation plan will be published to provide both the participating organizations and the public current information regarding the mitigation planning process. Further, approximately once every five years, the DMC will again seek the approval of the plan by the City Council. This interval has been selected to provide a sufficient period for the DMC to make significant progress in further data collection of events occurring in that time frame, technical analysis, implementation of currently proposed initiatives, and development of new proposals and to coincide with the review of the City's Community Rating System application. In this way, the plan can be kept up-to-date on a continuing basis by the DMC participants.

Public Information and Participation

The Greenville DMC, as well as individual participating agencies and organizations, has been active in attempting to engage the general public in the planning process. As detailed below, several public information activities have been undertaken to explain the mitigation planning process to the community and to solicit their input and involvement in

the planning process, as well as to provide mitigation awareness and educational information. The DMC welcomes public input to the planning process, and fosters public participation through the issuance of media releases, holding public meetings and hearings, etc.

Detailed below are past highlights of the process used to engage the general public in the mitigation planning process.

- Four meetings (see numbered items below) with community organizations were held to discuss hazards mitigation planning. These meetings were selected to provide different perspectives on potential hazards and response activities. In addition, mitigation initiatives were solicited.
 1. A meeting was held in the City of Greenville office building. The meeting introduced the DMC to the hazard mitigation process, and solicited comments from the committee members concerning previous hazard events. The committee members then compiled a list of mitigation initiatives.
 2. A community meeting was organized to solicit ideas from residents of Greenville. The meeting was ended due to no attendance by the public.
 3. A third meeting was held with the DMC to rank the initiatives proposed from the initial meeting.
 4. A final meeting was held to review the Multi-Hazard Mitigation Plan.

The DMC will continue to solicit input from the community.

The Priority for Initiative Implementation

As a part of its future planning process, the City of Greenville DMC also will periodically review the proposed mitigation initiatives approved for incorporation into the plan to determine their priority for implementation during the next planning period. This assessment will encourage the Committee to focus on those initiatives designated as priority. However, because each participating organization has independent authority and responsibility for implementation of their proposed mitigation initiatives, the organizations retain the prerogative to act in their own interests, using their own priorities for mitigation initiative implementation.

In many ways, the priority for implementation assigned to proposed mitigation initiatives could be considered a suggestion or recommendation to the proposal sponsors to seek the resources for implementation. These resources may range from the normal budgeting process for the organization to seeking state or federal financial or technical support for implementation of the initiative.

Effectiveness of Mitigation Initiatives

Of course, the true measure of progress in the implementation of mitigation initiatives is their success in saving lives, avoiding property damage and protecting valuable or irreplaceable resources in the community. As the mitigation initiatives that have been incorporated into the City of Greenville Multi-Hazard Mitigation Plan are implemented, there will be more opportunities to measure the “success” of the DMC’s mitigation efforts.

The best opportunity for measuring this success is to evaluate the community’s experience with actual disasters and to attempt to estimate the number of lives that were saved by the implemented initiatives or the value of the property protected from disaster-related damage.

In addition, however, recent disaster events can be very helpful in highlighting the mitigation needs of the community based on the type, location or magnitude of the impacts experienced. In turn, this can be a major factor in the future progress of implementation of the plan, as the DMC considers and acts on actual disaster experience by the community. Such recommendations can be referred to a “lead” agency with the intention that that organization will use the information to propose additional mitigation initiatives for incorporation into the plan.

Compiling data on the “success” of existing and/or completed mitigation initiatives should be an activity undertaken by the DMC members on an ongoing basis and is an integral component of the process used to implement and maintain the City of Greenville Multi-Hazard Mitigation Plan, which is more fully discussed in Section 7.

Summary

The DMC recognizes that it will take a long period of time and implementation of many if not all of the proposed initiatives approved for this plan, to make City of Greenville a truly disaster-resistant community. However, the continuing dedication to the safety and welfare of the community shown by the participants in this planning process will make this ambitious goal possible.

City of Greenville

Multi-Hazard Mitigation Plan

Section Six

SUMMARY OF HAZARDS AND VULNERABILITIES

Introduction

This section of the City of Greenville Multi-Hazard Mitigation Plan summarizes the results of the hazard identification and vulnerability assessment processes undertaken by the Disaster Mitigation Committee (DMC). The intent of this section is to provide a compilation of the information gathered and the judgments made about the hazards threatening the City of Greenville, and the potential vulnerability to those hazards. This information is then used for formulating mitigation actions and priorities.

In the following sections, the natural hazards that can pose a threat to the City of Greenville are discussed. Included is an evaluation of recent events of these hazards. This is followed by an estimation of the risk caused by each of these hazards. The evaluation of the risk is followed a section on vulnerability assessments of the City of Greenville and Repetitive Loss properties (Due to “Right to Privacy” restraints, detailed information on repetitive loss properties is not a part of the public portion of this document). Some information on land uses and critical facilities is also included.

It should be noted that the historical data on hazards in the City of Greenville is limited to knowledge that an event occurred. Very little information on the extent of damages in terms of areas affected and costs could be found. However, the organizers of this plan have used what information is available to evaluate the risk to various hazards. It is believed that through the diverse group of those involved, including the public, that all hazards have been identified and appropriately assessed in order to prepare the City of Greenville for future events.

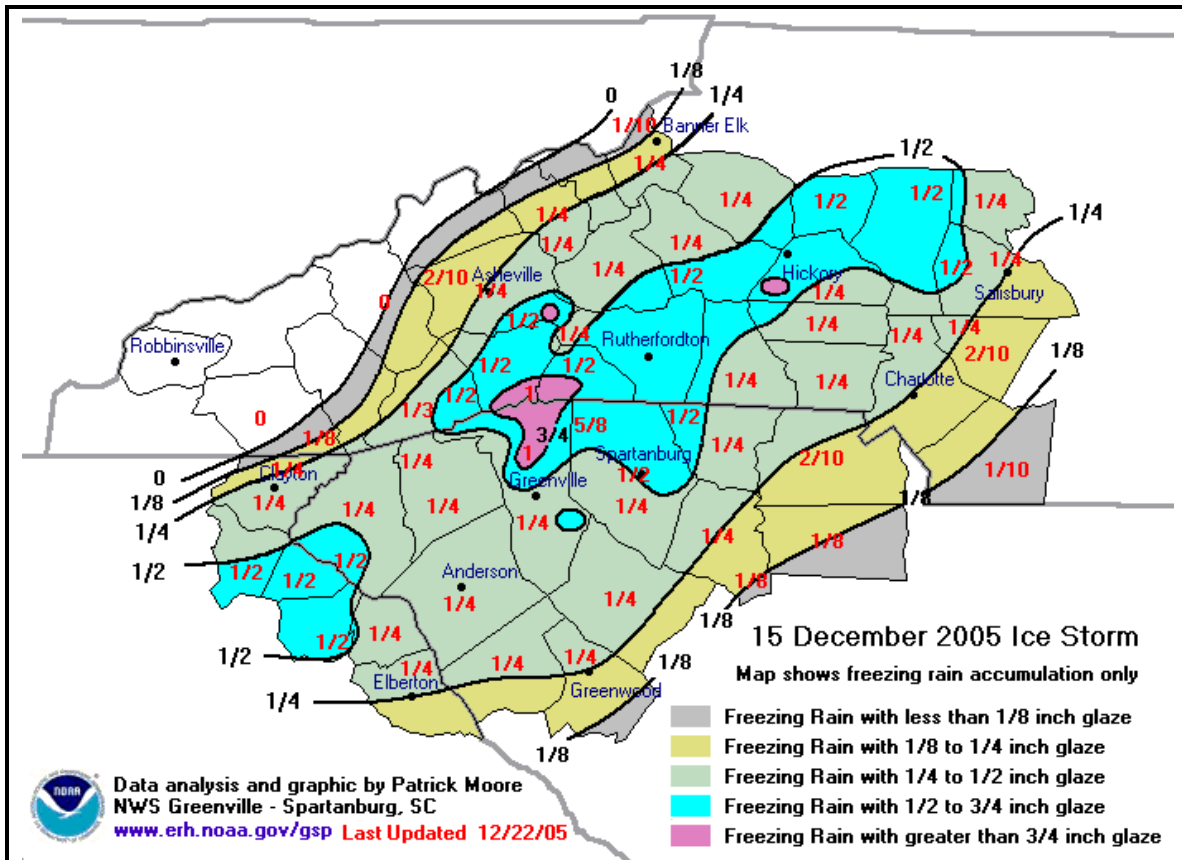
Hazard Identification

The following paragraphs contain information about the natural hazards that can affect the City of Greenville. These discussions are based on many different sources that have been collected. Some of the most beneficial of these sources are listed in the following table. However, the most informative sources have been interviews and meetings with the City of Greenville employees and residents.

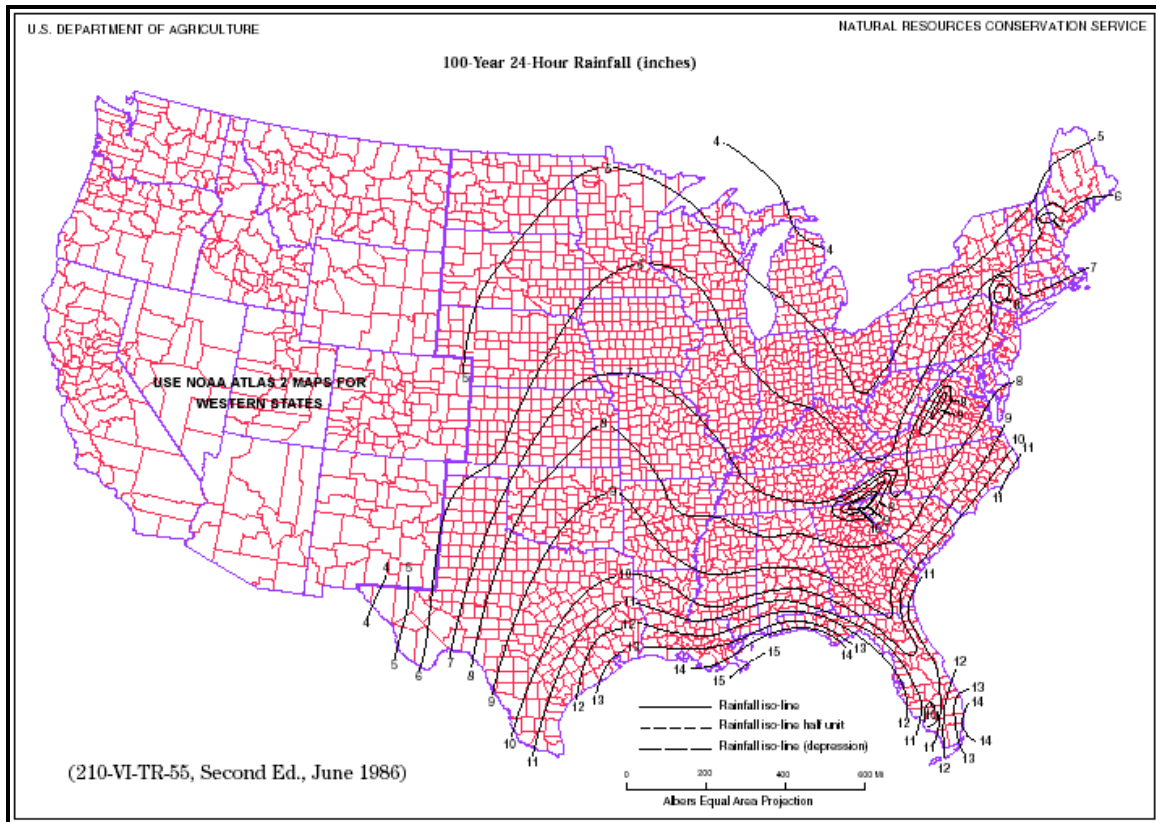
| Item # | Source Title | Applicable Hazard(s) |
|--------|--|----------------------|
| 1 | SC State Hazard Mitigation Plan | All hazards |
| 2 | SC State Flood Mitigation Plan | Floods |
| 3 | Greenville County Emergency Operation Plan | All hazards |
| 4 | USC SHELDUS Data | All hazards |
| 5 | Greenville County Flooding Problem Areas | Floods |
| 6 | Greenville County Flood Insurance Studies | Floods |
| 7 | Greenville County Flood Control Ordinance | Floods |
| 8 | USGS Earthquake Hazards Program | Earthquake |
| 9 | USGS National Landslide hazards Program | Landslides |
| 10 | USC Hazards Research Laboratory | All hazards |
| 11 | 2000 US Census Data | All hazards |
| 12 | FEMA's HAZUS Software | All hazards |
| 13 | Greenville County GIS information | All hazards |
| 14 | SC State Climatology Data | All hazards |
| 15 | State Tornado Data | Tornadoes/High Winds |
| 16 | Local/State Newspapers | All hazards |
| 17 | Greenville County FIRMs | Floods |

Winter Storms: This type of hazard is commonly associated with precipitation in the form of ice or sleet and cold temperatures that cause major disruptions to many types of services and are dangerous to those without heat and/or water. Roads covered in ice or blocked by fallen trees prevent emergency services from reaching those in need. Overhead lines are commonly torn down by the fallen trees or weight of the ice on the lines, leaving homes and businesses without electricity and heat. In addition, water lines freeze and break from the cold temperatures and accumulated ice/snow on building roofs can cause structural failure. Direct and indirect costs associated with this hazard can be large and are often mitigated with federal and/or state funds.

This type of hazard is a common threat to the City. The City can expect to have at least one winter storm each winter that causes major disruptions in transportation and widespread power losses. Fortunately for the City, there has only been one documented winter storm since 2005. On December 15, 2005, a damaging ice storm spread across the northwestern portion of the state. Ice as thick as three quarters of an inch accumulated on trees and power lines, causing a vast amount of damage and power outages. An estimated amount of property damage peaked at \$900,000.



Floods: This hazard is associated with large infrequent rainfall events or weak hurricanes or tropical storms that have moved inland. Flooding problems areas are commonly found in densely populated areas that have inadequate drainage systems or buildings located in flood prone areas. Flooding can also be associated with steeply sloped mountainous regions in the form of flash floods. These hazards are extremely dangerous due to the velocity of the moving water and debris. The City faces once of these situations located in the floodplain. In addition, Greenville gets as much rain each year as nearly any part of the United States. Only several isolated regions in the northwest US get more. This is illustrated in the NOAA figure below.



The Reedy River, which flows through the City, is well known for flooding. The river's average gage height is between .80 – 1ft; but if the City receives over 4 inches in a span of a few hours, depths of the Reedy downtown could easily reach 15ft, putting flood levels 2 to 3 feet above their banks.

A map in Appendix D is provided showing flood problem areas in the City.

Tornadoes/High Winds: The high winds associated with tornadoes or microbursts can cause major disruptions, similar to the effects of winter storms; blocked roads, downed trees and damaged electricity lines. Tornadoes/high winds are commonly formed as part of larger thunderstorm systems or a spin offs from hurricanes. People living in mobile or manufactured housing represent a particular vulnerability. The impact of these events is expected to be much smaller in comparison to other hazards such as winter storms due to the concentrated nature of tornadoes/high winds and limited area of disruption. In addition, tornadoes/high winds often occur in milder periods of the year when the potential for extreme temperatures is low. The spring months have historically been the most active season for tornadoes/high winds and most of the damages and lives lost due to tornadoes/high winds have occurred during this time.

There have been five rated tornadoes/high winds in the past 12 years according to the SHELDUS data. All have been rated an F0, the weakest rating on the Fujita scale. The Fujita Scale is used to rate the intensity of a tornado by examining the damage caused by the tornado after it has passed over a man-made structure (the scale is provided below). Although weak, some structure damage can be incurred. High winds have ripped roofs and shingles, blow down trees onto buildings and cars, and created flying

projectiles that have caused several injuries and damaged homes and cars. Structures that meet basic building code requirements should be able to withstand most tornadoes. Efforts that enforce these codes will provide reduced risk to this hazard.

A map in Appendix D shows the location of Tornado/High wind touchdowns in the City of Greenville in the past 50 years.

Fujita Scale

| F-Scale Number | Intensity Phrase | Wind Speed | Type of Damage Done |
|----------------|-----------------------|-------------|--|
| F0 | Gale tornado | 40-72 mph | Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages sign boards. |
| F1 | Moderate tornado | 73-112 mph | The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed. |
| F2 | Significant tornado | 113-157 mph | Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated. |
| F3 | Severe tornado | 158-206 mph | Roof and some walls torn off well constructed houses; trains overturned; most trees in fores uprooted |
| F4 | Devastating tornado | 207-260 mph | Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated. |
| F5 | Incredible tornado | 261-318 mph | Strong frame houses lifted off foundations and carried considerable distances to disintegrate; automobile sized missiles fly through the air in excess of 100 meters; trees debarked; steel re-inforced concrete structures badly damaged. |
| F6 | Inconceivable tornado | 319-379 mph | These winds are very unlikely. The small area of damage they might produce would probably not be recognizable along with the mess produced by F4 and F5 wind that would surround the F6 winds. Missiles, such as cars and refrigerators would do serious secondary damage that could not be directly identified as F6 damage. If this level is ever achieved, evidence for it might only be found in some manner of ground swirl pattern, for it may never be identifiable through engineering studies |

Thunderstorms: This hazard forms at the convergence of cold and warm, moist air masses, producing strong winds, hail, lightning, intense rainfall, and tornadoes. These systems are commonly concentrated over a few square miles and have durations of several hours. Most occur in warmer months, but in the milder climates of the southeast, can form any time of the year. Damages from thunderstorms are the result of high winds and local flooding.

The City of Greenville is similar to most portions of the State and region when considering the threat potential of thunderstorms. The more common variety of thunderstorms begin late in the afternoon after ground surfaces have sufficiently warmed from intense summer heat and end normally within a hour or two. Most of the rain events in Greenville (City) occur as thunderstorms, which are characteristically high intensity, small depth events.

The City has experienced several thunderstorm events including storms containing hail in H5 magnitudes (1.75 inches or 44.5mm on the TORRO Scale), winds topping 70 knots (Beaufort Wind scale), causing riverine flooding and collective damages over \$60,000.

TORRO Scale

| | Intensity Category | Typical Hail Diameter (mm)* | Probable Kinetic Energy, J-m² | Typical Damage Impacts |
|-----------|---------------------------|------------------------------------|---|--|
| H0 | Hard Hail | 5 | 0-20 | No damage |
| H1 | Potentially Damaging | 5-15 | >20 | Slight general damage to plants, crops |
| H2 | Significant | 10-20 | >100 | Significant damage to fruit, crops, vegetation |
| H3 | Severe | 20-30 | >300 | Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored |
| H4 | Severe | 25-40 | >500 | Widespread glass damage, vehicle bodywork damage |
| H5 | Destructive | 30-50 | >800 | Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries |
| H6 | Destructive | 40-60 | | Bodywork of grounded aircraft dented, brick walls pitted |
| H7 | Destructive | 50-75 | | Severe roof damage, risk of serious injuries |
| H8 | Destructive | 60-90 | | (Severest recorded in the British Isles) Severe damage to aircraft bodywork |
| H9 | Super Hailstorms | 75-100 | | Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open |

| | Intensity Category | Typical Hail Diameter (mm)* | Probable Kinetic Energy, J-m ² | Typical Damage Impacts |
|------------|--------------------|-----------------------------|---|--|
| H10 | Super Hailstorms | >100 | | Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open |

Beaufort Wind Scale

| Force | Wind (Knots) | WMO Classification | Appearance of Wind Effects | |
|-----------|--------------|--------------------|--|---|
| | | | On the Water | On Land |
| 0 | Less than 1 | Calm | Sea surface smooth and mirror-like | Calm, smoke rises vertically |
| 1 | 1-3 | Light Air | Scaly ripples, no foam crests | Smoke drift indicates wind direction, still wind vanes |
| 2 | 4-6 | Light Breeze | Small wavelets, crests glassy, no breaking | Wind felt on face, leaves rustle, vanes begin to move |
| 3 | 7-10 | Gentle Breeze | Large wavelets, crests begin to break, scattered whitecaps | Leaves and small twigs constantly moving, light flags extended |
| 4 | 11-16 | Moderate Breeze | Small waves 1-4 ft. becoming longer, numerous whitecaps | Dust, leaves, and loose paper lifted, small tree branches move |
| 5 | 17-21 | Fresh Breeze | Moderate waves 4-8 ft taking longer form, many whitecaps, some spray | Small trees in leaf begin to sway |
| 6 | 22-27 | Strong Breeze | Larger waves 8-13 ft, whitecaps common, more spray | Larger tree branches moving, whistling in wires |
| 7 | 28-33 | Near Gale | Sea heaps up, waves 13-20 ft, white foam streaks off breakers | Whole trees moving, resistance felt walking against wind |
| 8 | 34-40 | Gale | Moderately high (13-20 ft) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks | Whole trees in motion, resistance felt walking against wind |
| 9 | 41-47 | Strong Gale | High waves (20 ft), sea begins to roll, dense streaks of foam, spray may reduce visibility | Slight structural damage occurs, slate blows off roofs |
| 10 | 48-55 | Storm | Very high waves (20-30 ft) with overhanging crests, sea white with densely blown foam, | Seldom experienced on land, trees broken or uprooted, "considerable |

| | | | | |
|----|-------|---------------|--|--------------------|
| | | | heavy rolling, lowered visibility | structural damage" |
| 11 | 56-63 | Violent Storm | Exceptionally high (30-45 ft) waves, foam patches cover sea, visibility more reduced | |
| 12 | 64+ | Hurricane | | |

Earthquakes: This hazard involved the sudden quick movement of large pieces of earth, believed to be caused by the slipping of tectonic plates past one another, releasing energy to surface layers. This sudden motion can cause major destruction to buildings, roads, dams, and other structures. In addition, underground utility lines can be ruptured.

The City of Greenville is located approximately 60 miles southeast of an epicenter located near Asheville, North Carolina. An epicenter is the estimated origin of the seismic waves that eventually reach the ground surface.

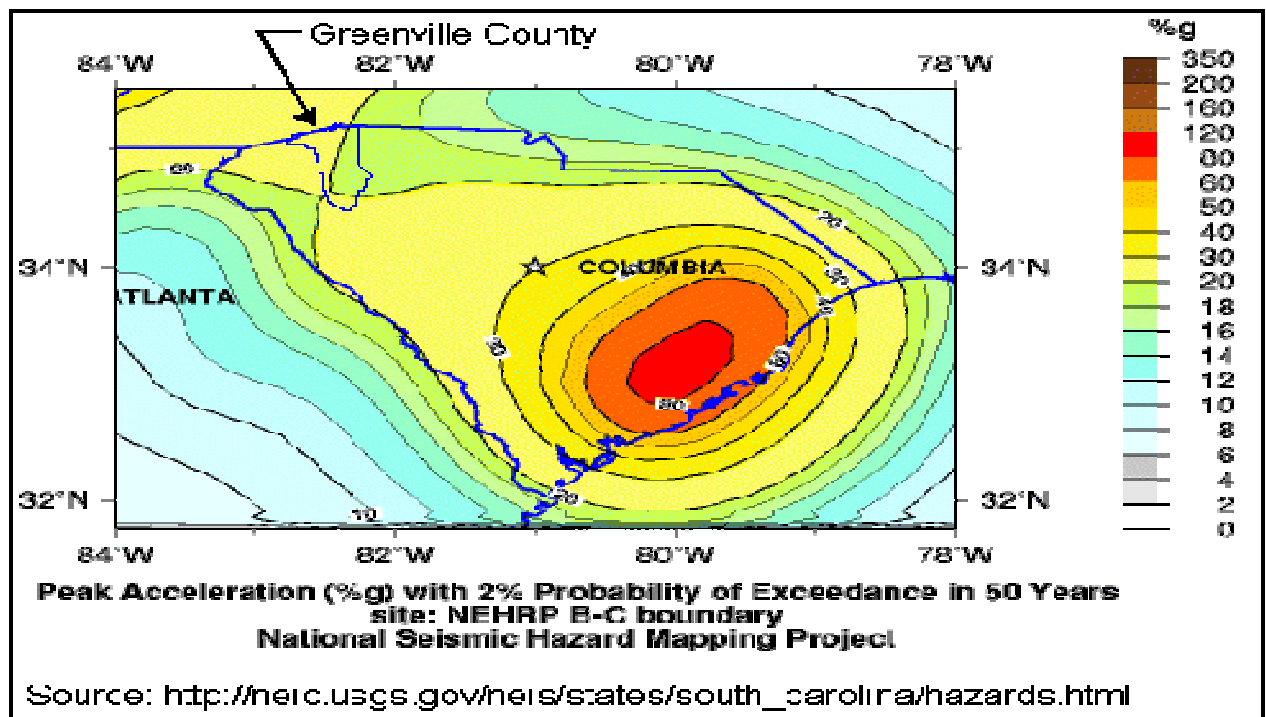
Although earthquakes have occurred in South Carolina in the recent past, most are of a magnitude that they are not noticed by anyone other than a seismologist. Most of the earthquakes that have recently occurred were located near the Charleston/Summerville area to the south. This is also the location of one of the worst earthquake in the written history of the eastern United States. Due to the proximity of the City to this designated epicenter, it is considered to be at risk to this hazard.

After review of the available data, it was determined that the impact of an earthquake in Greenville is less than 2% which is considered a very small risk in magnitude and frequency as compared to other areas of the State and the United States.

Earthquakes are measured on the Richter scale, provided below. The Richter magnitude is calculated from the amplitude of the largest seismic wave recorded for the earthquake.

Richter Magnitude Scale

| Richter magnitudes | Description | Earthquake effects | Frequency of occurrence |
|--------------------|-------------|--|--------------------------|
| Less than 2.0 | Micro | Microearthquakes, not felt. | About 8,000 per day |
| 2.0-2.9 | Minor | Generally not felt, but recorded. | About 1,000 per day |
| 3.0-3.9 | | Often felt, but rarely causes damage. | 49,000 per year (est.) |
| 4.0-4.9 | Light | Noticeable shaking of indoor items, rattling noises. Significant damage unlikely. | 6,200 per year (est.) |
| 5.0-5.9 | Moderate | Can cause major damage to poorly constructed buildings over small regions. At most slight damage to well-designed buildings. | 800 per year |
| 6.0-6.9 | Strong | Can be destructive in areas up to about 160 kilometres (100 mi) across in populated areas. | 120 per year |
| 7.0-7.9 | Major | Can cause serious damage over larger areas. | 18 per year |
| 8.0-8.9 | Great | Can cause serious damage in areas several hundred miles across. | 1 per year |
| 9.0-9.9 | | Devastating in areas several thousand miles across. | 1 per 20 years |
| 10.0+ | Epic | Never recorded; see below for equivalent seismic energy yield. | Extremely rare (Unknown) |



Although no significant earthquake has hit Greenville, on December 7, 2007, residents were awakened by a small tremble. The 3.1 magnitude earthquake centered about six (6) miles north of Columbus, N.C. shook a widespread area as far as Greenville, SC. No damages were reported.

Wildfires: Wildfires can be an extremely hazardous event, especially on urban fringes that are in close proximity to wooded areas. Wildfires are commonly more frequent during drought periods, but can occur at any time during any given year. According to the State Mitigation Plan, during the most recent drought period in South Carolina, the state experienced over 4,100 wildfires accounting for a loss of about 27,000 acres per year, a significant increase from other time periods.

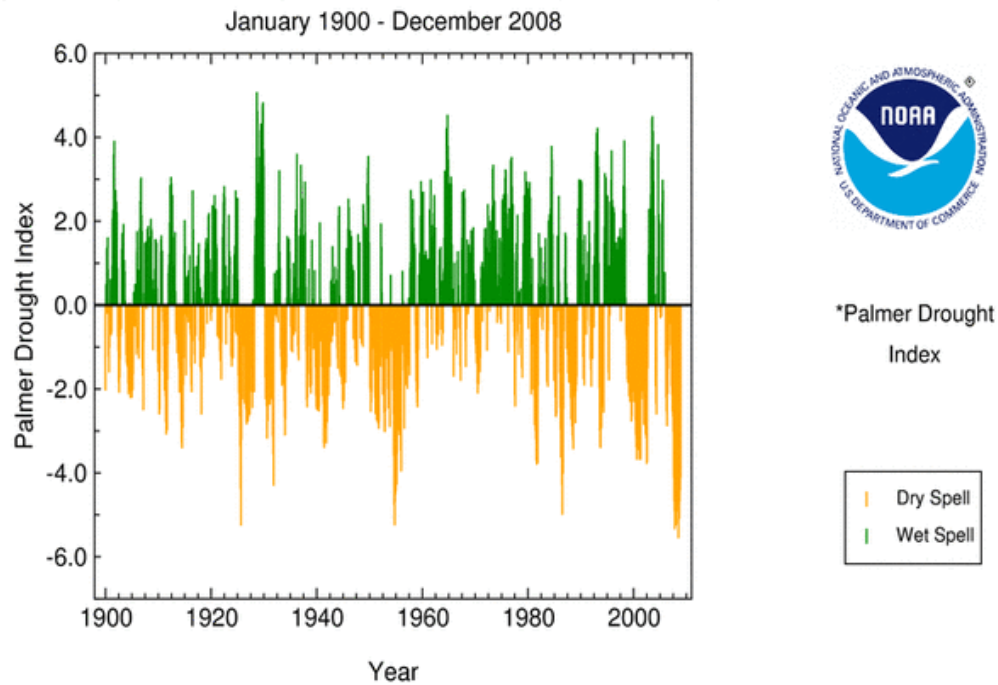
Although the City has not experienced a wildfire, the outer fringe is still susceptible to this hazard.

Dam/Levee Failure: Dam and levee structural integrity is vulnerable to failure to many causes. Although most reservoirs are small in size where a dam failure would not cause significant damage, some dams and levees, called High Hazard, are such that the result of failure would impact many lives and properties. These structures commonly fail due to excessive rainfall events or overtopping and the associated erosion. Negligence or improper design can also cause breaches in these controls.

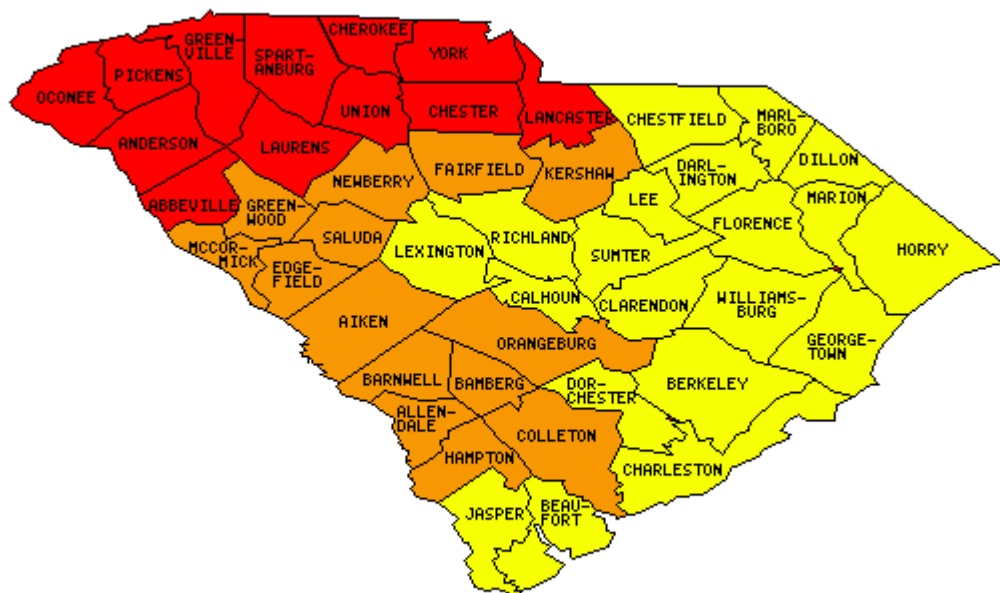
Drought/Heat Wave: This hazard is characterized as an extended period of months, or years when a region notes a deficiency in its water supply, generally caused by a region receiving consistent below average precipitation. The City is susceptible to this hazard.

During the period of 2007 and 2008 the City was designated, by the NOAA, a -5 Palmer Index rating which uses temperature and rainfall information to formulate dryness. (The Palmer Index ranges from -6 (extreme drought) to +6 (extreme moist)). However, the City has a supply of potential potable water reserves, and did not require any mandatory water use restrictions. Temperatures were as high as 97F. Collectively the County accounted for \$14,058,478 in drought damages in 2008.

Upstate (Northwest) South Carolina (Division 2) PDI*



South Carolina Drought Status by County April 16, 2008



S.C.
State
Climate
Office

Information regarding the existing population and property at risk within these hazard zones has been obtained, where possible, from US census data, from the property appraisal records of the City, aerial photographs, topographic maps, and similar information sources. Evaluations of the potential risk to valuable environmental resources in the impacted areas have been derived from review of available environmental inventories, maps of park lands, wildlife refuges, wetlands, potable water supplies, and other similar natural features. Information on the potential risk to the economic well being of the community, particularly regarding indirect economic costs of potential hazard events, has been derived from evaluating the number of businesses that may be affected by the event, the number of jobs involved, and the revenue these businesses return to the community.

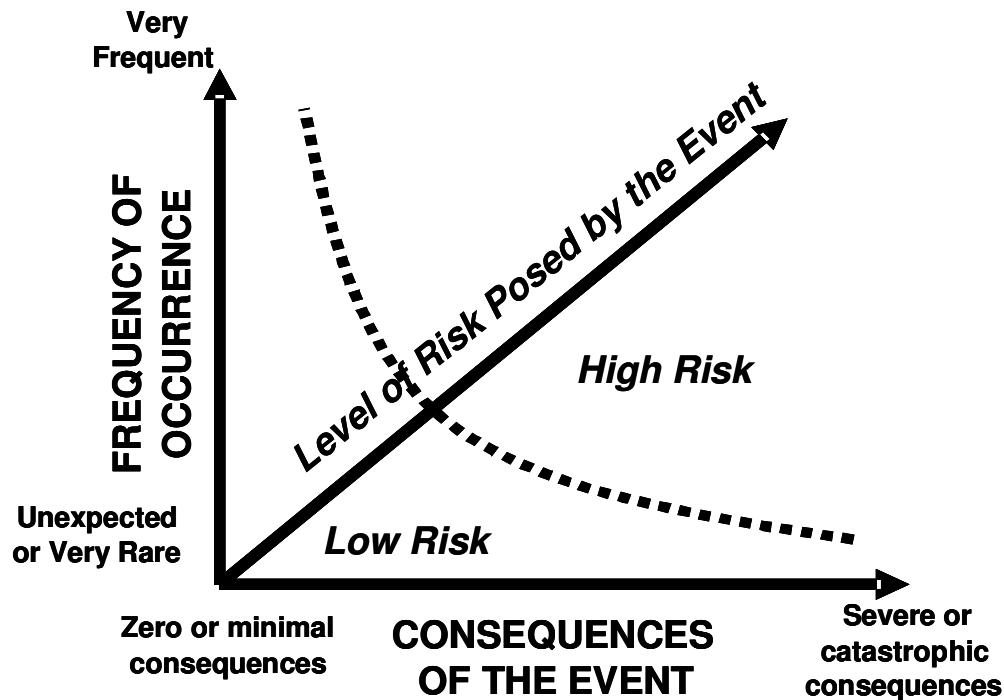
It must be emphasized that in many cases, detailed information regarding the areas potentially impacted by a specific hazard, as well as its potential health and safety, property, environmental and economic impacts of that hazard, may not have been available. Further, it has not been the intent of the DMC, nor have funding resources been available, to conduct extensive new studies to obtain such information solely for the purposes of the development of this mitigation plan. Therefore, it has often been necessary to rely on the informed judgment of knowledgeable local officials to identify hazards and derive estimates of the risk each poses to the community. The DMC believes that their experience with their own communities, as well as their capabilities to derive reasonable estimates of the geographic area at risk and the potential impacts of the hazard, is adequate for the purposes of this planning effort. Where the absence of hazard and risk-related data has been deemed by the City to be a significant limitation on the effectiveness of this planning process, a proposed mitigation initiative to request funding to develop such data may be incorporated into the mitigation plan.

Risk Estimation

As noted in Section 4, the technical planning process begins with hazard identification. In this process, representatives of Greenville consider all of the natural hazards that are likely to threaten the community. When the hazard types are identified as relevant to, or of concern for, Greenville, the participants can make an estimate of the risk each poses.

The estimate of risk is based on the judgment of the planners regarding the likely frequency of occurrence of the hazard event compared to its probable consequences. For purposes of this analysis, “risk” is defined as a relative measure of the probability that a hazard event will occur in comparison to the consequences or impacts of that event. That is, if a hazard event occurs frequently, and has very high consequences, then that hazard is considered to pose a very high risk to the affected communities. In comparison, if a hazard event is not expected to occur frequently, and even if it did, the consequences would be minimal, then that hazard is considered to pose a very low risk.

This relationship between frequency of occurrence and consequences of an event can be illustrated by the following graph:



This graph illustrates that some hazards can be defined as “low risk,” for they do not occur often enough and/or do not result in significant impacts even when they do. In comparison, other hazards may occur often enough and/or have sufficiently severe consequences when they do, that they must be considered “high risk.” Each of the hazards considered to be a threat to the City of Greenville can be assessed for its probability of occurrence and its likely consequences.

By considering the relative risk of the different hazards that threaten the City of Greenville, greater priority can be given to the “higher” risk hazards in order to most effectively utilize the time and resources available for the mitigation planning process. In this way, the planning approach used for the City of Greenville supports what can be termed “risk-based planning” because it facilitates the participants’ capabilities to focus on the highest risk hazards.

To do this, the DMC derives a “relative risk score” using a qualitative process in which planners record, on a numeric scale, the likely frequency of occurrence, the extent of the community that would be impacted, and the likely consequences in terms of public safety, property damage, economic impacts and harm to valuable environmental resources. The numeric total of the assessments of each of these is considered in this plan to constitute the “relative risk score.”

The same numeric criteria are used to classify the risk that a defined hazard poses to the City of Greenville. Use of common evaluation criteria enables the planning group as a whole to make comparisons of the relative risk of one hazard type in relation to another. As noted above, such comparisons can also be used to guide and prioritize the planning process by enabling planners to focus on the hazards with the highest assessed risk.

These common risk estimation numeric factors used by all participants in the planning are as follows:

| <i>RISK FACTOR</i> | <i>EVALUATION CRITERION</i> | <i>ASSIGNED VALUE</i> |
|---|--|-----------------------|
| Area Impacted | No developed area impacted | 0 |
| | Less than 25% of developed area impacted | 1 |
| | Less than 50% of developed area impacted | 2 |
| | Less than 75% of developed area impacted | 3 |
| | Over 75% of developed area impacted | 4 |
| Probability of Occurrence | Unknown but rare occurrence | 1 |
| | Unknown but anticipate an occurrence | 2 |
| | 100 years or less occurrence | 3 |
| | 25 years or less occurrence | 4 |
| | Once a year or more occurrence | 5 |
| Health and Safety Consequences | No health or safety impact | 0 |
| | Few injuries/illnesses | 1 |
| | Few fatalities or many injuries/illnesses | 2 |
| | Numerous fatalities | 3 |
| Consequences to Property | No property damage | 0 |
| | Few properties destroyed or damaged | 1 |
| | Few destroyed – many damaged | 2 |
| | Few damaged – many destroyed | 2 |
| | Many properties damaged and destroyed | 3 |
| Consequences to Environmental Resources | Little or no environmental damage | 0 |
| | Resources damaged with short term recovery practical | 1 |
| | Resources damaged with long term recovery feasible | 2 |
| | Resources destroyed beyond recovery | 3 |
| Economic Consequences | No economic impact | 0 |
| | Low direct and / or low indirect costs | 1 |
| | Low direct and high indirect costs | 2 |
| | High direct and low indirect costs | 3 |
| | High direct and high indirect costs | 4 |

A single, numeric value is selected from each of the five risk factors. The five values are then used to derive a total relative risk value for a particular hazard that is “weighted” for the probability of its occurrence.

The total relative risk for a particular hazard is calculated by adding the selected numeric values for each of the “*Impact Area*,” “*Health & Safety*,” “*Property*,” “*Environment*” and “*Economy*” and multiplying this total by the numeric value selected for the “*Probability of Occurrence*,” or, in other words, by using this formula:

$$\left[\begin{array}{c} \text{Area} \\ \text{Impacted} \end{array} + \begin{array}{c} \text{Health and Safety} \\ \text{Consequences} \end{array} + \begin{array}{c} \text{Consequences to} \\ \text{Property} \end{array} + \begin{array}{c} \text{Consequences to} \\ \text{Environmental} \\ \text{Resources} \end{array} + \begin{array}{c} \text{Economic} \\ \text{Consequences} \end{array} \right] \times \text{Probability of} \\ \text{Occurrence} = \text{Relative Risk}$$

The resulting numeric value for relative risk can vary from zero, meaning the identified hazard poses no estimated risk at all to the jurisdiction, up to a maximum of 80, which means that hazard poses a very substantial risk to the jurisdiction. The actual values selected for the City of Greenville are found below in section “Identified Hazards.”

The “weighting” of the relative risk value by the “Probability of Occurrence” factor provides local mitigation planners with a more realistic basis to prioritize their subsequent planning work. While a postulated hazard event could result in catastrophic damages to the City, perhaps it only has an extremely rare probability of occurrence. With this “weighted” approach, the actual risk from this hazard would have a low relative risk rating. In comparison, a hazard that occurs on a very frequent basis, say once every few years, but has lesser consequences, would result in a higher relative risk value due to its higher probability or frequency of occurrence. Therefore, local mitigation planners from the City of Greenville have prioritized their efforts to focus on these higher risk hazards as they complete their vulnerability assessments and propose mitigation initiatives to address those vulnerabilities.

Pursuant to the requirements of the Disaster Mitigation Act of 2000, the City of Greenville is required to evaluate a prescribed list of natural hazards. These hazards are: Earthquakes; Tsunamis; Coastal and Riverine Erosion; Landslides/Sinkholes; Hurricanes and Coastal Storms; Severe Storms/Tornadoes; Floods; Wildfires; Dam/Levee Failure; Volcanic Activity; Drought/Heat Wave; and Winter Storms/Freezes. While many of these hazards are relevant to the City of Greenville, some are not due to the geographic location and characteristics of the planning area. In the planning process, each of these hazards has been assessed by the City of Greenville. If, under that planning process, a specific hazard is assessed, and the relative risk estimate for that hazard is determined to be zero (meaning the hazard actually poses no identifiable risk to the jurisdiction), then that hazard is not considered further in the planning process, in the subsequent assessments of vulnerability of the community to that hazard, or evaluation of the adequacy of city policies to manage the risks posed by that hazard.

In deriving these estimates of risk for each hazard, the City of Greenville has utilized any available information regarding the geographic areas that may be impacted by each identified hazard, as well as population, infrastructure, and facilities within those impacted areas. This has included inventories of valuable environmental resources, as well as factors that are influential to the economic well being of the community. Examples of such existing information resources that have been accessed in this manner are listed in the following table. For much of the City, this information has been available in a geographic information system (GIS) database, or has been accessed from internet websites and existing GIS databases available from state and federal agencies.

Risk Evaluation: For the City of Greenville mitigation planning area, the complete results of the hazard identification and risk estimation process are shown below. The table shows the relative risk posed by various hazard to the City of Greenville. The numeric criteria used for this analysis are defined above and at the bottom of each report, as well as in the text given above. In addition, the following paragraphs also provide some additional information regarding the natural hazards affecting the City of Greenville.

| Hazard | Area of Impact | Probability of occurrence | Consequence of Occurrence | | | | Risk Rating |
|--------------------|----------------|---------------------------|---------------------------|----------|-------------|----------|-------------|
| | | | Health & Safety | Property | Environment | Economic | |
| Winter Storms | 4 | 5 | 1 | 1 | 0 | 2 | 40 |
| Flooding | 3 | 3 | 3 | 2 | 2 | 4 | 39 |
| Dam/Levee Failure | 3 | 2 | 3 | 3 | 2 | 3 | 24 |
| High Winds/Tornado | 1 | 4 | 1 | 1 | 0 | 1 | 16 |
| Thunder-storms | 2 | 5 | 0 | 0 | 0 | 1 | 15 |
| Earth-quakes | 4 | 2 | 1 | 1 | 0 | 1 | 14 |
| Wildfires | 1 | 1 | 1 | 2 | 2 | 1 | 7 |
| Drought/Heat wave | 3 | 4 | 1 | 0 | 1 | 1 | 33 |

The highest risk hazards throughout the planning area, in descending order based on the relative risk ratings, are: Winter Storms, Floods, Drought/Heat Wave, Dam/Levee Failure, Tornadoes/High Winds, Thunderstorms, Earthquakes, and Wildfires. Tsunamis, Coastal and Riverine Erosion, Landslides/Sinkholes, Coastal Storms, and Volcanic Activity are not shown in the above table for they have been designated as posing zero risk to the City of Greenville by those representatives making the planning decisions. This is most closely related to the very low probability of occurrence for these hazards.

For the most part, the available data does not allow for a more technical evaluation of the hazards. Information gathered from discussions with City officials and residents provided much of basis for the evaluation of risk and vulnerability found in this plan. Efforts to improve these considerations will be discussed in sections describing mitigation activities.

The Vulnerability Assessment Process

The vulnerability assessment process for the DMC begins with profiling the basic, mitigation-related characteristics of the City. Very basic demographic, land use and infrastructure information was gathered for the City. The resulting information is presented below.

The Vulnerability Assessment Process, as described above, is still valid and on-going during the Update period.

The table below indicates the building valuation of properties that may be affected by all eight hazards identified in the plan.

City of Greenville Structural Property Valuation

| Class | No. of Properties | Building Valuation (\$) |
|----------------------|-------------------|-------------------------|
| Residential | 17,982 | 2,449,259,870 |
| Commercial | 2,886 | 1,476,397,988 |
| Critical Facilities* | 67 | 728,414,996 |

* See Appendix G for Critical Facilities Listing

Repetitive Loss Properties: Another indication of the hazards threatening the City of Greenville, and the risk posed by those hazards, is to identify whether properties have been previously or repeatedly damaged by past disaster events. The properties, which may be buildings, roads, utilities, or similar construction, can be termed “repetitive loss properties.” Properties can fall into this classification based on repeated damages from any type of hazard. A specific category of repetitive loss properties is those that are insured under the National Flood Insurance Program, and have had repeated claims for flood loss damages. The City of Greenville has 8 such recorded properties, in which 1 has been demolished and rebuilt to code. Two others have been completely demolished. The remaining 5 buildings consist of 1 commercial property, and 4 residential properties. In summary, the map in Appendix D shows 7 repetitive loss structures which are as follows;

| Type of Repetitive Loss Structure | Number of Structures | Located on Map (Y/N) |
|-----------------------------------|----------------------|----------------------|
| Residential | 4 | Y |
| Commercial | 1 | Y |
| Demolished | 2 | Y |
| Rebuilt | 1 | N |
| Total: | 8 | |

Land Use Trends and Potential Vulnerability: The DMC recognizes that the way in which land is utilized, especially land within known hazard-prone areas, is a key measure of community vulnerability, because some land uses, such as for residential or industrial development, can be more susceptible to disaster-related damages than others. Therefore, analysis of land use trends will be performed by the City of Greenville’s Planning Commission. The DMC recognizes that its efforts, particularly to identify the areas at risk from various hazards, is a key factor in guiding the careful use of land to minimize future vulnerabilities to disaster. When needed and desired, modifications to the plans, ordinances, codes and similar policies will be proposed as mitigation initiatives for incorporation into this plan.

At this point, the City continues to take several measures to control development from an economic and vulnerability standpoint. The City is currently ranked a class 7 within the

Community Rating System (CRS) and has adopted the International Building Code Standards as amended by the State of South Carolina.

To address new buildings and infrastructure, the City will continue to enforce the International Building Code Standards as well as the regulations found in the Greenville Stormwater Management Plan and Stormwater Ordinance.

Critical Facilities: Many facilities and systems in the City are very important to the health, safety and welfare of the community, especially during disasters caused by natural hazards. Therefore, high priority is given to assessing their vulnerabilities to future disasters and proposing mitigation initiatives to address identified vulnerabilities. The DMC has created a detailed list of facilities. However, technical evaluations of each of these facilities has not been prepared due to the expensive and time consuming and was beyond the scope of this original report.

Summary

It must be emphasized that the fundamental reason for undertaking the hazard identification and vulnerability assessment process is to highlight vulnerabilities that need to be addressed by the development of proposed mitigation initiatives for incorporation into the City of Greenville hazard mitigation plan. In addition, this process has made it obvious to the DMC that more information is needed in order to provide thorough assessments. The committee has therefore created mitigation initiatives to address any current data shortcomings. This component of the mitigation planning process can be expected to be continued in future updates of the plan until all mitigation needs are addressed.

City of Greenville
Multi-Hazard Mitigation Plan

Section Seven

MITIGATION GOALS AND PLAN IMPLEMENTATION

Introduction

This section of the City of Greenville Multi-Hazard Mitigation Plan describes the goals and objectives established by the Disaster Mitigation Committee (DMC), and the completed and anticipated actions for implementation and maintenance of this plan in an ongoing effort to achieve these goals.

Goals and Objectives for the Mitigation Plan

The City of Greenville DMC established a number of goals and objectives to guide its work. The goals and objectives helped to focus the efforts of the group in the mitigation planning effort to achieve an end result that matches the unique needs, capabilities and desires of the City of Greenville.

1) City government will have the capability to develop, maintain, and utilize hazard information

- a) Data and information needed for defining hazards, risk areas and vulnerabilities in the community will be obtained
- b) The capability to effectively utilize available data and information related to mitigation planning and program development will be available
- c) The effectiveness of mitigation initiatives implemented in the community will be measured and documented
- d) There will be a program to derive mitigation “lessons learned” from each significant disaster event occurring in or near the community

2) The City will have the capability to initiate and sustain emergency response operations during and after a disaster

- a) Communications systems supporting emergency services operations will be retrofitted or relocated to provide for effective communication during times of disaster
- b) Emergency services organizations will have the capability to detect emergency situations and promptly initiate emergency response operations
- c) Local emergency services facilities will be assessed and City-owned service facilities will be retrofitted or relocated to withstand the structural impacts of disasters
- d) Response capabilities will be available to protect visitors, special needs individuals, and the homeless from a disaster’s health and safety impacts

- 3) The continuity of City government operations will not be significantly disrupted by disasters**
 - a) Measures will be implemented to alert City personnel of impending disasters and corresponding action plans
 - b) Train key City employees in disaster response and operations
- 4) The policies and regulations of City government will support effective hazard mitigation programming throughout the City**
 - a) City government will establish and enforce building and land development codes that are effective in addressing the hazards threatening the community
 - b) City government will protect high hazard natural areas from new or continuing development
 - c) Land use policies, plans and regulations will discourage or prohibit inappropriate location of structures or infrastructure components in areas of higher risk
 - d) Reconstruction and rehabilitation of structures and utilities in the City will incorporate appropriate hazard mitigation techniques
 - e) The City will participate fully in the National Flood Insurance Program
- 5) Residents of the City will have homes, institutions, and places of employment that are less vulnerable to disasters**
 - a) The vulnerability to disasters of schools, libraries, museums, and other institutions important to the daily lives of the community will be minimized
- 6) The economic vitality of the City will not be significantly threatened by a disaster**
 - a) City government emergency response and disaster recovery plans will appropriately consider the needs of key employers in the community
 - b) City government will encourage community businesses and industries to make their facilities and operations disaster resistant
 - c) City government will implement programs to address public perceptions of community condition and functioning in the aftermath of a disaster
- 7) The availability and functioning of the City's infrastructure will not be significantly disrupted by a disaster**
 - a) City government will encourage hazard mitigation programming by private sector organizations owning or operating key community utilities
 - b) Routine maintenance of the community's infrastructure will be done to minimize the potential for system failure because of or during a disaster
 - c) Transportation facilities and systems serving the City will be constructed and/or retrofitted to minimize the potential for disruption during a disaster
- 8) All members of the City will understand the hazards threatening local areas and the techniques to minimize vulnerability to those hazards**
 - a) All interested individuals will be encouraged to participate in hazard mitigation planning and training activities.
 - b) Education programs in risk communication and hazard mitigation will be established and implemented
 - c) Managers of public facilities will be knowledgeable in hazard mitigation techniques and the components of the City's mitigation plan

- d) Technical training in mitigation planning and programming will be given to appropriate local government employees
- e) The owners and operators of businesses and industries in the City will be provided information on appropriate hazard mitigation techniques
- f) The public living or working in defined hazard areas will be aware of that fact, understand their vulnerability and know appropriate mitigation techniques
- g) The public will have facilitated access to information needed to understand their vulnerability to disasters and effective mitigation techniques

These goals selected by the DMC are related to the broad mitigation needs and capabilities of the communities involved, although some of the initiatives are focused on a specific hazard type or category. In general the City of Greenville mitigation goals and objectives are “multi-hazard” in scope and can be described as statements of the desired “mitigation-related capabilities” that will be present in the future as the goals are achieved. The City is a current participant of the NFIP, and these goals will help the City remain compliant.

Guidance to meet the goals of this mitigation plan will be provided by the State of South Carolina Emergency Management Division, pursuant to the State Mitigation Plan. The state does not provide a specific set of goals, however, guidance and coordination of hazard preparations and mitigation is available.

Using a “Goal-based” Planning Process

The goals established by the City of Greenville DMC are considered to be broad, general guidance that defines the long-term direction of the planning. As indicated in the list of goals and objectives above, each goal statement has one or more objectives that provide a more specific framework for actions to be taken by the DMC and its participants. The objectives define actions or results that can be placed into measurable terms by the DMC, and translated into specific assignments for implementation by the participants in the DMC and associated agencies and organizations.

The objectives selected by the DMC are intended to create a specific framework for guiding the development of proposed mitigation initiatives for incorporation into the plan. Whenever feasible, the planning participants have attempted to associate each proposed mitigation initiative with the objective statement the initiative is intended to achieve. By associating a mitigation initiative with a specific objective, the proposed initiative is also, of course, intended to help achieve the broader goal statement to which the objective corresponds. Proposing mitigation initiatives that are consistent with the selected objectives is a principal mechanism for the DMC participants to achieve the stated goals of the mitigation planning program.

To illustrate this point, the table below shows a list of the mitigation initiatives included in the 2009 plan and the objective statement which they are intended to help achieve. This enabled the City of Greenville DMC to identify which of the established objectives is to be addressed by the proposed initiative, if any. This allows the DMC to consider achievement of a specific objective under an established goal as it reviews a proposed initiative for incorporation into the plan, or as it assigns the initiative a priority or schedule for implementation. This approach creates a framework for “goal-based” planning by the

DMC, focusing the group's efforts on proposing and implementing mitigation initiatives intended to achieve the established mitigation goals.

As the City of Greenville Hazard Mitigation Plan is reviewed and updated by the DMC, the goals and supporting objective statements are also reviewed to ensure they are still applicable to meeting the unique needs, interests and desires of the community.

| Initiative Description | Planning Goal(s) Targeted | Planning Objective Satisfied |
|---|------------------------------|---------------------------------|
| A. Prevention | | |
| Develop a Spill and Industrial Accidents Action Plan (Fleet Yard) | 1, 3, 5 | 1a, 3a, 5b |
| Early warning system | 2, 3 | 2a, 2c, 2e, 3a |
| Develop a plan for post-disaster nuclear power cleanup | 1, 3, 5 | 1a, 3b, 5b |
| Heavy rain event sewage study | 1, 5 | 1a, 5b |
| Collaborate with National Weather Service "Turn Around, Don't Drown" Campaign | 1, 8 | 1a, 8f-g |
| Arboricultural tree study | 1, 5 | 1a, 5b |
| Underground Electricity Plan | 2, 5 | 2a, 5b |
| Storm Debris Removal Process Plan | 1, 2, 3 | 1a, 2a, 3a |
| B. Public Education & Awareness | | |
| Enhance GIS database | 1, 8 | 1a, 8f-g |
| CISM post-disaster stress relief program | 2, 3, 8 | 2b, 8f-g |
| Enhance hazards education | 3, 8 | 3b, 8a-g |
| Installation of rain gauges | 2, 3 | 2a, 2c, 3a |
| C. Natural Resources Protection | | |
| White Oak Basin watershed study | 1, 5 | 1a, 5b |
| Address erosion control (Reedy River & Landfill) | 4, 5 | 4 a-b, 4e, 5a-b |
| Dam gate sediment removal maintenance plan | 1, 5 | 1a, 5b |
| Develop riverine crews to assist with debris removal | 5, 7 | 5, 7b-c |
| D. Emergency Services | | |
| Reassessment of Reverse 911 System (Bi-lingual) | 2, 3 | 2a, 3a |
| Provide backup generators for key intersections and critical facilities | 2 | 2a-e |
| Enhance "Officer Century" emergency devices | 2 | 2a-e |
| Incorporating National Weather Service in post-disaster review meetings | 1, 2, 3, 6, 7, 8 | 1d, 2e, 3b, 6a-b, 7a, 8s |
| Increase number of City represented CERT program participants | 3, 6 | 3b, 6c |
| E. Property Protection | | |
| Dwelling Elevation Program | 5 | 5a |
| Relocate Public Works facility | 1, 2, 4 | 1a, 2d, 4d |
| Stock piling debris locations | 1, 8 | 1a, 8f |
| F. Structural Projects | | |
| Stone Lake Dam restoration | 5, 7 | 5, 7b-c |

Addressing Known Risks and Vulnerabilities

The process of selecting initiatives to mitigate known threats to hazards began with a simple brainstorming exercise by the members of the DMC. Committee members also consulted personnel from within their respective agency or organization. The resulting list is part wish-list and part a reflection of the threats to the City of Greenville. It is difficult to remove from memory recent events and the damage that resulted. Therefore, this list is an indication of the problems that the City of Greenville needs to address, based on complaints, cost of repairs, and perceived future needs.

Modification to Other Policies, Plans and Programs

It is the intention of the DMC to continue to improve the existing policy framework for the City of Greenville so that they will be able to more effectively manage the community's vulnerabilities to future disasters. An analysis of the current policy framework is included in Section 6 of this plan. Any shortfalls in the number of policies addressing identified higher risk hazards can be addressed by implementing non-structural initiatives intended to modify or enhance current plans, policies and programs. The proposed modifications to the listed policies and programs are additional documentation of the DMC's efforts to achieve its established goals and objectives.

Plan Implementation and Plan Maintenance Procedures

This portion of Section 7 discusses the manner in which the City of Greenville Mitigation Plan will continue to be implemented and maintained over time. "Plan implementation" is considered as the implementation of the proposed mitigation initiatives now included in the plan. "Plan maintenance" is considered to be the process by which the City of Greenville DMC will continue to update, improve and expand the mitigation planning process. It also includes the technical analyses needed for the process to propose more mitigation initiatives for incorporation into the plan. "Plan maintenance" further includes the group's activities to monitor implementation of the plan, to evaluate the effectiveness of implemented mitigation initiatives, and to continually strive to engage the community in the planning process. The basic elements of the DMC's actions to implement and maintain the plan are also described in the DMC's operating procedures, given in Section 4 of the plan.

Plan Implementation Responsibility and Schedules

As noted above, implementation of the City of Greenville Mitigation Plan is basically through implementation of the approved mitigation initiatives incorporated into the plan. As these initiatives are implemented over the years, the facilities, systems and neighborhoods of the participating jurisdictions will become less vulnerable to the impacts of future disasters, and the communities of the City of Greenville will become increasingly more disaster resistant.

Pursuant to the planning process, the individual agencies and organizations that have been assigned responsibility for the mitigation initiatives incorporated into the plan are responsible for their implementation when the resources or opportunity to do so become

available. As a practical matter, in most cases, this means that the responsible agencies identify the most feasible funding source (e.g., a state or federal grant program, the agency's budgetary process, etc.), make application to the funding source or otherwise allocate funds, and, upon receipt of funding, take the necessary steps to actually implement the project, whatever that may entail (e.g., design, permitting and construction, etc.). In other cases, this may mean that, should a unique opportunity for implementation of an initiative arise, e.g., upon receipt of unexpected funds, immediately after a disaster event, etc., the agency can proceed with implementation of the initiative.

The DMC encourages representatives of the agencies and organizations responsible for a proposed initiative to associate it with one or more potential funding sources. The purpose of this is to facilitate implementation of a proposed initiative by the sponsoring agency by indicating the starting point for seeking funding for implementation.

While the actual responsibility for implementation of a mitigation initiative lies with the responsible agency or department, the DMC as a cooperative organization has a substantial involvement in plan implementation and can assist with the coordinating and scheduling of the implementation of approved mitigation initiatives.

As a part of the planning process, on a periodic basis of every five years and immediately following any major disaster, approved mitigation initiatives included in the plan are re-evaluated as to their continuing value and the need for their implementation. The purpose of this re-evaluation is to assure that a proposed mitigation initiative remains a valuable component of the plan, and whether any unique or unanticipated conditions warrant extra efforts to implement the initiative.

Plan Maintenance and Monitoring of Plan Implementation

Mitigation planning is a dynamic process that must be continually adjusted to account for changes in the community and to further refine the information, judgments and proposals documented in the local mitigation plan. The process used by the City of Greenville DMC to maintain the plan consists primarily of four functions.

The first is to continue to expand and improve the mitigation plan by accomplishing additional technical analyses, such as vulnerability assessments and post-event analysis of disasters, etc. The second is to continue to expand participation in the planning process by implementing public information programs and by inviting expanded participation by the private sector. The third is to routinely monitor implementation of the initiatives in the plan until each is completed and in-place, and to assess their actual effectiveness following the next relevant disaster event. The fourth is to issue an updated plan document for use by the participating organizations, to inform the community, and when appropriate for submittal to state and federal agencies for approval pursuant to the Disaster Mitigation Act of 2000. This portion of Section 7 of the plan describes these four activities by the DMC to maintain the City of Greenville Mitigation Plan.

The technical analyses conducted by the City will be an ongoing effort to continually assess the hazards threatening the community, the vulnerabilities to those hazards, and program framework to control those vulnerabilities. When indicated, the technical analysis also includes formulating proposed mitigation initiatives to eliminate or minimize

the identified vulnerabilities. The City has completed the vulnerability assessment based on the best available information. As this process continues and additional data is gathered the DMC will be better equipped to provide for more detailed analyses. In the next planning cycles, the DMC will continue to assess the vulnerabilities of facilities and planning areas. Vulnerability assessments are fundamental to identifying needed mitigation initiatives to propose for incorporation into the plan, and as this process is continued, additional mitigation initiatives will be proposed for incorporation into the plan.

Another technical analysis important to maintaining the plan is the expanded and refined evaluation of the policy and program framework of the City and the adequacy of this framework to control the vulnerabilities of the community.

The second type of activity to continue to maintain the City of Greenville Mitigation Plan will be to continue to expand participation in the DMC and the mitigation planning process. The current participants in the planning and the level of their participation are addressed in Section 3 of the plan. Gaining additional participation in the planning is also part of the public information and community outreach component of the plan.

The third category of plan maintenance activities that will be undertaken by the City of Greenville DMC will be to monitor the implementation of mitigation initiatives. The DMC documents the efforts to fund the initiative, to conduct required studies, and to obtain any needed permits, as well as to estimate the time remaining to complete necessary design, needed studies and purchasing or construction activities. When an initiative is completed, this fact is noted in the program as well. A section discussing completed mitigation activities will be added to Section 5 during the next plan revision.

As a part of monitoring the implementation of mitigation initiatives, following a disaster and as a part of the post-event analysis that the DMC will conduct, the effectiveness of completed mitigation initiatives, or any pre-existing mitigation initiatives, in reducing the human and economic impacts of the event can be estimated. As time passes and disaster events occur, this will enable the DMC to accumulate a database of “mitigation success stories” with regard to the value of the property losses avoided and the number of fatalities, injuries or illnesses prevented.

Monitoring of the effectiveness of plan implementation and maintenance also involves assessing the effectiveness of the mitigation goals and objectives established for the planning process. As noted above, the DMC established general goals and a number of specific objectives to guide the participants in the mitigation planning process, and these are given above. The DMC’s attempts to address the established objectives, with the intent of achieving the associated mitigation goals for the community, is a key measure of the effectiveness of the continuing plan maintenance and plan implementation. The table in section 8, which was discussed above, documents the DMC’s efforts to achieve the established goals and objectives through the implementation of associated proposed mitigation initiatives. As these initiatives are implemented, and monitored for their effectiveness in future disasters, the DMC will be able to determine the overall success of their mitigation planning effort. In future planning cycles, these goals will be reviewed and re-evaluated to ensure they are still relevant to the unique needs of the community and continue to address current and expected conditions.

The fourth category of plan maintenance activities is to actually incorporate the results of all technical analyses, including the development of new mitigation initiatives and to publish another updated edition of the City of Greenville Hazard Mitigation Plan. The

DMC will continue to engage the public in the planning process, to expand direct participation in the planning, and to increase representation on the City of Greenville DMC itself. In order to complete this category of plan maintenance activity, the participants will use a planning cycle which is given in the next section.

Current Planning Cycle Outline

Below lists the major aspects of the Planning Cycle beginning in 2010 and ending in 2015:

- The DMC will meet as necessary and after each major event
- Mitigation initiatives will be collected as they appear from various City organization, neighborhood groups, and businesses
- Adoption and implementation of new initiatives will be reviewed, ranked, and approved during the next planning cycle.

The planned date for release of the next edition of the City of Greenville Mitigation Plan is intended to be 2015, in which it is the intention of the City to incorporate the next update into Greenville County's Multi-jurisdiction Multi-hazard Mitigation Plan. At that time, the entire planning process, along with the new data that will have been collected, will be reviewed and altered as necessary.

Implementation through Existing Plans and Programs

One of the methods to most effectively implement the City of Greenville Hazard Mitigation Plan is to propose and implement initiatives that will modify other community plans, policies, and programs. By including personnel from a variety of departments in the hazard mitigation planning process, concepts derived from the planning process will be spread throughout City departments such as; public works, floodplain management, GIS, and planning/zoning. Mitigation activities initiated by this plan will be incorporated into the Community Rating System (CRS) plan and vice versa.

Continued Public Involvement

The DMC will continue efforts to develop and implement a year-round program to engage the community in the mitigation planning process and to provide them with mitigation-related information and education. These efforts will be to continually invite public comments and recommendations regarding the mitigation goals for the community, the priorities for the planning, and the unique needs of each community for mitigation-related public information.

Public information activities that have been completed or are planned by the organizations making up the City of Greenville DMC are listed in Section 5 of this plan. Each of these activities continues to engage the community in the planning process through the presentation of a specific topic or program related to or relevant for, hazard mitigation.

The Next Planning Cycles

As given in this section, the City of Greenville DMC has established a schedule and procedure for both plan implementation and plan maintenance that is expected to be helpful in improving and expanding the mitigation planning process.

In addition to these activities for plan maintenance, the DMC will establish a recommended schedule for implementation of the proposed priority initiatives included in this edition of the plan. It is expected that the agencies and organizations that sponsored these initiatives for the plan will, during the next planning cycles, take advantage of timely opportunities and available resources to implement them on the desired schedule, if it is possible to do so.

The City of Greenville Hazard Mitigation Plan is a dynamic document, reflecting a continuing, and expanding planning process. The efforts of the DMC will continue into the future, striving to make the City of Greenville truly a disaster resistant community.

City of Greenville

Multi-Hazard Mitigation Plan

Section Eight

COMPILATION OF PROPOSED MITIGATION INITIATIVES

Introduction

This section of the City of Greenville Multi-Hazard Mitigation Plan contains the compilation of the proposed mitigation initiatives that have been formulated as the result of the planning efforts by the Disaster Mitigation Committee (DMC). These mitigation initiatives form the fundamental mechanism for the implementation of the local mitigation plan. That is, when the resources and opportunity to do so become available, the sponsoring organization implements an initiative to address the vulnerabilities of the facilities, systems and planning areas that have been identified through the mitigation planning process. After each successful implementation of an initiative, the benefited community will become that much more resistant to the impacts of future disasters.

Initiatives Incorporated into the Mitigation Plan

The compilation is based on a prioritization that was conducted by the DMC overseeing the development of the Hazard Mitigation Plan. The proposed initiatives discussed in this section are specific mitigation actions and projects being considered to reduce the effects of each hazard” pursuant to §201.6(c)(3)(ii) of the federal regulations.

As specified in the procedures given in Section 4 of the plan, each proposed mitigation initiative is subjected to a review and analysis by the DMC. The purpose of this review and analysis is to ensure that an initiative proposed by a participating organization or community group is based on an adequate level of technical analysis, that all needed information about the proposal is presented, that any assumptions utilized are reasonable and logical, that the proposal is consistent with the goals and objectives of the DMC, and that it is addressing identified vulnerabilities of the community or shortfalls in the communities’ mitigation policy framework. More specifically, the DMC’s review and analysis process is focused on ensuring the technical validity of the proposal, making a judgment whether the initiative would be technically effective and cost-beneficial, if it is duplicative or in conflict with other proposed initiatives, or if its implementation would have an adverse affect in another jurisdiction. If necessary, the proposal is returned to the sponsoring organization for revision.

When the DMC reaches a favorable judgment regarding the proposal, a recommendation is made that it be adopted for incorporation into the City of Greenville Hazard Mitigation Plan. The DMC can then review the proposal for any other concerns, such as its consistency with other community-based plans, programs, and political policies, and if appropriate, formally approve the proposal and its incorporation into the plan. In this way, each mitigation initiative is only incorporated into the plan after satisfactorily undergoing a “peer review” process considering both technical validity and policy compliance.

The following is a brief description of the initiatives that have been considered by the DMC for inclusion in the City of Greenville Multi-Hazard Mitigation Plan:

A. Prevention

Develop a Spill and Industrial Accidents Action Plan (Fleet Yard): The City proposes to create a Spill and Industrial Accidents Action Plan to lessen the risk in the case of an accident in the Public Works fleet yard.

Early warning system: In efforts to forewarn its citizens of approaching hazards, the City is proposing to install an early warning system that would sound, allowing citizens to take the necessary precautions to remain safe.

Develop a plan for post-disaster nuclear power cleanup: The City proposes to develop a plan for post-disaster nuclear power cleanup. No such plan is in place in the event of a hazard.

Severe rain event sewage study: The City contains a number of old sewage pipes that may crack, or lead to manhole overflows. The City proposes to study the sewage system as heavy rain events occur.

Collaborate with National Weather Service “Turn Around, Don’t Drown” Campaign: The City plans to utilize barricades equipped with the NWS slogan “Turn around, don’t drown” in its Parks and Recreational facilities during flooding events.

Arboricultural tree study: The City has experienced a number of tree related power outages over the past year. In efforts to eliminate reoccurrences, the City is proposing to perform a study on obvious drought damaged trees, and remove them accordingly.

Underground Electricity Plan: The City is proposing to develop plans and designs on the incorporation of underground electricity for the downtown area. This technique will help prevent power outages during storm events.

Storm Debris Removal Process Plan: In efforts to always have debris removal assistance available, the City is proposing to develop a plan that would allow contractors to remove debris in problem areas.

Create Firebreaks Around Critical Facilities: The City is proposing to develop firebreaks around its critical facilities to insure safety in the event of wildfire.

B. Public Education and Awareness

Enhance GIS database: The City has proposed to allow public users into its GIS database by allowing them to create an account with a username and password.

CISM Post-disaster stress relief program: The City plans to coordinate with local agencies to help with post-disaster stress relief. This program is already in place, and the City is proposing to help efforts in stress relief.

Installation of rain gages: In an attempt to collect more localized hazard data, the City is proposing to install rain gages throughout the City. This data will be used to educate the public on hazard related issues.

Enhance hazards education: In an attempt to educate residents on hazard damages and their role in hazard mitigation, the City proposes that information be distributed, via television and literature, to further promote hazard awareness.

C. Natural Resources Protection

White Oak Basin watershed study: The City would like to reassess the floodways in the White Oak Basin. After the assessment, the City may send new flood boundary information to FEMA for approval.

Address erosion control (Reedy River & Landfill): In efforts to preserve the natural state of the Reedy River, the City is proposing to address erosion problems along its stream banks.

Develop riverine crews to assist with debris removal: The City proposes to develop riverine crews that would be responsible for removing debris from crossings after a hazard. These actions could prevent flooding upstream.

Reedy River Dam gate sediment removal maintenance plan: In order to control the amounts of sediment accumulation on the dam gate, the City is proposing to develop a sediment removal plan.

D. Emergency Services

Reassessment of Reverse 911 System (Bi-lingual): The City realizes that every citizen may not speak English fluently; therefore, it plans to reassess the current Reverse 911 system and make it bi-lingual (Spanish).

Provide backup generators for key intersections and critical facilities: The City proposes to purchase new generators for Critical Facilities and key intersections. These generators will be used in power outage situations so that City offices, emergency health facilities and some traffic lights may function, as needed.

Enhance “Officer Century” emergency devices: These devices are used for officers to conduct traffic in the event of a power outage. The City proposes to enhance these devices by making them more ‘user friendly’ and sturdy to keep personnel safe.

Incorporating National Weather Service in post-disaster review meetings: The City is interested in adding the NWS to its post-disaster review meetings, which are used to discuss the “rights and wrongs” of mitigation activities after a disaster strikes.

Increase number of City represented CERT program participants: The County sponsors a free Community Emergency Response Training (CERT) where the City would encourage resident participation. Once trained, the citizens will be able to help during emergency situations, and provide relief for other emergency service workers.

E. Property Protection

Dwelling Elevation Program: The City would like to develop a Dwelling Elevation Program similar to the program used by the County. The program will help individuals in the flood plain elevate their finished floor elevation to prevent future flooding.

Relocate Public Works facility: Currently the Public Works facility is located in the floodplain which causes delays in hazard response. The City plans to relocate the facility to lessen the chances of the Public Works department not being able to provide service during these events.

Stock piling debris locations: As current debris piling areas meet their maximum capacity, the City would like to work directly with the Public Works Department in identifying new stock piling locations.

F. Structural Projects

Stone Lake Dam restoration: The City would like to address the erosion issues along Stone Lake Dam to ensure its stability.

Priority Status for Plan Inclusion and Implementation

One format for describing mitigation initiatives included in the plan lists the mitigation initiatives and their current status as “approved,” “pending,” or “completed”. An approved mitigation initiative is one that has been fully processed and approved for incorporation into the plan by the DMC, and as noted above. A pending initiative is one that has been proposed by a participant in the planning process, but as of the time of the preparation of this document, it had not been fully processed by the DMC. Of course, a completed mitigation initiative is one that has been implemented by the responsible agency or organization.

As shown in the section “Initiatives by Hazard” below, all initiatives have been approved.

Priority Ranking for Proposed Mitigation Initiatives

This next section report, lists all of the mitigation initiatives currently in the City of Greenville’s Multi-Hazard Mitigation Plan, in the order of their priority scores. The priority scores are based on 9 separate prioritization criteria used by all of the planning participants to allow the DMC to compare various mitigation initiatives. The specific priority scores are based on a numeric classification system explained in the following table:

| Priority Criterion | Numeric Score |
|--|---------------|
| Strategy Effectiveness | |
| No affect on Risk or Hazard | 0 |
| Affects several structures within the City | 1 |
| Affects many structures within the City | 2 |
| Affects most structures within the City | 3 |
| Percentage of Population Benefited | |
| Less than 10% benefited | 0 |
| 10% to 50% benefited | 1 |
| 51% to 75% benefited | 2 |
| Greater than 75% benefited | 3 |
| Time to Implement | |
| Cannot be implemented | 0 |
| Longer than one year | 1 |
| Within one year | 2 |
| Immediate | 3 |
| Time to Impact | |
| Cannot be implemented | 0 |
| Longer than one year | 1 |
| Within one year | 2 |
| Immediate | 3 |
| Cost to City | |
| Completely Unaffordable | 0 |
| Expensive, but manageable | 1 |
| Cost is easily managed | 2 |
| Little to no cost | 3 |
| Cost to Others | |
| Completely Unaffordable | 0 |
| Expensive, but manageable | 1 |
| Cost is easily managed | 2 |
| Little to no cost | 3 |
| Funding Source | |
| No known funding source available | 0 |
| Requires outside funding | 1 |
| Requires budget consideration | 2 |
| Within existing city budget | 3 |

| Community Support | |
|---|----------|
| Opposed by the entire community | 0 |
| Acceptable only to those affected by the project | 1 |
| Some community opposition | 2 |
| Acceptable community wide | 3 |
| Project Feasibility | |
| Not possible | 0 |
| Accomplished with extensive design and planning | 1 |
| Accomplished with some design and planning | 2 |
| Easily accomplished | 3 |

This table shows that the minimum priority rank for a proposed initiative is zero (0), while the maximum is twenty-seven (27). The priority ranking given through application of the nine criteria in the above table will remain constant through time because of the inherent characteristics of the proposed initiative, unless those characteristics are also modified.

All of the initiatives are listed by the priority score assigned to each as a result of the common process to characterize and prioritize mitigation initiatives that is used by all participants in the planning process. This priority score is a long-term characterization value directly associated with each specific initiative based on its own merits at the time it was first proposed by the individual participant. The priority score is intended to serve as a guideline for the DMC regarding the relative desirability of implementation of a specific mitigation initiative in relation to the other proposed initiatives incorporated into the plan.

All mitigation initiatives are prioritized and evaluated in accordance with consideration with the National Flood Insurance Program.

| Project Description | Strategy Effectiveness | Percent of Population Benefited | Time to Implement | Time to Impact | Cost to City | Cost to Others | Funding Source | Community Support | Project Feasibility | Point Total | Project Priority |
|---|------------------------|---------------------------------|-------------------|----------------|--------------|----------------|----------------|-------------------|---------------------|-------------|------------------|
| A. Prevention | | | | | | | | | | | |
| Develop a Spill and Industrial Accidents Action Plan (Fleet Yard) | 2 | 1.5 | 3 | 2.5 | 1.5 | 3 | 2 | 2.5 | 1.5 | 19.5 | 7 |
| Early warning system | 3 | 3 | 2 | 3 | 1 | 2 | 1 | 3 | 2 | 20 | 6 |
| Develop a plan for post-disaster nuclear power cleanup | 3 | 3 | 2 | 2.5 | 1 | 1 | 1.5 | 3 | 1.5 | 18.5 | 13 |
| Severe rain event sewage study | 3 | 3 | 1 | 1 | .5 | .5 | 1 | 2.5 | 1 | 13.5 | 23 |
| Collaborate with National Weather Service's "Turn Around, Don't Drown" Campaign | 2 | 1.5 | 3 | 3 | 2 | 3 | 1.5 | 2.5 | 3 | 21.5 | 5 |
| Arboricultural tree study | 2 | 2 | 1 | 1.5 | 1.5 | 1.5 | 2 | 1.5 | 1.5 | 14.5 | 20 |
| Underground Electricity Plan | 3 | 3 | 1 | 1 | .5 | .5 | 3 | 2 | 1 | 15 | 17 |
| Storm Debris Removal Process Plan | 3 | 3 | 2 | 3 | 2.5 | 3 | 3 | 3 | 2 | 24.5 | 1 |
| Create Firebreaks around Critical Facilities | 3 | 3 | 1 | 3 | 1.5 | 3 | 1 | 2 | 2 | 19.5 | 8 |
| B. Public Education & Awareness | | | | | | | | | | | |
| Enhance GIS database (password protected) | 2 | 1.5 | 2 | 2.5 | 1.5 | 2.5 | 2 | 1.5 | 2.5 | 17 | 15 |
| CISM Post-disaster stress relief program | 3 | 3 | 2 | 3 | 2 | 2 | 1.5 | 3 | 2 | 19.5 | 9 |
| Installation of rain gages | 1 | .5 | 3 | 3 | 2.5 | 3 | 2.5 | 1.5 | 2 | 19.5 | 10 |
| Enhance hazards education | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 22 | 3 |
| C. Natural Resources Protection | | | | | | | | | | | |
| White Oak Basin watershed study | 1 | .5 | 1.5 | 2 | 1 | 2.5 | 3 | 1 | 1.5 | 14 | 22 |
| Address erosion control (Reedy River & Landfill) | 2.5 | 2.5 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 11 | 25 |
| Develop Riverine Crews to assist with debris removal | 2.5 | 2.5 | 2 | 1 | 1 | 1 | 2.5 | 1 | 1.5 | 15.5 | 16 |
| Reedy River Dam gate sediment removal maintenance plan | 3 | 2 | 1 | 1 | 2 | .5 | 3 | 2 | 3 | 17.5 | 14 |
| D. Emergency Services | | | | | | | | | | | |
| Reassessment of Reverse 911 system (Bi-lingual) | 2.5 | 1.5 | 2 | 3 | 1.5 | 2.5 | 2 | 2.5 | 2 | 19.5 | 11 |
| Provide backup generators for key intersections and critical facilities | 3 | 3 | 1 | 3 | 1 | 1 | 1 | 3 | 2 | 15 | 18 |
| Enhance "Officer Century" emergency devices | 2 | 2 | 1 | 3 | 1 | 1 | 1 | 2 | 2 | 15 | 19 |
| Incorporating National Weather Service in post-disaster review meetings | 2 | 2 | 2 | 3 | 2 | 2.5 | 2.5 | 3 | 3 | 22 | 4 |
| Increase number of City represented CERT program participants | 2.5 | 2 | 2 | 2.5 | 1.5 | 2.5 | 2 | 2.5 | 2 | 19.5 | 12 |
| E. Property Protection | | | | | | | | | | | |
| Dwelling Elevation Program | 1 | 0 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 10 | 26 |
| Relocate Public Works Facility | 1.5 | 2 | 1 | 2.5 | 1 | 2 | 2 | 1.5 | 1.5 | 14.5 | 21 |
| Stock piling debris locations | 3 | 3 | 2 | 3 | 2.5 | 3 | 3 | 2 | 2 | 23.5 | 2 |
| F. Structural Projects | | | | | | | | | | | |
| Stone Lake Dam Restoration | 2 | 1 | 1 | 3 | 1 | 1 | 1.5 | 1 | 1 | 12.5 | 24 |

Benefit-to-Cost Ratio

A key analytical measure commonly used in vulnerability assessments is the benefit to cost ratio, which expresses the estimated benefits, in dollars, in comparison to the estimated costs to implement and maintain the proposed mitigation initiative. For an initiative to be considered “cost effective,” the dollar value of the benefits derived needs to exceed the costs to implement and maintain the initiative, or, in other words, the benefit to cost ratio should be greater than 1.0. The process for calculating a benefit to cost ratio begins with estimating the direct and indirect costs of the “worst case” disaster scenario that the mitigation initiative is intended to address. If the initiative were to be implemented, these are the future costs that would be avoided, or, in other words, the “benefits” derived from implementing the initiative. Both direct costs of the disaster scenario are considered, such as structural damages, as well as indirect costs, such as lost wages. The total of the direct and indirect costs are then divided by the predicted life of the initiative, in years. This then gives the dollar benefits of the project on an annual basis. The cost side of the benefit to cost ratio is estimated by determining the estimated cost to initially implement the proposal, such as initial construction cost for a “bricks and mortar” project, or the development costs for a training program. To this amount is then added any annual costs that implementation of the project would incur, such as annual operations and maintenance costs or annual implementation costs. Next, the approach then considers any “cost impact” of the proposal, or the costs that would be incurred by others in the City due to implementation of the initiative, such as the economic effect on new construction of adopting a more stringent building code. The cost impact figure is also annualized by the life of the project, and then any annual cost impact values, such as an annual user fee or tax, is added to give a total annual cost impact. Finally, by dividing the annual costs of the “benefits” of the proposal by the annual cost and cost impact necessary to implement the proposal, a benefit to cost ratio is estimated. A more sophisticated methodology for calculating a benefit to cost ratio is likely to be necessary at the time of actual implementation, applying to state or federal agencies for funding, or for the design and construction stage of development.

During the evaluation of all mitigation activities, a cost-benefit analysis was conducted to determine the suitability of all initiatives.

Initiatives by Hazard

This section of the plan describes the proposed initiatives included in the plan to address the hazards that have been identified as threatening the City of Greenville. The table below presents the mitigation initiatives that have been proposed to address the identified hazards posing the most risk to Greenville, as determined by the DMC. As described in Section 6 of this plan, the hazards are ranked based on risk from high to low as winter storms, wildfires, floods, thunderstorms, high winds, and earthquakes. This section is also another example of how the planning approach used by the City of Greenville has effectively used the hazard identification and risk estimation process to guide formulation of proposed initiatives.

| Initiative Description by Hazard | Secondary Hazard(s) Mitigated |
|--|-------------------------------|
| A. Winter Storms | |
| Develop a spill and industrial accidents action plan (Fleet Yard) | All other natural Hazards |
| Enhance GIS database | All other natural Hazards |
| Provide backup generators for critical facilities and key intersection | All other natural Hazards |
| Develop Riverine crews to assist with debris removal | All other natural Hazards |
| Reassessment of Reverse 911 system (bi-lingual) | All other natural Hazards |
| Incorporating NWS in post-disaster review meetings | All other natural Hazards |
| Increase number of City represented CERT program participants | All other natural Hazards |
| Underground Electricity Plan | All other natural Hazards |
| Storm Debris Removal Process Plan | All other natural Hazards |
| Stock Piling Debris Locations | All other natural Hazards |
| B. Floods | |
| Severe Rain event sewage study | A |
| Collaborate with NWS "Turn Around, Don't Drown" Campaign | N/A |
| CISM post-disaster stress relief program | All other natural Hazards |
| Installation of Rain Guages | A,F |
| White Oak Basin watershed study | All other natural Hazards |
| Address Erosion Control (Reedy River & Landfill) | N/A |
| Dwelling Elevation Program | N/A |
| Relocate Public Works facility | All other natural Hazards |
| C. Drought/Heat Wave | |
| Enhance hazards education | All other natural Hazards |
| D. Dam/Levee Failure | |
| Reedy River Dam gate sediment removal maintenance plan | All other natural Hazards |
| Stone Lake Dam restoration | All other natural Hazards |
| E. Thunderstorms | |
| Arboricultural tree study | All other natural Hazards |
| Enhance "Officer Century" emergency devices | All other natural Hazards |
| F. Tornadoes/High Winds | |
| Early warning system | E |
| G. Earthquakes | |
| Develop a plan for post-disaster nuclear power cleanup | All other natural Hazards |
| H. Wildfires | |
| Create Firebreaks around Critical Facilities | N/A |

| Initiative Description | Responsible Party |
|---|---|
| A. Prevention | |
| Develop a Spill and Industrial Accidents Action Plan (Fleet Yard) | SCDHEC, City Engineers |
| Early warning system | USGS, City Engineers, NWS |
| Develop a plan for post-disaster nuclear power cleanup | Duke Power |
| Severe rain event sewage study | USACE, City Engineers |
| Collaborate with National Weather Service "Turn Around, Don't Drown" Campaign | NWS, Emergency Management, FEMA |
| Arboricultural tree study | NWS, City Engineers, Public Works |
| Underground Electricity Plan | City Managers |
| Storm Debris Removal Process Plan | Public Works |
| Create Firebreaks around Critical Facilities | Public Works |
| B. Public Education & Awareness | |
| Enhance GIS database | GIS Department |
| CISM post-disaster stress relief program | Mental Health, Emergency Services, FEMA |
| Enhance hazards education | City Engineers, GIS, Public Works, Emergency Management, NRCS |
| Installation of rain gauges | NWS, GIS, City Engineers, Public Works |
| C. Natural Resources Protection | |
| White Oak Basin watershed study | NRCS, City Engineers |
| Address erosion control (Reedy River & Landfill) | NRCS, City Engineers, Public Works |
| Develop riverine crews to assist with debris removal | Public Works |
| Reedy River Dam gate sediment removal maintenance plan | City Engineers, Public Works |
| D. Emergency Services | |
| Reassessment of Reverse 911 System (Bilingual) | Emergency Management, City Engineers, NWS |
| Provide backup generators for key intersections and critical facilities | Public Works, City Engineers, Emergency Management |
| Enhance "Officer Century" emergency devices | Emergency Management |
| Incorporating National Weather Service in post-disaster review meetings | NWS, Emergency Management |
| Increase number of City represented CERT program participants | Emergency Management |
| E. Property Protection | |
| Dwelling Elevation Program | City Engineers |
| Relocate Public Works facility | Public Works, City Engineers |
| Stock piling debris locations | Public Works, Emergency Management |
| F. Structural Projects | |
| Stone Lake Dam restoration | City Engineers |

Potential Funding Sources

Each initiative incorporated in the City of Greenville Mitigation Plan has been ranked based on the ability to fund it, either within City budget or from outside funding sources. The DMC has consulted this list and developed a subset of the potential sources for the approved initiatives, shown in Appendix B. Then using this list, funding sources are assigned to initiatives by their respective “Primary Area”, as necessary, regarding the likely funding source. These designations are shown in the table below.

As of the current date on this plan, Greenville has not verified the true availability of all sources on this list. Some may no longer be available, while others may have come into existence since this list was developed. It is the expectation of the DMC that the agencies and organizations that sponsored a specific initiative would utilize the information given in this report to pursue funding opportunities to implement the initiative. Additional information regarding each of the potential funding sources listed in Appendix B, such as contact information, eligibility, etc., is available within the City’s database.

| Initiative Description | Funding Source Primary Area |
|---|---|
| A. Prevention | |
| Creating a Spill and Industrial Accidents Action Plan (Fleet Yard) | Support Services Grant |
| Early warning system | Infrastructure Systems Grant |
| Develop a plan for post-disaster nuclear power cleanup | Support Services Grant |
| Severe rain event sewage study | Infrastructure Systems Grant |
| Collaborate with National Weather Service "Turn Around, Don't Drown" Campaign | Public Education Grant, City of Greenville |
| Arboricultural tree study | Agricultural Assistance Grant |
| Underground Electricity Plan | Communications, General, Infrastructure Systems Grants |
| Storm Debris Removal Process Plan | General, Parks/Natural Areas Grants |
| Create Firebreaks around Critical Facilities | General, Emergency Response Equipment Grants |
| B. Public Education & Awareness | |
| Enhance GIS database | City of Greenville, Public Education Grant |
| CISM post-disaster stress relief program | Support Services Grant, City of Greenville |
| Enhance hazards education | Public Education Grant, City of Greenville |
| Installation of rain gauges | Storm Water, Flood Control Structures Grants |
| C. Natural Resources Protection | |
| White Oak Basin watershed study | NRCS Matching, Flood Control Structures Grant |
| Address erosion control (Reedy River & Landfill) | River/Stream Restoration Grant |
| Develop riverine crews to assist with debris removal | Storm Water, Flood Control Structures, Measures/Support Services Grants |
| Reedy River Dam gate sediment removal maintenance plan | General, Flood Control Structures Grants |
| D. Emergency Services | |
| Reassessment of Reverse 911 System (Bi-lingual) | Support Services, Public Education Grants |
| Provide backup generators for key intersections and critical facilities | Measures/Support Services Grants, City of Greenville |
| Enhance "Officer Century" emergency devices | City of Greenville, Emergency Response Equipment Grant |
| Incorporating National Weather Service in post-disaster review meetings | City of Greenville, General Grants |
| Increase number of City represented CERT program participants | Support Services Grant, City of Greenville |
| E. Property Protection | |
| Dwelling Elevation Program | Support Services Grant |
| Relocate Public Works facility | Emergency Services Grant |
| Stock piling debris locations | City of Greenville, General Grants |
| F. Structural Projects | |
| Stone Lake Dam restoration | Flood Control Structures Grant |

**Appendix A – Database of Hazard Events from Events from the City of
Greenville and SHEL DUS Database**

City of Greenville

Multi- Hazard Mitigation Plan

Appendix A - Recent Events

An important indication of the hazards threatening the community is the actual occurrence of disaster events, and the level of impact they have on the community. Assessment of past disasters can also be very informative regarding the types, locations, or scope of mitigation initiatives that would be needed to prevent similar damages from future events of the same type. Data on recent events was collected from four sources, Greenville County, local newspapers, the National Climatic Data Center and the SHELDES database. This list is provided in Appendix A.

The Disaster Mitigation Committee has assessed available data on past disaster events for the planning process. The DMC has begun provisions that will allow for the collection of various details regarding the costs of future disaster events to support the expansion of this plan, greater technical modeling of expected damages, and resulting actions.

The hazards identified by the Greenville County DMC are directly related to the County and its municipalities, including the City of Greenville, therefore, the content of the following Appendices will be drafted directly from the Greenville County Multi-jurisdictional Hazard Mitigation Plan.

The following list of recent events in Greenville County was obtained from several County employees during the data collection and interviewing process in the development of the GC Hazard Mitigation Plan.

County-supplied recent event data

| Event Name/Description | Primary Hazard |
|----------------------------|---------------------|
| Winter Storm Event #2003-1 | Severe Winter Storm |
| Hurricane Floyd | Flooding |
| Hurricane Fran | Flooding |
| Winter Storm Event #1996-1 | Severe Winter Storm |
| Hurricane Opal | Flooding |
| Winter Storm Event #1993-1 | Severe Winter Storm |
| Tropical Storm Jerry | Flooding |
| Hurricane Irene | Flooding |
| Flooding Event #2003-2 | Flooding |
| Sandy Flat Earthquake #2 | Earthquake |
| Winter Storm Event #2003-2 | Severe Winter Storm |
| Winter Storm Event #2002-2 | Severe Winter Storm |
| Winter Storm Event #2002-1 | Severe Winter Storm |
| Tropical Storm Hanna | Flooding |
| Tropical Storm Helena | Flooding |
| Winter Storm Event #2000-1 | Severe Winter Storm |
| Sandy Flat Earthquake #1 | Earthquake |
| Flooding Event #2003-1 | Flooding |

Winter Storms

| HAZARD BEGIN DATE | HAZARD END DATE | HAZARD TYPE | COUNTY | STATE | FIPS CODE | FATALITIES | INJURIES | PROPERTY DAMAGE | CROP DAMAGE | LOCATION | REMARKS |
|-------------------|-----------------|--|------------|-------|-----------|------------|----------|-----------------|----------------|-------------------------------------|---|
| 3/2/1960 | 3/2/1960 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.06 | 0 | \$2,777.78 | \$0.00 | NORTHERN SOUTH CAROLINA | SNOW, ICE |
| 3/9/1960 | 3/11/1960 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$1,428.57 | \$0.00 | NORTHERN AND CENTRAL SECTIONS OF SC | SNOW, SLEET, ICE |
| 1/25/1961 | 1/26/1961 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$108.70 | SOUTH CAROLINA | ICE STORM |
| 12/31/1963 | 1/1/1964 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0.57 | \$10,869.57 | \$1,086.96 | SOUTH CAROLINA | ICE |
| 1/26/1966 | 1/27/1966 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.03 | 0 | \$14,285.71 | \$0.00 | CENTRAL AND NORTH SECTIONS OF STATE | ICE, SNOW |
| 1/29/1966 | 1/30/1966 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.15 | 0 | \$0.00 | \$10,869.57 | STATEWIDE | SEVERE COLD-ICE AND SNOE |
| 1/9/1968 | 1/13/1968 | SEVERE STORM/THUNDER STORM, WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$15,625.00 | \$1.56 | NORTHERN 2/3 OF STATE | RAIN, SLEET, SNOW, AND FREEZING RAIN |
| 2/15/1969 | 2/17/1969 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.04 | 0 | \$10,638.30 | \$1,063,829.79 | STATEWIDE | SNOW, SLEET AND FREEZING RAIN |
| 3/25/1971 | 3/25/1971 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.39 | 0.67 | \$27,777.78 | \$27.78 | NORTHERN HALF OF STATE | SNOW/STORM |
| 12/3/1971 | 12/3/1971 | SEVERE STORM/THUNDER STORM, WIND, WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$10,869.57 | SOUTH CAROLINA | SNOW, SLEET, FREEZING RAIN, RAIN, WINDS |
| 4/1/1972 | 4/30/1972 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$56,818.18 | STATE | COLD SPELL |
| 1/7/1973 | 1/8/1973 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$108,695.65 | STATEWIDE | SNOW & ICE |
| 2/9/1973 | 2/10/1973 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.2 | 0 | \$108,695.65 | \$108.70 | STATEWIDE | SNOW/STORM |
| 4/11/1973 | 4/12/1973 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$27,777.78 | NORTHWEST & NORTHERN SC | FROST & FREEZE |
| 3/18/1974 | 3/18/1974 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$833.33 | NORTHWESTERN SC | FREEZE |
| 10/3/1974 | 10/4/1974 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$1,282.05 | \$0.00 | WESTERN, NORTHERN, CENTRAL SC | FROST, FREEZE |
| 2/3/1975 | 2/3/1975 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$2,777.78 | \$277.78 | NORTHWEST AND NORTH | ICE STORM |
| 3/2/1975 | 3/2/1975 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$1,086.96 | STATEWIDE | LOW TEMPERATURES |
| 2/6/1979 | 2/6/1979 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$166,666.67 | \$166.67 | | SNOW, SLEET, ICE |
| 2/17/1979 | 2/18/1979 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.04 | 0 | \$10,869.57 | \$108.70 | | SNOW, SLEET, FREEZING RAIN |
| 2/5/1980 | 2/6/1980 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$108.70 | | SNOW/STORM |
| 2/9/1980 | 2/9/1980 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$8,333.33 | \$83.33 | | SNOW/STORM |
| 3/1/1980 | 3/2/1980 | SEVERE STORM/THUNDER STORM, WINTER WEATHER | GREENVILLE | SC | 45045 | 0.02 | 0 | \$1,086.96 | \$1,086.96 | | SNOW, FREEZING RAIN, DRIZZLE AND SLEET |
| 12/31/1981 | 12/31/1981 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$8,333.33 | \$0.00 | | FREEZING RAIN, SLEET |
| 1/12/1982 | 1/12/1982 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$1,786.00 | \$176.00 | ALL BUT COASTAL PLAIN | SNOW/SLEET/FREEZING RAIN |
| 2/26/1982 | 2/26/1982 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$1,087.00 | \$0.00 | STATEWIDE | SNOW/SLEET/GLAZE |
| 3/27/1982 | 3/27/1982 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$108,696.00 | STATEWIDE | EXTREME COLD |
| 4/7/1982 | 4/7/1982 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$1,250,000.00 | STATEWIDE, EXCEPT SOUTHERN | FROST/FREEZE |
| 1/21/1983 | 1/21/1983 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$10.87 | STATEWIDE | FREEZING RAIN, SLEET, SNOW |
| 2/5/1983 | 2/5/1983 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$8,333.33 | \$0.00 | NORTHWESTERN SC | SNOW, FREEZING RAIN |
| 4/17/1983 | 4/17/1983 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$1,086,956.52 | STATEWIDE | EXTREME COLD |
| 12/25/1983 | 12/25/1983 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.59 | 0 | \$10,869.57 | \$10,869.57 | STATEWIDE | EXTREME COLD |
| 12/30/1983 | 12/30/1983 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.04 | 0 | \$1,086.96 | \$108.70 | STATEWIDE | EXTREME COLD |
| 1/13/1984 | 1/13/1984 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$1,785.71 | \$178.57 | | FREEZING RAIN/GLAZE |
| 1/20/1985 | 1/24/1985 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.33 | 0 | \$10,869.57 | \$1,086.96 | | EXTREME COLD/SNOW |
| 2/11/1985 | 2/12/1985 | HAIL, SEVERE STORM/THUNDER STORM, WIND, WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$1.09 | | WIND/SNOW/HAIL/THUND ERSTORMS |
| 3/19/1985 | 3/19/1985 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$1,086.96 | | FROST/FREEZE |
| 4/10/1985 | 4/10/1985 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$83,333.33 | | EXTREME COLD |
| 1/27/1986 | 1/28/1986 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$10.87 | | COLD |
| 3/22/1986 | 3/23/1986 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$1,086.96 | | COLD |
| 4/23/1986 | 4/24/1986 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$1,086.96 | | FROST, FREEZE |
| 1/25/1987 | 1/25/1987 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$8,333.33 | \$83.33 | | ICE STORM |
| 2/16/1987 | 2/16/1987 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.06 | 0 | \$2,777.78 | \$277.78 | | ICE STORM |
| 4/1/1987 | 4/1/1987 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$1,250.00 | | FREEZE |
| 1/7/1988 | 1/11/1988 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$0.00 | STATEWIDE | SNOW, ICE/SLEET |
| 2/17/1989 | 2/17/1989 | SEVERE STORM/THUNDER STORM, WINTER WEATHER | GREENVILLE | SC | 45045 | 0.02 | 0 | \$10,869.57 | \$0.00 | | SEVERE STORM-ICE/SLEET |
| 2/17/1989 | 2/17/1989 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$83,333.33 | \$0.00 | ZONES 1 AND 2 | ICE STORM |
| 2/23/1989 | 2/23/1989 | SEVERE STORM/THUNDER STORM, WINTER WEATHER | GREENVILLE | SC | 45045 | 0.07 | 0 | \$1,086.96 | \$0.00 | | SEVERE STORM-SNOW |
| 2/23/1989 | 2/23/1989 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$0.00 | STATEWIDE | HEAVY SNOW |
| 4/12/1989 | 4/12/1989 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$2,631.58 | \$0.00 | NORTHWEST SC (ZONES 1 THRU 4) | FREEZE |
| 5/8/1989 | 5/8/1989 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$4,166.67 | NORTHWEST SC (ZONES 1-3) | FROST |
| 12/22/1989 | 12/22/1989 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.15 | 0.09 | \$10,869.57 | \$0.00 | | EXTREME COLD |
| 12/22/1989 | 12/22/1989 | WINTER WEATHER | GREENVILLE | SC | 45045 | 2 | 0 | \$14,285.71 | \$0.00 | ZONES 1 THRU 6 | EXTREME COLD |
| 12/22/1989 | 12/22/1989 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0.13 | 0.07 | \$108,695.65 | \$0.00 | | EXTREME COLD |
| 3/21/1990 | 3/21/1990 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$108,695.65 | | EXTREME COLD |
| 12/10/1992 | 12/10/1992 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$16,667.00 | \$0.00 | | ICE STORM |
| 12/27/1992 | 12/28/1992 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$18,519.00 | \$18,519.00 | | ICE STORM |
| 2/11/1994 | 2/11/1994 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$263,157.89 | \$0.00 | NORTHWEST; NORTH & NO | ICE STORM |
| 1/6/1995 | 1/6/1995 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$11,111.11 | \$0.00 | | FREEZING RAIN |
| 1/7/1996 | 1/7/1996 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$5,555.00 | \$0.00 | | WINTER STORM |
| 1/7/1996 | 1/7/1996 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$5,555.00 | \$0.00 | | WINTER STORM |
| 3/8/1996 | 3/8/1996 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$1,333,330.00 | GREENVILLE | EXTREME COLD |
| 1/9/1997 | 1/9/1997 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$40,000.00 | \$0.00 | | ICE STORM |
| 1/2/1999 | 1/3/1999 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$2,002,000.00 | \$0.00 | | ICE STORM |
| 12/4/2002 | 12/4/2002 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$9,090,909.09 | \$0.00 | | |
| 2/26/2004 | 2/26/2004 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$237,500.00 | \$0.00 | | |
| 12/15/2005 | 12/15/2005 | WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$300,000.00 | \$0.00 | | FROST, FREEZE |

Drought/Heat Wave

| HAZARD BEGIN DATE | HAZARD END DATE | HAZARD TYPE | COUNTY | STATE | FIPS CODE | FATALITIES | INJURIES | PROPERTY DAMAGE | CROP DAMAGE | LOCATION | REMARKS |
|-------------------|-----------------|----------------|------------|-------|-----------|------------|----------|-----------------|-------------|----------|----------------------|
| 7/1/1993 | 7/31/1993 | Drought - Heat | Greenville | SC | 45045 | 0 | 0 | 10869565.2 | 0 | | Drought, Hot Weather |
| 7/1/1986 | 7/31/1986 | Drought | Greenville | SC | 45045 | 0 | 0 | 108695.65 | 1086956.52 | | Drought |
| 7/1/1977 | 7/31/1977 | Drought - Heat | Greenville | SC | 45045 | 0 | 0 | 1086.96 | 108695.65 | | Drought, Heat |
| 6/1/1988 | 6/30/1988 | Drought | Greenville | SC | 45045 | 0 | 0 | 1086.96 | 10869.57 | | Drought |
| 6/1/1983 | 6/1/1983 | Drought - Heat | Greenville | SC | 45045 | 0 | 0 | 1086.96 | 1086956.52 | | Heat, Drought |
| 6/1/1986 | 6/30/1986 | Drought | Greenville | SC | 45045 | 0 | 0 | 1086.96 | 10869.57 | | Drought |
| 10/1/1978 | 10/31/1978 | Drought - Heat | Greenville | SC | 45045 | 0 | 0 | 108.7 | 1086.96 | | Drought, Dry Weather |
| 7/1/1988 | 7/31/1988 | Drought | Greenville | SC | 45045 | 0 | 0 | 108.7 | 1086.96 | | Drought |
| 4/1/1978 | 4/13/1978 | Drought | Greenville | SC | 45045 | 0 | 0 | 10.87 | 1086.96 | | Drought |
| 2/1/1988 | 2/28/1988 | Drought | Greenville | SC | 45045 | 0 | 0 | 10.87 | 1086.96 | | Drought |
| 8/1/1988 | 8/31/1988 | Drought | Greenville | SC | 45045 | 0 | 0 | 1.39 | 1388.89 | | Drought |
| 6/1/1984 | 6/20/1984 | Drought | Greenville | SC | 45045 | 0 | 0 | 0 | 1086.96 | | Drought |
| 5/1/1986 | 5/31/1986 | Drought | Greenville | SC | 45045 | 0 | 0 | 0 | 10869.57 | | Drought |
| 5/1/1994 | 5/31/1994 | Drought | Greenville | SC | 45045 | 0 | 0 | 0 | 1086956.52 | | DROUGHT |
| 5/1/1995 | 5/31/1995 | Drought | Greenville | SC | 45045 | 0 | 0 | 0 | 434782.61 | | DROUGHT |

Wildfires

| HAZARD BEGIN DATE | HAZARD END DATE | HAZARD TYPE | COUNTY | STATE | FIPS CODE | FATALITIES | INJURIES | PROPERTY DAMAGE | CROP DAMAGE | LOCATION | REMARKS |
|-------------------|-----------------|-------------|------------|-------|-----------|------------|----------|-----------------|--------------|-----------|--------------|
| 4/1/1985 | 4/30/1985 | WILDFIRE | GREENVILLE | SC | 45045 | 0.02 | 0.04 | \$108.70 | \$10,869.57 | | FIRE |
| 3/15/1966 | 3/31/1966 | WILDFIRE | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$0.00 | STATEWIDE | FOREST FIRES |
| 3/1/1985 | 3/21/1985 | WILDFIRE | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$108,695.65 | | FIRE |

Flooding

| HAZARD BEGIN DATE | HAZARD END DATE | HAZARD TYPE | COUNTY | STATE | FIPS CODE | FATALITIES | INJURIES | PROPERTY DAMAGE | CROP DAMAGE | LOCATION | REMARKS |
|----------------------|--------------------|---|------------|-------|-----------|------------|----------|--------------------|----------------|-----------------------------------|--|
| 3/1/1966 | 3/5/1966 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$1,086.96 | STATEWIDE | FLOODING |
| 2/3/1973 | 2/3/1973 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$1.09 | STATEWIDE | FLOODING |
| 3/12/1975 | 3/12/1975 | FLOODING, SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$108.70 | STATEWIDE | HEAVY RAINS, FLOODING |
| 9/18/1975 | 9/18/1975 | FLOODING, LIGHTNING, SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0.5 | 1.5 | \$250,000.00 | \$2,500.00 | GREENVILLE CO | HEAVY RAINS AND FLASH FLOODING, LIGHTNING |
| 5/28/1976 | 5/29/1976 | FLOODING | GREENVILLE | SC | 45045 | 0.67 | 2.33 | \$166,666.67 | \$1,666.67 | | FLASH FLOOD |
| 10/7/1976 | 10/7/1976 | FLOODING, SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$500.00 | GREENVILLE | HEAVY RAINS, FLASH FLOODING |
| 10/8/1976 | 10/9/1976 | FLOODING, SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0.33 | \$83,333.33 | \$8,333.33 | | HEAVY RAINS, FLASH FLOODING |
| 10/9/1976 | 10/19/1976 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$10,869.57 | | FLOOD |
| 11/5/1977 | 11/6/1977 | FLOODING, SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$25,000.00 | \$0.00 | | HEAVY RAIN, FLASH FLOOD |
| 1/25/1978 | 1/26/1978 | FLOODING, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$1.09 | | WIND, FLASH FLOOD |
| 1/26/1978 | 1/31/1978 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$0.00 | | FLOOD |
| 8/6/1978 | 8/7/1978 | FLOODING, SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$125,000.00 | \$1,250.00 | | HEAVY RAIN, FLOOD |
| 3/23/1979 | 3/23/1979 | FLOODING, SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 1.33 | \$16,666.67 | \$0.00 | | WIND, RAIN, FLOODING |
| 6/2/1979 | 6/2/1979 | FLOODING, SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$500.00 | | RAIN, FLOODING |
| 3/15/1980 | 3/31/1980 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$1,086.96 | | FLOOD |
| 8/8/1980 | 8/8/1980 | FLOODING, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$108.70 | | WIND, FLOOD |
| 3/17/1983 | 3/17/1983 | COASTAL, FLOODING, SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0.07 | 0 | \$10,869.57 | \$1,086.96 | STATEWIDE | WIND, RAIN, FLOODING, BEACH EROSION |
| 12/6/1983 | 12/6/1983 | FLOODING, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$1,282.05 | \$12.82 | WESTERN, NORTHERN & CENTRAL | FLOOD, WIND |
| 2/27/1984 | 2/27/1984 | FLOODING, SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$1,086.96 | \$10.87 | | RAIN/WIND/FLOOD |
| 7/12/1984 | 7/12/1984 | FLOODING, LIGHTNING, WIND | GREENVILLE | SC | 45045 | 0 | 2 | \$50,000.00 | \$0.00 | GREER | LIGHTNING/WIND/FLOOD |
| 7/26/1984 | 7/26/1984 | FLOODING, SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0.07 | \$1,086.96 | \$10.87 | | WIND/RAIN/FLOOD |
| 8/16/1985 | 8/18/1985 | FLOODING, SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$6,250.00 | \$6,250.00 | | FLOOD/RAIN |
| 3/17/1990 | 3/17/1990 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | GREENVILLE VIC. | FLOOD |
| 10/11/1990 | 10/11/1990 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$0.00 | | FLOOD |
| 7/30/1991 | 7/30/1991 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | GREENVILLE | FLASH FLOOD |
| 7/28/1994 | 7/28/1994 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | GREENVILLE COUNTY | |
| 8/17/1994 | 8/17/1994 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$500,000.00 | \$5,000,000.00 | GREENVILLE COUNTY | |
| 8/26/1995 | 8/26/1995 | FLOODING | GREENVILLE | SC | 45045 | 1 | 5 | \$5,000,000.00 | \$0.00 | GREENVILLE COUNTY | |
| 8/27/1995 | 8/27/1995 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$2,000,000.00 | \$0.00 | GREENVILLE COUNTY | |
| 8/27/1995 | 8/27/1995 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$500,000.00 | \$0.00 | GREENVILLE COUNTY | |
| 1/7/1998 | 1/7/1998 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | GREENVILLE | |
| 6/30/2002 | 6/30/2002 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | | |
| 3/20/2003 | 3/20/2003 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$1,000,000.00 | \$0.00 | | |
| 8/7/2003 | 8/7/2003 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$10,000.00 | \$0.00 | | |
| 7/29/2004 | 7/29/2004 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$3,500,000.00 | \$0.00 | | |
| 9/7/2004 | 9/7/2004 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$15,000.00 | \$0.00 | | |
| 9/7/2004 | 9/7/2004 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$8,000.00 | \$0.00 | | |
| 9/9/2004 | 9/9/2004 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | | |
| 9/27/2004 | 9/27/2004 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$20,000.00 | \$0.00 | | |
| 7/7/2005 | 7/7/2005 | FLOODING | GREENVILLE | SC | 45045 | 0 | 0 | \$300,000.00 | \$0.00 | | |

Tornado/High Winds

| HAZARD BEGIN DATE | HAZARD END DATE | HAZARD TYPE | COUNTY | STATE | FIPS CODE | FATALITIES | INJURIES | PROPERTY DAMAGE | CROP DAMAGE | LOCATION | REMARKS |
|----------------------|--------------------|-------------|------------|-------|--------------|------------|----------|--------------------|----------------|----------|-----------------------|
| 6/21/1964 | 6/21/1964 | TORNADO | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | | TORNADO |
| 5/2/1967 | 5/2/1967 | TORNADO | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | | TORNADO |
| 7/12/1967 | 7/12/1967 | TORNADO | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | | TORNADO |
| 5/27/1973 | 5/27/1973 | TORNADO | GREENVILLE | SC | 45045 | 0 | 15.33 | \$166,666.67 | \$16,666.67 | | TORNADO |
| 3/23/1979 | 3/23/1979 | TORNADO | GREENVILLE | SC | 45045 | 0 | 2 | \$5,000,000.00 | \$0.00 | | TORNADO |
| 2/10/1990 | 2/10/1990 | TORNADO | GREENVILLE | SC | 45045 | 0 | 0 | \$500,000.00 | \$0.00 | | TORNADO |
| 10/5/1995 | 10/5/1995 | TORNADO | GREENVILLE | SC | 45045 | 0 | 0 | \$75,000.00 | \$0.00 | | TORNADO |
| 11/11/2002 | 11/11/2002 | TORNADO | GREENVILLE | SC | 45045 | 0 | 0 | \$250,000.00 | \$0.00 | | |
| 11/11/2002 | 11/11/2002 | TORNADO | GREENVILLE | SC | 45045 | 0 | 0 | \$2,000.00 | \$0.00 | | |
| 3/13/1993 | 3/13/1993 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$5555.56 | \$ 55,555.56 | | High Winds |
| 2/23/2003 | 2/23/2003 | WIND | GREENVILLE | SC | 45045 | 2 | 0 | 50000 | 0 | | |
| 3/28/1984 | 3/28/1984 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 50000 | 50000 | | Hail/Wind |
| 11/11/1995 | 11/11/1995 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 35714.29 | 0 | | HIGH WINDS |
| 3/8/1995 | 3/8/1995 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 13000 | 0 | | HIGH WINDS |
| 7/10/1980 | 7/10/1980 | WIND | GREENVILLE | SC | 45045 | 0.2 | 0 | 12500 | 1250 | | wind, lightning |
| 4/2/2005 | 4/2/2005 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 11666.66 | 0 | | HIGH WIND |
| 3/7/2004 | 3/7/2004 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 10909.09 | 0 | | |
| 2/3/1998 | 2/3/1998 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 10000 | 0 | | HIGH WIND |
| 6/2/1985 | 6/2/1985 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 8333.33 | 8333.33 | | Hail/Wind |
| 4/3/1974 | 4/3/1974 | WIND | GREENVILLE | SC | 45045 | 0.5 | 0 | 8333.33 | 833.33 | | HAIL, WIND |
| 9/16/2004 | 9/17/2004 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 7500 | 0 | | High Wind |
| 9/7/2004 | 9/7/2004 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 5000 | 0 | | High Wind |
| 5/13/1997 | 5/13/1997 | WIND | GREENVILLE | SC | 45045 | 6 | 0 | 3000 | 0 | | GUSTY WINDS |
| 7/28/1968 | 7/28/1968 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 2500 | 0 | | Windstorm |
| 4/15/2008 | 4/15/2008 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 2000 | 0 | | Dust Devil |
| 3/7/2004 | 3/7/2004 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 2000 | 0 | | |
| 3/22/1968 | 3/22/1968 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1666.67 | 0 | | Windstorm |
| 3/2/1972 | 3/2/1972 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1666.67 | 0 | | Wind |
| 8/23/1983 | 8/23/1983 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1428.57 | 0 | | Wind, Lightning |
| 4/8/1974 | 4/8/1974 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1388.89 | 1.39 | | WIND, ELECTRICAL |
| 12/6/1983 | 12/6/1983 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1282.05 | 12.82 | | Flood, Wind |
| 2/25/1980 | 2/25/1980 | WIND | GREENVILLE | SC | 45045 | 0 | 0.04 | 1087 | 0 | | windstorm |
| 8/8/1980 | 8/8/1980 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1086.96 | 108.7 | | wind, flood |
| 6/7/1985 | 6/7/1985 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1086.96 | 108.7 | | Hail/Wind |
| 7/14/1977 | 7/14/1977 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1086.96 | 10.87 | | Wind, Lightning |
| 3/16/1981 | 3/16/1981 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1086.96 | 1.09 | | High Winds |
| 1/3/1989 | 1/3/1989 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1086.96 | 1.09 | | HIGH WIND |
| 3/21/1974 | 3/21/1974 | WIND | GREENVILLE | SC | 45045 | 0.15 | 0 | 1086.96 | 108.7 | | HIGH WINDS |
| 7/25/1983 | 7/25/1983 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1086.96 | 10.87 | | Wind, Lightning |
| 5/15/1975 | 5/15/1975 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1086.96 | 10.87 | | Wind, Lightning |
| 3/24/1975 | 3/24/1975 | WIND | GREENVILLE | SC | 45045 | 0.3 | 0 | 1086.96 | 10.87 | | Wind, Lightning, Hail |
| 7/3/2006 | 7/3/2006 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1000 | 0 | | Strong Wind |
| 3/10/2002 | 3/10/2002 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 1000 | 0 | | |
| 6/5/1975 | 6/5/1975 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 384.62 | 38.46 | | Wind, hail |
| 11/20/1974 | 11/20/1974 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 238.1 | 0 | | Wind |
| 1/18/1996 | 1/18/1996 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 166.67 | 0 | | HIGH WIND |
| 11/21/1973 | 11/21/1973 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 147.06 | 0 | | Windstorm |
| 2/18/1960 | 2/18/1960 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 142.86 | 0 | | WINDSTORMS, HAIL |
| 11/23/1961 | 11/23/1961 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 108.7 | 0 | | Windstorm |
| 1/20/1964 | 1/20/1964 | WIND | GREENVILLE | SC | 45045 | 0.02 | 0 | 108.7 | 0 | | Windstorm |
| 2/25/1961 | 2/25/1961 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 108.7 | 0 | | High Winds |
| 12/31/1975 | 12/31/1975 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 108.7 | 0 | | Strong winds |
| 3/30/1974 | 3/30/1974 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 0 | 38.46 | | High winds and hail |
| 5/16/1963 | 5/16/1963 | WIND | GREENVILLE | SC | 45045 | 0 | 0 | 0 | 2777.78 | | |

Severe Storms/Thunderstorms

| HAZARD BEGIN DATE | HAZARD END DATE | HAZARD TYPE | COUNTY | STATE | FIPS CODE | FATALITIES | INJURIES | PROPERTY DAMAGE | CROP DAMAGE | LOCATION | REMARKS |
|-------------------|-----------------|--|------------|-------|-----------|------------|----------|-----------------|-------------|--|---|
| 6/20/1961 | 6/21/1961 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$16,666.67 | \$16,666.67 | NORTHERN PARTS OF OCONEE, PICKENS, AND GREENVILLE COUNTIES | HEAVY RAIN |
| 3/5/1963 | 3/6/1963 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0.17 | 0 | \$8,333.33 | \$0.00 | UPSTATE SC | RAINSTORM |
| 3/12/1963 | 3/13/1963 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$8,333.33 | \$0.00 | UPSTATE SC | RAINSTORM |
| 4/6/1964 | 4/8/1964 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$83,333.33 | \$83,333.33 | NORTHWESTERN SOUTH CAROLINA | HEAVY RAINS |
| 10/4/1964 | 10/6/1964 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0.02 | 0 | \$10,869.57 | \$10,869.57 | STATEWIDE | RAINSTORM |
| 10/15/1964 | 10/16/1964 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$0.00 | \$1,086.96 | STATEWIDE | RAINSTORM |
| 8/20/1967 | 8/25/1967 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$108.70 | GREENVILLE | RAIN |
| 1/9/1968 | 1/13/1968 | SEVERE STORM/THUNDER STORM, WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$15,625.00 | \$1.56 | NORTHERN 2/3 OF STATE | RAIN, SLEET, SNOW, AND FREEZING RAIN |
| 9/19/1969 | 9/19/1969 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | GREENVILLE | RAINSTORM |
| 9/19/1970 | 9/19/1970 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | GREENVILLE COUNTY | THUNDERSTORM, HIGH WINDS |
| 12/3/1971 | 12/3/1971 | SEVERE STORM/THUNDER STORM, WIND, WINTER WEATHER | GREENVILLE | SC | 45045 | 0 | 0 | \$10,869.57 | \$10,869.57 | SOUTH CAROLINA | SNOW, SLEET, FREEZING RAIN, RAIN, WINDS |
| 3/1/1980 | 3/2/1980 | SEVERE STORM/THUNDER STORM, WINTER WEATHER | GREENVILLE | SC | 45045 | 0.02 | 0 | \$1,086.96 | \$1,086.96 | | SNOW, FREEZING RAIN, DRIZZLE AND SLEET |
| 12/3/1983 | 12/3/1983 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$1,923.08 | \$192.31 | WESTERN & CENTRAL | WIND, HEAVY RAIN |
| 7/16/1988 | 7/16/1988 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$50.00 | TIGERVILLE | SEVERE STORM-WIND |
| 2/17/1989 | 2/17/1989 | SEVERE STORM/THUNDER STORM, WINTER WEATHER | GREENVILLE | SC | 45045 | 0.02 | 0 | \$10,869.57 | \$0.00 | | SEVERE STORM-ICE/SLEET |
| 2/23/1989 | 2/23/1989 | SEVERE STORM/THUNDER STORM, WINTER WEATHER | GREENVILLE | SC | 45045 | 0.07 | 0 | \$1,086.96 | \$0.00 | | SEVERE STORM-SNOW |
| 6/5/1989 | 6/5/1989 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | TAYLORS | TSTM WIND |
| 6/5/1989 | 6/5/1989 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | GREER | TSTM WIND |
| 4/10/1990 | 4/10/1990 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 4 | \$50,000.00 | \$0.00 | GREER | SEVERE STORM-WIND |
| 7/1/1990 | 7/1/1990 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$50,000.00 | | SEVERE STORM-WIND |
| 6/9/1992 | 6/9/1992 | SEVERE STORM/THUNDER STORM | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | GREENVILLE | HEAVY RAIN |
| 7/21/1992 | 7/21/1992 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$50,000.00 | \$0.00 | GREENVILLE D | THUNDERSTORM WINDS |
| 7/6/1999 | 7/6/1999 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$10,000.00 | \$0.00 | | |
| 8/1/1999 | 8/1/1999 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$65,000.00 | \$0.00 | | |
| 7/22/2000 | 7/22/2000 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$130,000.00 | \$0.00 | | |
| 6/30/2002 | 6/30/2002 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$10,000.00 | \$0.00 | | |
| 7/1/2002 | 7/1/2002 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$10,000.00 | \$0.00 | | |
| 8/18/2002 | 8/18/2002 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$25,000.00 | \$0.00 | | |
| 8/16/2003 | 8/16/2003 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$300,000.00 | \$0.00 | | |
| 7/5/2004 | 7/5/2004 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$150,000.00 | \$0.00 | | |
| 4/22/2005 | 4/22/2005 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$25,000.00 | \$0.00 | | |
| 6/25/2007 | 6/25/2007 | SEVERE STORM/THUNDER STORM, WIND | GREENVILLE | SC | 45045 | 0 | 0 | \$10,000.00 | \$0.00 | | |

Earthquake

| HAZARD BEGIN DATE | HAZARD END DATE | HAZARD TYPE | COUNTY | STATE | FIPS CODE | FATALITIES | INJURIES | PROPERTY DAMAGE | CROP DAMAGE | LOCATION | REMARKS |
|-------------------|-----------------|-------------|------------|-------|-----------|------------|----------|-----------------|-------------|----------------|---------|
| Post 1990 | | Earthquake | Greenville | SC | 45045 | 0 | 0 | | | Sandy Flats #1 | |
| Post 1990 | | Earthquake | Greenville | SC | 45045 | 0 | 0 | | | Sandy Flats #2 | |

Appendix B – Potential Funding Sources

Greenville County Multi-jurisdictional Hazard Mitigation Plan

Funding Report by Primary Area

Primary Funding Area: Agricultural Assistance

Program: **Conservation Reserve**

Agency: Farm Service Agency, USDA

Agency Type: Federal

Description: To protect the nation's long-term capability to produce food and fiber; to reduce soil erosion and sedimentation, improve water quality, and create a better habitat for wildlife. Created to encourage farmers to convert highly erodible cropland or other environmentally sensitive acreages, CRP promotes vegetative cover, such as cool season or native grasses, wildlife plantings, or trees. Landowners receive an annual rental payment for the term of the multi-year contract, \$50,000 per accepted application per fiscal year.

Matching Requirement: 50 *Phone:* 202-720-1872 *Webpage:* www.fsa.usda.gov/dafp/cepd

Program: **Emergency Conservation**

Agency: Farm Service Agency, USDA

Agency Type: Federal

Description: Provides emergency funding to rehabilitate farmland damaged by wind erosion, floods, hurricanes, or other natural disasters, and for carrying out emergency water conservation measures during periods of severe drought. During severe drought, ECP also provides emergency water assistance — both for livestock and for existing irrigation systems for orchards and vineyards. ECP may be made available in areas without regard to a Presidential or Secretarial emergency disaster designation.

Matching Requirement: 0 *Phone:* 202-720-7807 *Webpage:* www.fsa.usda.gov/pas/disaster

Program: **Emergency Haying and Grazing Assistance**

Agency: Farm Service Agency, USDA

Agency Type: Federal

Description: Emergency haying and grazing of certain Conservation Reserve Program acreage may be made available in areas suffering from weather-related natural disaster. Requests for assistance may be initiated by FSA county committees. The State committee then makes a recommendation to the Deputy Administrator for Farm Programs.

Matching Requirement: 0 *Phone:* by state *Webpage:* www.fsa.usda.gov/pas/disaster

Program: **Emergency Loan Assistance**

Agency: Farm Service Agency, Loan Making Division, USDA

Agency Type: Federal

Description: FSA provides low-interest loan assistance to eligible farmers to help cover production and physical losses in counties declared as disaster areas by the President or designated by the Secretary of Agriculture. The FSA Administrator may also authorize loan assistance to cover physical losses only. The loan limit is up to 80 percent of actual production loss (i.e., the value of lost crops, milk etc.), or 100 percent of the actual physical loss, with a maximum indebtedness under this program of \$500,000. Loans for crop, livestock, and non-real-estate losses are normally repaid in 1 to 7 years depending upon the loan purpose, repayment ability, and collateral available as loan security. In special circumstances, terms of up to 20 years may be authorized. Loans for physical losses to real estate must normally be repaid within 30 years. In unusual circumstances, repayment may be extended over a maximum of 40 years.

Matching Requirement: 0 *Phone:* 202-720-7807 *Webpage:* www.fsa.usda.gov/pas/disaster/emloan

Program: **Environmental Quality Incentives Program**

Agency: Natural Resources Conservation Service, USDA

Agency Type: Federal

Description: Provides a single, voluntary conservation program for farmers and ranchers to address significant natural resource needs and objectives. Nationally, it provides technical, financial, and educational

assistance, half of it targeted to livestock-related natural resource concerns and the other half to more general conservation priorities

Matching Requirement: 25 *Phone:* 202-720-1873 *Webpage:* www.epa.gov/owow/watershed/wacade

Program: **Farmland Protection**

Agency: Natural Resource Conservation Service, USDA *Agency Type:* Federal

Description: To purchase conservation easements or other interests on lands to limit conversion to non-agricultural uses of farmland with prime, unique, or other productive soils.

Matching Requirement: 50 *Phone:* 202-690-0639 *Webpage:* www.info.usda.gov/nrcs/fpcp/fpp.htm

Program: **National Disaster Assistance Program**

Agency: Farm Service Agency, Emergency Conservation Program; Non- Insured Assistance Program Division, USDA *Agency Type:* Federal

Description: Provides emergency food assistance to supply eligible livestock and low-interest loans to farmers and rural people for housing, production and physical losses, restoring damaged land and control of disease. The program is used in the event feed sources such as grazing, foraging, and feed crops have been lost due to some natural disaster. A number of eligibility requirements apply as well as some use restrictions.

Matching Requirement: 0 *Phone:* 202-720-2791 *Webpage:* www.usda.gov

Program: **Noninsured Crop Disaster Assistance Program**

Agency: Farm Service Agency, USDA *Agency Type:* Federal

Description: Provides financial assistance to eligible producers affected by natural disasters. This federally-funded program covers non-insurable crop losses and planting prevented by disasters in cases where the expected unit production of the crop is reduced by more than 50 percent; or prevented the farmer from planting more than 35 percent of the intended crop acreage

Matching Requirement: 0 *Phone:* 202-720-7807 *Webpage:* www.fsa.usda.gov/pas/disaster/default.

Program: **Pesticide Environmental Stewardship Grants**

Agency: Office of Prevention, Pesticides, and Toxic Substances, EPA *Agency Type:* Federal

Description: Forms voluntary partnerships with pesticide users to reduce the risks from pesticides in agricultural and non-agricultural settings, and implement pollution prevention measures.

Matching Requirement: 0 *Phone:* 703-308-7035 *Webpage:* www.epa.gov/owow/watershed/wacade

Program: **Plant and Animal Disease, Pest Control, and Animal Care**

Agency: Animal and Plant Health Inspection Service, Dept. of Agriculture *Agency Type:* Federal

Description: To protect U.S. agriculture from economically injurious plant and animal diseases and pests, ensure the safety and potency of veterinary biologic, and ensure the humane treatment of animals. Recipients share some project or program costs.

Matching Requirement: 0 *Phone:* 301-734-8792. *Webpage:* www.aphis.usda.gov

Program: **Soil and Water Conservation**

Agency: Natural Resource Conservation Service, USDA *Agency Type:* Federal

Description: To help people conserve, improve, and sustain the natural resources and environment, it provides cost share and incentive payments to farmers and ranchers to voluntarily address threats to soil, water, and related natural resources, including grazing land, wetlands, and wildlife habitat. There will be a five to ten year contract period.

Matching Requirement: 25 *Phone:* 202-720-7730 *Webpage:* www.nrcs.usda.gov/NRCSProg.html

Primary Funding Area: Communications

Program: Public Telecommunications Facilities: Planning and Construction

Agency: Public Telecommunications Facilities Program, Office of Telecommunications and Information Applications/NTIA, DOC **Agency Type:** Federal

Description: Assists in the planning, acquisition, installation and modernization of public telecommunications facilities, through planning grants and matching construction grants, in order to: a) extend delivery of public telecommunications services to as many citizens of the United States and territories as possible by the most efficient and economical means, including the use of broadcast and non-broadcast technologies; b) increase public telecommunications services and facilities available to, operated by and owned by minorities and women; and c) strengthen the capability of existing public television and radio stations to provide public telecommunications service to the public.

Matching Requirement: 0 **Phone:** 202-482-5802. **Webpage:** aspe.os.dhhs.gov/cfda/p11550.htm

Primary Funding Area: Emergency Response Equipment

Program: Assistance to Firefighters

Agency: USFA, FEMA **Agency Type:** Federal

Description: Funding to enhance local and tribal nation fire department capabilities to protect the health and safety of the public, and of firefighting personnel facing fire and fire-related hazards. Categories include training, wellness/fitness programs, fire fighting vehicles, fire fighting equipment, personal protective equipment, and fire prevention programs.

Matching Requirement: 0 **Phone:** 866- 274-0960 **Webpage:** www.usfa.fema.gov/grants

Program: Fire Management

Agency: Fish and Wildlife Service, DOI **Agency Type:** Federal

Description: Technical assistance to governments and sharing of federal fire-fighting resources with other governmental entities for prevention, use, suppression.

Matching Requirement: 0 **Phone:** 202-205-1657 **Webpage:** www.fs.fed.us/fire/fire_new/manageme

Program: State Domestic Preparedness Equipment Support

Agency: Office of Justice Programs, DOJ **Agency Type:** Federal

Description: To plan for and execute a comprehensive threat and needs assessment, to develop a 3-year plan to enhance first responder capabilities, and to provide for equipment purchases and the provision of specialized training.

Matching Requirement: 0 **Phone:** 202-305-9887 **Webpage:** aspe.os.dhhs.gov/cfda/p16007.htm#i37

Program: Wildland Urban Interface Community and Rural Fire Assistance

Agency: Bureau of Land Management, DOI **Agency Type:** Federal

Description: To assist communities at risk from catastrophic wildland fires by providing assistance to provide community programs that develop local capability including; assessment and planning, mitigation activities, and community and homeowner education and action; plan and implement hazardous fuels reduction activities, including the training, monitoring or maintenance associated with such hazardous fuels reduction activities, on federal land, or on adjacent nonfederal land for activities that mitigate the threat of catastrophic fire to communities and natural resources in high risk areas; enhance local and small business employment opportunities for rural communities; enhance the knowledge and fire protection capability of rural fire districts by providing assistance in education and training, protective clothing and equipment purchase, and mitigation methods on a cost share basis.

Matching Requirement: 0 **Phone:** 208-387-5150 **Webpage:** aspe.os.dhhs.gov/CFDA/p15228.htm

Primary Funding Area: General

Program: Community Development Block Grants/Economic Development Initiative

Agency: Community Planning and Development, HUD

Agency Type: Federal

Description: To help public entities eligible under the Section 108 Loan Guarantee program carry out economic development projects authorized by Section 108(a) of the Housing and Community Development Act of 1974, as amended. Grant assistance must enhance the security of loans guaranteed under the Section 108 program or improve the viability of projects financed with loans guaranteed under the Section 108 program. In addition, this program will make competitive economic development grants in conjunction with Section 108 loan guarantees for qualified Brownfields projects.

Matching Requirement: 0 **Phone:** 202-708-1871 **Webpage:** aspe.os.dhhs.gov/cfda/p14246.htm#i37

Program: Community Outreach Partnership Center Program

Agency: Office of Policy Development and Research, Grant

Agency Type: Federal

Description: This program funds partnerships among institutions of higher education and communities to solve urban problems through research, outreach and exchange of information.

Matching Requirement: 0 **Phone:** 202-708-1537 **Webpage:** aspe.os.dhhs.gov/cfda/p14511.htm

Program: Disaster Assistance for Older Americans

Agency: Administration on Aging, DHHS

Agency Type: Federal

Description: Grants given to the state agency on aging to improve disaster services to individuals over age 60 and their families. Services offered can include advocacy and outreach programs, cleanup services, meals programs, case management, senior day care, and other services that may be required due to the situation.

Matching Requirement: 0 **Phone:** 800-677-1116 **Webpage:** www.aoa.dhhs.gov/

Program: Emergency Federal Law Enforcement Assistance

Agency: Office of Justice Programs, DOJ

Agency Type: Federal

Description: Provides necessary assistance to a State government in order to provide an adequate response to an uncommon situation which requires law enforcement, which is or threatens to become of serious or epidemic proportions, and with respect to which State and local resources are inadequate to protect the lives and property of citizens, or to enforce the criminal law.

Matching Requirement: 0 **Phone:** 202-616-3458 **Webpage:** aspe.os.dhhs.gov/cfda/p16577.htm#i37

Program: Emergency Management Institute (EMI)_Resident Educational Program

Agency: EMI, FEMA

Agency Type: Federal

Description: To improve emergency management practices among State, local and tribal government managers, and Federal officials as well, in response to emergencies and disasters.

Matching Requirement: 0 **Phone:** 301-447-1000 **Webpage:** aspe.os.dhhs.gov/cfda/p83530.htm

Program: Emergency Watershed Protection (EWP)

Agency: USDA-NRCS

Agency Type: Federal

Description: Program objective is to assist sponsors and individuals in implementing emergency measures to relieve imminent hazards to life and property created by a natural disaster. Activities include providing financial and technical assistance to remove debris from streams, protect destabilized streambanks, establish cover on critically eroding lands, repairing conservation practices, and the purchase of flood plain easements. The program is designed for installation of recovery measures.

Matching Requirement: 25 **Phone:** (864) 467-2755 **Webpage:** nrcs.usda.gov/programs/ewp/

Program: **Environmental Protection Consolidated Grants-Program Support**

Agency: Grants Administration Division, EPA

Agency Type: Federal

Description: The program allows for the consolidation of two or more pollution control programs into one single program. The total amount of funding is only equal to the actual amounts of the grants being consolidated.

Matching Requirement: 0 *Phone:* 202-564-5325 *Webpage:* www.epa.gov/

Program: **Physical Disaster Loans**

Agency: Office of Disaster Assistance, SBA

Agency Type: Federal

Description: Two types of loans available include Home Disaster Loans and Business Disaster Loans. These are loans available to cover uninsured losses suffered in declared physically damaging disasters. Applicants must show an ability to repay the loan.

Matching Requirement: 0 *Phone:* 800-827-5722 *Webpage:* www.sba.gov/disaster/loans.html

Program: **Reimbursement for Firefighting on Federal Property**

Agency: US Fire Administration, FEMA

Agency Type: Federal

Description: To provide that each fire service organization which engages in firefighting operations on Federal property may be reimbursed for their direct expenses and direct losses (those losses and expenses that are not considered normal operating expenses) incurred in firefighting.

Matching Requirement: 0 *Phone:* 301-447-1358 *Webpage:* aspe.os.dhhs.gov/cfda/p83007.htm#i37

Program: **Technology Development for Environmental Management**

Agency: Office of Science and Technology, Office of Environmental Management, DOE

Agency Type: Federal

Description: OST works with the Environmental Management (EM) customer programs to develop new or improved technology systems to reduce risks to the environment and to the public, reduce overall cleanup costs, and furnish cleanup methods that did not previously exist in order to satisfy applicable Federal, State, local laws, and regulations.

Matching Requirement: 0 *Phone:* 301-903-7425 *Webpage:* aspe.os.dhhs.gov/cfda/p81104.htm

Primary Funding Area: Infrastructure Systems

Program: **Airport Improvement Program**

Agency: Federal Aviation Administration, DOT

Agency Type: Federal

Description: To assist sponsors, owners, or operators of public-use airports in the development of a nationwide system of airports adequate to meet the needs of civil aeronautics.

Matching Requirement: 0 *Phone:* 202- 267-3831 *Webpage:* aspe.os.dhhs.gov/cfda/p20106.htm

Program: **Bridge Alteration**

Agency: U. S. Coast Guard, DOT

Agency Type: Federal

Description: To accomplish alteration of obstructive bridges to render navigation through or under it reasonably free, easy, and unobstructed for the benefit of navigation. In accordance with the Coast Guard Authorization Act of 1996, permanent authority exists in 49 U.S.C. 104(e) to transfer funds from the Federal-Aid Highways discretionary bridge program to the Coast Guard to finance alteration of Truman-Hobbs obstructive highway bridges.

Matching Requirement: 0 *Phone:* 202-267-1977 *Webpage:* aspe.os.dhhs.gov/cfda/p20007.htm

Program: **Capitalization Grants for Drinking Water State Revolving Funds**

Agency: Office of Ground Water and Drinking Water, EPA *Agency Type:* Federal

Description: Grant money is provided to the state which loans money to local governments and water authorities. The loan money is to be used to improve drinking water supply. The loan money is then repaid back into this revolving fund, to allow other parties to borrow this money for similar projects.

Matching Requirement: 20 *Phone:* 800-426-4791 *Webpage:* www.epa.gov/SAFEWATER/INDEX.ht

Program: **Community Development Block Grants/Entitlement Grants**

Agency: Community Planning and Development, HUD *Agency Type:* Federal

Description: To develop viable urban communities, by providing decent housing and a suitable living environment, and by expanding economic opportunities, principally for persons of low and moderate income. Can include acquisition of real property, relocation and demolition, rehabilitation of residential and nonresidential structures, provision of public facilities and improvements, such as water and sewer facilities which require reviews by the State single point of contact or a Regional Planning Agency in accordance with Executive Order 12372, streets, and neighborhood centers. In addition, CDBG funds may be used to pay for public services within certain limits.

Matching Requirement: 0 *Phone:* 202-708-1577 *Webpage:* aspe.os.dhhs.gov/cfda/p14218.htm

Program: **Community Development Block Grants/State's**

Agency: Community Planning and Development, HUD *Agency Type:* Federal

Description: To develop viable urban communities by providing decent housing, a suitable living environment, and expanding economic opportunities, principally for persons of low and moderate income. States must distribute the funds to units of general local government in non-entitlement areas.

Matching Requirement: 0 *Phone:* 202-708-1322 *Webpage:* aspe.os.dhhs.gov/cfda/p14228.htm

Program: **Drought Contingency Water**

Agency: U.S. Army Corps of Engineers *Agency Type:* Federal

Description: May be used only for water supply vulnerability revealed by droughts. Water can be provided only if surplus water is available in a Corps reservoir. Where the governor of a state has declared a state of emergency due to drought, Corps project managers may approve withdrawals from 50 acre-feet of storage or less. This water can be made available for domestic and industrial uses but not for crop irrigation.

Matching Requirement: 0 *Phone:* 703-428-9055 *Webpage:* www.fsa.usda.gov/drought/finalreport/fi

Program: **Economic Development: Technical Assistance**

Agency: Economic Development Administration, DOC *Agency Type:* Federal

Description: Promotes economic development and alleviate under-employment and unemployment in distressed areas, EDA operates a technical assistance program. The program provides funds to: (1) enlist the resources of designated university centers in promoting economic development; (2) support innovative economic development projects; (3) disseminate information and studies of economic development issues of national significance; and (4) finance feasibility studies and other projects leading to local economic development.

Matching Requirement: 0 *Phone:* 202- 482-4085 *Webpage:* aspe.os.dhhs.gov/cfda/p11303.htm

Program: **Emergency Community Water Assistance Grants**

Agency: Water and Waste Rural Utilities Service, USDA *Agency Type:* Federal

Description: Assists rural communities that have had a significant decline in quantity or quality of drinking water. Grants can be made in rural areas and cities or towns with a population not in excess of 10,000, of modest income, and modest construction projects, and a median household income of 100 percent of a State's non-metropolitan median household income. Grants may be made for 100 percent of project costs. The maximum grant is \$500,000 when a significant decline in quantity or quality of water occurred within two years, or \$75,000 to make emergency repairs and replacement of facilities on existing systems.

Matching Requirement: 0 *Phone:* 202-690-2670 *Webpage:* www.usda.gov/rus/water/programs.htm

Program: **Emergency Relief**

Agency: Federal Highway Administration

Agency Type: Federal

Description: Provides planning and design assistance to state governments to repair roads which were built with Federal funds, replace or rehabilitate bridges, and other transportation purposes as a result of natural disasters or catastrophic failures. For Interstate highways, the Federal share is 90 percent. For all other highways, the Federal share is 80 percent. Emergency repair work to restore essential travel, minimize the extent of damage, or protect the remaining facilities, accomplished in the first 180 days after the disaster occurs, may be reimbursed at 100 percent Federal share.

Matching Requirement: -100 *Phone:* 202-366-4655 *Webpage:* www.fhwa.dot.gov/

Program: **Emergency Well Construction and Water Transport**

Agency: U.S. Army Corps of Engineers

Agency Type: Federal

Description: The cost of transporting water is provided by the Corps, but the cost of purchasing and storing water is the nonfederal sponsor's responsibility. Federal costs associated with well construction must be repaid. This is a program of last resort. The law requires that all other reasonable means must be exhausted before the Corps has authority to help. Corps assistance is supplemental to state and local efforts. Long-term solutions to water supply problems are the responsibility of state and local interests.

Matching Requirement: 0 *Phone:* 703-428-9055 *Webpage:* www.fsa.usda.gov/drought/finalreport/fi

Program: **Farm Labor Housing Loans and Grants**

Agency: USDA

Agency Type: Federal

Description: To make loans to provide decent, safe, and sanitary housing for domestic farm labor in areas where needed and provide grants where there is a pressing need for such facilities in an area for farm laborers and there is reasonable doubt that housing can be provided without the grant assistance.

Matching Requirement: 10 *Phone:* 202-720-1604 *Webpage:* www.rurdev.usda.gov/mo/factflh.htm

Program: **Grants-in-Aid for Railroad Safety: State Participation**

Agency: Federal Railroad Administration

Agency Type: Federal

Description: Promotes safety in all areas of railroad operations; reduce railroad related accidents and casualties; and to reduce damage to property caused by accidents involving any carrier of hazardous materials by providing State participation in the enforcement and promotion of safety practices.

Matching Requirement: 50 *Phone:* 202-493-6300 *Webpage:* aspe.os.dhhs.gov/cfda/p20303.htm

Program: **Highway Planning and Construction**

Agency: Federal Highway Administration, DOT

Agency Type: Federal

Description: To assist State transportation agencies in the planning and development of an integrated, interconnected transportation system important to interstate commerce and travel by constructing and rehabilitating the National Highway System, including the Interstate System; and for transportation improvements to all public roads except those functionally classified as local; to provide aid for the repair of Federal-aid roads following disasters; to foster safe highway design; to replace or rehabilitate deficient or obsolete bridges; and to provide for other special purposes.

Matching Requirement: 0 *Phone:* 202-366-4853 *Webpage:* aspe.os.dhhs.gov/cfda/p20205.htm

Program: **HOME Investment Partnerships Program**

Agency: Community Planning and Development, HUD

Agency Type: Federal

Description: (1) To expand the supply of affordable housing, particularly rental housing, for low and very low income Americans; (2) to strengthen the abilities of State and local governments to design and implement strategies for achieving adequate supplies of decent, affordable housing; (3) to provide both financial and technical assistance to participating jurisdictions, including the development of model programs for developing affordable low income housing; and (4) to extend and strengthen partnerships among all levels of government and the private sector, including for-profit and nonprofit organizations, in the production and operation of affordable housing.

Matching Requirement: 0 *Phone:* 202-708-2470 *Webpage:* aspe.os.dhhs.gov/cfda/p14239.htm

Program: **National Dam Safety**

Agency: Mitigation Directorate, FEMA

Agency Type: Federal

Description: Establishment and maintenance of effective State programs intended to ensure dam safety, to protect human life and property, and to improve State dam safety programs.

Matching Requirement: 0 *Phone:* 202-646-2704 *Webpage:* aspe.os.dhhs.gov/cfda/p83550.htm#i37

Program: **Pollution Control Loans**

Agency: Small Business Administration

Agency Type: Federal

Description: Intended to provide loan guarantees to eligible small businesses for the financing of the planning, design, or installation of pollution control facilities. These facilities must prevent, reduce, abate, or control any form of pollution, including recycling.

Matching Requirement: 0 *Phone:* 800-U-ASK- *Webpage:* www.epa.gov/owow/watershed/wacade

Program: **Resource Conservation and Development Loans**

Agency: Water and Waste Rural Utilities Service, USDA

Agency Type: Federal

Description: Provides loan assistance to local agencies in authorized Resources Conservation and Development areas. Loan funds may be used for water based recreation facilities, soil and water development, conservation, control and use facilities, community water storage facilities, and necessary equipment to implement the above. A loan to a single RC&D area cannot exceed \$500,000.

Matching Requirement: 0 *Phone:* 202-690-2670 *Webpage:*

Program: **Rural Housing and Economic Development**

Agency: Community Planning and Development , HUD

Agency Type: Federal

Description: To expand the supply of affordable housing and access to economic opportunities in rural areas.

Matching Requirement: 0 *Phone:* 202-708-2290 *Webpage:* aspe.os.dhhs.gov/cfda/p14250.htm

Program: **Rural Rental Housing Loans**

Agency: USDA

Agency Type: Federal

Description: Loans may be made for housing in communities of up to 10,000 people and under certain conditions, towns and cities between 10,000 and 20,000 people. Loans are approved by the RD State Director and do not require a disaster declaration by the President or Secretary of Agriculture.

Matching Requirement: 0 *Phone:* 202- 720-1604 *Webpage:* www.rurdev.usda.gov/rhs/ProgramBrie

Program: **State and Community Highway Safety**

Agency: Office of Highway Safety, Federal Highway Administration

Agency Type: Federal

Description: Provides a coordinated national highway safety program to reduce traffic accidents, deaths, injuries, and property damage.

Matching Requirement: 20 *Phone:* 202-366-6902 *Webpage:* aspe.os.dhhs.gov/cfda/p20600.htm#i37

Program: **Superfund Technical Assistance Grants for Citizen Groups at Priority Sites**

Agency: Office of Emergency and Remedial Response, EPA

Agency Type: Federal

Description: Provides resources under CERCLA, Section 117(e) for community groups to hire technical advisors who can assist them in interpreting technical information concerning the assessment of potential hazards and the selection and design of appropriate remedies at sites eligible for cleanup under the Superfund program.

Matching Requirement: 0 *Phone:* 703-603-8889 *Webpage:* aspe.os.dhhs.gov/cfda/p66806.htm

Program: **Water Conservation Field Services**

Agency: Department of the Interior

Agency Type: Federal

Description: Provides assistance to agriculture, municipalities, states, tribes, water conservation districts, water conservancy districts, irrigation associations, any entity that is using Reclamation Project water, and others.

Matching Requirement: 0 *Phone:* 303-445-2945 *Webpage:* www.fsa.usda.gov/drought/finalreport/fi

Program: **Water Quality Cooperative Agreements**

Agency: Office of Wastewater Management, EPA

Agency Type: Federal

Description: To assist States, Indian Tribes, interstate agencies, and other public or nonprofit organizations in developing, implementing, and demonstrating innovative approaches relating to the causes, effects, extent, prevention, reduction, and elimination of water pollution. This includes watershed approaches for combined sewer overflow, sanitary sewer overflows, and storm water discharge problems, pretreatment and sludge (biosolids) program activities, and alternative ways to measure the effectiveness of point source programs.

Matching Requirement: 0 *Phone:* 202-564-0672 *Webpage:* aspe.os.dhhs.gov/cfda/p66463.htm

Primary Funding Area: New Public Buildings

Program: **Disaster Recovery Initiative**

Agency: Office of Community Planning and Development, HUD

Agency Type: Federal

Description: For recovery from major disasters declared by the President. Each supplemental appropriations statute specifies the disasters or time period of disaster declarations for which funding is available. Can be used for rehabilitating residential and commercial buildings; homeownership assistance; building new replacement housing; code enforcement; acquiring, constructing or reconstructing public facilities and improvements, including streets, neighborhood centers, and water and sewer facilities; assistance to disaster-affected businesses for carrying out economic development activities to create and retain jobs; buying flood prone properties and making other mitigation efforts to protect damaged properties from, and reduce the cost of, future disaster damage; and making relocation payments to displaced people and businesses, and other activities. Funds may also be used for emergency response activities, such as debris removal, clearance, and demolition not funded by other federal disaster assistance and extraordinary increases in the level of public services for disaster victims.

Matching Requirement: 25 *Phone:* 202-708-1112 *Webpage:* www.hud.gov

Program: **Economic Development Grants for Public Works and Infrastructure Development**

Agency: Public Works Division, Economic Development Administration, DOC

Agency Type: Federal

Description: The grants available can be used to build public facilities such as water and sewer systems, industrial access roads, industrial parks, tourism facilities, vocational schools, and other public facilities that will enhance the areas ability to improve its business expansion. Overall the projects need to develop long-term economic health to assist in the creation and retention of skilled jobs that can provide for immediate employment for the unemployed and under employed in the area..

Matching Requirement: 0 *Phone:* 202-482-5081 *Webpage:* www.doc.gov/eda/

Primary Funding Area: Parks/Natural Areas - Development/Preservation

Program: Brownfields Economic Redevelopment Initiative

Agency: Office of Solid Waste and Emergency Response, EPA

Agency Type: Federal

Description: Funding and assistance to assess clean up and help redevelop abandoned properties with real and implied environmental contamination.

Matching Requirement: 0

Phone: 202-260-1223

Webpage: epa.gov/brownfields

Program: Forestry Incentives Program

Agency: Natural Resources Conservation Service, USDA

Agency Type: Federal

Description: The Forestry Incentives Program (FIP) is intended to ensure the nation's ability to meet future demand for sawtimber, pulpwood, and quality hardwoods. FIP provides cost-share monies to help with the costs of tree planting, timber stand improvements, and related practices on non-industrial private forestlands. In addition to ensuring a future supply of timber, FIP's forest maintenance and reforestation projects provide numerous natural resource benefits, including reduced soil erosion and wind and enhanced water quality and wildlife habitat.

Matching Requirement: 35

Phone: 202-720-6521

Webpage: epa.gov/owowwtr1/watershed

Program: National Forest Foundation Awards

Agency: National Forest Foundation

Agency Type: Foundation

Description: Funds non-governmental organizations working in, or adjacent to, national forests and grasslands; preference given to proposed projects in six geographical areas focused upon Collaborative Stewardship, Watershed Health & Restoration, Wildlife Habitat Improvement, and Recreational Opportunities Enhancement. It is a matching awards program 1:1 with private cash contributions. In-kind contributions may be noted to show leverage for a project, but will not be matched by federal funds. Projects must be completed within a year from project award date. Applications will be accepted from non-federal partners, community-based organizations, educational institutions, and other non-profit 501(c)(3) organizations.

Matching Requirement: 50

Phone: 202- 496-4963

Webpage: www.natlforests.org

Program: Rivers, Trails and Conservation Assistance

Agency: Rivers, Trails and Conservation Assistance, National Park Service, DOI

Agency Type: Federal

Description: To serve as a national technical resource for government and nonprofit partnerships; to increase the number of rivers and lands protected; and to expand the number of trails established nationwide.

Matching Requirement: 0

Phone: 202- 565-1200.

Webpage: aspe.os.dhhs.gov/cfda/p15921.htm

Program: Stewardship Incentives Program

Agency: Forest Service, USDA

Agency Type: Federal

Description: Technical and financial assistance to encourage non-industrial private forest landowners to keep their lands and natural resources productive and healthy. Qualifying land includes rural lands with existing tree cover or land suitable for growing trees which is owned by a private individual, group, association, corporation, Indian tribe, or other legal private entity. Eligible landowners must have an approved Forest Stewardship Plan and own 1,000 or fewer acres of qualifying land. Authorizations may be obtained for exceptions of up to 5,000 acres.

Matching Requirement: 0

Phone: 202-720-6521

Webpage: www.nrcs.usda.gov/NRCSProg.html

Program: Wildlife Restoration

Agency: Fish and Wildlife Service, DOI

Agency Type: Federal

Description: Provides funding for the selection, restoration, rehabilitation and improvement of wildlife habitat, wildlife management research, and the distribution of information produced by the projects.

Matching Requirement: 0

Phone: 703-358-2156

Webpage: www.fws.gov

Primary Funding Area: Plans & Procedures

Program: Community Assistance Program - State

Agency: Mitigation Directorate

Agency Type: Federal

Description: Ensures that communities participating in the National Flood Insurance Program (NFIP) are achieving flood loss reduction measures consistent with program direction. The CAP-SSSE is intended to identify, prevent and resolve floodplain management issues in participating communities before they develop into problems requiring enforcement action.

Matching Requirement: 25 **Phone:** 202-646-4621 **Webpage:** www.fema.gov/mit/

Program: Economic Adjustment Assistance for Disasters

Agency: Economic Development Administration, DOC

Agency Type: Federal

Description: For strategic planning, project implementation and revolving loan funds to mitigate effects of industrial or corporate restructuring, disaster, depletion of natural resources, new Federal laws or regulations. Applicants may be economic development districts, Indian Tribes and other eligible areas at local and regional levels, consortiums, universities, public or private non-profits or associations; short-term planning grants to States, sub-State planning regions and urban areas.

Matching Requirement: 0 **Phone:** 202-482-5081 **Webpage:** hom.doc.gov/

Program: Emergency Management Performance Grants

Agency: FEMA

Agency Type: Federal

Description: To develop comprehensive emergency management, including terrorism consequence management preparedness, at the State and local level and to improve emergency planning, preparedness, mitigation, response, and recovery capabilities.

Matching Requirement: 0 **Phone:** 202-646-7057 **Webpage:** aspe.os.dhhs.gov/CFDA/p83552.htm

Program: Habitat Conservation

Agency: National Oceanic and Atmospheric Administration, DOC

Agency Type: Federal

Description: Provides grants and cooperative agreements for biological, economic, sociological, public policy, and other research, administration, and public education projects on the coastal environment to benefit U.S. fisheries, conserve protected resources.

Matching Requirement: 0 **Phone:** 301-713-0174 **Webpage:** aspe.os.dhhs.gov/cfda/p11463.htm

Program: Hazardous Materials Assistance

Agency: Hazardous Materials Unit, Chemical and Radiological Preparedness Division, FEMA

Agency Type: Federal

Description: Provides technical and financial assistance through the States to support State, local and Indian tribal governments in oil and hazardous materials emergency planning and exercising. To enhance State, Tribal and local governments capabilities to inter-operate with the National Response System (NRS). To support the Comprehensive Hazardous Materials (HAZMAT) Emergency Response - Capability Assessment Program (CHER-CAP) Activities.

Matching Requirement: 0 **Phone:** 202- 646-4542 **Webpage:** aspe.os.dhhs.gov/CFDA/p83012.htm#i

Program: Superfund State Site: Specific Cooperative Agreements

Agency: Office of Solid Waste and Emergency Response, EPA

Agency Type: Federal

Description: To (1) Conduct site characterization activities at potential confirmed hazardous waste sites; (2) undertake remedial planning and remedial implementation actions at sites on the National Priorities List (NPL) to clean up the hazardous waste sites that are found to pose hazards to human health; and (3) effectively implement the statutory requirements of CERCLA 121 (f) which mandates substantial and meaningful State involvement.

Matching Requirement: 0 **Phone:** 703-308-8506 **Webpage:** aspe.os.dhhs.gov/cfda/p66802.htm#i37

Program: Surveys, Studies, Investigations and Special Purpose Grants

Agency: Environmental Protection Agency

Agency Type: Federal

Description: (1) To support Surveys, Studies and Investigations and Special Purpose assistance associated with Air Quality, Acid Deposition, Drinking Water, Water Quality, Hazardous Waste, Toxic Substances, and Pesticides; (2) to identify, develop and demonstrate necessary pollution control techniques; to prevent, reduce, and eliminate pollution; and (3) to evaluate the economic and social consequences of alternative strategies and mechanisms for use by those in economic, social, governmental, and environmental management positions.

Matching Requirement: 0

Phone: 202-260-2597

Webpage: aspe.os.dhhs.gov/cfda/p66606.htm

Program: Watershed Assistance Grants

Agency: Office of Wetlands, Oceans and Watersheds , EPA

Agency Type: Federal

Description: EPA establishes a cooperative agreement with one or more nonprofit organization(s) or other eligible entities to support watershed partnership organizational development and long-term effectiveness.

Matching Requirement: 0

Phone: 202-260-4538

Webpage: www.epa.gov/owow/watershed/wacade

Program: Watershed Surveys and Planning

Agency: Natural Resource Conservation Service, USDA

Agency Type: Federal

Description: To provide planning assistance to Federal, State, and local agencies for the development of coordinated water and related land resources programs in watersheds and river basins.

Matching Requirement: 0

Phone: 202-720-4527

Webpage: aspe.os.dhhs.gov/cfda/p10906.htm

Primary Funding Area: Public Education

Program: CEPP Technical Assistance Grants

Agency: Chemical Emergency Preparedness and Prevention Office , EPA **Agency Type:** Federal

Description: Provides financial assistance to States, Local agencies, and Indian Tribes for chemical accident prevention activities that relate to the Risk Management Program under the Clean Air Act Section 112(r). To provide financial assistance to Tribes for chemical emergency planning, and community right-to-know programs which are established to prevent or eliminate unreasonable risk to the health and environment of communities within the State.

Matching Requirement: 0

Phone: 202- 564-7981

Webpage: aspe.os.dhhs.gov/cfda/p66810.htm

Program: Community Services Block Grant

Agency: Office of Community Services, Administration for Children and Families, DHHS **Agency Type:** Federal

Description: Competitive grants given to the state to provide services and other provisions for low-income persons and families to combat the causes of poverty within the states communities. The states are given leeway in regards to the programs they establish.

Matching Requirement: 0

Phone: 202-401-9340

Webpage: www.acf.dhhs.gov/programs/ocs/

Program: Disaster Legal Services

Agency: Human Services Division, Response and Recovery Directorate, FEMA **Agency Type:** Federal

Description: Program to provide legal assistance to low-income individuals or families and groups. Free legal advice can include counseling, and even representation in non-fee generating cases with an exception provided for under Part 206-164 (b). Fee-generating cases will not be handled and will be referred through legal referral services.

Matching Requirement: 0 *Phone:* 202-646-4600 *Webpage:* www.fema.gov/

Program: **Environmental Justice through Pollution Prevention**

Agency: Office of Pollution Prevention and Toxics, EPA

Agency Type: Federal

Description: Provides financial assistance to low-income and people-of-color communities to implement pollution prevention activities. EPA strongly encourages cooperative efforts among communities, business, industry, and government to address common pollution prevention goals. Projects funded under this grant program may involve public education, training, demonstration projects, and public or private partnerships, as well as approaches to develop, evaluate, and demonstrate nonregulatory strategies and technologies.

Matching Requirement: 0 *Phone:* 703-841-0483 *Webpage:* www.epa.gov/owow/watershed/wacade

Program: **Hurricane Program**

Agency: Mitigation Directorate, FEMA

Agency Type: Federal

Description: Provides assistance to certain coastal states to reduce the devastating effects from hurricanes. Programs include property protection, evacuation studies, hazard identification, training exercises and public education programs.

Matching Requirement: 25 *Phone:* 202-646-3362 *Webpage:* www.fema.gov/mit/

Program: **Pipeline Safety**

Agency: Research and Special Programs Administration, DOT

Agency Type: Federal

Description: To develop and maintain State natural gas, liquefied natural gas, and hazardous liquid pipeline safety programs.

Matching Requirement: 50 *Phone:* 202-366-4564 *Webpage:* aspe.os.dhhs.gov/cfda/p20700.htm

Program: **Water Pollution Control**

Agency: Environmental Protection Agency

Agency Type: Federal

Description: A wide range of support for prevention and abatement projects for surface and ground water sources. Funding cannot be used for waste treatment facilities. Funds can be used on studies, planning, training and public information.

Matching Requirement: 0 *Phone:* 800-832-7828 *Webpage:* www.epa.gov/

Primary Funding Area: Retrofit Public/Historical Structures

Program: **Disaster Assistance for the Elderly**

Agency: Administration on Aging, DHHS

Agency Type: Federal

Description: Funding awarded to States through their Agencies on Aging. The funds are distributed to support services like nutrition program, and renovation and construction of senior resource centers.

Matching Requirement: 0 *Phone:* 202-619-2618 *Webpage:* www.aoa.dhhs.gov/

Program: **Environmental And Historic Preservation And Cultural Resources Programs**

Agency: FEMA

Agency Type: Federal

Description: Consists of two distinct elements: 1) The Environmental Program and 2) the Historic Preservation and Cultural Resources Program. 1) is to ensure that actions directly implemented by FEMA and non-federal partners integrate environmental concerns into disaster mitigation, planning, response, and recovery decision-making. 2) is to address the needs of communities in preparing for, mitigating, responding and recovering from the devastating effects disasters may have on historic properties and cultural resources; also provides a wide range of technical and educational assistance to communities in partnership with other federal agencies and private national cultural heritage organizations.

Matching Requirement: 0 *Phone:* 202-646-3362 *Webpage:* www.fema.gov/mit/ep/index.htm

Primary Funding Area: River/Stream - Restoration/Preservation

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|------------------------------|--|---------------------|--|
| <i>Program:</i> | Protection, Clearing and Straightening Channels | | |
| <i>Agency:</i> | U.S. Army Corps of Engineers | <i>Agency Type:</i> | Federal |
| <i>Description:</i> | To restore channels for purposes of navigation or flood control. Local cost participation requirements and procedures for determining the local share of project costs are similar to those for navigation or flood control projects specifically authorized by Congress under regular authorization procedures. Annual expenditures limited to \$1,000,000. | | |
| <i>Matching Requirement:</i> | 0 | <i>Phone:</i> | 202-272-8835 |
| | | <i>Webpage:</i> | aspe.os.dhhs.gov/cfda/P12109.htm |

| | | | |
|------------------------------|---|---------------------|--|
| <i>Program:</i> | Community Disaster Loans | | |
| <i>Agency:</i> | Response and Recovery Directorate | <i>Agency Type:</i> | Federal |
| <i>Description:</i> | Provides loans subject to Congressional loan authority, to any local government that has suffered substantial loss of tax and other revenue in an area in which the President designates a major disaster exists. The funds can only be used to maintain existing functions of a municipal operating character and the local government must demonstrate a need for financial assistance. | | |
| <i>Matching Requirement:</i> | 75 | <i>Phone:</i> | 202-646-4066 |
| | | <i>Webpage:</i> | www.fema.gov/r-n-r |

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|------------------------------|---|---------------------|--|
| Program: | Crisis Counseling Assistance and Training | | |
| Agency: | Human Services Division, Response and Recovery Directorate, | Agency Type: | Federal FEMA |
| Description: | Crisis counseling services | | |
| Matching Requirement: | 0 | Phone: | 202-646-3685 |
| | | Webpage: | www.fema.gov/ |

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| <i>Program:</i> | Economic Injury Disaster Loans | | |
| <i>Agency:</i> | Office of Disaster Assistance, SBA | <i>Agency Type:</i> | Federal |
| <i>Description:</i> | Small business loan program available to those concerns that suffered economic injury due to a Presidential, Small Business Administration, or Secretary of Agriculture- declared disaster. The rules of the SBA apply including physical location within the disaster area. There is a \$1,500,000 limit on the amount of the loan. Repayment may take up to 30 years. | | |
| <i>Matching Requirement:</i> | 0 | <i>Phone:</i> | 202-205-6734 |
| | | <i>Webpage:</i> | www.sba.gov/disaster |

Program: **Fire Suppression Assistance Program**

Agency: Response and Recovery Directorate, FEMA *Agency Type:* Federal

Description: Provides real-time, pro-active assistance to states to help fire suppression efforts on public or privately owned forests or grasslands. Assistance can be applied for prior to a Presidential declaration if the fires threaten to become major disasters.

Matching Requirement: 30 *Phone:* 202-646-4535 *Webpage:* www.usfa.fema.gov/fedguide/ch1-23.htm

Program: **Historic Properties, Repair and Restoration of Disaster-Damaged**

Agency: Infrastructure Support Division, FEMA *Agency Type:* Federal

Description: Used in conjunction with the Stafford Act to evaluate the effects of repairs, restoration and mitigation of hazards to disaster-damaged historic properties.

Matching Requirement: 0 *Phone:* 202-646-3362 *Webpage:* www.fema.gov/

Program: **Mitigation Assistance**

Agency: FEMA *Agency Type:* Federal

Description: Project Impact helps communities that have a history of losses from natural disasters or have a significant disaster risk, such as those located in watershed floodplains. Funds are provided to help assess risks, build public-private partnerships, identify and implement projects, and communicate and mentor success.

Matching Requirement: 0 *Phone:* 202-646-4600 *Webpage:* www.fema.gov/impact

Program: **Project Impact**

Agency: FEMA *Agency Type:* Federal

Description: Project Impact helps communities that have a history of losses from natural disasters or have a significant disaster risk, such as those located in watershed floodplains. Funds are provided to help assess risks, build public-private partnerships, identify and implement projects, and communicate and mentor success.

Matching Requirement: 0 *Phone:* 202-646-4600 *Webpage:* www.fema.gov/impact

Program: **Public Assistance Grant**

Agency: Infrastructure Support Division, Response and Recovery Directorate *Agency Type:* Federal

Description: Available when areas have been impacted by a Presidentially-declared disaster. The funds may be used for a number of projects including repairs or replacement of damages structures, building, bridges, water facilities, utilities, roads, etc. The money can also be used for debris removal. Also, eligibility of cultural resources and private non-profit museums are designed to improve the ability for collections and cultural facilities to recover from disasters.

Matching Requirement: 25 *Phone:* 202-646-4600 *Webpage:* www.fema.gov/

Primary Funding Area: Storm Water, Flood Control Structures, Measures

Program: **Emergency Advance Measures for Flood Prevention**

Agency: U.S. Army Corps of Engineers *Agency Type:* Federal

Description: Performs activities prior to flooding or flood fight that would assist in protecting against loss of life and damages to property due to flooding.

Matching Requirement: 0 *Phone:* 202-272-0251 *Webpage:* aspe.os.dhhs.gov/CFDA/p12111.htm

Program: **Emergency Operations Flood Response and Post Flood Response**

Agency: U.S. Army Corps of Engineers *Agency Type:* Federal
Description: To provide emergency flood response and post flood response assistance as required to supplement State and local efforts and capabilities in time of flood or coastal storm.

Matching Requirement: 0 *Phone:* 202- 272-0251 *Webpage:* www.usace.army.mil/business.html

Program: **Emergency Rehabilitation of Flood Control Works or Federally Authorized Coastal Protection Works**

Agency: U.S. Army Corps of Engineers *Agency Type:* Federal

Description: Funds may be used for emergency repairs to flood control facilities and restoration of federally authorized coastal protection systems. The facilities must have been damaged by the winds, rain, and wave actions from a storm event and not from neglect. The funds may not be used for new projects or major improvements of existing facilities.

Matching Requirement: 0 *Phone:* 202-272-0169 *Webpage:* www.usace.army.mil/

Program: **Emergency Watershed Protection (EWP)**

Agency: Natural Resources Conservation Service, USDA *Agency Type:* Federal

Description: Purpose is to undertake emergency measures, including the purchase of flood plain easements, for runoff retardation and soil erosion prevention to safeguard lives and property from floods, drought, and the products of erosion on any watershed whenever fire, flood or any other natural occurrence is causing or has caused a sudden impairment of the watershed. It provides funding to project sponsors for such work as clearing debris from clogged waterways, restoring vegetation, and stabilizing river banks.

Matching Requirement: 25 *Phone:* 202- 720-1604 *Webpage:* www.nrcs.usda.gov/NRCSProg.html

Program: **Flood Control Projects (Small)**

Agency: U.S. Army Corps of Engineers *Agency Type:* Federal

Description: Reduce flood damages through projects not specifically authorized by Congress. Project Planning Studies are undertaken in a single feasibility phase. The first \$100,000 is federally funded. Additional costs are cost-shared 50/50 with local sponsor.

Matching Requirement: 50 *Phone:* 202-761-1975 *Webpage:* aspe.os.dhhs.gov/CFDA/p12106.htm

Program: **Flood Damage Reduction**

Agency: U.S. Army Corps of Engineers *Agency Type:* Federal

Description: The US Army Corps of Engineers designs and builds flood and erosion control protection for highways, bridges, hospitals, churches, schools and other public facilities to protect them from further flood damage. The project cost must have a federal limit of \$500,000.

Matching Requirement: 0 *Phone:* 202-272-0169 *Webpage:* www.usace.army.mil/public.html#Flood

Program: **Flood Mitigation Assistance Program**

Agency: Mitigation Directorate *Agency Type:* Federal

Description: These grants are to be used to develop cost-effective measures to reduce the risk of flooding within communities. Planning grants must be approved prior to application for project grants. The funds can be used for developing and improving flood mitigation plans. States and communities can apply for project grants to implement measures to reduce flood losses. Projects that reduce the risk of flood damage to structures insurable under the National Flood Insurance Program are eligible for consideration.

Matching Requirement: 25 *Phone:* 202-646-5621 *Webpage:* www.fema.gov/mit/icc_d.htm

Program: **Flood Plain Management Services**

Agency: U.S. Army Corps of Engineers *Agency Type:* Federal

Description: The funds can be used to identify flood hazards, implement flood hazard planning and mitigation

efforts. Can also include planning and preparedness of hurricanes and other flood causing incidents.

Matching Requirement: 0 *Phone:* 202-272-0169 *Webpage:* www.usace.army.mil/

Program: **Flood Risk Reduction**

Agency: Farm Service Agency, USDA

Agency Type: Federal

Description: For farmers who voluntarily enter into contracts to receive payments on lands with high flood potential. In return, participants agree to forego certain USDA program benefits. These contract payments provide incentives to move farming operations from frequently flooded land.

Matching Requirement: 0 *Phone:* 202-720-6521 *Webpage:* www.nrcs.usda.gov/NRCSProg.html

Program: **Hazard Mitigation Grant Program**

Agency: Mitigation Directorate

Agency Type: Federal

Description: Grant monies provided to implement hazard mitigation projects. The eligible projects are those that have been developed to reduce future losses to lives and property. Projects can include relocation, acquisition, demolition and elevating of structures.

Matching Requirement: 25 *Phone:* 202-646-3362 *Webpage:* www.fema.gov/mit/

Program: **Integrated Flood Observation and Warning System**

Agency: Office of Hydrology, National Weather Service, National Oceanic and Atmospheric Administration

Agency Type: Federal

Description: The goals of the IFLOWS Program are to substantially reduce the annual loss of life from flash floods, reduce property damage, and reduce disruption of commerce and human activities. Numerous communities, state and federal agencies are now linked in a wide area communications network using this technology. This Automated Flood Warning Systems (AFWS) network connects numerous local flood warning systems, and integrates and shares information from approximately 250 computers and 1500 sensors in 12 states.

Matching Requirement: 0 *Phone:* (609) 261-6600 *Webpage:* www.afws.net/

Program: **National Flood Mitigation Fund**

Agency: Mitigation Directorate

Agency Type: Federal

Description: Funds programs designed to reduce the risk of flood damage. Grants can be used for flood mitigation programs including relocation, demolition, acquisition of flood-prone properties, floodproofing and other techniques designed to limit the exposure to flood damage.

Matching Requirement: 25 *Phone:* 202-646-4621 *Webpage:* www.fema.gov/mit/

Program: **Protection of Essential Highways, Highway Bridge Approaches, and Public Works**

Agency: U.S. Army Corps of Engineers

Agency Type: Federal

Description: Provides bank protection of highways, highway bridges, essential public works, churches, hospitals, schools, and other nonprofit public services endangered by flood-caused erosion. Cost-share basis, but Federal limit of \$1 million.

Matching Requirement: 0 *Phone:* 202-761-1975 *Webpage:* aspe.os.dhhs.gov/CFDA/p12105.htm

Program: **Snagging and Clearing for Flood Control**

Agency: U.S. Army Corps of Engineers

Agency Type: Federal

Description: To reduce flood damages. In most cases project studies will be at Federal expense. Cost-sharing is required for projects, but the Federal part cannot exceed \$500,000,000.

Matching Requirement: 0 *Phone:* 202- 761-1975 *Webpage:* www.usace.army.mil/business.html

Program: **Surface Transportation**

Agency: Federal Highway Administration, ISTEA

Agency Type: Federal

Description: The funds are administered through the state to be used on any roads except for local minor collectors. The state must also set aside 10% of the state allocated funds for transportation enhancement projects which can include beautification projects along the roadways, wetland mitigation or other measures to prevent runoff from polluting local waterways.

Matching Requirement: 0 *Phone:* 202-466-2636 *Webpage:* www.tea21.org/

Program: **Technical Assistance and Training Grants**

Agency: Water and Waste Rural Utilities Service, USDA *Agency Type:* Federal

Description: Provides technical assistance and training to associations on a wide range of issues relating to the delivery of water and waste disposal service for rural communities with a population of 10,000 or less. Funds may be used to assist communities and rural areas identify and evaluate solutions to water or wastewater problems, improve facility operation and maintenance activities, or prepare funding applications for water or wastewater treatment facility construction projects.

Matching Requirement: 0 *Phone:* 202-690-2670 *Webpage:* www.usda.gov/rus/water/programs.htm

Program: **Water and Waste Disposal Grants**

Agency: Water and Waste Rural Utilities Service, USDA *Agency Type:* Federal

Description: Program to reduce water and waste disposal costs to a reasonable level for rural users. Grants may be made for up to 75 percent of eligible project costs in some cases.

Matching Requirement: 25 *Phone:* 202-690-2670 *Webpage:* www.usda.gov/rus/water/programs.htm

Program: **Water and Waste Disposal Loans**

Agency: Water and Waste Rural Utilities Service, USDA *Agency Type:* Federal

Description: The loan can be used to provide the local sponsors share of the cost of watershed projects such as flood prevention, irrigation, water quality management, sedimentation control, recreation and water storage. The total amount of the loans to one watershed may not exceed \$10,000,000. For development of water and waste disposal (including solid waste disposal and storm drainage) systems in rural areas and towns with a population not in excess of 10,000.

Matching Requirement: 0 *Phone:* 202-690-2670 *Webpage:* www.usda.gov/rus/water/programs.htm

Program: **Watershed Protection and Flood Prevention**

Agency: Natural Resources Conservation Service, USDA *Agency Type:* Federal

Description: Technical and financial assistance to voluntarily plan, design and construct watershed-based projects on private lands. Watershed plans involving an estimated Federal contribution in excess of \$5 million for construction, or construction of any single structure having a capacity in excess of 2,500 acre feet, require Congressional committee approval.

Matching Requirement: 0 *Phone:* 202-720-3534 *Webpage:* www.ftw.nrcs.usda.gov/pl566/pl566.html

Primary Funding Area: Support Service

Program: **Weatherization Assistance for Low-Income Persons**

Agency: Office of Energy Efficiency and Renewable Energy, DOE *Agency Type:* Federal

Description: To insulate the dwellings of low-income persons, particularly the elderly, persons with disabilities, families with children, high residential energy users, and households with a high energy burden, in order to conserve needed energy and to aid those persons least able to afford higher utility costs.

Matching Requirement: 0 *Phone:* 202-586-4074 *Webpage:* aspe.os.dhhs.gov/cfda/p81042.htm

Program: **Business and Industry Loans**

Agency: Rural Business-Cooperative Service, DOA *Agency Type:* Federal
Description: Assists public, private, or cooperative organizations (profit or nonprofit), Indian tribes or individuals in rural areas to obtain quality loans for the purpose of improving, developing or financing business, industry, and employment and improving the economic and environmental climate in rural communities including pollution abatement and control.

Matching Requirement: 0 *Phone:* 202-690-4737 *Webpage:* aspe.os.dhhs.gov/cfda/p10768.htm

Program: **Centers for Disease Control and Prevention Investigations and Technical Assistance**

Agency: Centers for Disease Control and Prevention, DHHS *Agency Type:* Federal

Description: Assists State and local health authorities and other health related organizations in controlling communicable diseases, chronic diseases, and other preventable health conditions. Investigations and evaluation of all methods of controlling or preventing disease are carried out by providing epidemic aid, surveillance, technical assistance, consultation, and by providing leadership and coordination of joint national, State, and local efforts.

Matching Requirement: 0 *Phone:* 770-488-2700 *Webpage:* aspe.os.dhhs.gov/cfda/p93283.htm#i37

Program: **Community Facilities Loans and Grants**

Agency: Community Programs, Rural Housing Service, DOA *Agency Type:* Federal

Description: To construct, enlarge, extend, or otherwise improve community facilities providing essential services to rural residents.

Matching Requirement: 0 *Phone:* 202-720-1490 *Webpage:* aspe.os.dhhs.gov/cfda/p10766.htm

Program: **Cora Brown Fund**

Agency: Response and Recovery Directorate, FEMA *Agency Type:* Foundation

Description: To help victims of natural disasters not caused by or attributed to war by providing for disaster-related needs that have not been, or will not be met by government agencies or any other organizations which have programs to address such needs; however, the fund is not intended to replace or supersede these programs. The fund may not be used in a way that disaster-related home repair and rebuilding; (2) disaster-related unmet needs; and (3) other services which alleviate human suffering and promote the well being of disaster victims. They are identified and recommended by the Regional Director or his/her representatives, with assistance from other governmental agencies and voluntary disaster agencies.

Matching Requirement: 0 *Phone:* 202- 646-3642 *Webpage:* aspe.os.dhhs.gov/cfda/p83538.htm#i37

Program: **Direct Housing: Natural Disaster**

Agency: Rural Housing Service, DOA *Agency Type:* Federal

Description: Assists qualified lower income rural families to meet emergency assistance needs resulting from natural disaster to buy, build, rehabilitate, or improve dwellings in rural areas. Funds are only available to the extent that funds are not provided by FEMA. For the purpose of administering these funds, natural disaster will only include those areas identified by a Presidential declaration.

Matching Requirement: 0 *Phone:* 202-720-1474 *Webpage:* aspe.os.dhhs.gov/cfda/p10445.htm

Program: **Disaster Housing Assistance**

Agency: Human Services Division, Response and Recovery Directorate, FEMA *Agency Type:* Federal

Description: Housing assistance for victims in declared disaster areas. Assistance can include temporary housing reimbursement, home repair assistance, assistance towards rent, assistance towards mortgage. Applicants must provide proof of residency or ownership, hardship caused by the disaster, damage caused by the disaster. Additional information may need to include notice of eviction or foreclosure proceedings, total repair estimates, and temporary housing receipts.

Matching Requirement: 0 *Phone:* 202-646-4600 *Webpage:* www.fema.gov/

Program: **Disaster Unemployment Assistance**

Agency: Human Services Division, Response and Recovery Directorate, *Agency Type:* Federal FEMA

Description: Provides unemployment benefits for those individuals left jobless due to a declared major disaster who are not eligible for standard unemployment insurance benefits. Available funds to be used for compensation and administrative costs.

Matching Requirement: 0 *Phone:* 202-646-4600 *Webpage:* www.fema.gov/

Program: **Economic Development - Support for Planning Organizations**

Agency: Economic Development Administration, Planning and Development Assistance Division, Dept. of Commerce *Agency Type:* Federal

Description: Provides administrative aid to multi-county Economic Development Districts and Redevelopment Areas. The grants fund administrative cost involved in the operation of the organization. Primarily designated for areas with up to 250,000 population, high and persistent unemployment or underemployment.

Matching Requirement: 0 *Phone:* 202-482-5081 *Webpage:* hom.doc.gov/

Program: **Emergency Food and Shelter National Board**

Agency: HUD *Agency Type:* Federal

Description: Supplements the work of local private and governmental social service organizations to help people in need of emergency assistance. This collaborative effort between the private and The National Board uses a formula involving population, poverty, and unemployment data to determine the eligibility of a civil jurisdiction. There is no national application process. Board is chaired by FEMA.

Matching Requirement: 0 *Phone:* 703-706-9660 *Webpage:* www.efsp.unitedway.org/efspnew/Page

Program: **Emergency Shelter Grants**

Agency: Community Planning and Development, HUD *Agency Type:* Federal

Description: Emergency shelters and housing for homeless individuals. Funds are available through the State. Funds must be used for renovation, alterations or conversions of buildings to homeless shelters. Services for the homeless may make up to 30% of the funds while administrative costs are not be more than 5% of the fund. Local municipalities and non-profit organizations may apply directly to the State.

Matching Requirement: 0 *Phone:* 202-708-1455 *Webpage:* www.hud.gov/offices/cpd/homeless/pro

Program: **Employment and Training Assistance - Dislocated Workers**

Agency: Employment and Training Administration, DOL *Agency Type:* Federal

Description: Funds used to provide job-training, job-search, placement assistance and other services to assist dislocated workers obtain jobs.

Matching Requirement: 0 *Phone:* 202-219-5690 *Webpage:* www.doleta.gov/

Program: **Grants for Public Works and Economic Development**

Agency: Public Works Division, Economic Development Administration, *Agency Type:* Federal DOC

Description: Promotes long-term economic development and assists in the construction of public works and development facilities needed to initiate and support the creation or retention of permanent jobs in the private sector in areas experiencing substantial economic distress.

Matching Requirement: 0 *Phone:* 202-482-5265. *Webpage:* aspe.os.dhhs.gov/cfda/p11300.htm#i11

Program: **Home Investment Partnership Program**

Agency: Community Planning and Development, HUD *Agency Type:* Federal

Description: HOME allocates funds by formula in a block grant to States, urban counties, cities, and specially

authorized consortia of jurisdictions for a variety of housing, depending upon the State's or local government's needs.

Matching Requirement: 0 *Phone:* 800-245-2691 *Webpage:* www.hud.gov

Program: **Impact Aid Disaster Assistance Program**

Agency: Office of Elementary and Secondary Education, USDE *Agency Type:* Federal

Description: Funds are available to schools impacted by a declared disaster. Applications must be submitted within 90 days of the declaration and can be used to offset the loss of revenue and disaster recovery costs. (Lenders who have made or hold federal college or university student loans also were directed to provide financial relief from monthly loan payments to those borrowers affected by the 9-11-01 terrorist attacks in New York City.)

Matching Requirement: 0 *Phone:* 202-401-2311 *Webpage:* www.ed.gov/offices/OESE/

Program: **Individual and Family Grants**

Agency: Human Services Division, Response and Recovery Directorate, FEMA *Agency Type:* Federal

Description: To provide funds for the necessary expenses and serious needs of disaster victims, which cannot be met through other forms of disaster assistance or through other means such as insurance.

Matching Requirement: 0 *Phone:* 202-646-3685 *Webpage:* aspe.os.dhhs.gov/cfda/p83543.htm#i37

Program: **Mortgage Insurance, Homes for Disaster Victims**

Agency: Single Family Development Division, Office of Insured Single Family Housing, HUD *Agency Type:* Federal

Description: Loans available to individuals or families who are victims of a major disaster for the purchase of homes. HUD insures the lenders for possible losses from the mortgages on these homes. Those eligible must have resided in housing that was damaged or destroyed in a Presidentially- declared disaster.

Matching Requirement: 0 *Phone:* 202-708-1455 *Webpage:* www.hudclips.org/cgi/index.cgi

Program: **Public Health and Social Services Emergency Fund**

Agency: Dept. Health and Human Services *Agency Type:* Federal

Description: To provide supplemental funding for public health and social service emergencies.

Matching Requirement: 0 *Phone:* 301-443-1167 *Webpage:* aspe.os.dhhs.gov/CFDA/p93003.htm#i

Program: **Rural Business Enterprise Grants**

Agency: Rural Business-Cooperative Service, DOA *Agency Type:* Federal

Description: Facilitates the development of small and emerging private business, industry, and related employment for improving the economy in rural communities.

Matching Requirement: 0 *Phone:* 202-720-1400 *Webpage:* aspe.os.dhhs.gov/cfda/p10769.htm

Program: **Rural Business Opportunity Grants**

Agency: Rural Business-Cooperative Service, USDA *Agency Type:* Federal

Description: To promote sustainable economic development in rural communities with exceptional needs.

Matching Requirement: 0 *Phone:* 202-720-1400. *Webpage:* aspe.os.dhhs.gov/cfda/p10773.htm

Program: **Rural Housing Site Loans and Self: Help Housing Land Development Loans**

Agency: Rural Housing Service, DOA *Agency Type:* Federal

Description: Assists public or private nonprofit organizations interested in providing sites for housing; to acquire and develop land in rural areas to be subdivided as adequate building sites and sold on a cost development basis to families eligible for low and very low income loans, cooperatives, and broadly based nonprofit rural rental housing applicants.

Matching Requirement: 0 *Phone:* 202-720-1474 *Webpage:* aspe.os.dhhs.gov/cfda/p10411.htm

Program: **SBA Disaster Assistance**

Agency: Small Business Administration

Agency Type: Federal

Description: Provides low interest, fixed rate loans to disaster victims, enabling them to repair or replace property damaged or destroyed in declared disasters. It also offers such loans to affected small businesses to help them recover from economic injury caused by such disasters. (SBA offers three kinds of disaster loans: physical disaster home loans, physical disaster business loans, and economic injury business loans.)

Matching Requirement: 0 *Phone:* 202-205-6734 *Webpage:* www.disastercenter.com/laworder/sbal

Program: **Temporary Assistance for Needy Families**

Agency: Administration for Children and Families, Office of Family Assistance, DHHS

Agency Type: Federal

Description: Provides temporary emergency assistance for families with children. A State must establish financial eligibility criteria for benefits under either of these purposes.

Matching Requirement: 0 *Phone:* by state *Webpage:* www.acf.dhhs.gov/programs/ofa/

Program: **Very Low to Moderate Income Housing Loans**

Agency: Rural Housing Service, DOA

Agency Type: Federal

Description: Assists very low and low-income families through direct loans to buy, build, rehabilitate, or improve and to provide the customer with modest, decent, safe, and sanitary dwellings and related facilities as a permanent residence in rural areas. Subsidized funds are available on direct loans only for low and very low-income applicants. Non-subsidized funds (loan making) are available for very low and low-income applicants who are otherwise eligible for subsidy, but at the present time, the subsidy is not needed. Loan guarantees are also available to assist low and moderate income rural families in home acquisition.

Matching Requirement: 0 *Phone:* 202-720-1474 *Webpage:* aspe.os.dhhs.gov/cfda/p10410.htm

Program: **Very Low-Income Housing Repair Loans and Grants**

Agency: Rural Housing Service, DOA

Agency Type: Federal

Description: To give very low-income rural homeowners an opportunity to make essential repairs to their homes to make them safe and to remove health hazards to the family or the community.

Matching Requirement: 0 *Phone:* 202-720-1474 *Webpage:* aspe.os.dhhs.gov/cfda/p10417.htm

Primary Funding Area: Training - Emergency Services

Program: **Chemical Emergency Preparedness and Prevention Technical Assistance Grants**

Agency: Chemical Emergency Preparedness and Prevention Office, EPA *Agency Type:* Federal

Description: Grants awarded for accident prevention and emergency preparedness programs for chemical accident emergencies. All project periods must not be more than two years long.

Matching Requirement: 25 *Phone:* 202-260-6657 *Webpage:* www.epa.gov/swercepp

Program: **Emergency Management Institute Training Assistance**

Agency: EMI, FEMA

Agency Type: Federal

Description: To defray travel and per diem expenses of State, local and tribal emergency management personnel who attend training courses conducted by the Emergency Management Institute, at the Emmetsburg, Maryland facility; Bluemont, Virginia facility; and selected off-site locations. Its purpose is to improve emergency management practices among State, local and tribal government managers, in response to emergencies and disasters.

Matching Requirement: 0 *Phone:* 301-447-1000. *Webpage:* aspe.os.dhhs.gov/cfda/p83527.htm

Program: **Hazardous Materials Emergency Preparedness Grant**
Agency: Hazardous Materials Emergency Preparedness, DOT *Agency Type:* Federal
Description: Provides financial and technical assistance as well as national direction and guidance to enhance State and local hazardous materials emergency planning and training.
Matching Requirement: 0 *Phone:* 202-366-0001 *Webpage:* www.usfa.fema.gov/hazmat/hmep/bkgr

Program: **Hazardous Materials Training Program for Implementation of the Superfund Amendment and Reauthorization Act (SARA) of 1986**
Agency: FEMA *Agency Type:* Federal
Description: To provide training in support of Tribal governments emergency planning, preparedness, mitigation, response, and recovery capabilities. These programs must provide special emphasis on emergencies associated with hazardous chemicals. U.S. territories must apply for Emergency Management Performance Grants.
Matching Requirement: 20 *Phone:* 202- 646-4516 *Webpage:* www.fema.gov <http://www.fema.gov>

Program: **National Fire Academy Training Assistance**
Agency: National Fire Academy, US Fire Administration, FEMA *Agency Type:* Federal
Description: Provides travel stipends to students attending Academy courses.
Matching Requirement: 0 *Phone:* 301-447-1035 *Webpage:* aspe.os.dhhs.gov/cfda/p83009.htm

Primary Funding Area: Wetlands Development/Restoration

Program: **Capitalization Grants for Clean Water State Revolving Funds**
Agency: Assessment and Watershed Protection Division, Office of Wetlands, Oceans and Watersheds, EPA *Agency Type:* Federal
Description: Funding through regional offices include The National Estuary Program, The Wetlands Protection State Development Grant Program and the Non-point Source Implementation Grant Program.
Matching Requirement: 20 *Phone:* 202-260-7166 *Webpage:* www.epa.gov/OWOW

Program: **Conservation Technical Assistance**
Agency: Natural Resources Conservation Service, USDA *Agency Type:* Federal
Description: The purpose of the program is to assist land-users, communities, units of state and local government, and other Federal agencies in planning and implementing conservation systems. The purpose of the conservation systems are to reduce erosion, improve soil and water quality, improve and conserve wetlands, enhance fish and wildlife habitat, improve air quality, improve pasture and range condition, reduce upstream flooding, and improve woodlands.
Matching Requirement: 0 *Phone:* 202- 720-1604 *Webpage:* www.nrcs.usda.gov/NRCSProg.html#

Program: **Farmable Wetlands Pilot**
Agency: Farm Service Agency, USDA *Agency Type:* Federal
Description: Voluntary program to restore up to 500,000 acres of farmable wetlands and associated buffers by improving the land's hydrology and vegetation. Eligible producers in Iowa, Minnesota, Montana, Nebraska, North Dakota, and South Dakota can enroll eligible land in the FWP through the Conservation Reserve Program (CRP). Restoring wetlands will reduce downstream flood damage, improve surface and groundwater quality, and recharge groundwater supplies. FWP contracts are from 10 to 15 years in exchange for annual rental payments, incentive payments, and cost-share for installing necessary practices.
Matching Requirement: 0 *Phone:* 202-720-7807 *Webpage:* www.fsa.usda.gov/pas/disaster/default.

Program: **Flood Hazard Mitigation and Riverine Ecosystem Restoration**
Agency: U.S. Army Corps of Engineers *Agency Type:* Federal

Description: Informally known as Challenge 21, this watershed-based program focuses on identifying sustainable solutions to flooding problems by examining nonstructural solutions in flood-prone areas, while retaining traditional measures where appropriate. Eligible projects will meet the dual purpose of flood hazard mitigation and riverine ecosystem restoration. Projects might include the relocation of threatened structures, conservation or restoration of wetlands and natural floodwater storage areas and planning for responses to potential future floods.

Matching Requirement: 50 *Phone:* 202-761-0115 *Webpage:* www.epa.gov/owow/watershed/wacade

Program: **North American Wetlands Conservation Act Grants**

Agency: Fish and Wildlife Service

Agency Type: Federal

Description: Provides matching grants to carry out wetlands conservation projects in the United States, Canada, and Mexico. Both the Standard and Small Grants programs help deliver funding to on-the-ground projects through the protection, restoration, or enhancement of an array of wetland habitats.

Matching Requirement: 0 *Phone:* 703-358-1784 *Webpage:* www.epa.gov/owow/watershed/wacade

Program: **North American Wetlands Conservation Fund**

Agency: Fish and Wildlife Service, DOI

Agency Type: Federal

Description: To provide grant funds for wetlands conservation projects, such as acquisition, restoration, and enhancement of wetlands and wetlands ecosystems.

Matching Requirement: 0 *Phone:* 703-358-1784 *Webpage:* aspe.os.dhhs.gov/cfda/p15623.htm

Program: **Oil Spill Liability Trust Fund**

Agency: US Coast Guard, USDT

Agency Type: Federal

Description: Program provides funding for the immediate response and removal of oil spills. Although primarily used to offset the onsite costs of removal, funding may also be used to cover administrative costs associated with a particular incident.

Matching Requirement: 0 *Phone:* 202-267-2229 *Webpage:* www.uscg.mil/

Program: **Partners for Fish and Wildlife**

Agency: Fish and Wildlife Service, Branch of Habitat Restoration, USDI

Agency Type: Federal

Description: Voluntary habitat restoration in cooperation with private landowners. Provides technical and financial assistance to restore wetlands, streams and river corridors, prairie, grasslands and other important fish and wildlife habitats for Federal trust species (migratory birds, threatened and endangered species, anadromous fish, and some marine mammals).

Matching Requirement: 50 *Phone:* 703-358-2201 *Webpage:* partners.fws.gov/

Program: **Sustainable Development Challenge Grant**

Agency: Office of Air and Radiation, EPA

Agency Type: Federal

Description: Grants provided to encourage private-public partnership that promotes economically and environmentally sustainable development in the community.

Matching Requirement: 0 *Phone:* 202-564-7400 *Webpage:* www.epa.gov/

Program: **Watershed Program and Flood Prevention (Small)**

Agency: Natural Resources Conservation Service, USDA

Agency Type: Federal

Description: Provides planning assistance to Federal, State, and local agencies for the development of coordinated water and related land resources programs in watersheds and river basins. Works through local government sponsors and helps participants solve natural resource and related economic problems on a watershed basis. Projects include watershed protection, flood prevention, erosion and sediment control, water supply, water quality, fish and wildlife habitat enhancement, wetlands creation and restoration, and public recreation in watersheds of 250,000 or fewer acres. Both technical and financial assistance are available.

Matching Requirement: 0 *Phone:* 202-720-3534 *Webpage:* www.nrcs.usda.gov/NRCSProg.html

Program: **Wetlands Conservation Projects**

Agency: Fish and Wildlife Service, North American Waterfowl and Wetlands Office, DOI *Agency Type:* Federal

Description: Promote long-term conservation of North American wetland ecosystems and the waterfowl and other migratory birds, fish and wildlife that depend upon such habitats through partnerships. Principle conservation actions supported are acquisition, creation, enhancement, and restoration of wetlands and wetlands-associated habitat. Grant amount: is \$50,000 maximum.

Matching Requirement: 0 *Phone:* 703-358-1784 *Webpage:* www.fws.gov/cep/cwgfact.html

Program: **Wetlands Program Development Grants**

Agency: Office of Water, EPA *Agency Type:* Federal

Description: Provide financial assistance to states, federally- recognized Indian tribes, and local governments to support development of new, or augmentation and enhancement of existing wetland programs. Projects must clearly demonstrate a direct link to an increase in the state's, tribe's, or local government's ability to protect its wetland resources.

Matching Requirement: 25 *Phone:* 800-832-7828 *Webpage:* www.epa.gov/owow/wetlands/2002gran

Program: **Wetlands Protection Grants**

Agency: Office of Water, EPA *Agency Type:* Federal

Description: Protection of wetlands through plan development, development of model prototype projects such as effective wetland monitoring, innovative watershed protection.

Matching Requirement: 0 *Phone:* 800-832-7828 *Webpage:* www.epa.gov/R5water/wshednps/pdf/w

Program: **Wetlands Reserve**

Agency: Natural Resources Conservation Service, USDA *Agency Type:* Federal

Description: Offers landowners the opportunity to protect, restore, and enhance wetlands and wildlife habitat on their property through technical and financial support. Efforts are aimed at long-term conservation and wildlife practices and protection.

Matching Requirement: 0 *Phone:* 202-720-1067 *Webpage:* www.ftw.nrcs.usda.gov/pl566/pl566.html

Program: **Wildlife Habitat Incentives**

Agency: Natural Resources Conservation Service, USDA *Agency Type:* Federal

Description: For development and improvement of wildlife habitat primarily on private land and aquatic areas. Provides both technical assistance and up to 75 percent cost-share assistance to establish and improve fish and wildlife habitat. WHIP agreements between NRCS and the participant generally last from 5 to 10 years from the date the agreement is signed.

Matching Requirement: 25 *Phone:* 202-720-1067 *Webpage:* www.ftw.nrcs.usda.gov/pl566/pl566.html

**Appendix C – Meeting Minutes from the Disaster Mitigation Committee and
Community Meetings**



Meeting Minutes

Date of Meeting: August 17, 2009
10:00 a.m.

Re: Hazard Mitigation Kickoff Meeting

Location: City of Greenville City Hall

Issue Date: August 19, 2009

Submitted By: R. Washington

In Attendance: See attached

Conference Call:

ITEMS DISCUSSED

- Meeting began at 10 a.m. with an introduction by Jessica Chapman.
- Committee members introduced themselves by giving their name and affiliation.
- Trevor Gauron (Woolpert) gave presentation on Hazard Mitigation including the following topics:
 - Project Introduction
 - Describe the Process
 - Consider the hazards (Flooding, wind, winter Storm, earthquake and wildfire)
 - Consider the Risk (Structures, infrastructure, critical facilities, and emergency services)
 - Develop a plan (Develop an activity list, and prioritize the activities)
 - Plan preparation, submittal and approval
 - Discuss potential mitigation activities
 - Discuss next steps
- The question was posed by the City of Greenville as to whether man-made emergencies (terrorism, nuclear disaster, civil unrest, etc) could be incorporated into this program. Trevor commented that they can be incorporated but are not eligible for funding through this plan.
- After the presentation, the Committee members began to discuss potential mitigation activities (Listed in the 'Additional Items' section).
- After the discussion of mitigation activities, the Committee agreed to coordinate a public meeting to solicit ideas from residents.
- The meeting ended around 12 p.m.

ADDITIONAL ITEMS

Listed below are the Proposed Mitigation Activities. These activities will be ranked/prioritized by the Committee during the next mitigation meeting.

- Adjustments to Building Codes (City has started initiative)
- White Oak basin watershed study
- Enhance GIS (Online Access, password protected for certain users only)
- Incorporating National Weather Service (NWS) into the post-disaster review meeting
- Increase number of City represented CERT Program participants
- Relocation of Public Works facility
- Creating a Spill and Industrial Accidents Action Plan (Fleet Yard)
- Reassessment of Reverse 911 System (Bi-lingual)
- Assisting Rev. Fleming with CISM stress-relief management program
- Installation of rain gages (Real-time Data for Rainfall Info)
- Address erosion control (Reedy River & Landfill)
- Develop a riverine crew to assist with debris removal
- Henderson Basin crossing analysis
- Addressing repetitive loss structures
- Dwelling Elevation Program
- Early warning system
- Stone Lake dam restoration
- Develop a plan for sewage inspections after disasters
- Develop a plan for nuclear power cleanup after disasters
- Sewage Study for heavy rain events
- Provide backup generators for key intersections and critical facilities
- Collaborate with NWS' "Turn Around, Don't Drown" Campaign
- Collaborate with County to enhance residents education of hazards
- Enhance "Officer Century" emergency booths

NEXT STEPS

1. The City will conduct a public meeting to solicit ideas from the community.
2. The Committee will reconvene to prioritize the initiatives. This meeting is tentatively planned for October. Invitations will be sent out to the Committee members at a later date. During this meeting, the Committee will prioritize the initiatives listed above.
3. Woolpert will develop a draft plan for the Committee to review.
4. The plan will then proceed to SCEMD/FEMA for approval.



MEETING SIGN-IN SHEET

| | |
|--|--|
| Project: Multi-Hazard Mitigation Plan Scoping Meeting | Meeting Date: August 17, 2009 |
| Facilitator: | Place/Room: 3 rd Floor Conference Room City Hall |

| Name | Title | Company | Phone | Fax | E-Mail |
|-------------------|--|---|-----------------------|-----|-------------------------------|
| Sylvia Palmer | Resident | | 864-420-7033 | | |
| PAT TANNER | Hydrologist | NWS | 864-8791085 | | |
| Tony Sturzy | Warning Coordinator | NWS | 848-9970 | | |
| Jessica Chapman | Assistant City Engineer | City of Greenville | 467-5708 | | jchapman@greenvillesc.gov |
| Kevin Pulis | Civil Engineer | City of Greenville | 467-4409 | | kpulis@greenvillesc.gov |
| KIRSTEN ROBERTSON | DISTRICT MANAGER | GREENVILLE CO. SOIL & WATER CONSERVATION DISTRICT 110 | 467-2755 EXT 467-4565 | | KRobertson@greenvillesc.gov |
| John W. Sasser | City of Greenville | | | | jsasser@greenvillesc.gov |
| Vandrey Fleming | Community President | Westville | 430-2095 | | lynnebbmc@charterinternet.com |
| Mike Madden | City of Greenville Police | | 444-4328 | | mmadden@greenville-sc.gov |
| Jerry Chapman | Gen Mgr. Const & Opns Planning Manager | Duke Energy | 234-4149 | | jerry.chapman@duke-energy.com |
| Jean Pool | City of Greenville | | 467-4495 | | jpool@greenvillesc.gov |
| Tom McDowell | Chief | GCFD | 467-4445 | | tmcdowell@greenvillesc.gov |
| JACKIE JONES | RESIDENT | THE PHOENIX CENTER | 467-3177 467-3179 | | jones@phoenixcenter.org |
| Robert Hall | Fltplan. Adm | Greenville City | 467-7523 | | rohall@greenvillesc.gov |
| | | | | | |
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Meeting Minutes

Date of Meeting: October 12, 2009
10:00 a.m. **Re:** Hazard Mitigation Prioritization Meeting

Location: City of Greenville City Hall **Issue Date:**

Submitted By: R. Washington

In Attendance: See attached **Conference Call:**

ITEMS DISCUSSED

- Meeting began at 10 a.m. with an introduction by Trevor Gauron.
- Committee began the ranking process.
- In the time allotted, the Committee was able to rank 7 of 22 initiatives
 - The Committee agreed to designate the same point value for the Henderson Basin Flood Study to the White Oak Basin Watershed study.
- A suggestion presented that Woolpert send out an email to all Committee members with the prioritization form and instructions on how to complete the form, so that everyone would have a voice in the ranking process.
 - The Committee agreed to the suggestion.
- The meeting ended at 11:15 a.m.

NEXT STEPS

1. Woolpert will prepare an email to send to Committee members by Oct. 16, 2009, and all ranking forms should be return by Oct. 26, 2009.
2. The City will conduct a public meeting to solicit ideas from the community.
3. Woolpert will develop a draft plan for the Committee to review.
4. The plan will then proceed to SCEMD/FEMA for approval.



Place/Room: 3rd Floor

| Name | Title | Company | Phone | Fax | E-Mail |
|-----------------|----------------------------|-----------------------------|------------------|--------------|--|
| Kevin Pulis | Civil Eng. | City of Greenville | 864 467-4400 | | kpulis@greenville.sc.gov |
| KEITH DRUMMOND | GC CODES | GreV County | 467-7595 | 467-7222 | greenville keithdrummond@county.org |
| Jessica Chapman | Assistant City Engineer | COG | 864- 467-4400 | | jchapman@greenvillesc.gov |
| David Crigler | SR. VP & GM | Prudential C. Dan Joyner | 678-5203 | 370- 4763 | dcrigler@ cdanjoyner.com |
| PICK RICHARDSON | GC VICE PRES | HARPER CORP | 527-2511 | 527-2536 | RICHARDSON@ HARPERCORP.COM |
| Terry Chapman | G.M. Const & Maint. | Duke Energy | 864 234-4149 | | Terry Chapman @ duke-energy.com |
| Bill Mizianec | VP Assistant | Carolina Holdings | 272-0088 | 272-0078 | bill.mizianec@ choldings.com |
| John Wasson | Chief of Inspection | City of Greenville | 467-4565 | 467-4493 | jwasson@ greenville.sc.gov |
| Jean Pool | Planning & Dev. Manager | City of Greenville | 467-4495 | | jpool@greenville.sc.gov |



Meeting Minutes

Date of Meeting: October 13, 2009
5:30 pm

Re: Community Meeting

Location: City of Greenville

Issue Date:

Submitted By: R. Washington

In Attendance: R. Washington
T. Gauron
K. Pulis

Conference Call:

ITEMS DISCUSSED

- Meeting took place from 5:30 – 6:00pm to introduce the citizens of Greenville to Hazard Mitigation planning.
- The City's Engineering Dept. gave notice to local news media, placed bulletins in local shopping centers to alert citizens of the meeting.
- No members of the Greenville community attended.



Meeting Minutes

Date of Meeting: December 18, 2009 **Re:** Draft Review Meeting

Location: City of Greenville **Issue Date:**

Submitted By: R. Washington

In Attendance: See Attached Sheet **Conference Call:**

ITEMS DISCUSSED

- This meeting was called to provide the DMC with a draft copy of the Hazard Mitigation plan
- Trevor (Woolpert) guided the DMC through the document, and the recorded edits are listed below:
 1. Ed Marr suggested 2 new initiatives: Storm Debris Removal Process/Identify locations for stock piling debris
 2. Alan Johnson proposed a new initiative: Underground of Electricity lines
 3. Officer Century's should be 'devices' not 'booths'
 4. Incorporate City GIS data into Maps
 5. Remove Henderson Basin initiative from process
 6. Add Members to the DMC List
 - Ed Marr
 - Brian Watson
 - Jackie Jones
 - Dean Elliot
 7. Add a table of acronyms
 8. Update effective date to 2010-2015
 9. Edit Responsible Parties table
- The DMC was asked to submit any additional ideas to the Consultant by Dec 31, 2009.



MEETING SIGN-IN SHEET

Project: Multi-Hazard Mitigation Meeting

Meeting Date: 12/18/09

Facilitator: City of Greenville

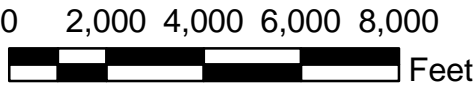
Place/Room: 1st Floor Conference

| Name | Title | Company | Phone | Fax | E-Mail |
|--------------------|-------------------------|---------------------------------|--------------|--------------|---------------------------------|
| JACKIE JONES | CITIZEN | THE PHOENIX CENTER | 386-1041 | 242-9367 | jones@phoenixcenter.org |
| Ed Marr | SW Admin | Public Works | 467-4345 | 467-4303 | emarr@greenvillesc.gov |
| David Grigler | | Prod./Tolper | 678-5203 | 370-4763 | dgrigler@cdm.com |
| Pick Richardson | | HARPER CORP | 527-2511 | 527-2536 | RICHARDSON@HARPERCORP.COM |
| Tom McDowell | Fire Citizen | GLFD | 467-4445 | 467-5790 | TMCDOWELL@greenvillesc.gov |
| RUFAN VILLOTT | LT. | POISON HPT. | 467-5149 | 467-5051 | RVILLOTT@GREENVILLESC.GOV |
| Robert Hall | FP Adm. | GC Codes | 467-7523 | | rohall@greenvillecounty.org |
| PAT TANNER | NWS | NATIONAL WEATHER SERVICE | 848-9970 | | PATRICIA.TANNER@NOAA.GOV |
| Jessica Chapman | Assistant City Engineer | COG | 864-467-5708 | 864-467-5754 | jchapman@greenvillesc.gov |
| Sylvia Palmer | Resident | Nicholtown Neighborhood Assoc | 420-7033 | | syvpalm@aol.com |
| Kevin Pulis | Civil Engineer | City of Greenville | 467-4409 | | kpulis@greenvillesc.gov |
| Alan Johnson, P.E. | Principal | ALIBER Engineering | 244-9238 | 244-9576 | AJohnson@CaliberEngineering.com |
| Varday Fleming | Community President | West Primmille Community Assoc. | 430-2095 | 232-2181 | Lynn-bbmc@charterinternet.com |
| Rhys Kear | Planner | City of Greenville | 467-4496 | 467-4510 | rKear@greenvillesc.gov |
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Appendix D – Maps

City of Greenville
Hazard Mitigation

Critical Facilities



Legend

City Facilities

Law Enforcement

Schools

Fire Stations

City Boundary

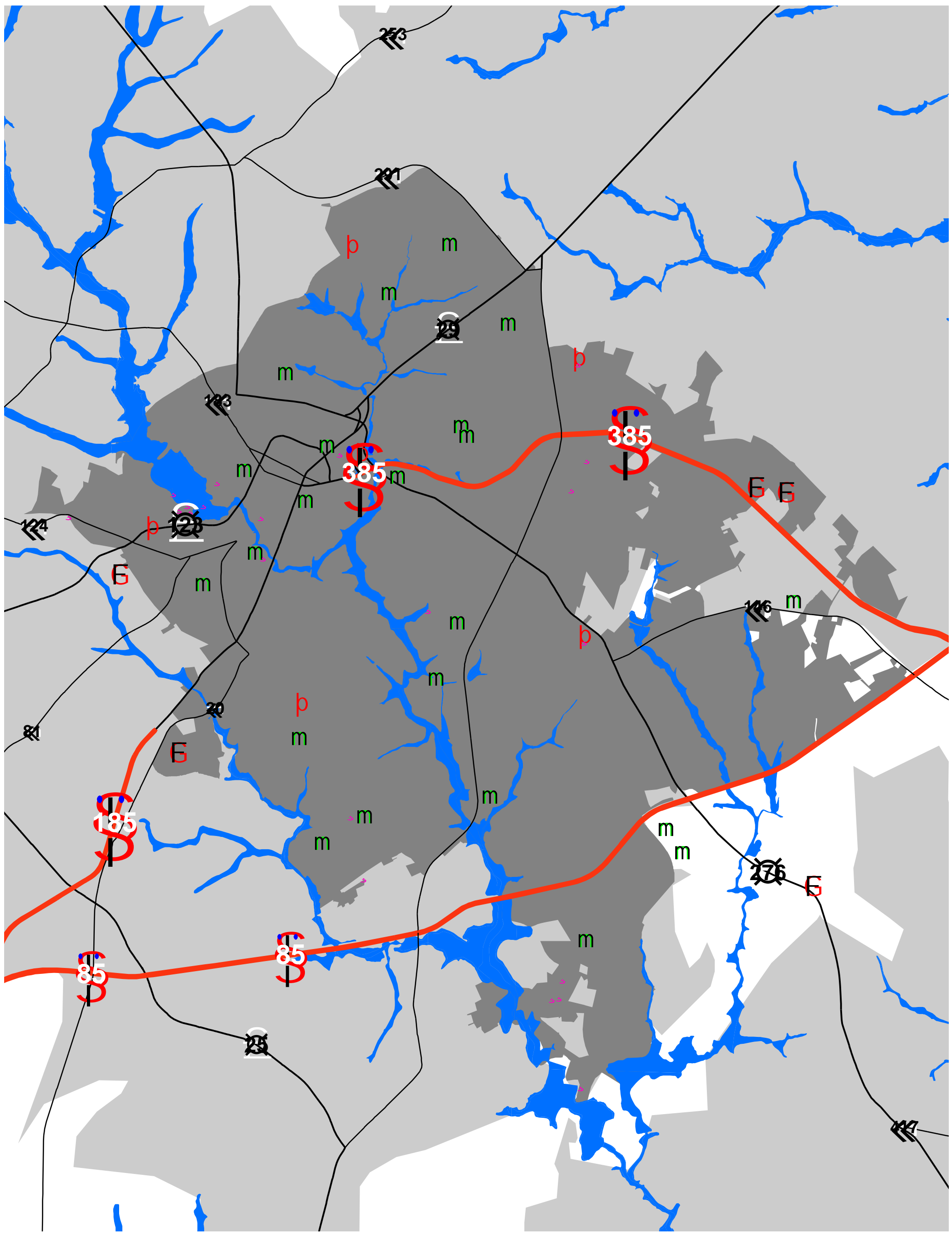
Urbanized Area

Interstates

US Highways

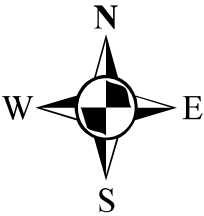
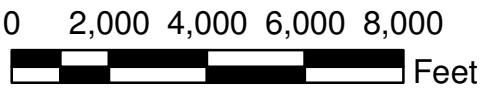
SC Highways

100-Year Floodplain





City of Greenville
Hazard Mitigation


Flooding Issues





Legend


 Repeat Loss Structures


 Flooding Problem Areas


 City Boundary

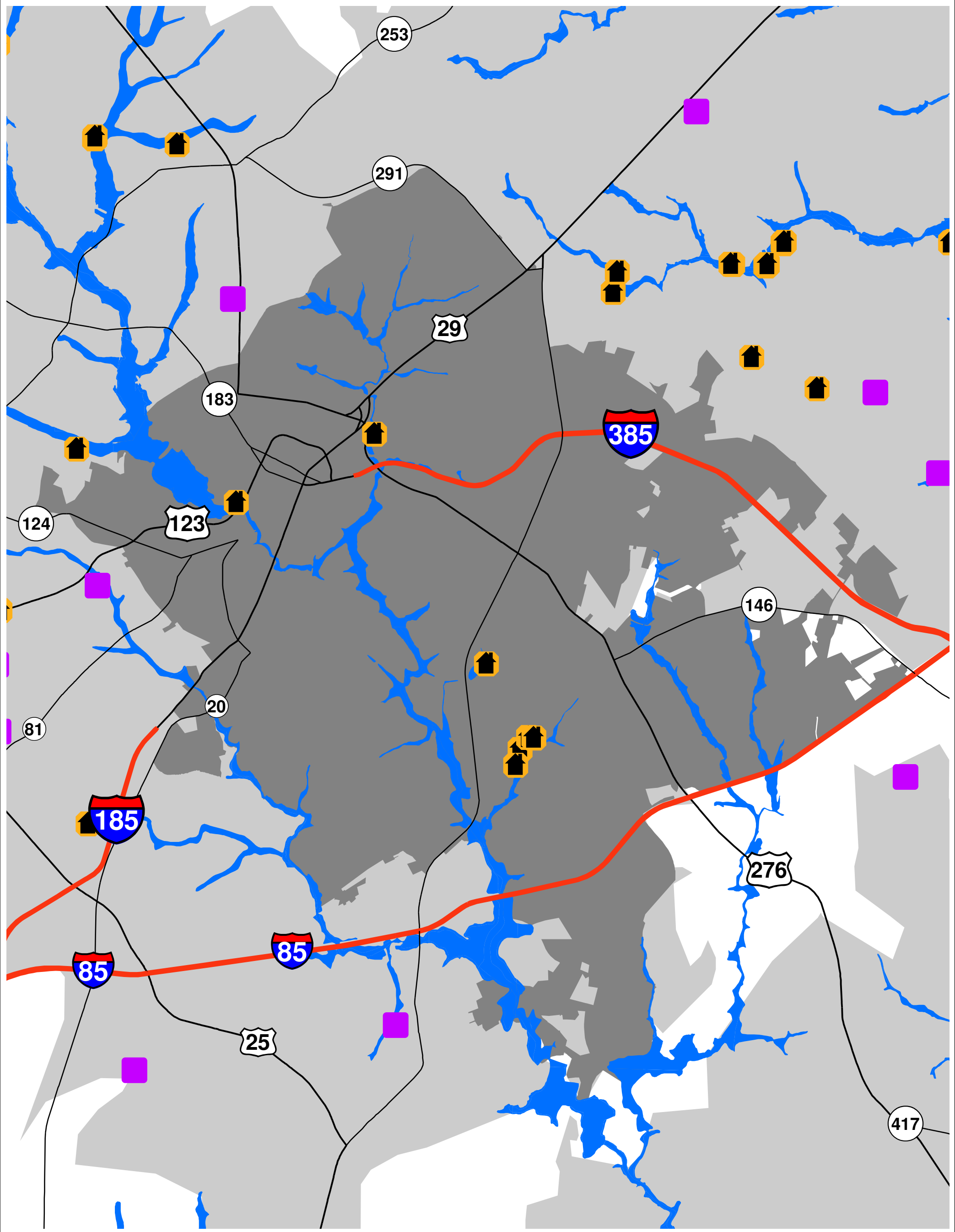
 Urbanized Area

 Interstates

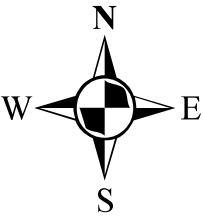
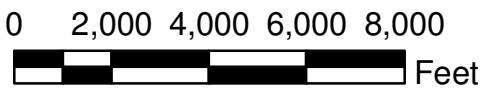
 US Highways

 SC Highways

 100-Year Floodplain

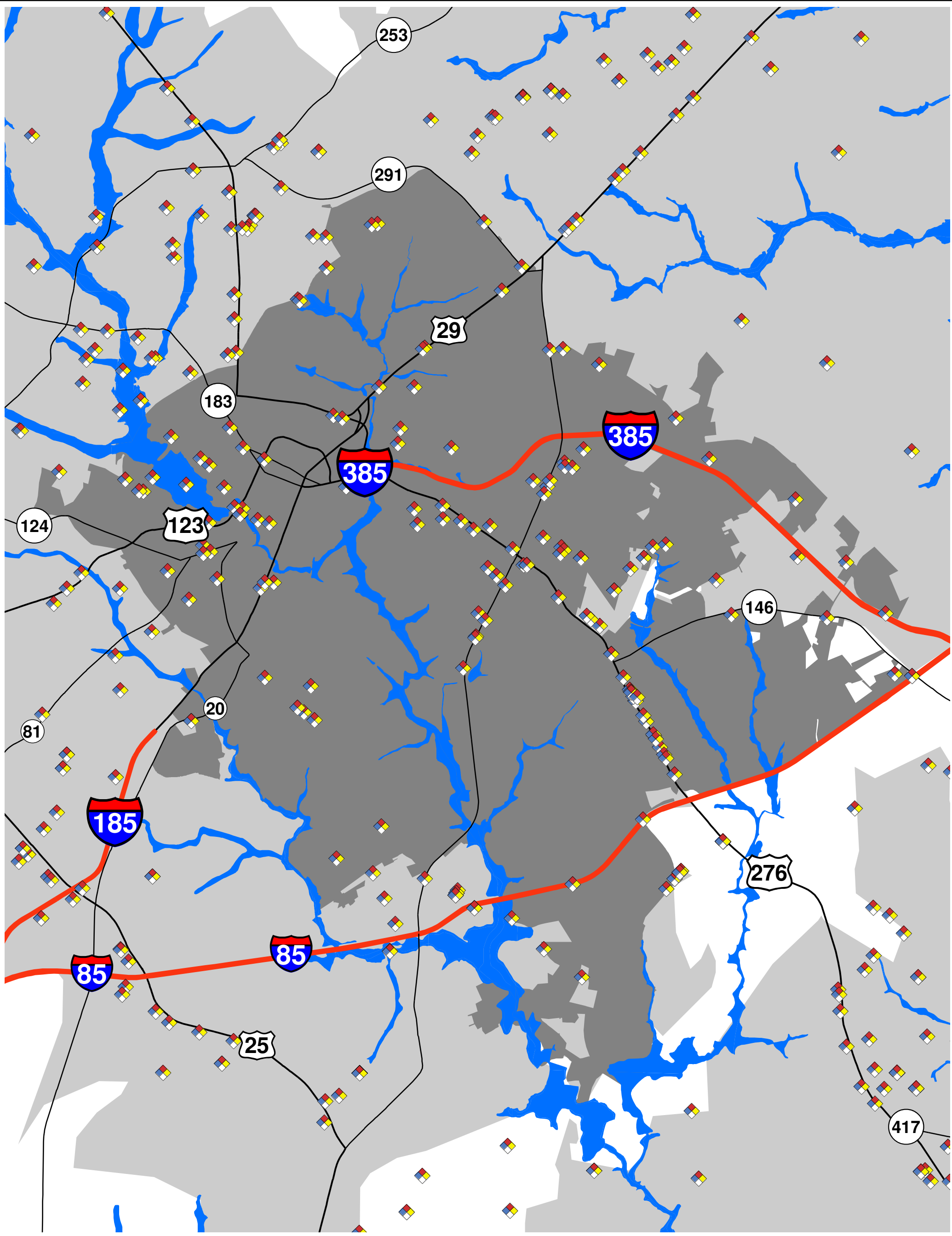


Hazardous Materials



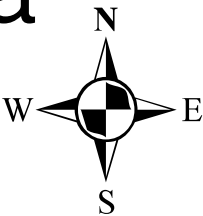
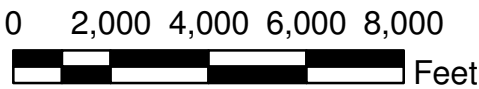
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| | Hazardous Materials | | Interstates |
| | City Boundary | | US Highways |
| | Urbanized Area | | SC Highways |
| | | | 100-Year Floodplain |



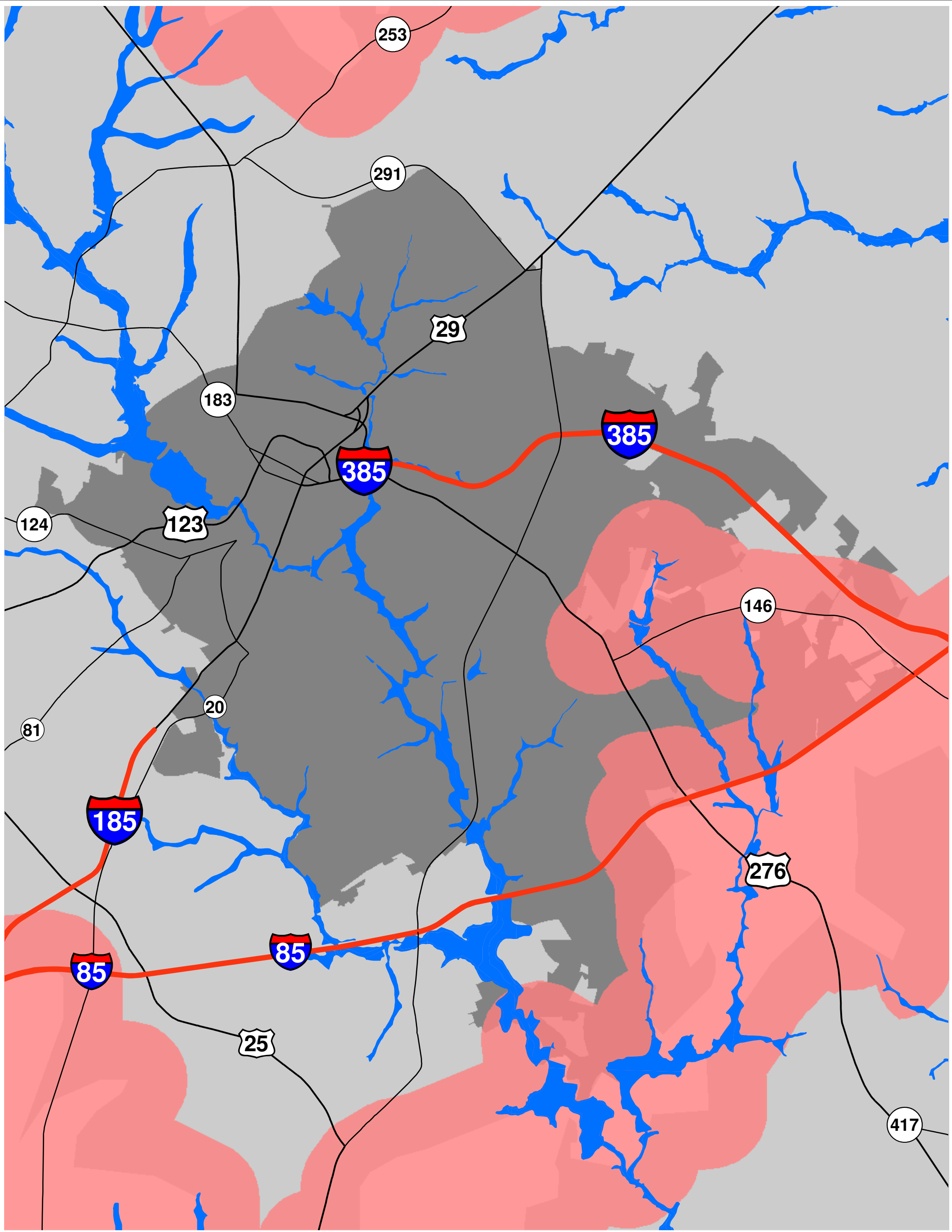
City of Greenville
Hazard Mitigation

Potential Wildfire Impact Area



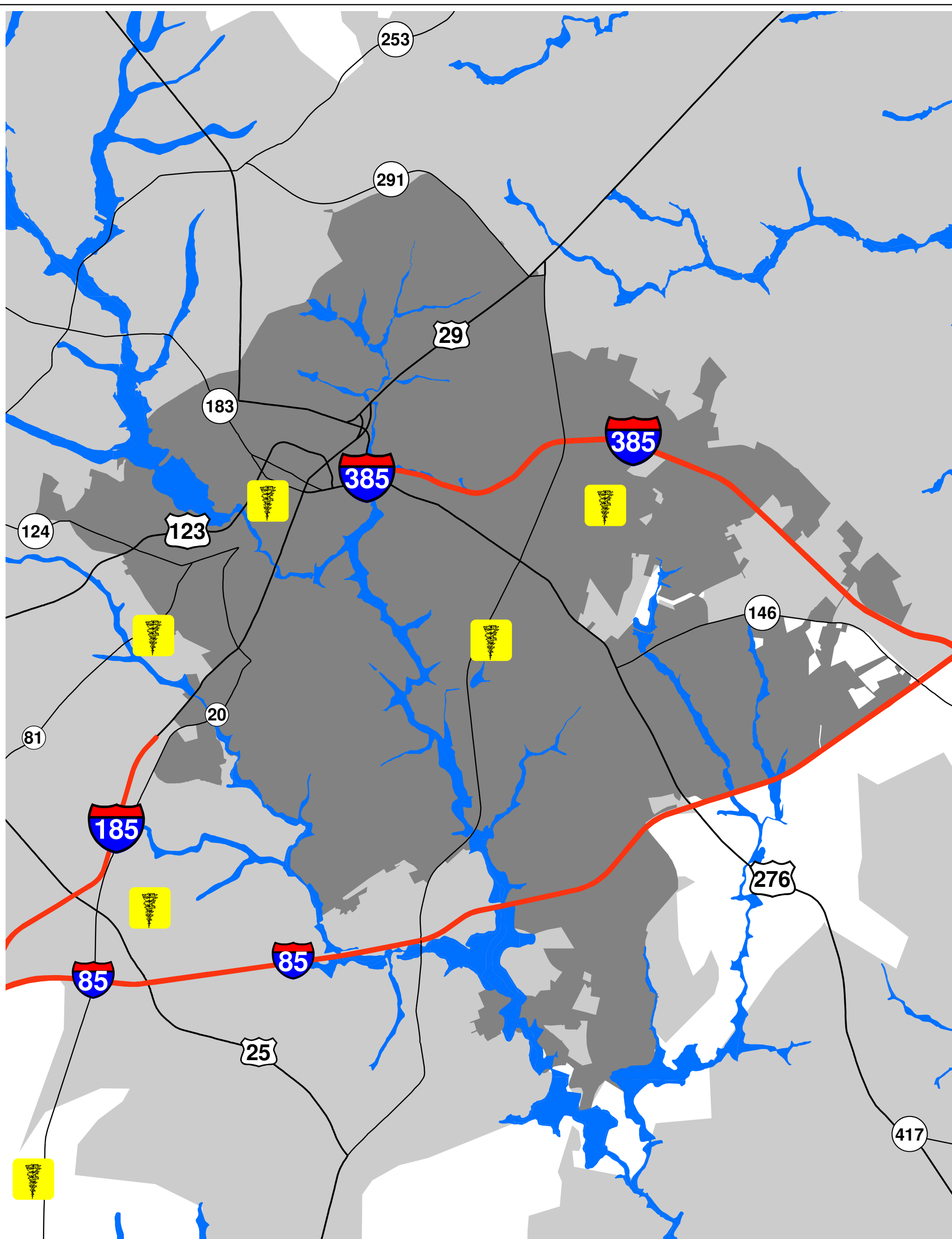
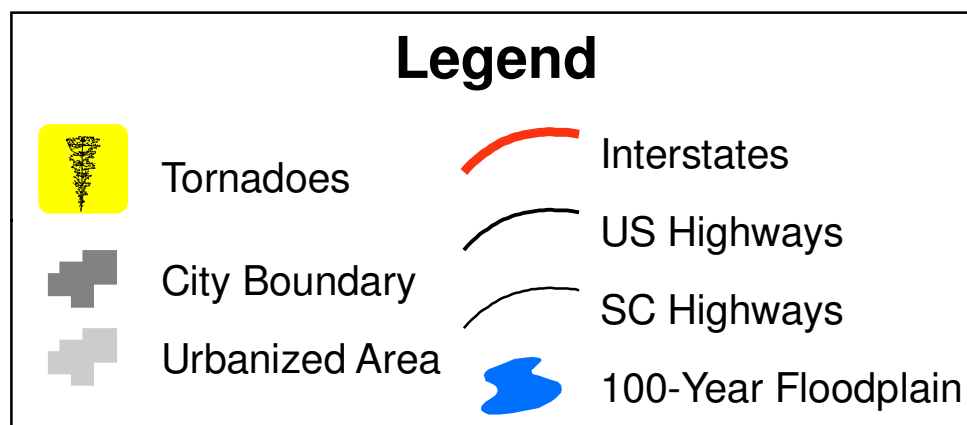
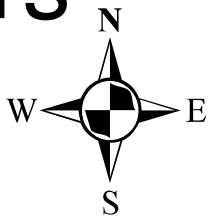
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| | Wildfire Impact Areas | | Interstates |
| | City Boundary | | US Highways |
| | Urbanized Area | | SC Highways |
| | | | 100-Year Floodplain |



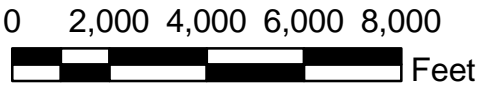
City of Greenville Hazard Mitigation Tornadoes in the Last 50 Years

0 2,000 4,000 6,000 8,000
Feet



City of Greenville
Hazard Mitigation

Dams



Legend

Dams

City Boundary

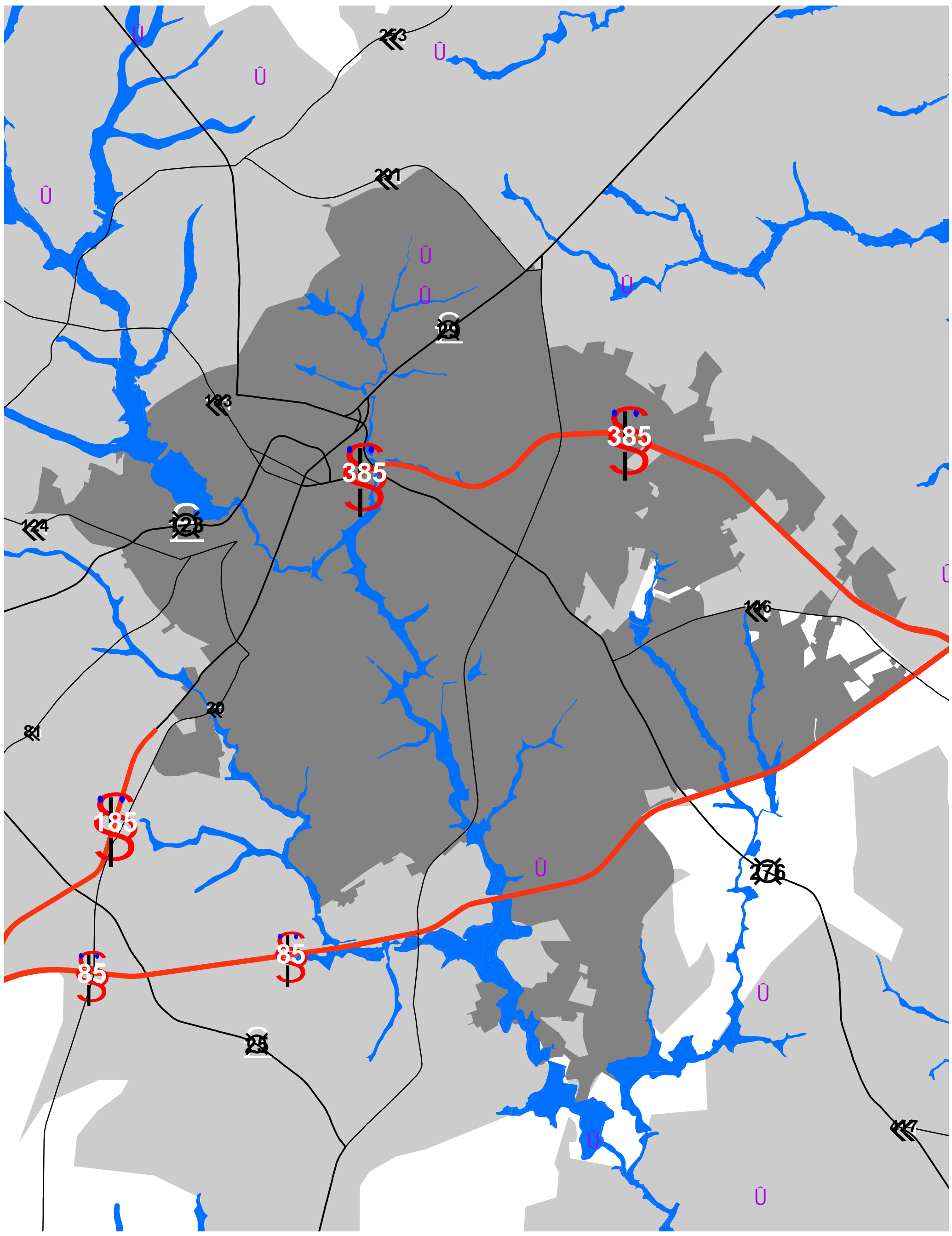
Urbanized Area

Interstates

US Highways

SC Highways

100-Year Floodplain



**Appendix E – Combined Tables for Mitigation Measures Evaluation and
Prioritization**

| Project Description | Strategy Effectiveness | Percent of Population Benefited | Time to Implement | Time to Impact | Cost to City | Cost to Others | Funding Source | Community Support | Project Feasibility | Point Total | Project Priority |
|---|------------------------|---------------------------------|-------------------|----------------|--------------|----------------|----------------|-------------------|---------------------|-------------|------------------|
| A. Prevention | | | | | | | | | | | |
| Develop a Spill and Industrial Accidents Action Plan (Fleet Yard) | 2 | 1.5 | 3 | 2.5 | 1.5 | 3 | 2 | 2.5 | 1.5 | 19.5 | 7 |
| Early warning system | 3 | 3 | 2 | 3 | 1 | 2 | 1 | 3 | 2 | 20 | 6 |
| Develop a plan for post-disaster nuclear power cleanup | 3 | 3 | 2 | 2.5 | 1 | 1 | 1.5 | 3 | 1.5 | 18.5 | 12 |
| Severe rain event sewage study | 3 | 3 | 1 | 1 | .5 | .5 | 1 | 2.5 | 1 | 13.5 | 22 |
| Collaborate with National Weather Service's "Turn Around, Don't Drown" Campaign | 2 | 1.5 | 3 | 3 | 2 | 3 | 1.5 | 2.5 | 3 | 21.5 | 5 |
| Arboricultural tree study | 2 | 2 | 1 | 1.5 | 1.5 | 1.5 | 2 | 1.5 | 1.5 | 14.5 | 19 |
| Underground Electricity Planning | 3 | 3 | 1 | 1 | .5 | .5 | 3 | 2 | 1 | 15 | 16 |
| Storm Debris Removal Process Plan | 3 | 3 | 2 | 3 | 2.5 | 3 | 3 | 3 | 2 | 24.5 | 1 |
| B. Public Education & Awareness | | | | | | | | | | | |
| Enhance GIS database (password protected) | 2 | 1.5 | 2 | 2.5 | 1.5 | 2.5 | 2 | 1.5 | 2.5 | 17 | 14 |
| CISM Post-disaster stress relief program | 3 | 3 | 2 | 3 | 2 | 2 | 1.5 | 3 | 2 | 19.5 | 8 |
| Installation of rain gages | 1 | .5 | 3 | 3 | 2.5 | 3 | 2.5 | 1.5 | 2 | 19.5 | 9 |
| Enhance hazards education | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 22 | 3 |
| C. Natural Resources Protection | | | | | | | | | | | |
| White Oak Basin watershed study | 1 | .5 | 1.5 | 2 | 1 | 2.5 | 3 | 1 | 1.5 | 14 | 21 |
| Address erosion control (Reedy River & Landfill) | 2.5 | 2.5 | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 11 | 24 |
| Develop Riverine Crews to assist with debris removal | 2.5 | 2.5 | 2 | 1 | 1 | 1 | 2.5 | 1 | 1.5 | 15.5 | 15 |
| Dam gate sediment removal maintenance plan | 3 | 2 | 1 | 1 | 2 | .5 | 3 | 2 | 3 | 17.5 | 13 |
| D. Emergency Services | | | | | | | | | | | |
| Reassessment of Reverse 911 system (Bi-lingual) | 2.5 | 1.5 | 2 | 3 | 1.5 | 2.5 | 2 | 2.5 | 2 | 19.5 | 10 |
| Provide backup generators for key intersections and critical facilities | 3 | 3 | 1 | 3 | 1 | 1 | 1 | 3 | 2 | 15 | 17 |
| Enhance "Officer Century" emergency devices | 2 | 2 | 1 | 3 | 1 | 1 | 1 | 2 | 2 | 15 | 18 |
| Incorporating National Weather Service in post-disaster review meetings | 2 | 2 | 2 | 3 | 2 | 2.5 | 2.5 | 3 | 3 | 22 | 4 |
| Increase number of City represented CERT program participants | 2.5 | 2 | 2 | 2.5 | 1.5 | 2.5 | 2 | 2.5 | 2 | 19.5 | 11 |
| E. Property Protection | | | | | | | | | | | |
| Dwelling Elevation Program | 1 | 0 | 1 | 3 | 1 | 1 | 1 | 1 | 1 | 10 | 25 |
| Relocate Public Works Facility | 1.5 | 2 | 1 | 2.5 | 1 | 2 | 2 | 1.5 | 1.5 | 14.5 | 20 |
| Stock piling debris locations | 3 | 3 | 2 | 3 | 2.5 | 3 | 3 | 2 | 2 | 23.5 | 2 |
| F. Structural Projects | | | | | | | | | | | |
| Stone Lake Dam Restoration | 2 | 1 | 1 | 3 | 1 | 1 | 1.5 | 1 | 1 | 12.5 | 23 |

Appendix F – City Council Resolution

A R E S O L U T I O N

TO ADOPT A MULTI-HAZARD MITIGATION PLAN FOR THE CITY OF GREENVILLE REQUIRED BY FEMA FOR THE PURPOSE OF BECOMING ELIGIBLE FOR GRANTS ASSOCIATED WITH DISASTER LOSS AND MITIGATION PROJECTS.

WHEREAS, the Federal Emergency Management Administration (FEMA) has made grants available to municipalities for the express purpose of receiving certain types of non-emergency disaster assistance, including funding for mitigation projects; and

WHEREAS, in order for the City of Greenville to become grant eligible, an approved Multi-Hazard Mitigation Plan shall be submitted to FEMA; and

WHEREAS, the City contracted with Woolpert Engineering to prepare the Multi-Hazard Mitigation Plan; and

WHEREAS, the City held a public meeting as provided by FEMA on this plan on October 13, 2009; and

WHEREAS, now the City Council must adopt this Plan prior to submission to FEMA;

NOW, THEREFORE, BE IT RESOLVED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF GREENVILLE, SOUTH CAROLINA that the FEMA Multi-Hazard Mitigation Plan prepared by Woolpert Engineering be approved and submitted to FEMA.

RESOLVED THIS 12 DAY OF July, 2010.



MAYOR

Attest:



CITY CLERK

Appendix G – List of Critical Facilities

SCHOOLS

| NAME | ADDRESS | CITY | STATE | ZIP | TM# | FMV |
|--------------------------------|--------------------------|------------|-------|------------|-------------|---------------------|
| ART GALLERY & MUSEUM OF BOB JO | 1700 WADE HAMPTON BLVD | GREENVILLE | SC | 29609-5052 | 281-1-1 | \$6,437,240 |
| AUGUSTA ROAD BAPTIST CHURCH WE | 1823 AUGUSTA ST | GREENVILLE | SC | 29605-2991 | 217-4-4 | \$419,863 |
| CHRIST CHURCH EPISCOPAL | 10 N CHURCH ST | GREENVILLE | SC | 29601-2864 | 44-2-3 | \$502,061 |
| EMMANUEL ACADEMY | 106 DUPONT DR | GREENVILLE | SC | 29607-1183 | 189.3-4-3.2 | \$91,097 |
| FAITH CHRISTIAN ACADEMY & PRES | 21 E FARIS RD | GREENVILLE | SC | 29605-1729 | 203-9-59 | \$133,472 |
| FIRST PRESBYTERIAN CHURCH WEEK | 200 W WASHINGTON ST | GREENVILLE | SC | 29601-2639 | 49-1-7 | \$1,371,135 |
| GREENVILLE SCHOOL DISTRICT ELE | 99 MCALISTER RD | GREENVILLE | SC | 29607-2514 | 199.3-1-1.1 | \$81,534 |
| GREENVILLE SCHOOL DISTRICT ELE | 1200 PARKINS MILL RD | GREENVILLE | SC | 29607-3643 | 270.1-1-6.1 | \$1,858,250 |
| GREENVILLE SCHOOL DISTRICT ELE | 115 RANDALL ST | GREENVILLE | SC | 29609-5536 | 6-3-3 | \$302,734 |
| GREENVILLE SCHOOL DISTRICT ELE | 424 SUMMIT DR | GREENVILLE | SC | 29609-4821 | 185-2-3 | \$469,172 |
| GREENVILLE SCHOOL DISTRICT ELE | 100 BLYTHE DR | GREENVILLE | SC | 29605-2055 | 212-4-8 | \$352,072 |
| GREENVILLE SCHOOL DISTRICT ELE | 100 WINYAH ST | GREENVILLE | SC | 29605-1836 | 215-7-1 | \$161,650 |
| GREENVILLE SCHOOL DISTRICT ELE | 1720 E NORTH ST | GREENVILLE | SC | 29607-1457 | 193.2-5-4 | \$169,237 |
| | 1720 E NORTH ST | GREENVILLE | SC | 29607-1457 | 193.2-5-2 | \$389,404 |
| | 1720 E NORTH ST | GREENVILLE | SC | 29607-1457 | 193.2-5-1 | \$196,030 |
| GREENVILLE SCHOOL DISTRICT HIG | 1 VARDRY ST | GREENVILLE | SC | 29601-3585 | 87-2-1 | \$3,123,500 |
| GREENVILLE SCHOOL DISTRICT HIG | 61 ISBELL LN (158 Ridge) | GREENVILLE | SC | 29607-3724 | 272-1-16.2 | \$386,185 |
| GREENVILLE SCHOOL DISTRICT MID | 339 LOWNDES AVE | GREENVILLE | SC | 29607-1498 | 193.2-5-1 | \$196,030 |
| GREENVILLE SCHOOL DISTRICT MID | 122 DEOYLEY AVE | GREENVILLE | SC | 29605-2106 | 222.2-3-31 | \$241,215 |
| GREENVILLE SCHOOL DISTRICT MID | 125 TWIN LAKE RD | GREENVILLE | SC | 29609-3913 | 274.1-1-1.1 | \$781,582 |
| GREENVILLE SCHOOL DISTRICT SPE | 111 LAURENS RD | GREENVILLE | SC | 29607-1825 | 48-1-17 | \$2,036,010 |
| GREENVILLE SCHOOL DISTRICT SPE | 15 ENDEL ST | GREENVILLE | SC | 29611-4844 | 123-16-9 | \$31,226 |
| GREENVILLE SCHOOL DISTRICT SPE | 205 ANDERSON ST | GREENVILLE | SC | 29601-4020 | 82-2-12 | \$38,338 |
| GREENVILLE SCHOOL DISTRICT SPE | 950 W FARIS RD | GREENVILLE | SC | 29605-4255 | 101-1-2 | \$1,503,400 |
| OVERBROOK BAPTIST CHURCH | 1705 E NORTH ST | GREENVILLE | SC | 29607-1456 | 189.3-3-1 | \$148,775 |
| ST ANTHONY CATHOLIC SCHOOL | 309 GOWER ST | GREENVILLE | SC | 29611-4999 | 76.2-1-14 | \$73,772 |
| ST JOSEPHS HIGH SCHOOL | 800 E WASHINGTON ST | GREENVILLE | SC | 29601-3037 | 65-1-13.1 | \$32,263 |
| ST MARYS CATHOLIC CHURCH SCHOO | 101 HAMPTON AVE | GREENVILLE | SC | 29601-1928 | 15-1-9.1 | \$2,267,400 |
| WEBSTER UNIVERSITY GREENVILLE | 250 COMMONWEALTH DR | GREENVILLE | SC | 29615-4846 | 543.1-1-1.5 | \$4,056,319 |
| WESTMINSTER PRESBYTERIAN CHURC | 2310 AUGUSTA ST | GREENVILLE | SC | 29605-1796 | 215-2-13.1 | \$589,050 |
| CHRIST CHURCH EPISCOPAL SCH CA | 245 CAVALIER DR | GREENVILLE | SC | 29607-4290 | M14.3-1-5.5 | \$2,189,350 |
| GOVERNORS SCHOOL | 15 UNIVERSITY ST | GREENVILLE | SC | 29601 | 69-3-2.8 | \$2,778,528 |
| SCHOOL | 901 WOODRUFF RD | GREENVILLE | SC | 29601 | 545.1-1-7 | \$3,885,000 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 269-1-11.2 | \$222,924 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 269-1-11.4 | \$710,348 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 269-1-11.7 | \$455,586 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 269-1-11.9 | \$59,532 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 269-1-28 | \$248,458 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 269-1-31.1 | \$3,221,001 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 269-1-36.1 | \$445,985 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 267-1-3 | \$2,071,446 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 267-1-3.5 | \$2,211,840 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 267-1-3.6 | \$312,882 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 267-1-4 | \$783,684 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 267-1-5 | \$1,923,720 |
| GREENVILLE TECH | S PLEASANTBURG DR | GREENVILLE | SC | 29606 | 269-1-2.1 | \$1,588,360 |
| J L MANN HIGH | 160 FAIRFOREST WY | GREENVILLE | SC | | M11.1-1-3.2 | \$1,105,300 |
| TOTAL | | | | | | \$52,653,960 |

EMERGENCY FACILITIES

| NAME | ADDRESS | CITY | STATE | ZIP | TM# | FMV |
|--------------------------------|----------------------|------------|-------|-------|------------|--------------------|
| GREENVILLE COUNTY SHERIFFS DEP | 4 MCGEE STREET | GREENVILLE | SC | 29601 | 39.1-1-1 | \$717,530 |
| NORFOLK SOUTHERN CORP POLICE D | 1120 W WASHINGTON ST | GREENVILLE | SC | 29601 | 25-1-7 | \$170,000 |
| GREENVILLE CO. EMD AGENCY | 206 S MAIN ST | GREENVILLE | SC | 29602 | 59-4-2.1 | \$292,100 |
| FIRE STATION | 801 RUTHERFORD RD | GREENVILLE | SC | 29602 | 183.2-5-20 | \$265,008 |
| FIRE STATION | 14 PELHAM RD | GREENVILLE | SC | 29602 | 280-1-3.5 | \$72,169 |
| FIRE STATION | 880 E STONE AV | GREENVILLE | SC | 29602 | 39.5-2-3 | \$102,392 |
| FIRE STATION | 125 N LEACH ST | GREENVILLE | SC | 29602 | 78-7-19 | \$48,669 |
| FIRE STATION | 15 WAITE ST | GREENVILLE | SC | 29602 | 263-1-1.1 | \$268,200 |
| FIRE STATION | 2101 AUGUSTA ST | GREENVILLE | SC | 29602 | 204-11-19 | \$83,176 |
| PUBLIC WORKS | 360 S HUDSON ST | GREENVILLE | SC | 29601 | 55-2-6 | \$79,792 |
| TOTAL | | | | | | \$2,099,036 |

HOSPITALS

| Name | Address | City | State | Zip Code | TM# | FMV |
|--------------------------------|------------------------|------------|-------|------------|--------------|----------------------|
| ROGER C PEACE REHAB HOSPITAL | 701 GROVE ROAD | GREENVILLE | SC | 29605-4295 | 101-1-2 | \$631,992,000 |
| SHRINERS HOSPITAL FOR CHILDREN | 950 WEST FARIS ROAD | GREENVILLE | SC | 29605-4277 | 101-1-2 | |
| GREENVILLE MEMORIAL HOSPITAL | 701 GROVE ROAD | GREENVILLE | SC | 29605-4295 | 101-1-2 | |
| PATEWOOD MEMORIAL HOSPITAL | 175 PATEWOOD ROAD | GREENVILLE | SC | 26915 | 543.2-1-11.1 | |
| ST FRANCIS EASTSIDE HOSPITAL | 125 COMMONWEALTH DRIVE | GREENVILLE | SC | 26915 | 543.1-1-1.6 | |
| TOTAL | | | | | | \$673,662,000 |

Appendix K - City of Simpsonville Hazard Mitigation Plan

City of Simpsonville

Multi-Hazard Mitigation Plan Update

May, 2015

City of Simpsonville
Multi-Hazard Mitigation Plan

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City of Simpsonville
Multi-Hazard Mitigation Plan

Section One

EXECUTIVE SUMMARY

The City of Simpsonville is threatened by a number of natural hazards. These hazards endanger the health and safety of the population of the community, jeopardize its economic vitality, and imperil the quality of its environment. Because of the importance of avoiding or minimizing the vulnerabilities to these hazards, the public and private sector interests of the City of Simpsonville have joined together to create the City of Simpsonville Disaster Mitigation Committee (DMC) to undertake a comprehensive planning process that has culminated in the publication of this document: “The City of Simpsonville Multi-Hazard Mitigation Plan Update.” This City of Simpsonville Multi-Hazard Mitigation Plan update builds upon previous research, planning and analysis performed for The Greenville County Multi-jurisdictional Hazard Mitigation Plan (Revised 2009) and the City of Simpsonville Multi-Hazard Mitigation Plan approved by FEMA on October 12, 2010.

The revisions of this plan were placed under the direction of the Public Works Division of the City of Simpsonville, in particular Jay Crawford, Assistant Director of Public Works. All meetings were facilitated by Mr. Crawford. Key participants, organizations, and agencies involved in the development of this plan are the city agencies of Public Works, City Council, and Public Safety. A complete list of participants can be found in Section Three. The City of Simpsonville DMC has also actively engaged the community at large in the mitigation planning process, undertaking several efforts to solicit the community’s opinions and recommendations regarding mitigation needs and the topics covered in the plan.

Planning Process

The agreement between the City and the DNR detailed the planning approach as follows:

- Meet the criteria described in the Disaster Mitigation Act of 2000 and for receiving credit under the Community Rating System program
 - Address winter storms, drought/heat wave, wildfires, flooding, tornado/high winds, thunderstorms and earthquakes. Follow the ten (10) step Federal Emergency Management Agency (FEMA) planning process as outlined below.
1. **Organize:** Create the DMC and develop a schedule for project completion.
 2. **Public Involvement:** Insure that the general public has an opportunity to provide input into the planning process.
 3. **Coordination:** Coordinate with appropriate individuals and organizations to insure adequate representation at various meetings.
 4. **Hazard Assessment:** Address the five hazards listed above including; review

of existing plans, review of past events and claims data, and obtain input from committee members and the public.

5. **Problem Assessment:** Review available information regarding the impact of hazards on public health and safety, infrastructure and property damage. Where possible, the impacts on property should be measured in dollar losses. Optional efforts included; utilizing HAZUS earthquake and flood/wind to determine expected extent of damages and performing a facilities inventory. (Due to limited resources, and at the discretion of the DMC, these options were not performed in this planning cycle.)
6. **Goal Setting:** Establish goals and objectives for the plan.
7. **Mitigation Activities:** Determine mitigation activities relative to the five hazards being considered and the unique characteristics of the City of Simpsonville. The following six basic mitigation strategies were to be considered; 1) Preventive measures, 2) Property protection, 3) Natural Resource Protection, 4) Emergency Services, 5) Structural projects, and 6) Public Information.
8. **Draft Plan:** Prepare a draft plan containing a description of the planning process, the hazard assessment and problem analysis, the goals, and a summary of possible and appropriate measures. The draft plan is to reviewed and open to comment during a public meeting.
9. **Final Plan:** The final plan will be prepared considering comments from the internal review and the public.
10. **Implementation:** The plan should be adopted by City Council and the DMC should be available for reviewing and revising the plan from time to time.

To date, Tasks 1 – 7 have been completed and the draft plan is being prepared for review and approval. *A copy of the council resolution adopting this plan will be attached to indicate that Tasks 8 and 9 have completed.* Task 10 is an on-going activity.

Mitigation Initiatives

In general, decisions regarding potential impacts of hazards and potential mitigation initiatives came from the DMC. Input was also solicited from a variety of other groups representing homeowners, business owners, emergency response organizations and industrial leaders. Ranking of initiatives was based on a point system and each initiative was scored by the DMC. The results can be found in Section 8 of this document.

A mechanism has also been established by the DMC to regularly update the plan. This process includes soliciting additional mitigation initiatives, evaluating response to recent disasters, and tracking the progress of those initiatives already reviewed and approved.

Goals and Objectives

The DMC has established eight (8) goals in the Mitigation Plan. These goals revolved mainly around providing education to the public and government officials, improving communications and response activities and protecting structures. Specific objectives were established for each

goal and as initiatives were approved, it was noted which objective would be met by that initiative.

Summary

Disaster Mitigation Planning is not a one-time project, but rather an on-going process. The City of Simpsonville started the process in 2009 and will continue to update the plan as scheduled to keep their plan updated and relevant. This plan update will serve to reaffirm the City's efforts to reduce damages and loss of life from future natural disasters.

City of Simpsonville
Multi-Hazard Mitigation Plan
Section Two
INTRODUCTION AND PURPOSE

Introduction

The City of Simpsonville Disaster Mitigation Committee (DMC) has been established to make the population, neighborhoods, businesses and institutions of the community more resistant to the impacts of future disasters. The DMC has been undertaking a comprehensive evaluation of the vulnerabilities of the community to future natural hazards in order to identify ways to make the communities of the planning area more resistant to their impacts. This document reports the results of that planning process.

Purpose

The City of Simpsonville Multi-Hazard Mitigation Plan and its underlying planning process are intended by the DMC to serve many purposes. These include the following:

Provide a Methodical, Substantive Approach to Mitigation Planning.

The approach utilized by the City of Simpsonville DMC relies on a methodical process to identify vulnerabilities to future disasters and to propose the mitigation initiatives necessary to avoid or minimize those vulnerabilities. These include interviews, research, data collection, draft(s) and review(s) of plan, community involvement, work sessions, and implementation. Each step in the process builds upon the previous step, so that there is a high level of assurance that the mitigation initiatives proposed by the participants have a valid basis for both their justification and priority for implementation. One key purpose of this plan is to document that process and to present its results to the community.

Enhance Public Awareness and Understanding

The DMC is interested in finding ways to make the community as a whole more aware of the natural hazards that threaten the public health and safety, the economic vitality of businesses, and the operational capability of important facilities and institutions. The plan identifies the hazards threatening the City of Simpsonville and provides an assessment of the relative level of risk they pose. The plan also includes a number of proposals of ways to avoid or minimize those vulnerabilities. This information will be very helpful to individuals that wish to understand how the community could become safer from the impacts of future disasters.

The DMC and its member organizations, has and will continue to conduct a number of community outreach and public information programs. The purpose of these is to engage the community as a whole in the local mitigation planning process, in order to shape the goals, priorities, and content of the plan, as well as to provide information and education to the public regarding ways to be more protected from the impacts of future disasters. The DMC has been, and will continue to be, active in communicating with the public and engaging interested members of the community in the planning process.

Create a Decision Tool for Management

The City of Simpsonville Multi-Hazard Mitigation Plan provides information needed by the managers and leaders of local government, business and industry, community associations, and other key institutions and organizations to take actions to address vulnerabilities to future disasters. It also provides proposals for specific projects and programs that are needed to eliminate or minimize the risks to specific hazards. The plan is based on the best available data, which although limited in many regards, provides a solid foundation for hazard planning and mitigation and future improvements.

These proposals, called “mitigation initiatives” in the plan, have been justified on the basis of their economic benefits using a uniform technical analysis. These initiatives have also been prioritized. This approach is intended to provide a decision tool for the management of participating organizations and agencies regarding why the proposed mitigation initiatives should be implemented, which should be implemented first, and the economic and public welfare benefits of doing so.

Promote Compliance with State and Federal Program Requirements

There are a number of state and federal grant programs, policies, and regulations that encourage or even mandate local government to develop and maintain a comprehensive hazard mitigation plan. This plan is specifically intended to assist the participating local governments to comply with these requirements, and to enable them to more fully and quickly respond to state and federal funding opportunities for mitigation-related projects. Because the plan defines, justifies, and prioritizes mitigation initiatives that have been formulated through a technically valid hazard analysis and vulnerability assessment process, the participating organizations are better prepared to more quickly and easily develop the necessary grant application materials for seeking state and federal funding.

Enhance Local Policies for Hazard Mitigation Capability

A component of the hazard mitigation planning process conducted by the City of Simpsonville DMC is the analysis of the existing policy, program, and regulatory basis for control of growth and development, as well as the functioning of key facilities and systems. This process involves cataloging the current mitigation related policies of local government so that they can be compared against the hazards that threaten the jurisdiction and the relative risks these hazards pose to the community. When the risks posed to the community by a specific hazard are not adequately addressed in the community's policy or regulatory framework, the potential impacts of future disasters can be even more severe. Therefore, the planning process utilized by the DMC supports evaluation of the adequacy of the community's policies and programs in light of the level of risk posed by specific hazards. This evaluation supports and justifies efforts to propose enhancements in the policy basis for could or should be promulgated by the City to create a more disaster-resistant future for the community.

The following sections of the City of Simpsonville Multi-Hazard Mitigation Plan present the detailed information to support these purposes. The remainder of the plan describes the planning organization developed by the DMC, as well as its approach to managing the planning process. The plan provides a description of the mitigation-related characteristics of City of Simpsonville, such as its land uses and population growth trends, the mitigation-related policies already in-place, identified critical facilities present in the community, and if there are properties that have been repetitively damaged by past disasters. The plan then summarizes the results of the hazard identification and vulnerability assessment process, and addresses the adequacy of the current policy basis for hazard management by City of Simpsonville and participating organizations. The plan also documents the structural and non-structural mitigation initiatives to address the identified vulnerabilities. The plan further addresses the mitigation goals and objectives established by the DMC and the actions to be taken to maintain, expand and refine the City of Simpsonville Mitigation Plan and the planning process. Finally, the past and planned efforts of the DMC to engage the entire community in the mitigation planning process are documented.

City of Simpsonville
Multi-Hazard Mitigation Plan

Section Three

DISASTER MITIGATION COMMITTEE ORGANIZATION

Introduction

The City of Simpsonville's Disaster Mitigation Committee (DMC) is made up of a number of city agencies, community organizations, and institutions. This section discusses the organizational structure used to complete the planning process. Also provided is a summary of the current status of planning activities by the participants documenting the level of participation by the City's DMC.

On a regular basis, the DMC will meet to discuss this plan and refine as necessary its contents and direction. In these meetings, the committee will review mitigation activities that are ongoing or planned. This meeting will allow the members of the committee to continually reflect upon the mitigation plan and its appropriateness to each organization and agency's individual needs and expectations.

Any desired changes to the mitigation plan will be considered by the group and agreed upon. These changes will then be presented to the City Council for review. The Council can reject, accept, or ask for revisions to the proposed changes. In addition, the DMC will schedule meetings with the public as necessary if changes to the mitigation plan occur. It is also a function of the mitigation committee to coordinate and exchange information with their respective agency or department.

Participating Organizations

A total of 13 public/private organizations are supporting the planning process. (It is intended that the number of participating organizations and groups will continue to grow in future planning cycles.) The agencies and organizations currently participating in the hazard mitigation planning process are listed on page 3.4.

The Disaster Mitigation Committee Organizational Structure

The DMC encourages participation by all interested agencies, organizations, and individuals. The organization is intended to represent a partnership between the public and private sector of the community, working together to create a disaster resistant community. The proposed mitigation initiatives developed by the DMC and listed in this plan, when implemented, are intended to make the entire community safer from the impacts of future disasters, for the benefit of every individual, neighborhood, business and institution.

The responsibilities and duties of the DMC are detailed in the operating procedures, which are provided in the next section. This section summarizes the roles of the different components of the DMC and describes the participation that has actually occurred during the planning period covered by this document.

The Committee represents key city organizations participating in the planning process, and is the group that makes the official decisions regarding the planning process. The Committee serves as the official liaison to their respective agency and the community. Most importantly for this document, however, is the DMC's role to approve proposed mitigation initiatives for incorporation into the plan, for determining the priorities for implementation of those initiatives, and for removing or terminating initiatives that are no longer desirable for implementation.

The DMC also coordinates the actual technical analyses and planning activities that are fundamental to development of this plan. These activities may include conducting the hazard identification and vulnerability assessment processes, as well as receiving and coordinating the mitigation initiatives proposed for incorporation into this plan. The coordinating process undertaken constitutes a "peer review" of the proposed mitigation initiatives submitted for incorporation into the plan. Through the peer review, each proposed initiative is to be reviewed for its consistency with the goals and objectives established for the planning process and its relationship to identified hazards and defined vulnerabilities to those hazards. The peer review incorporated into the City's planning process also strives to assure the following: Assumptions used by the organization to develop the proposal are reasonable; Proposal's would not conflict with or duplicate other proposed initiatives; Initiatives specifically addresses risk to a hazard(s); Proposals are feasible and consistent with known requirements; and that proposals, if implemented, would not cause harm or disruption to adjacent jurisdictions.

City agencies and local organizations are the key to accomplishing the planning process. The effort begins with developing a community profile of the City to document the basic characteristics of the community that are relevant to controlling the impacts of disasters. Then vulnerability assessments are conducted of key facilities, systems and neighborhoods to define how these may be vulnerable to the impacts of all types of disasters. Finally, the City uses the vulnerability assessments to formulate and characterize mitigation initiatives that they could implement if the resources to do so became available. Once these proposed initiatives are reviewed and coordinated, the DMC can then decide to formally approve them by vote in order to incorporate them into the Multi-Hazard Mitigation Plan. As soon as a proposed mitigation initiative is approved, it is sent to the City Council for their approval. Once accepted by the Council, it is considered to be officially a part of the Multi-Hazard Mitigation Plan, and expected to be implemented as soon as the resources and/or opportunity to do so becomes available.

The DMC is also responsible for coordinating the efforts to involve the community at large in

the mitigation planning process, and to promote mitigation-related educational program in the community. More detailed information regarding the public information and community outreach activities involved in the development and implementation of this plan are provided in Section 5.

As of the publishing of this plan, the DMC has conducted three (2) meetings to gather information and solicit public input. A summary of these meetings is as follows:

- Plan Update Meeting October 1, 2013
 - Committee members introduced
 - Committee was reminded of the purpose and use of a Hazard Mitigation Plan.
 - Accomplishments to date were discussed
 - Ongoing initiatives were discussed
 - New initiatives were introduced
 - Discussion of the Ranking Criteria/Prioritization List
 - Prioritization of Initiatives
- Follow-Up meeting
 - A community-wide meeting was called to solicit ideas
 - Meeting was ended due to no attendance.
- Draft Review Public Meeting
 - Public Meeting held to review draft mitigation plan prior to adoption
 - Items to be discussed included any possible revisions to draft; submittal to FEMA; City Council Approval
 - Announcements were made via internet, television and local newspaper, but yielded no attendance

The DMC has benefited from the assistance and support of its members. A listing the members and their committee affiliation is provided below. It is important to note that participation in the Committee is not limited in any manner, and all members of the community, whether representing the public or private sector, are welcome to participate. As described in Section 7, which discusses the maintenance and updating of the plan, the group intends to continue its efforts to engage more members of the community in the planning process.

| Name | Department | Email Address |
|------------------|--|--|
| Jay Crawford* | Assist. Dir. of Public Works, City of Simpsonville | jcrawford@simpsonvillepublicworks.org |
| Ken Ashworth* | Hillcrest High School | kashwort@greenville.k12.sc.us |
| David Dyrhaug* | City of Simpsonville Planning | DDyrhaug@simpsonville.com |
| Wesley Williams* | City of Simpsonville Fire Dept. | Chief@simpsonvillefd.com |
| Steve Moore* | City of Simpsonville Police Dept. | Chief@simpsonvillepd.com |
| Ron Lawson | Caliber Engineering | ronlawson2010@gmail.com |
| Keith Russell | Hillcrest Middle School | KRussell@greenville.k12.sc.us |
| Gary Smith | S.C. House of Representatives | Smith@schouse.org |
| Pat Thomas* | Home Depot | Moxie3@frontier.com |
| John Laux* | Dir. of Public Works, City of Simpsonville | jlaux@simpsonvillepublicworks.org |
| Russ Poole | Dickens & Company, Realtors | Russ@Dickenscompany.com |
| Mike Craven* | City of Simpsonville Building Dept. | |
| Adam Lezan* | City of Simpsonville Fire Dept. | fireMarshal@simpsonvillefd.com |

Notes: * Member present during Ranking process

City of Simpsonville
Multi-Hazard Mitigation Plan
Section Four
OPERATING PROCEDURES

Introduction

This section of the City of Simpsonville Multi-Hazard Mitigation Plan describes the characteristics of the Disaster Mitigation Committee (DMC) and basic procedures for conducting the planning process.

The Disaster Mitigation Committee's Operating Procedures

These procedures involve both a technical approach to the planning and an organizational methodology for incorporating mitigation initiatives into the City of Simpsonville Multi-Hazard Mitigation Plan. The same planning process and technical approach was followed for the development of the Greenville County Multi-jurisdictional Hazard Mitigation Plan.

The planning process was started with the development of the DMC as an organization and obtaining participation from key organizations and institutions. The planning work conducted to update this document relies heavily on the expertise and authorities of the participating agencies and organizations, rather than on detailed scientific or engineering studies. The DMC is confident that because of their role in the community the best judgment of the participating individuals, and the use of readily available information, can achieve a level of detail in the analysis that is adequate for purposes of local mitigation planning. As the planning process described herein continues, more detailed and costly scientific studies of the mitigation needs of the community can be defined as initiatives for incorporation into the plan and implemented as resources become available to do so.

Establishing the planning schedule

The DMC initially established a planning schedule for development of this document in cooperation with the South Carolina Department of Natural Resources. At the outset of the planning period, the DMC defined the goals that the planning process is attempting to achieve, as well as the specific objectives within each goal that will help to focus the planning efforts. (The goals and objectives established by the City of Simpsonville DMC for this planning period, as well as the anticipated plan maintenance schedule, are described in Section 7 of this plan.)

Conducting the needed analyses and then formulating proposed mitigation initiatives to

avoid or minimize known vulnerabilities of the community to future disasters is an enormous effort, and one that must take place over a long period of time. Therefore, for any one planning period, the goals and objectives set by the DMC are intended to help focus the effort of the participants, for example, by directing attention to certain types of facilities or planning areas, or by emphasizing implementation of selected types of proposed mitigation initiatives.

The approach used by the DMC is intended to use these priorities to continue, during each planning cycle, to assess more planning areas and facilities, to develop more proposed mitigation initiatives to address the results of those assessments, to strive to implement previously proposed mitigation initiatives, and to further engage the public and the community in the planning process.

Hazard Identification and Risk Estimation

The DMC identified hazards that threaten all or portions of the community. The DMC also used general information to estimate the relative risk of the various hazards as an additional method to focus their analysis and planning efforts.

The DMC compared the likelihood or probability that a hazard will impact an area, as well as the consequences of that impact to public health and safety, property, the economy, and the environment. This comparison of the consequences of an event with its probability of occurrence is a measure of the risk posed by that hazard to the community. The DMC compares the estimated relative risks of the different hazards it has identified to highlight which hazards should be of greatest concern during the upcoming mitigation planning process.

Information resources regarding hazard identification and risk estimation, although limited, are available. The planners have attempted to incorporate consideration of hazard specific maps, including floodplain delineation maps, whenever applicable, and have attempted to avail themselves of GIS-based analyses of hazard areas and the locations of critical facilities, infrastructure components, and other properties located within the defined hazard areas.

Section 6 in the plan gives the specific results and conclusions reached from this effort for the planning area as a whole including notation of the available reference materials utilized in the analysis.

Estimating the relative risk of different hazards is followed by an assessment of the types of physical or operational impacts potentially resulting from a hazard event. Two methods are available to the DMC to assess the communities' vulnerabilities to future disasters.

Vulnerability Assessment

The first avenue is a methodical, qualitative examination of the vulnerabilities of important facilities, systems and planning areas to the impacts of future disasters. For the participating organizations, this is done by the individuals most familiar with the facility, system or planning area through a guided, objective assessment process. The process ranks both the hazards to which the facility, system or planning area is most vulnerable, as well as the consequences to the community should it be disrupted or damaged by a disaster. This process typically results in identification of specific vulnerabilities that can be addressed by specific mitigation initiatives that could be proposed and incorporated into this plan. As an associated process, the DMC also reviews past experiences with disasters to see if those events highlighted the need for specific mitigation initiatives based on the type or location of damage they caused. Again, these experiences can result in the formulation and characterization of specific mitigation initiatives for incorporation into the plan.

The second avenue for assessment of community vulnerabilities involves comparison of the existing policy, program and regulatory framework to control growth, development and facility operations in a manner that minimizes vulnerability to future disasters. The DMC members can assess the existing codes, plans, and programs to compare City provisions and requirements against the hazards posing the greatest risk to the community. If indicated, the City of Simpsonville can then propose development of additional codes, plans or policies as mitigation initiatives for incorporation into the City of Simpsonville Multi-Hazard Mitigation Plan for future implementation when it is appropriate to do so.

Due to limited resources during this planning period, the DMC chose not to proceed with Method 1 - a critical facilities assessment. This type of detailed technical assessment is listed as a potential mitigation initiative and will be conducted as funds and resources come available.

Developing Hazard Mitigation Initiatives

This process enables the DMC participants to highlight the most significant vulnerabilities, again to assist in prioritizing specific hazard mitigation initiatives to eliminate or minimize those vulnerabilities. Once the highest priorities are defined, the DMC can identify specific mitigation initiatives for the plan that would eliminate or minimize those vulnerabilities.

The procedure used in this plan update involved describing the initiative, relating it to one of the goals and objectives established by the DMC, and justifying its implementation on the basis of its economic benefits and/or protection of public health and safety, as well as valuable or irreplaceable environmental or cultural resources. A simple “benefit to cost” ratio was established for each initiative to demonstrate that it would indeed be worthwhile to pursue when or if the resources to do so become available. A more detailed benefit to cost ratio will need to be prepared as funds become available to ensure that a proper ratio is met. Each proposed mitigation initiative was also “prioritized” for implementation in a consistent manner.

In characterizing a mitigation initiative for incorporation into the DMC’s plan, it is important to recognize that the level of analysis has been intentionally designed to be appropriate for this stage in the planning process. That is, it is the interest of the DMC to have a satisfactory level of confidence that a proposed mitigation initiative, when it is implemented, will be cost effective, feasible to implement, acceptable to the community, and technically effective in its purpose. To do this, the technical analyses conducted, including the development of a simple benefit to cost ratio for each proposal, have been based on a straightforward, streamlined approach, relying largely on the informed judgment of experienced local officials. The analyses, including the benefit to cost ratio, have not been specifically designed to meet the known or anticipated requirements of any specific state or federal funding agency, due largely to the fact that such requirements can vary with the agency and type of proposal. Therefore, at the point when the organization proposing the initiative is applying for funding from any state or federal agency, or from any other public or private funding source, that organization will then address the specific informational or analytical requirements of the funding agency.

Each mitigation initiative proposed for incorporation into the plan update is formulated by the DMC for consideration by the City for future implementation.

Developing the Local Mitigation Plan

Once a proposed mitigation initiative has been developed, the information used to characterize the initiative is submitted to the DMC for review. At this point, an initiative is considered to be a “pending initiative” that is being processed for incorporation into the plan, when it then becomes an “approved initiative.” On receipt of a pending initiative the DMC evaluates the merits of the proposal and the validity of the judgments and assumptions that went into its characterization, as well as considers its potential for conflict with other programs or interests. The DMC also assures that the proposal is consistent with the goals and objectives established for the planning period and confirms that it would not duplicate or harm a previously submitted proposal.

If there is such a difficulty with a proposed initiative, it is returned to the submitting organization for revision or reconsideration.

Once an initiative has been reviewed, coordinated, and is satisfied regarding its merit, it is brought before the Committee, which votes to incorporate the proposed initiative into the strategy. Upon approval, the proposed initiative is then considered to be officially part of the mitigation plan.

The City of Simpsonville mitigation planning process first objectively prioritizes proposed mitigation initiatives using an objective, fixed set of criteria, but has the flexibility to adjust the implementation schedule of the initiatives to respond to unique or unanticipated conditions.

Approval of the Current Edition of the Plan

On a periodic basis, the City of Simpsonville Multi-Hazard Mitigation Plan is to be submitted to the City Council for review, modification if needed, and approval or adoption. To facilitate this action, Section 6 of this plan provides City information, hazard and vulnerability assessment, and proposed initiatives. Following adoption or approval of the plan, the respective agencies and organizations will continue to implement the plan, to expand its scope, continue its analyses, and take other such continuing action to maintain the planning process. This includes action by the Committee to routinely incorporate proposed mitigation initiatives into the plan, without the necessity to also continuously solicit the formal approval of the plan by the City Council. It is intended that the City of Simpsonville Multi-Hazard Mitigation Plan will be submitted to the City council approximately every five years for review and formal adoption or approval. Evidence of approval of this edition of the mitigation plan is provided in Section 5 of this plan. It is important to emphasize that this document represents a “snapshot” of the planning process and is prepared as a current document for use by the planning group, the community, and state and federal authorities.

Implementation of Approved Mitigation Initiatives

Once incorporated into the City of Simpsonville Multi-Hazard Mitigation Plan, the agency or organization proposing the initiative becomes responsible for its implementation. This may mean developing a budget for the effort, or making application to state and federal agencies for financial support for implementation. This approach holds each department accountable for proper and timely implementation of the mitigation initiatives. The DMC is responsible for overall coordination of these efforts. The current status of implementation of mitigation initiatives incorporated into the plan is discussed in the next section.

In this plan implementation process, the DMC continues to monitor the implementation status of initiatives, to assign priorities for implementation and to take other such actions to support and coordinate implementation of initiatives by the involved organizations. In reality, it is the implementation of proposed initiatives, along with other actions by the organizations participating in the planning to maintain, refine and expand the technical analyses used in the planning, that constitutes the process to implement the mitigation plan.

Benefits of the Planning Process

It is important to emphasize that the procedure used by the DMC is based on the following important concepts:

- A multi-organizational planning group establishes specific goals and objectives to address the community's vulnerabilities to all types of hazards.
- The planning procedure utilizes a logical process of hazard identification, risk evaluation and vulnerability assessment, as well as review of past disaster events, that is consistently applied by all participants through the use of common evaluation criteria.
- Mitigation initiatives are proposed for incorporation into the plan.
- The process encourages participants to propose specific mitigation initiatives that are feasible to implement and clearly directed at reducing specific vulnerabilities to future disasters.
- Proposed mitigation initiatives are characterized in a substantive manner, suitable for this level of planning, to assure their cost effectiveness and technical merit.
- All mitigation initiatives to be incorporated into the plan are prioritized in accord with ten objective, comprehensive criteria that are used by all participating departments.
- The plan is periodically reviewed and adopted to ensure that the mitigation actions taken by their organizations are consistent with each community's larger vision and goals, as well as their overall unique needs and circumstances.

City of Simpsonville
Multi-Hazard Mitigation Plan

Section Five

PROGRESS IN PLAN IMPLEMENTATION

Introduction

This section discusses the current status of implementation of the City of Simpsonville Multi-Hazard Mitigation Plan. There are several aspects of plan implementation that need to be addressed:

- The status of promulgation or formal adoption of the plan by the City Council,
- The activities of the Disaster Mitigation Committee (DMC) to engage the public and the community at large in the mitigation planning process
- The DMC's priorities for implementation of approved mitigation initiatives now incorporated into the plan, and
- A discussion of how recent disaster experience has illustrated the need for and success of the City of Simpsonville Multi-Hazard Mitigation Plan.

Status of Plan Promulgation and Approval

Promulgation and approval of the plan is a very important step in assuring its implementation. As was discussed in the previous section, the updated plan will be presented to the City of Simpsonville Council for approval and official acceptance as the Multi-Hazard Mitigation Plan.

As the City of Simpsonville DMC continues its planning efforts in the future, it is intended that additional updates of the mitigation plan will be published to provide both the participating organizations and the public current information regarding the mitigation planning process. As stated in the original plan, approximately once every five years, the DMC will again seek the approval of the plan by the City Council. This interval has been selected to provide a sufficient period for the DMC to have made significant progress in further data collection of events occurring in that time frame, technical analysis, implementation of currently proposed initiatives, and development of new proposals and to coincide with the review of the City's Community Rating System application. In this way, the plan can be kept up-to-date on a continuing basis by the DMC participants.

Public Information and Participation

The Simpsonville DMC, as well as individual participating agencies and organizations, has been active in attempting to engage the general public in the planning process. As detailed below,

several public information activities have been undertaken to explain the mitigation planning process to the community and to solicit their input and involvement in the planning process, as well as to provide mitigation awareness and educational information. The DMC welcomes public input to the planning process, and fosters public participation through the issuance of media releases, holding public meetings and hearings, etc. Detailed below are past highlights of the process used to engage the general public in the mitigation planning process.

- Three meetings (see bulleted items below) with community organizations were held to discuss hazards mitigation planning. These meetings were selected to provide different perspectives on potential hazards and response activities. In addition, mitigation initiatives were solicited.
 1. A meeting was held in the City of Simpsonville Public Works building. During the meeting, committee members reviewed status of objectives in current plan noting completed initiatives, updating status toward ongoing initiatives, and recommending new initiatives. The committee members then ranked the initiatives.
 2. A joint community meeting with Greenville County, the City of Greenville, Mauldin, and Fountain Inn was organized to solicit ideas from residents of Greenville County.
 3. A final meeting was called to review the draft plan, and to solicit any changes presented by the Community. Jay Crawford took it upon himself to properly advertise for this meeting.

The DMC will continue to solicit input from the community. The public will be involved in the 2015 HMP update planning process with two (2) public meetings. One public meeting will be held prior to plan approval and adoption. The second meeting will be held at the time of plan adoption. Appendix B contains documentation for the required public meetings. The public is notified through the City website that the HMP is available for review in the Public Works Office throughout the year. Any feedback received from Council or the public is transmitted to the DMC during the annual fall meeting. The DMC will consider all public feedback for inclusion in the plan update and planning process.

The Priority for Initiative Implementation

As a part of its future planning process, the City of Simpsonville DMC also will continue to periodically review the proposed mitigation initiatives approved for incorporation into the plan to determine their priority for implementation during the next planning period. This assessment will encourage the Committee to focus on those initiatives designated as priority. However,

because each participating organization has independent authority and responsibility for implementation of their proposed mitigation initiatives, the organizations retain the prerogative to act in their own interests, using their own priorities for mitigation initiative implementation.

In many ways, the priority for implementation assigned to proposed mitigation initiatives could be considered a suggestion or recommendation to the proposal sponsors to seek the resources for implementation. These resources may range from the normal budgeting process for the organization to seeking state or federal financial or technical support for implementation of the initiative.

Effectiveness of Mitigation Initiatives

Of course, the true measure of progress in the implementation of mitigation initiatives is their success in saving lives, avoiding property damage and protecting valuable or irreplaceable resources in the community. As the mitigation initiatives that have been incorporated into the City of Simpsonville Multi-Hazard Mitigation Plan are implemented, there will be more opportunities to measure the “success” of the DMC’s mitigation efforts.

The best opportunity for measuring this success is to evaluate the community’s experience with actual disasters and to attempt to estimate the number of lives that were saved by the implemented initiatives or the value of the property protected from disaster related damage.

In addition, however, recent disaster events can be very helpful in highlighting the mitigation needs of the community based on the type, location or magnitude of the impacts experienced. In turn, this can be a major factor in the future progress of implementation of the plan, as the DMC considers and acts on actual disaster experience by the community. Such recommendations can be referred to a “lead” agency with the intention that that organization will use the information to propose additional mitigation initiatives for incorporation into the plan.

Compiling data on the “success” of existing and/or completed mitigation initiatives should be an activity undertaken by the DMC members on an ongoing basis and is an integral component of the process used to implement and maintain the City of Simpsonville Multi-Hazard Mitigation Plan, which is more fully discussed in Section 7.

Summary

The DMC recognizes that it will take a long period of time and implementation of many if not all of the proposed initiatives approved for this plan, to make City of Simpsonville a truly disaster-resistant community. However, the continuing dedication to the safety and welfare of the community shown by the participants in this planning process will make this ambitious goal possible.

City of Simpsonville
Multi-Hazard Mitigation Plan

Section Six

SUMMARY OF HAZARDS AND VULNERABILITIES

Summary

This section of the City of Simpsonville Multi-Hazard Mitigation Plan summarizes the results of the hazard identification and vulnerability assessment processes undertaken by the Disaster Mitigation Committee (DMC). The hazards identified by the Greenville County DMC are directly related to the County and its municipalities, including the City of Simpsonville, therefore, this information can be found in the Greenville County Multi-jurisdictional Hazard Mitigation Plan Section 6. The intent of that section is to provide a compilation of the information gathered and the judgments made about the hazards threatening not only Greenville County but the City of Simpsonville, and the potential vulnerability to those hazards. This information is then used for formulating mitigation actions and priorities.

It must be emphasized that the fundamental reason for undertaking the hazard identification and vulnerability assessment process is to highlight vulnerabilities that need to be addressed by the development of proposed mitigation initiatives for incorporation into the City of Simpsonville hazard mitigation plan. In addition, this process has made it obvious to the DMC that more information is needed in order to provide thorough assessments. The committee has therefore created mitigation initiatives to address any current data shortcomings. This component of the mitigation planning process can be expected to be continued in future updates of the plan until all mitigation needs are addressed.

Risk Estimation

As noted in Section 4, the technical planning process begins with hazard identification. In this process, representatives of the City of Simpsonville consider all of the natural hazards that are likely to threaten the community. When the hazard types are identified as relevant to, or of concern for, the City of Simpsonville, the participants can make an estimate of the risk each poses.

The estimate of risk is based on the judgment of the planners regarding the likely frequency of occurrence of the hazard event compared to its probable consequences. For purposes of this analysis, “risk” is defined as a relative measure of the probability that a hazard event will occur in comparison to the consequences or impacts of that event. That is, if a hazard event occurs frequently, and has very high consequences, then that hazard is considered to pose a very high risk to the affected communities. In comparison, if a hazard event is not expected to occur frequently, and even if it did, the consequences would be minimal, then that hazard is considered to pose a very low risk.

Some hazards can be defined as “low risk,” for they do not occur often enough and/or do not result in significant impacts even when they do. In comparison, other hazards may occur often enough and/or have sufficiently severe consequences when they do, that they must be considered “high risk.” Each of the hazards considered to be a threat to the City of Simpsonville can be assessed for its probability of occurrence and its likely consequences.

By considering the relative risk of the different hazards that threaten the City of Simpsonville, greater priority can be given to the “higher” risk hazards in order to most effectively utilize the time and resources available for the mitigation planning process. In this way, the planning approach used for the City of Simpsonville supports what can be termed “risk-based planning” because it facilitates the participants’ capabilities to focus on the highest risk hazards. To do this, the DMC derives a “relative risk score” using a qualitative process in which planners’ record, on a numeric scale, the likely frequency of occurrence, the extent of the community that would be impacted, and the likely consequences in terms of public safety, property damage, economic impacts and harm to valuable environmental resources. The numeric total of the assessments of each of these is considered in this plan to constitute the “relative risk score.”

The same numeric criteria are used to classify the risk that a defined hazard poses to the City of Simpsonville. Use of common evaluation criteria enables the planning group as a whole to make comparisons of the relative risk of one hazard type in relation to another. As noted above, such comparisons can also be used to guide and prioritize the planning process by enabling planners to focus on the hazards with the highest assessed risk.

These common risk estimation numeric factors used by all participants in the planning are as follows:

| <i>RISK FACTOR</i> | <i>EVALUATION CRITERION</i> | <i>ASSIGNED VALUE</i> |
|---|--|-----------------------|
| Area Impacted | No developed area impacted | 0 |
| | Less than 25% of developed area impacted | 1 |
| | Less than 50% of developed area impacted | 2 |
| | Less than 75% of developed area impacted | 3 |
| | Over 75% of developed area impacted | 4 |
| Probability of Occurrence | Unknown but rare occurrence | 1 |
| | Unknown but anticipate an occurrence | 2 |
| | 100 years or less occurrence | 3 |
| | 25 years or less occurrence | 4 |
| Health and Safety Consequences | Once a year or more occurrence | 5 |
| | No health or safety impact | 0 |
| | Few injuries/illnesses | 1 |
| | Few fatalities or many injuries/illnesses | 2 |
| | Numerous fatalities | 3 |
| Consequences to Property | No property damage | 0 |
| | Few properties destroyed or damaged | 1 |
| | Few destroyed – many damaged | 2 |
| | Few damaged – many destroyed | 2 |
| Consequences to Environmental Resources | Many properties damaged and destroyed | 3 |
| | Little or no environmental damage | 0 |
| | Resources damaged with short term recovery practical | 1 |
| | Resources damaged with long term recovery feasible | 2 |
| Economic Consequences | Resources destroyed beyond recovery | 3 |
| | No economic impact | 0 |
| | Low direct and / or low indirect costs | 1 |
| | Low direct and high indirect costs | 2 |
| | High direct and low indirect costs | 2 |
| | High direct and high indirect costs | 3 |

A single, numeric value is selected from each of the five risk factors. The five values are then used to derive a total relative risk value for a particular hazard that is “weighted” for the probability of its occurrence.

The resulting numeric value for relative risk can vary from zero, meaning the identified hazard poses no estimated risk at all to the jurisdiction, up to a maximum of 80, which means that hazard poses a very substantial risk to the jurisdiction. The actual values selected for the City of Simpsonville are found below in section “Identified Hazards. ”

The “weighting” of the relative risk value by the “Probability of Occurrence” factor provides local mitigation planners with a more realistic basis to prioritize their subsequent planning work. While a postulated hazard event could result in catastrophic damages to the City, perhaps it only has an extremely rare probability of occurrence. With this “weighted” approach, the actual risk from this hazard would have a low relative risk rating. In comparison, a hazard that occurs on a very frequent basis, say once every few years, but has lesser consequences, would result in a higher relative risk value due to its higher probability or frequency of occurrence. Therefore, local mitigation planners from the City of Simpsonville have prioritized their efforts to focus on these higher risk hazards as they complete their vulnerability assessments and propose mitigation initiatives to address those vulnerabilities.

Pursuant to the requirements of the Disaster Mitigation Act of 2000, the City of Simpsonville is required to evaluate a prescribed list of natural hazards. These hazards are: Earthquakes; Tsunamis; Coastal and Riverine Erosion; Landslides/Sinkholes; Hurricanes and Coastal Storms; Tornadoes/high winds; Floods; Wildfires; Dam/Levee Failure; Volcanic Activity; Drought/Heat Wave; and Winter Storms/Freezes. While many of these hazards are relevant to the City of Simpsonville, some are not due to the geographic location and characteristics of the planning area. In the planning process, each of these hazards has been assessed by the City of Simpsonville. If, under that planning process, a specific hazard is assessed, and the relative risk estimate for that hazard is determined to be zero (meaning the hazard actually poses no identifiable risk to the jurisdiction), then that hazard is not considered further in the planning process, in the subsequent assessments of vulnerability of the community to that hazard, or evaluation of the adequacy of city policies to manage the risks posed by that hazard. In deriving these estimates of risk for each hazard, the City of Simpsonville has utilized any available information regarding the geographic areas that may be impacted by each identified hazard, as well as population, infrastructure, and facilities within those impacted areas. This has included inventories of valuable environmental resources, as well as factors that are influential to the economic well-being of the community. Examples of such existing information resources that have been accessed in this manner are listed in the following table. For much of the City, this information has been available in a geographic information system (GIS) database, or has been accessed from internet websites and existing GIS databases available from state and federal agencies.

Risk Evaluation: For the City of Simpsonville mitigation planning area, the complete results of hazard identification and risk estimation process are shown below. The table shows the relative risk posed by various hazard to the City of Simpsonville. The numeric criteria used for this analysis are defined above and at the bottom of each report, as well as in the text given above. In addition, the following paragraphs also provide some additional information regarding the natural hazards affecting the City of Simpsonville.

| Hazard | Area of Impact | Probability of Occurrence | Consequences of Occurrence | | | | Risk Rating |
|------------------------|----------------|---------------------------|----------------------------|----------|-------------|----------|-------------|
| | | | Health & Safety | Property | Environment | Economic | |
| Winter Storms | 4 | 5 | 1 | 1 | 0 | 2 | 40 |
| Flooding | 1 | 3 | 1 | 1 | 1 | 2 | 18 |
| High Winds/ Tornado | 1 | 4 | 1 | 1 | 0 | 1 | 16 |
| Thunder Storms | 2 | 5 | 0 | 0 | 0 | 1 | 15 |
| Earth Quakes | 4 | 2 | 1 | 1 | 0 | 1 | 14 |
| Wildfires | 1 | 3 | 1 | 2 | 2 | 1 | 21 |
| Drought/ Heat Wave | 3 | 4 | 1 | 0 | 1 | 1 | 33 |

The highest risk hazards throughout the planning area, in descending order based on the relative risk ratings, are: Winter Storms, Drought/Heat Wave, Wildfires, Floods, Tornadoes/High Winds, Thunderstorms, and Earthquakes. Tsunamis, Coastal and Riverine Erosion, Landslides/Sinkholes, Coastal Storms, Dam/Levee Failure, and Volcanic Activity are not shown in the above table for they have been designated as posing little risk to the City of Simpsonville by those representatives making the planning decisions. This is most closely related to the very low probability of occurrence for these hazards.

For the most part, the available data does not allow for a more technical evaluation of the hazards. Information gathered from discussions with City officials and residents provided much of basis for the evaluation of risk and vulnerability found in this plan. Efforts to improve these considerations will be discussed in sections describing mitigation activities.

The Vulnerability Assessment Process

The vulnerability assessment process for the DMC begins with profiling the basic, mitigation-related characteristics of the City. Very basic demographic, land use and infrastructure information was gathered for the City. The resulting information is presented below.

The Vulnerability Assessment Process, as described above, is still valid and on-going during the Update period.

The following table indicates the building valuation of properties that may be affected by all hazards identified in the plan.

| Class | No. of Properties | Building Valuation (\$) |
|---------------------|-------------------|-------------------------|
| | | |
| Residential | 6,299 | \$688,694,832 |
| Commercial | 345 | \$243,945,724 |
| Industrial | 0 | 0 |
| Critical Facilities | 16 | \$10,962,478 |

Repetitive Loss Properties: Another indication of the hazards threatening the City of Simpsonville, and the risk posed by those hazards, is to identify whether properties have been previously or repeatedly damaged by past disaster events. The properties, which may be buildings, roads, utilities, or similar construction, can be termed “repetitive loss properties.” Properties can fall into this classification based on repeated damages from any type of hazard. A specific category of repetitive loss properties is those that are insured under the National Flood Insurance Program, and have had repeated claims for flood loss damages. To date, the City does not contain any repetitive loss properties.

Land Use Trends and Potential Vulnerability: The DMC recognizes that the way in which land is utilized, especially land within known hazard-prone areas, is a key measure of community vulnerability, because some land uses, such as for residential or industrial development, can be more susceptible to disaster-related damages than others. Therefore, analysis of land use trends will be performed by the City of Simpsonville’s Planning Commission. The DMC recognizes that its efforts, particularly to identify the areas at risk from various hazards, is a key factor in guiding the careful use of land to minimize future vulnerabilities to disaster. When needed and desired, modifications to the plans, ordinances, codes and similar policies will be proposed as mitigation initiatives for incorporation into this plan.

At this point, the City continues to take measures to control development from an economic and vulnerability standpoint. Two of the better examples would be the adoption of the International Building Codes as amended by the State of South Carolina, and the Hillcrest High School new emergency evacuation route initiative.

To address new buildings and infrastructure, the City will continue to enforce the International Building Code Standards as well as require a downstream impact analysis for new development.

Critical Facilities: Many facilities and systems in the City are very important to the health, safety and welfare of the community, especially during disasters caused by natural hazards. Therefore, high priority is given to assessing their vulnerabilities to future disasters and proposing mitigation initiatives to address identified vulnerabilities. The DMC has created a detailed list of facilities. However, technical evaluations of each of these facilities has not been prepared due to the expensive and time consuming and was beyond the scope of this original report. Maps of the various critical facilities are provided in Appendix C.

Summary

It must be emphasized that the fundamental reason for undertaking the hazard identification and vulnerability assessment process is to highlight vulnerabilities that need to be addressed by the development of proposed mitigation initiatives for incorporation into the City of Simpsonville hazard mitigation plan. In addition, this process has made it obvious to the DMC that more information is needed in order to provide thorough assessments. The committee has therefore created mitigation initiatives to address any current data shortcomings. This component of the mitigation planning process can be expected to be continued in future updates of the plan until all mitigation needs are addressed.

City of Simpsonville
Multi-Hazard Mitigation Plan

Section Seven

MITIGATION GOALS AND PLAN IMPLEMENTATION

Introduction

This section of the City of Simpsonville Multi-Hazard Mitigation Plan describes the goals and objectives established by the Disaster Mitigation Committee (DMC), and the completed and anticipated actions for implementation and maintenance of this plan in an ongoing effort to achieve these goals.

Goals and Objectives for the Mitigation Plan

The City of Simpsonville DMC established a number of goals and objectives to guide its work. The goals and objectives helped to focus the efforts of the group in the mitigation planning effort to achieve an end result that matches the unique needs, capabilities and desires of the **City of Simpsonville**.

1) City government will have the capability to develop, maintain, and utilize hazard information

- a) Data and information needed for defining hazards, risk areas and vulnerabilities in the community will be obtained
- b) The capability to effectively utilize available data and information related to mitigation planning and program development will be available
- c) The effectiveness of mitigation initiatives implemented in the community will be measured and documented
- d) There will be a program to derive mitigation “lessons learned” from each significant disaster event occurring in or near the community

2) The City will have the capability to initiate and sustain emergency response operations during and after a disaster

- a) Communications systems supporting emergency services operations will be retrofitted or relocated to provide for effective communication during times of disaster
- b) Emergency services organizations will have the capability to detect emergency situations and promptly initiate emergency response operations
- c) Local emergency services facilities will be assessed and City-owned service facilities will be retrofitted or relocated to withstand the structural impacts of disasters

3) The continuity of City government operations will not be significantly disrupted by disasters

- a) Measures will be implemented to alert City personnel of impending disasters and corresponding action plans
- b) Train key City employees in disaster response and operations

4) The policies and regulations of City government will support effective hazard mitigation programming throughout the City

- a) City government will establish and enforce building and land development codes that are effective in addressing the hazards threatening the community
- b) City government will protect high hazard natural areas from new or continuing development
- c) Land use policies, plans and regulations will discourage or prohibit inappropriate location of structures or infrastructure components in areas of higher risk
- d) Reconstruction and rehabilitation of structures and utilities in the City will incorporate appropriate hazard mitigation techniques
- e) The City will participate fully in the National Flood Insurance Program

5) Residents of the City will have homes, institutions, and places of employment that are less vulnerable to disasters

- a) The vulnerability to disasters of schools, libraries, museums, and other institutions important to the daily lives of the community will be minimized

6) The economic vitality of the City will not be significantly threatened by a disaster

- a) City government emergency response and disaster recovery plans will appropriately consider the needs of key employers in the community
- b) City government will encourage community businesses and industries to make their facilities and operations disaster resistant
- c) City government will implement programs to address public perceptions of community condition and functioning in the aftermath of a disaster

7) The availability and functioning of the City's infrastructure will not be significantly disrupted by a disaster

- a) City government will encourage hazard mitigation programming by private sector organizations owning or operating key community utilities
- b) Routine maintenance of the community's infrastructure will be done to minimize the potential for system failure because of or during a disaster
- c) Transportation facilities and systems serving the City will be constructed and/or retrofitted to minimize the potential for disruption during a disaster

8) All members of the City will understand the hazards threatening local areas and the techniques to minimize vulnerability to those hazards

- a) All interested individuals will be encouraged to participate in hazard mitigation planning and training activities.
- b) Education programs in risk communication and hazard mitigation will be established and implemented
- c) Managers of public facilities will be knowledgeable in hazard mitigation techniques and the components of the City's mitigation plan
- d) Technical training in mitigation planning and programming will be given to appropriate local government employees
- e) The owners and operators of businesses and industries in the City will be provided information on appropriate hazard mitigation techniques
- f) The public living or working in defined hazard areas will be aware of that fact, understand their vulnerability and know appropriate mitigation techniques
- g) The public will have facilitated access to information needed to understand their vulnerability to disasters and effective mitigation techniques

These goals selected by the DMC are related to the broad mitigation needs and capabilities of the communities involved, although some of the initiatives are focused on a specific hazard type or category. In general the City of Simpsonville mitigation goals and objectives are "multi-hazard" in scope and can be described as statements of the desired "mitigation-related capabilities" that will be present in the future as the goals are achieved.

Guidance to meet the goals of this mitigation plan will be provided by the State of South Carolina Emergency Management Division, pursuant to the State Mitigation Plan. The state does not provide a specific set of goals, however, guidance and coordination of hazard preparations and mitigation is available.

Using a "Goal-based" Planning Process

The goals established by the City of Simpsonville DMC are considered to be broad, general guidance that defines the long-term direction of the planning. As indicated in the list of goals and objectives above, each goal statement has one or more objectives that provide a more specific framework for actions to be taken by the DMC and its participants. The objectives define actions or results that can be placed into measurable terms by the DMC, and translated into specific assignments for implementation by the participants in the DMC and associated agencies and organizations.

The objectives selected by the DMC are intended to create a specific framework for guiding the development of proposed mitigation initiatives for incorporation into the plan. Whenever feasible, the planning participants have attempted to associate each proposed mitigation

initiative with the objective statement the initiative is intended to achieve. By associating a mitigation initiative with a specific objective, the proposed initiative is also, of course, intended to help achieve the broader goal statement to which the objective corresponds. Proposing mitigation initiatives that are consistent with the selected objectives is a principal mechanism for the DMC participants to achieve the stated goals of the mitigation planning program.

To illustrate this point, the table below shows a list of the mitigation initiatives included in the 2014 plan Update and the objective statement which they are intended to help achieve. This enabled the City of Simpsonville DMC to identify which of the established objectives is to be addressed by the proposed initiative, if any. This allows the DMC to consider achievement of a specific objective under an established goal as it reviews a proposed initiative for incorporation into the plan, or as it assigns the initiative a priority or schedule for implementation. This approach creates a framework for “goal-based” planning by the DMC, focusing the group’s efforts on proposing and implementing mitigation initiatives intended to achieve the established mitigation goals.

As the City of Simpsonville Hazard Mitigation Plan is reviewed and updated by the DMC, the goals and supporting objective statements are also reviewed to ensure they are still applicable to meeting the unique needs, interests and desires of the community.

| 2014 Initiative Description | Planning Goal(s) Targeted | Planning Objective Satisfied |
|--|--------------------------------------|---|
| A. Prevention | | |
| Perform bridge/culvert inspections | 1, 7 | 1a, 7b, 7c |
| Install monitoring stations for flood events | 1 | 1a |
| B. Public Education & Awareness | | |
| Enhance hazards education | 3, 8 | 3b, 8a-g |
| C. Natural Resources Protection | | |
| Address stream bank erosion control (Durbin Creek) | 7 | 7b |
| D. Emergency Services | | |
| Construct two-way radio tower | 2, 3 | 2a, 3a |
| Provide two-way radios for Public Works Vehicles | 2, 3 | 2a,3a |
| E. Property Protection | | |
| Address Storm water run-off from street paving | 4 | 4d |
| F. Structural Projects | | |
| Address sanitary sewer creek crossings | 4, 6 | 4d, 6a |

Addressing Known Risks and Vulnerabilities

The process of selecting initiatives to mitigate known threats to hazards began with a simple brainstorming exercise by the members of the DMC. Committee members also consulted personnel from within their respective agency or organization. The resulting list is part wish-list and part a reflection of the threats to the City of Simpsonville. It is difficult to remove from memory recent events and the damage that resulted. Therefore, this list is an indication of the problems that the City of Simpsonville needs to address, based on complaints, cost of repairs, and perceived future needs.

Modification to Other Policies, Plans and Programs

It is the intention of the DMC to continue to improve the existing policy framework for the City of Simpsonville so that they will be able to more effectively manage the community's vulnerabilities to future disasters. An analysis of the current policy framework is included in Section 6 of this plan. Any shortfalls in the number of policies addressing identified higher risk hazards can be addressed by implementing non-structural initiatives intended to modify or enhance current plans, policies and programs. The proposed modifications to the listed policies and programs are additional documentation of the DMC's efforts to achieve its established goals and objectives.

Plan Implementation and Plan Maintenance Procedures

This portion of Section 7 discusses the manner in which the City of Simpsonville Mitigation Plan will continue to be implemented and maintained over time. "Plan implementation" is considered as the implementation of the proposed mitigation initiatives now included in the plan. "Plan maintenance" is considered to be the process by which the City of Simpsonville DMC will continue to update, improve and expand the mitigation planning process. It also includes the technical analyses needed for the process to propose more mitigation initiatives for incorporation into the plan. "Plan maintenance" further includes the group's activities to monitor implementation of the plan, to evaluate the effectiveness of implemented mitigation initiatives, and to continually strive to engage the community in the planning process. The basic elements of the DMC's actions to implement and maintain the plan are also described in the DMC's operating procedures, given in Section 4 of the plan.

Plan Implementation Responsibility and Schedules

As noted above, implementation of the City of Simpsonville Mitigation Plan is basically through implementation of the approved mitigation initiatives incorporated into the plan. As these initiatives are implement over the years, the facilities, systems and neighborhoods of the

participating jurisdictions will become less vulnerable to the impacts of future disasters, and the communities of the City of Simpsonville will become increasingly more disaster resistant.

Pursuant to the planning process, the individual agencies and organizations that have been assigned responsibility for the mitigation initiatives incorporated into the plan are responsible for their implementation when the resources or opportunity to do so become available. As a practical matter, in most cases, this means that the responsible agencies identify the most feasible funding source (e.g., a state or federal grant program, the agency's budgetary process, etc.), make application to the funding source or otherwise allocate funds, and, upon receipt of funding, take the necessary steps to actually implement the project, whatever that may entail (e.g., design, permitting and construction, etc.). In other cases, this may mean that, should a unique opportunity for implementation of an initiative arise, e.g., upon receipt of unexpected funds, immediately after a disaster event, etc., the agency can proceed with implementation of the initiative.

The DMC encourages representatives of the agencies and organizations responsible for a proposed initiative to associate it with one or more potential funding sources. The purpose of this is to facilitate implementation of a proposed initiative by the sponsoring agency by indicating the starting point for seeking funding for implementation. While the actual responsibility for implementation of a mitigation initiative lies with the responsible agency or department, the DMC as a cooperative organization has a substantial involvement in plan implementation and can assist with the coordinating and scheduling of the implementation of approved mitigation initiatives. As a part of the planning process, on a periodic basis of every five years and immediate following any major disaster, approved mitigation initiatives included in the plan are reevaluated as to their continuing value and the need for their implementation. The purpose of this re-evaluation is to assure that a proposed mitigation initiative remains a valuable component of the plan, and whether any unique or unanticipated conditions warrant extra efforts to implement the initiative.

Plan Maintenance and Monitoring of Plan Implementation

Mitigation planning is a dynamic process that must be continually adjusted to account for changes in the community and to further refine the information, judgments and proposals documented in the local mitigation plan. The process used by the City of Simpsonville DMC to maintain the plan consists primarily of four functions.

The first is to continue to expand and improve the mitigation plan by accomplishing additional technical analyses, such as vulnerability assessments and post-event analysis of disasters, etc. The second is to continue to expand participation in the planning process by implementing public information programs and by inviting expanded participation by the private sector. The third is to routinely monitor implementation of the initiatives in the plan until each is

completed and in-place, and to assess their actual effectiveness following the next relevant disaster event. The fourth is to issue an updated plan document for use by the participating organizations, to inform the community, and when appropriate for submittal to state and federal agencies for approval pursuant to the Disaster Mitigation Act of 2000. This portion of Section 7 of the plan describes these four activities by the DMC to maintain the City of Simpsonville Mitigation Plan.

The technical analyses conducted by the City will be an ongoing effort to continually assess the hazards threatening the community, the vulnerabilities to those hazards, and program framework to control those vulnerabilities. When indicated, the technical analysis also includes formulating proposed mitigation initiatives to eliminate or minimize the identified vulnerabilities. The City has completed the vulnerability assessment based on the best available information. As this process continues and additional data is gathered the DMC will be better equipped to provide more detailed analyses. In the next planning cycles, the DMC will continue to assess the vulnerabilities of facilities and planning areas, emphasizing. Vulnerability assessments are fundamental to identifying needed mitigation initiatives to propose for incorporation into the plan, and as this process is continued, additional mitigation initiatives will be proposed for incorporation into the plan.

Another technical analysis important to maintenance of the plan is the expanded and refined evaluation of the policy and program framework of the City and the adequacy of this framework to control the vulnerabilities of the community.

The second type of activity to continue to maintain the City of Simpsonville Mitigation Plan will be to continue to expand participation in the DMC and the mitigation planning process. The current participants in the planning and the level of their participation are addressed in Section 3 of the plan. Gaining additional participation in the planning is also part of the public information and community outreach component of the plan. The planned public information activities are discussed in Section 5 and a report is given there entitled "Public Information Activity Report."

The third category of plan maintenance activities that will be undertaken by the City of Simpsonville DMC will be to monitor the implementation of mitigation initiatives. The DMC documents the efforts to fund the initiative, to conduct required studies, and to obtain any needed permits, as well as to estimate the time remaining to complete design, needed studies and purchasing or construction. When an initiative is completed, this fact is noted in the program as well. The current status of initiative implementation has been discussed in Section 5 of this plan, and the DMC will again update this section for the next publication of the plan.

As a part of monitoring the implementation of mitigation initiatives, following a disaster and as a part of the post-event analysis that the DMC will conduct, the effectiveness of completed mitigation initiatives, or any pre-existing mitigation initiatives, in reducing the human and

economic impacts of the event can be estimated. As time passes and disaster events occur, this will enable the DMC to accumulate a database of “mitigation success stories” with regard to the value of the property losses avoided and the number of fatalities, injuries or illnesses prevented.

Monitoring of the effectiveness of plan implementation and maintenance also involves assessing the effectiveness of the mitigation goals and objectives established for the planning process. As noted above, the DMC established general goals and a number of specific objectives to guide the participants in the mitigation planning process, and these are given above. The DMC’s attempts to address the established objectives, with the intent of achieving the associated mitigation goals for the community, is a key measure of the effectiveness of the continuing plan maintenance and plan implementation. The table in section 8, which was discussed above, documents the DMC’s efforts to achieve the established goals and objectives through the implementation of associated proposed mitigation initiatives. As these initiatives are implemented, and monitored for their effectiveness in future disasters, the DMC will be able to determine the overall success of their mitigation planning effort. In future planning cycles, these goals will be reviewed and re-evaluated to ensure they are still relevant to the unique needs of the community and continue to address current and expected conditions.

The fourth category of plan maintenance activities is to actually incorporate the results of all technical analyses, including the development of new mitigation initiatives and to publish another updated edition of the City of Simpsonville Hazard Mitigation Plan. The DMC will continue to engage the public in the planning process, to expand direct participation in the planning, and to increase representation on the City of Simpsonville DMC itself. In order to complete this category of plan maintenance activity, the participants will use a planning cycle which is given in the next section.

Current Planning Cycle Outline

Below lists the major aspects of the Planning Cycle beginning in 2014 and ending in 2019:

- The DMC will meet as necessary and after each major event
- Mitigation initiatives will be collected as they appear from various City organization, neighborhood groups, and businesses
- Adoption and implementation of new initiatives will be reviewed, ranked, and approved during the next planning cycle.

The planned date for release of the next edition of the City of Simpsonville Mitigation Plan Update is intended to be 2019. At that time, the entire planning process, along the new data that will have been collected, will be reviewed and altered as necessary. The process of approval by City Council will also be performed. It is the intention of the City to continue to incorporate the next update into Greenville County’s Multijurisdiction Multi-hazard Mitigation Plan.

Implementation through Existing Plans and Programs

One of the methods to most effectively implement the City of Simpsonville Hazard Mitigation Plan is to propose and implement initiatives that will modify other community plans, policies, and programs. By including personnel from a variety of departments in the hazard mitigation planning process, concepts derived from the planning process will be spread throughout City departments such as; public works, storm water management, GIS, and planning. Mitigation activities initiated by this plan will be incorporated into Simpsonville's Comprehensive plan, and vice versa.

Continued Public Involvement

The DMC will continue efforts to develop and implement a year-round program to engage the community in the mitigation planning process and to provide them with mitigation-related information and education. These efforts will be to continually invite public comments and recommendations regarding the mitigation goals for the community, the priorities for the planning, and the unique needs of each community for mitigation-related public information. Public information activities that have been completed or are planned by the organizations making up the City of Simpsonville DMC are listed in Section 5 of this plan. Each of these activities continues to engage the community in the planning process through the presentation of a specific topic or program related to or relevant for, hazard mitigation.

The Next Planning Cycles

As given in this section, the City of Simpsonville DMC has established a schedule and procedure for both plan implementation and plan maintenance that is expected to be helpful in improving and expanding the mitigation planning process.

In addition to these activities for plan maintenance, the DMC will establish a recommended schedule for implementation of the proposed priority initiatives included in this edition of the plan. It is expected that the agencies and organizations that sponsored these initiatives for the plan will, during the next planning cycles, take advantage of timely opportunities and available resources to implement them on the desired schedule, if it is possible to do so.

The City of Simpsonville Hazard Mitigation Plan Update is a dynamic document, reflecting a continuing, and expanding planning process. The efforts of the DMC will continue into the future, striving to make all of the jurisdictions of the City of Simpsonville truly disaster resistant communities.

City of Simpsonville
Multi-Hazard Mitigation Plan

Section Eight

REVIEW OF CURRENT AND PROPOSED MITIGATION INITIATIVES

Introduction

This section of the City of Simpsonville Multi-Hazard Mitigation Plan contains the compilation of the proposed mitigation initiatives that have been formulated as the result of the planning efforts by the Disaster Mitigation Committee (DMC). These mitigation initiatives form the fundamental mechanism for the implementation of the local mitigation plan. That is, when the resources and opportunity to do so become available, the sponsoring organization implements an initiative to address the vulnerabilities of the facilities, systems and planning areas that have been identified through the mitigation planning process. After each successful implementation of an initiative, the benefited community will become that much more resistant to the impacts of future disasters.

Initiatives Incorporated into the Mitigation Plan

The compilation is based on a prioritization that was conducted by the DMC overseeing the development of the Hazard Mitigation Plan. The proposed initiatives discussed in this section are specific mitigation actions and projects being considered to reduce the effects of each hazard” pursuant to §201.6(c)(3)(ii) of the federal regulations.

As specified in the procedures given in Section 4 of the plan, each proposed mitigation initiative is subjected to a review and analysis by the DMC. The purpose of this review and analysis is to ensure that an initiative proposed by a participating organization or community group is based on an adequate level of technical analysis, that all needed information about the proposal is presented, that any assumptions utilized are reasonable and logical, that the proposal is consistent with the goals and objectives of the DMC, and that it is addressing identified vulnerabilities of the community or shortfalls in the communities’ mitigation policy framework. More specifically, the DMC’s review and analysis process is focused on ensuring the technical validity of the proposal, making a judgment whether the initiative would be technically effective and cost beneficial, if it is duplicative or in conflict with other proposed initiatives, or if its implementation would have an adverse effect in another jurisdiction. If necessary, the proposal is returned to the sponsoring organization for revision.

When the DMC reaches a favorable judgment regarding the proposal, a recommendation is made that it be adopted for incorporation into the City of Simpsonville Hazard Mitigation Plan.

The DMC can then review the proposal for any other concerns, such as its consistency with other community-based plans, programs, and political policies, and if appropriate, formally approve the proposal and its incorporation into the plan. In this way, each mitigation initiative is only incorporated into the plan after satisfactorily undergoing a “peer review” process considering both technical validity and policy compliance.

The following is a brief description of the initiatives that have been considered by the DMC for inclusion in the City of Simpsonville updated Hazard Mitigation Plan:

A. Prevention

Perform Bridge/Culvert Analysis: During major rain events, several roads throughout the City tend to overtop. This mitigation activity will require a detailed analysis of each bridge/culvert on those roads to prioritize possible upgrades.

Install Monitoring Stations for Flood Events: In an attempt to collect more localized hazard data, the City proposes to install monitoring stations at designated locations to analyze the streams response to rainfall. This data will be used to collect data on weather events and to educate the public on hazard related issues.

B. Public Education and Awareness

Enhance hazards education: In an attempt to educate residents on hazard damages and their role in hazard mitigation, the City proposes that information be distributed via literature, web-site, and cable television, to further promote hazard awareness.

Provide links to flood hazard information on City web-sites: The Greenville County Office of Emergency Management has created a new web page containing a wealth of information including an excellent section on potential hazards to County Citizens. Numerous links are provided, including a link to the County Emergency Operations plan, a comprehensive emergency planning document. Links will be placed on the Public Works and City web-sites to take our citizens to the County web page.

C. Natural Resources Protection

Address Stream Bank Erosion Control (Durbin Creek): The City is proposing to address stream bank erosion in the Durbin Creek watershed to assist with natural resources protection.

D. Emergency Services

Purchase and install two-way radios in all public works vehicles: Having two-way radios in each Public Works vehicle will enable police and fire as well as dispatcher to communicate directly with public works crews to coordinate during emergency situations.

Erect two-way radio tower in central down-town area: The existing two-way tower is mounted to a water tower on the southern end of the city. Communication is sparse in the northern areas of the city. Erecting a new, more powerful, tower in the central area of the city will allow adequate signal strength throughout the city.

E. Property Protection

Lessen property flooding from storm water run-off from newly paved roads: Co-Trans-Co, who manages the annual road paving program for the City. As a means to lessen storm water run-off onto properties that border newly paved roads, the City proposes to work with Co-Trans-Co to develop a method of incorporating storm water management into the re-paving process.

F. Structural Projects

Replace sanitary sewer aerial creek crossings with flood resistant crossings: Sanitary Sewer aerial creek crossings are susceptible to being washed out during flood events. Such washouts would harm the environment as well as disrupt sewer service to residents, emergency facilities, hospitals, and businesses within the City. The City proposes to replace these crossing with a more durable design that would better be able to withstand flood events.

Priority Status for Plan Inclusion and Implementation

One format for describing mitigation initiatives included in the plan lists the mitigation initiatives and their current status as “approved”, “pending”, or “completed”. An approved mitigation initiative is one that has been fully processed and approved for incorporation into the plan by the DMC, and as noted above. A pending initiative is one that has been proposed by a participant in the planning process, but as of the time of the preparation of this document, it had not been fully processed by the DMC. Of course, a complete mitigation initiative is one that has been implemented by the responsible agency or organization.

As shown in the section, “Initiatives by Hazard” below, all initiatives have been approved.

Priority Ranking for Proposed Mitigation Initiatives

This next section report, lists all of the mitigation initiatives currently in the City of Simpsonville's Multi-Hazard Mitigation Plan, in the order of their priority scores. The priority scores are based on 9 separate prioritization criteria used by all of the planning participants to allow the DMC to compare various mitigation initiatives. The specific priority scores are based on a numeric classification system explained in the following table:

| Priority Criterion | Numeric Score |
|--|----------------------|
| Strategy Effectiveness | |
| No affect on Risk or Hazard | 0 |
| Affects several structures within the City | 1 |
| Affects many structures within the City | 2 |
| Affects most structures within the City | 3 |
| Percentage of Population Benefited | |
| Less than 10% benefited | 0 |
| 10% to 50% benefited | 1 |
| 51% to 75% benefited | 2 |
| Greater than 75% benefited | 3 |
| Time to Implement | |
| Cannot be implemented | 0 |
| Longer than one year | 1 |
| Within one year | 2 |
| Immediate | 3 |
| Time to Impact | |
| Cannot be implemented | 0 |
| Longer than one year | 1 |
| Within one year | 2 |
| Immediate | 3 |
| Cost to City | |
| Completely Unaffordable | 0 |
| Expensive, but manageable | 1 |
| Cost is easily managed | 2 |
| Little to no cost | 3 |
| Cost to Others | |
| Completely Unaffordable | 0 |
| Expensive, but manageable | 1 |
| Cost is easily managed | 2 |
| Little to no cost | 3 |
| Funding Source | |
| No known funding source available | 0 |
| Requires outside funding | 1 |

| | |
|---|----------|
| Requires budget consideration | 2 |
| Within existing City budget | 3 |
| Community Support | |
| Opposed by the entire community | 0 |
| Acceptable only to those affected by the project | 1 |
| Some community opposition | 2 |
| Acceptable community wide | 3 |
| Project Feasibility | |
| Not possible | 0 |
| Accomplished with extensive design and planning | 1 |
| Accomplished with some design and planning | 2 |
| Easily accomplished | 3 |

It is possible to see from this table that the minimum priority rank for a proposed initiative would be zero (0), while the maximum would be twenty-seven (27). The priority ranking given through application of the nine criteria in the above table will remain constant through time because of the inherent characteristics of the proposed initiative, unless those characteristics are also modified. All of the initiatives are listed by the priority score assigned to each as a result of the common process to characterize and prioritize mitigation initiatives that is used by all participants in the planning process. This priority score is a long-term characterization value directly associated with each specific initiative based on its own merits at the time it was first proposed by the individual participant. The priority score is intended to serve as a guideline for the DMC regarding the relative desirability of implementation of a specific mitigation initiative in relation to the other proposed initiatives incorporated into the plan.

All initiatives are prioritized and evaluated in accordance with the consideration with the National Flood Insurance Program.

| Project Description | Strategy Effectiveness | Percent of Population Benefited | Time to Implement | Time to Impact | Cost to City | Cost to Others | Funding Source | Community Support | Project Feasibility | Point Total | Project Priority |
|--|-------------------------------|--|--------------------------|-----------------------|---------------------|-----------------------|-----------------------|--------------------------|----------------------------|--------------------|-------------------------|
| A. Prevention | | | | | | | | | | | |
| Perform bridge/culvert inspections | 1.5 | 3 | 2 | 0.5 | 0.5 | 3 | 3 | 3 | 2 | 18.5 | 5 |
| Install monitoring stations for flood events | 1.5 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 2 | 10.5 | 7 |
| B. Public Education & Awareness | | | | | | | | | | | |
| Enhance Hazards education | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 2 | 22 | 2 |
| C. Natural Resources Protection | | | | | | | | | | | |
| Address stream bank erosion control (Durbin Creek) | 2 | 1 | 1 | 1.5 | 0.5 | 0.5 | 1.5 | 1 | 1 | 10 | 8 |
| D. Emergency Services | | | | | | | | | | | |
| Purchase and install two-way radios in public works vehicles | 3 | 3 | 2 | 3 | 2 | 2 | 2 | 3 | 3 | 23 | 1 |
| Erect two-way radio tower in central down-town area | 3 | 3 | 1 | 3 | 1 | 1 | 2 | 3 | 2 | 19 | 4 |
| E. Property Protection | | | | | | | | | | | |
| Lessen property flooding from storm water run-off from newly paved roads | 2 | 1 | 1 | 3 | 3 | 3 | 1 | 3 | 3 | 20 | 3 |
| F. Structural Projects | | | | | | | | | | | |
| Upgrade sanitary sewer creek crossings | 2 | 1 | 1 | 3 | 1 | 1 | 1 | 3 | 1 | 14 | 6 |

Benefit-to-Cost Ratio

A key analytical measure commonly used in vulnerability assessments is the benefit to cost ratio, which expresses the estimated benefits, in dollars, in comparison to the estimated costs to implement and maintain the proposed mitigation initiative. For an initiative to be considered "cost effective," the dollar value of the benefits derived needs to exceed the costs to implement and maintain the initiative, or, in other words, the benefit to cost ratio should be greater than 1.0. The process for calculating a benefit to cost ratio begins with estimating the direct and indirect costs of the 'worst case' disaster scenario that the mitigation initiative is intended to address. If the initiative were to be implemented, these are the future costs that would be avoided, or, in other words, the "benefits" derived from implementing the initiative. Both direct costs of the disaster scenario are considered, such as structural damages, as well as indirect costs, such as lost wages. The total of the direct and indirect costs are then divided by the predicted life of the initiative, in years. This then gives the dollar benefits of the project on an annual basis.

The cost side of the benefit to cost ratio is estimated by determining the estimated cost to initially implement the proposal, such as initial construction cost for a “bricks and mortar” project, or the development costs for a training program. To this amount is then added any annual costs that implementation of the project would incur, such as annual operations and maintenance costs or annual implementation costs. Next, the approach then considers any “cost impact” of the proposal, or the costs that would be incurred by others in the City due to implementation of the initiative, such as the economic effect on new construction of adopting a more stringent building code. The cost impact figure is also annualized by the life of the project, and then any annual cost impact values, such as an annual user fee or tax, is added to give a total annual cost impact. Finally, by dividing the annual costs of the “benefits” of the proposal by the annual cost and cost impact necessary to implement the proposal, a benefit to cost ratio is estimated. A more sophisticated methodology for calculating a benefit to cost ratio is likely to be necessary at the time of actual implementation, applying to state or federal agencies for funding, or for the design and construction stage of development.

During the evaluation of all mitigation activities, a cost-benefit review was conducted to determine the suitability of all initiatives.

Initiatives by Hazard

This section of the plan describes the proposed initiatives included in the plan to address the hazards that have been identified as threatening the City of Simpsonville. The table below presents the mitigation initiatives that have been proposed to address the identified hazards posing the most risk to Simpsonville, as determined by the DMC. As described in Section 6 of this plan, the hazards are ranked based on risk from high to low as winter storms, wildfires, floods, thunderstorms, high winds, and earthquakes. This section is also another example of how the planning approach used by the City of Simpsonville has effectively used the hazard identification and risk estimation process to guide formulation of proposed initiatives.

| Initiative Description by Hazard | Secondary Hazard(s) Mitigated |
|--|--------------------------------------|
| A. Winter Storms | |
| Purchase and install 2-way radios in all Public Works Trucks | C,D,E,F,G |
| Erect 2-way radio tower in central down-town area | C,D,E,F,G |
| B. Drought/Heat Wave | |
| Enhance Hazards Education | All other natural hazards |
| C. Wildfires | |
| D. Floods | |
| Perform bridge/culvert inspections | A |
| Install monitoring stations for flood events | A |
| Provide links to flood hazard information on City web-site | A |
| Address stream bank erosion control (Durbin Creek) | N/A |
| E. Tornado/High Winds | |
| F. Thunderstorms | |
| G. Earthquakes | |

| Initiative Description | Responsible Party |
|---|-------------------------------------|
| A. Prevention | |
| Perform bridge/culvert inspections | USACE, City of Simpsonville, Grants |
| Install monitoring stations for flood events | NWS, City of Simpsonville |
| B. Public Education and Awareness | |
| Enhance Hazards Education | City of Simpsonville |
| Provide links to flood hazard information on City web-sites | City of Simpsonville |
| C. Natural Resources Protection | |
| Address stream bank erosion control (Durbin Creek) | NRCS, City of Simpsonville, Grants |
| D. Emergency Services | |
| Purchase and install 2-way radios in all public works vehicles | City Police Department, Grants |
| Erect 2-way radio tower in central down-town area | City Police Department, Grants |
| E. Property Protection | |
| Lessen property damage from storm water run-off from newly paved roads | City of Simpsonville, Co-Trans-Co |
| F. Structural Projects | |
| Replace aerial sanitary sewer creek crossings with flood resistant crossing | FEMA, City of Simpsonville, Grants |

Potential Funding Sources

Each initiative incorporated in the City of Simpsonville Mitigation Plan has been ranked based on the ability to fund it, either within City budget or from outside funding sources. The DMC has consulted this list and developed a subset of the potential sources for the approved initiatives, shown in Appendix A. Then using this list, funding sources are assigned to initiatives by their respective “Primary Area”, as necessary, regarding the likely funding source. These designations are shown in the table below.

As of the current date on this plan, Simpsonville has not verified the true availability of all sources on this list. Some may no longer be available, while others may have come into existence since this list was developed. It is the expectation of the DMC that the agencies and organizations that sponsored a specific initiative would utilize the information given in this report to pursue funding opportunities to implement the initiative. Additional information regarding each of the potential funding sources listed in , such as contact information, eligibility, etc., is available within the City’s database.

| Initiative Description | Funding Source Primary Area |
|--|--|
| A. Prevention | |
| Perform bridge/culvert inspections | Storm Water, Flood Control Structures, Measures/Support Service Grants |
| Install monitoring stations for flood events | Storm Water, Flood Control Structures, Measures/Support Service Grants |
| B. Public Education & Awareness | |
| Enhance Hazards Education | Public Education Grants, City of Simpsonville |
| C. Natural Resources Protection | |
| Address stream bank erosion control (Durbin Creek) | NCRS Matching/Flood Control Structures Grants |
| D. Emergency Services | |
| Purchase and install two-way radios in all Public Works vehicles | Public Safety grants, City of Simpsonville |
| Erect two-way radio tower in central down-town area | Public Safety grants, City of Simpsonville |
| E. Property Protection | |
| Lesson property flooding from storm water run-off from newly paved roads | City of Simpsonville, Co Trans Co |
| F. Structural Projects | |
| Replace sanitary sewer aerial creek crossings with flood resistant crossings | FEMA, City of Simpsonville |

Appendix K-A – Local Mitigation Plan Review Tool



APPENDIX A:

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

| | | |
|---|--|--------------------------------------|
| Jurisdiction: City of Simpsonville | Title of Plan: Multi-Jurisdictional Hazard Mitigation Plan | Date of Plan: January 2015 |
| Local Point of Contact: Jay Crawford | Address: 110 Woodside Park Drive Simpsonville, SC 29681 | |
| Title: Assistant Director of Public Works | | |
| Agency: City of Simpsonville Public Works | | |
| Phone Number: 864-962-5723 | E-Mail: jcrawford@simpsonvillepublicworks.org | |

| | | |
|--|--|-----------------------------|
| State Reviewer: Melissa Potter | Title: State Hazard Mitigation Officer | Date: August 2013 |
|--|--|-----------------------------|

| | | |
|--|---------------|--------------|
| FEMA Reviewer: | Title: | Date: |
| Date Received in FEMA Region (insert #) | | |
| Plan Not Approved | | |
| Plan Approvable Pending Adoption | | |
| Plan Approved | | |

**SECTION 1:
REGULATION CHECKLIST**

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

| 1. REGULATION CHECKLIST | | Location in Plan (section and/or page number) | Met | Not Met |
|---|---|---|-----|------------|
| Regulation (44 CFR 201.6 Local Mitigation Plans) | | | | |
| ELEMENT A. PLANNING PROCESS | | | | |
| A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1)) | Pgs. 3.1; 3.2; 3.3; 3.4; 7.3.8 Appendix A | | | |
| A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2)) | Pgs. 3.1; 3.2 Appendix A | | | |
| A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1)) | Pgs. 5.1; 5.2 Appendix A | | | |
| A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3)) | Pgs. 4.2; 4.3 Sect. 6.2 Greenville County HMP | | | |
| A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii)) | Pg. 5.2; 7.9 | | | |
| A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i)) | Pgs. 7.5- 7.9 | | | |
| ELEMENT A: REQUIRED REVISIONS | | | | |
| | | | | |

| 1. REGULATION CHECKLIST | | Location in Plan (section and/or page number) | Met | Not Met |
|--|--|---|-----|------------|
| Regulation (44 CFR 201.6 Local Mitigation Plans) | | | | |
| ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT | | | | |
| B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i)) | Greenville County Appendices G & H | | | |
| B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i)) | Simpsonville Pg. 6.5 Greenville County sec. 6.3 | | | |
| B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii)) | Simpsonville Pg. 6.5 Greenville County sec. 6.2; 6.4; 6.5 | | | |
| B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii)) | Greenville County Sec. 6.5.1 | | | |
| ELEMENT B: REQUIRED REVISIONS | | | | |
| ELEMENT C. MITIGATION STRATEGY | | | | |
| C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3)) | Executive Summary Pg. 7.5 | | | |
| C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii)) | Pg. 7.2 | | | |
| C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i)) | Pg. 7.2 | | | |
| C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii)) | Pgs. 7.3; 7.4 Section 8 | | | |
| C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii)) | Pgs. 8.3-8.6 | | | |
| C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii)) | Pgs. 2.1; 7.9 | | | |
| ELEMENT C: REQUIRED REVISIONS | | | | |

| 1. REGULATION CHECKLIST | | Location in Plan (section and/or page number) | Met | Not Met |
|--|-----------------------------|---|-----|------------|
| Regulation (44 CFR 201.6 Local Mitigation Plans) | | | | |
| ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only) | | | | |
| D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3)) | Pg. 6.6 | | | |
| D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3)) | Pgs. 5.2-5.3; 7.5; Sec 8 | | | |
| D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3)) | No change | | | |
| ELEMENT D: REQUIRED REVISIONS | | | | |
| ELEMENT E. PLAN ADOPTION | | | | |
| E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5)) | Appendix C | | | |
| E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5)) | Appendix C | | | |
| ELEMENT E: REQUIRED REVISIONS | | | | |
| ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA) | | | | |
| F1. | | | | |
| F2. | | | | |
| ELEMENT F: REQUIRED REVISIONS | | | | |

SECTION 2: PLAN ASSESSMENT

INSTRUCTIONS: The purpose of the Plan Assessment is to offer the local community more comprehensive feedback to the community on the quality and utility of the plan in a narrative format. The audience for the Plan Assessment is not only the plan developer/local community planner, but also elected officials, local departments and agencies, and others involved in implementing the Local Mitigation Plan. The Plan Assessment must be completed by FEMA. The Assessment is an opportunity for FEMA to provide feedback and information to the community on: 1) suggested improvements to the Plan; 2) specific sections in the Plan where the community has gone above and beyond minimum requirements; 3) recommendations for plan implementation; and 4) ongoing partnership(s) and information on other FEMA programs, specifically RiskMAP and Hazard Mitigation Assistance programs. The Plan Assessment is divided into two sections:

1. Plan Strengths and Opportunities for Improvement
2. Resources for Implementing Your Approved Plan

Plan Strengths and Opportunities for Improvement is organized according to the plan Elements listed in the Regulation Checklist. Each Element includes a series of italicized bulleted items that are suggested topics for consideration while evaluating plans, but it is not intended to be a comprehensive list. FEMA Mitigation Planners are not required to answer each bullet item, and should use them as a guide to paraphrase their own written assessment (2-3 sentences) of each Element.

The Plan Assessment must not reiterate the required revisions from the Regulation Checklist or be regulatory in nature, and should be open-ended and to provide the community with suggestions for improvements or recommended revisions. The recommended revisions are suggestions for improvement and are not required to be made for the Plan to meet Federal regulatory requirements. The italicized text should be deleted once FEMA has added comments regarding strengths of the plan and potential improvements for future plan revisions. It is recommended that the Plan Assessment be a short synopsis of the overall strengths and weaknesses of the Plan (no longer than two pages), rather than a complete recap section by section.

Resources for Implementing Your Approved Plan provides a place for FEMA to offer information, data sources and general suggestions on the overall plan implementation and maintenance process. Information on other possible sources of assistance including, but not limited to, existing publications, grant funding or training opportunities, can be provided. States may add state and local resources, if available.

A. Plan Strengths and Opportunities for Improvement

This section provides a discussion of the strengths of the plan document and identifies areas where these could be improved beyond minimum requirements.

Element A: Planning Process

How does the Plan go above and beyond minimum requirements to document the planning process with respect to:

- *Involvement of stakeholders (elected officials/decision makers, plan implementers, business owners, academic institutions, utility companies, water/sanitation districts, etc.);*
- *Involvement of Planning, Emergency Management, Public Works Departments or other planning agencies (i.e., regional planning councils);*
- *Diverse methods of participation (meetings, surveys, online, etc.); and*
- *Reflective of an open and inclusive public involvement process.*

Element B: Hazard Identification and Risk Assessment

In addition to the requirements listed in the Regulation Checklist, 44 CFR 201.6 Local Mitigation Plans identifies additional elements that should be included as part of a plan's risk assessment. The plan should describe vulnerability in terms of:

- 1) A general description of land uses and future development trends within the community so that mitigation options can be considered in future land use decisions;*
- 2) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; and*
- 3) A description of potential dollar losses to vulnerable structures, and a description of the methodology used to prepare the estimate.*

How does the Plan go above and beyond minimum requirements to document the Hazard Identification and Risk Assessment with respect to:

- *Use of best available data (flood maps, HAZUS, flood studies) to describe significant hazards;*
- *Communication of risk on people, property, and infrastructure to the public (through tables, charts, maps, photos, etc.);*
- *Incorporation of techniques and methodologies to estimate dollar losses to vulnerable structures;*
- *Incorporation of Risk MAP products (i.e., depth grids, Flood Risk Report, Changes Since Last FIRM, Areas of Mitigation Interest, etc.); and*
- *Identification of any data gaps that can be filled as new data became available.*

Element C: Mitigation Strategy

How does the Plan go above and beyond minimum requirements to document the Mitigation Strategy with respect to:

- *Key problems identified in, and linkages to, the vulnerability assessment;*
- *Serving as a blueprint for reducing potential losses identified in the Hazard Identification and Risk Assessment;*
- *Plan content flow from the risk assessment (problem identification) to goal setting to mitigation action development;*
- *An understanding of mitigation principles (diversity of actions that include structural projects, preventative measures, outreach activities, property protection measures, post-disaster actions, etc);*
- *Specific mitigation actions for each participating jurisdictions that reflects their unique risks and capabilities;*
- *Integration of mitigation actions with existing local authorities, policies, programs, and resources; and*
- *Discussion of existing programs (including the NFIP), plans, and policies that could be used to implement mitigation, as well as document past projects.*

Element D: Plan Update, Evaluation, and Implementation (Plan Updates Only)

How does the Plan go above and beyond minimum requirements to document the 5-year Evaluation and Implementation measures with respect to:

- *Status of previously recommended mitigation actions;*
- *Identification of barriers or obstacles to successful implementation or completion of mitigation actions, along with possible solutions for overcoming risk;*
- *Documentation of annual reviews and committee involvement;*
- *Identification of a lead person to take ownership of, and champion the Plan;*
- *Reducing risks from natural hazards and serving as a guide for decisions makers as they commit resources to reducing the effects of natural hazards;*
- *An approach to evaluating future conditions (i.e. socio-economic, environmental, demographic, change in built environment etc.);*
- *Discussion of how changing conditions and opportunities could impact community resilience in the long term; and*
- *Discussion of how the mitigation goals and actions support the long-term community vision for increased resilience.*

B. Resources for Implementing Your Approved Plan

Ideas may be offered on moving the mitigation plan forward and continuing the relationship with key mitigation stakeholders such as the following:

- *What FEMA assistance (funding) programs are available (for example, Hazard Mitigation Assistance (HMA)) to the jurisdiction(s) to assist with implementing the mitigation actions?*
- *What other Federal programs (National Flood Insurance Program (NFIP), Community Rating System (CRS), Risk MAP, etc.) may provide assistance for mitigation activities?*
- *What publications, technical guidance or other resources are available to the jurisdiction(s) relevant to the identified mitigation actions?*
- *Are there upcoming trainings/workshops (Benefit-Cost Analysis (BCA), HMA, etc.) to assist the jurisdictions(s)?*
- *What mitigation actions can be funded by other Federal agencies (for example, U.S. Forest Service, National Oceanic and Atmospheric Administration (NOAA), Environmental Protection Agency (EPA) Smart Growth, Housing and Urban Development (HUD) Sustainable Communities, etc.) and/or state and local agencies?*

**SECTION 3:
MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)**

INSTRUCTIONS: For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

| MULTI-JURISDICTION SUMMARY SHEET | | | | | | | | | | |
|----------------------------------|-------------------|--|----------|-----------------|-------|-------|---------------------------|--|------------------------------|--|
| # | Jurisdiction Name | Jurisdiction Type (city/borough/ township/ village, etc.) | Plan POC | Mailing Address | Email | Phone | Requirements Met (Y/N) | | | |
| | | | | | | | A. Planning Process | B. Hazard Identification & Risk Assessment | C. Mitigation Strategy | D. Plan Review, Evaluation & Implementation |
| 1 | | | | | | | | | | |
| 2 | | | | | | | | | | |
| 3 | | | | | | | | | | |
| 4 | | | | | | | | | | |
| 5 | | | | | | | | | | |
| 6 | | | | | | | | | | |
| 7 | | | | | | | | | | |
| 8 | | | | | | | | | | |
| 9 | | | | | | | | | | |

MULTI-JURISDICTION SUMMARY SHEET

| # | Jurisdiction Name | Jurisdiction Type (city/borough/ township/ village, etc.) | Plan POC | Mailing Address | Email | Phone | Requirements Met (Y/N) | | | | | |
|----|-------------------|--|----------|-----------------|-------|-------|---------------------------|--|------------------------------|--|------------------------|----------------------------------|
| | | | | | | | A. Planning Process | B. Hazard Identification & Risk Assessment | C. Mitigation Strategy | D. Plan Review, Evaluation & Implementation | E. Plan Adoption | F. State Require- ments |
| 10 | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | |
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| 18 | | | | | | | | | | | | |
| 19 | | | | | | | | | | | | |
| 20 | | | | | | | | | | | | |

**Appendix K-B – Meeting Minutes from the Disaster Mitigation Committee and
Community Meetings**

Jay Crawford

From: Hall, Robert <RoHall@greenvillecounty.org>
Sent: Thursday, February 21, 2013 10:57 AM
To: Potter, Melissa; Marett, Jay; James, Brenda; Barber, Teresa; Jessica Chapman; roger.case@fountaininn.org; lori.cooper@fountaininn.org; Kim Hamel; jcrowford@simpsonvillepublicworks.org; rhawes@simpsonville.com
Subject: Hazard Mitigation Plan Meeting

Melissa Potter with the SC Emergency Management Division has requested a meeting to discuss our Multi-Jurisdictional Hazard Mitigation Plan Update. Even though the update is not required to be in place until January 2015, I can tell you from experience that it takes a significant amount of time to complete this process and it is **not** too early to begin planning. I am contacting you because your jurisdiction has expressed an interest in joining the County Plan.

Please check your calendars to let me know by Monday if you or a representative of your jurisdiction can attend this very important meeting that will be held in Suite 4100 at County Square. I have listed 2 potential meeting dates below. Being as flexible as possible, let me know if you could attend on one or either of these dates and who the representative will be. Based upon the overall response, I will pick the date that works best for the majority and send you a follow-up email to confirm.

March 20 1:30 PM

March 21 1:30 PM

Thank you for your participation.

Robert Hall, P.E., CFM
Floodplain Administrator
County of Greenville
(864) 467-7523

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Greenville County Hazard Mitigation Planning Meeting

Greenville County Square

March 21, 2013

Attendees:

Robert Hall, Greenville County

John Laux, City of Simpsonville

Teresa Barber, Greenville County

Jay Crawford, City of Simpsonville

Jay Maret, Greenville County

David Garner, SCEMD

Lori Cooper, Fountain Inn

Charlotte Foster, SCEMD

Kim Hamel, City of Mauldin

Melissa Potter, SCEMD

Minutes:

- I. Introductions
 - a. Greenville County hosted a meeting to discuss the next local mitigation plan update.
 - b. Greenville County, Fountain Inn, City of Mauldin, City of Simpsonville, and State Emergency Management were present.
- II. Review of Existing Plans
 - a. The following jurisdictions have a FEMA approved local hazard mitigation plan:
 - i. Greenville County (unincorporated)
 - ii. City of Greenville
 - iii. City of Simpsonville
 - iv. City of Greer
 - b. The following jurisdictions are looking to write a mitigation plan:
 - i. Fountain Inn
 - ii. City of Mauldin
 - c. Expiration Dates:
 - i. Greenville County (1/13/2015)
 - ii. City of Greenville (7/15/2015)
 - iii. City of Greer (11/7/2015)
 - iv. City of Simpsonville (10/11/2015)
- III. Mitigation Plan Update options
 - a. The options for the next local mitigation plan update include:
 - i. Continue to update separate single jurisdiction plans
 - ii. Join with the County to form a Multi-jurisdictional plan
 - b. The advantages to joining with the County include:
 - i. Having a singular, cohesive plan that represents all jurisdictions within Greenville
 - ii. Meet federal requirements for all jurisdictions to be eligible for pre- and post-disaster mitigation dollars.

- iii. Divide up responsibilities in times of tight budgets and lack of personnel
 - iv. The County is going to have a county-wide hazard vulnerability assessment completed this year. It will include all of the existing municipalities. Using this document will reduce the overall effort for the plan update process.
- c. The disadvantages to joining include:
 - i. Potentially being held back by any jurisdiction who does not provide data and information in a timely manner
 - ii. One entity would have to be the “keeper” of the plan to organize the final product.
- d. All representatives present at the meeting agreed to work together and transition to a multijurisdictional plan. The plan would likely be a base plan that laid out the mitigation planning process, jurisdiction participation, county profile, and risk assessment. Individual jurisdiction information, mitigation goals, and actions, would be included in an appendix.
- e. Greenville County would reach out to the other jurisdictions (Travelers Rest and City of Greer) to gauge their interest in joining the plan as well.

IV. Transitioning to a Multi-Jurisdictional Plan

- a. Changing the existing single jurisdiction plans into a multi-jurisdictional plan will require:
 - i. A joint planning effort
 - 1. Will have to show planning partners from each jurisdiction
 - 2. Explain how the jurisdictions helped in the plan update
 - ii. All jurisdictions will have to be represented in the risk assessment
 - iii. Each jurisdiction will have to list its own mitigation goals
 - iv. Each jurisdiction will have to provide a new or update list of mitigation actions.
 - 1. This is a “wish list” of mitigation plans, projects, and initiatives that the jurisdiction would like to see completed if funding were to become available.
 - 2. For each hazard type addressed, each municipality will have to include a least two mitigation actions.
 - v. Each municipality will have to adopt the plan
- b. Public Meetings
 - i. FEMA requires that the community host at least 2 public meetings about the plan update.
 - ii. The first one must be completed before FEMA reviews the draft plan.
 - iii. The second one can be when the municipalities adopt the plan in a public meeting (town/city/county council)
 - iv. Documentation must be included that shows that each municipality advertised the meeting to the public and that the meeting was held.

V. New FEMA requirements for this update

- a. There is a new crosswalk this year called the “Plan Review Tool”

- b. The new Digital Flood Insurance Rate Maps (DFIRMS) must be included in the plan
- c. FEMA would also like to see any mitigation suggestions included that came out of the RiskMAP products.

VI. Next Steps

- a. The group agreed to provide Greenville County (Robert Hall) with written confirmation that they will join a Greenville County Multi-jurisdictional Hazard Mitigation Plan no later than May 1st, 2013.
- b. Another meeting will be held in the near future to outline each jurisdiction's role in the plan update process and set deadlines to meet milestone.
- c. Any jurisdiction that does not meet deadlines may be removed from the plan. They will be able to join at a later date as an "add-on jurisdiction" when they have all of their information for the plan.

VII. Contact information

- a. To join the multi-jurisdictional plan, please contact Robert Hall at RoHall@greenvillecounty.org
- b. For more information on the meeting or mitigation planning questions, please contact Melissa Potter at mpotter@emd.sc.gov.



March 22, 2013

Robert Hall, P.E., CFM
Floodplain Administrator
County of Greenville
301 University Ridge
Greenville, SC 29601

Dear Mr. Hall:

The City of Simpsonville wishes join with Greenville County to formulate a Multi-jurisdictional Hazard Mitigation Plan. We agree to be represented in the risk assessment, provide all necessary support documents such as our mitigation goals and updated list of mitigation actions, and adopt the plan once it is completed and accepted by the State Emergency Management Division and FEEMA.

Sincerely,

Russell Hawes
City Administrator

Meeting Minutes

Date of Meeting: October 1, 2013
10:00 am

Re: Hazard Mitigation Goals Review Meeting

Location: City of Simpsonville

Issue Date: October 1, 2013

Submitted By: J. Crawford

In Attendance: See Attached List

ITEMS DISCUSSED

- Meeting began around 10 a.m. with an introduction from Jay Crawford.
- Review Meeting Presentation was delivered by Jay Crawford. It covered the following items:
 1. Review of Purpose
 2. Hazards of Concern
 3. Risk
 4. Mitigation Techniques
 5. County Initiatives
 6. Next Steps
- A small discussion of initiatives followed the presentation. Some of the initiatives include:
 1. Evacuation routes of schools near interstate
 2. Actions in the case of Spills or Industrial Accidents
 3. Communications Backup System
 4. Backup Generators for Critical Facility's
 5. Improve Communications between the School District and Parents
 6. Alarm System for Early Warnings
 7. Evaluation of Emergency Routes for student pickup
 8. Bridge inspections
 9. Stream bank Erosion Control (Durbin Creek)
 10. Downstream Impact Analysis
 11. Monitoring Stations for flooding
 12. Railroad scenario's
 13. Two-way radios for Public Works vehicles
 14. Move two-way radio communications tower
 15. Improvements to aerial sanitary sewer creek crossings
 16. New reverse 911 emergency communications system
- Meeting was concluded at 11 a.m.

SIMPSONVILLE PRE-DISASTER HAZARD MITIGATION REVIEW

UPDATE BOARD MEETING

OCTOBER 1, 2013

10:00 AM

LIST OF ATTENDEES

1. JOHN LAUX – PUBLIC WORKS DIRECTOR, CITY OF SIMPSONVILLE *TL*
2. KEN ASHWORTH – ASSIST. PRINCIPAL HILLCREST HIGH SCHOOL *KDA*
3. STEVE MOORE – POLICE CHIEF, CITY OF SIMPSONVILLE *Sam*
4. PAT THOMAS – RESIDENT, CITY OF SIMPSONVILLE *Pat*
5. DAVID DYRHAUG- PLANNING DIRECTOR, CITY OF SIMPSONVILLE *David*
6. JAY CRAWFORD – ASSIST. PUBLIC WORKS DIRECTOR, CITY OF SIMPSONVILLE *Jay*
7. WESLEY WILLIAMS- FIRE CHIEF, CITY OF SIMPSONVILLE *W*
8. ADAM LEZAN – FIRE MARSHALL, CITY OF SIMPSONVILLE *AL*
9. ~~AL SPAIN – BUILDING CODES~~
10. MIKE CRAVEN- BUILDING CODES *CMC*

Jay Crawford

From: Hall, Robert <RoHall@greenvillecounty.org>
Sent: Thursday, October 24, 2013 4:12 PM
To: jcrawford@simpsonvillepublicworks.org; Kim Hamel; Lori Cooper;
ccrear@greenvillesc.gov
Subject: Hazard Mitigation Plan Meeting

I have scheduled our conference room at the Codes Office (Suite 4100) for:

November 6 9 AM – 12 AM

We can meet and go through the Hazard Mitigation Plan. Bring your plan, notes, etc.

Hopefully we can come up with a game plan that everyone feels comfortable with.

See you then.

Robert Hall, P.E., CFM
Floodplain Administrator
County of Greenville
(864) 467-7523

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Multi-Jurisdictional Hazard Mitigation Plan 2015 Update

Planning Meeting

November 6, 2013

Note: All of the following is subject to any comments received from SCEMD and FEMA.

Meeting Highlights

Draft plan must be completed by March 1, 2014 in preparation for public meeting.

Two public meetings required. First meeting will be County-wide to include all jurisdictions. Each jurisdiction will publicize meeting and document publicity. The second public meeting will be held after FEMA "approves plan pending adoption by resolution." Each jurisdiction will hold the second meeting in conjunction with obtaining resolution for the HMP. Both public meetings must be documented for the HMP. Copies of the resolutions will be placed in the HMP.

Jurisdictions will place their respective plans in the Appendix (J – M) designated in the main Table of Contents. Robert will leave section numbers and Appendix unchanged for ease of reference. Good idea to have your own Table of Contents and section/ subsection numbers. This will make it easier to reference in the Plan Review Tool and easier for FEMA to find information.

The County plan will include the main Plan Review Tool (PRT) as Appendix A. Each jurisdiction will have the main PRT (as provided by Robert) with the information for their plan added. A copy of this jurisdiction specific PRT will be placed with the jurisdictional plan. Jurisdictions will reference information in their own plan like the following example or something similar: (Appendix L, Sec. 1).

Where possible, Robert will add information to the main plan to reduce duplication with jurisdictional plan. Each jurisdiction will review the sections to make sure information required by the PRT and the "How To" guide is present. Where necessary, jurisdiction will add specific information for their area.

The main plan covers the risk assessment for all hazards. Each jurisdiction will e-mail me by 12/1/13 to let me know if you have any issues with wildfire or dam failures. If not, I can add statements to cover these hazards as well. Each jurisdiction will add information on "floods" as necessary.

Robert will revisit all references to the County-wide Risk Assessment to reflect the reduced scope of this project. Also, he will try to obtain high hazard dam information to prepare a map. Each jurisdiction will note significant hazard events that have occurred within their area and will look at their own vulnerability to hazards.

Each jurisdiction should be able to take care of Items B4, C2, D3, E1 and E2 with one or two sentences. The main thing is to make sure all plans address the PRT items, either by referencing the main plan or within your own plan. There are certain things each jurisdiction must have (e.g., resolutions, mitigation objectives, etc.). Also, your plan should contain some information specific to your jurisdiction (e.g., plan development/review, specific vulnerabilities, etc.)

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Section 8: Mitigation Initiatives Update 8.1

- 8.1 Introduction
- 8.2 Initiatives Incorporated into the 2010 HMP Update
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- 8.4 Initiatives by Hazard
- 8.5 Potential Funding Sources
- 8.6 Mitigation Initiatives Status – 2015 HMP Update

Appendices

- A Local Mitigation Plan Review Tool (Greenville County)
- B Greenville County Hazard Mitigation Plan Resolutions
- C Outreach Activities Documentation
 - DMC Meeting Minutes
 - Floodplain Outreach Meetings Log
 - Hazard Mitigation Planning Meeting Minutes
 - Public Meetings Documentation
- D Hazard Events Data Summary
 - SHELDUS Databases
 - 2010 Plan Cycle Hazard Events Damage Summary
- E 2010 Plan Cycle Annual Mitigation Initiatives Progress Reports
- F Critical Facilities
- G General Risk Assessment Maps
 - Flood Issues
 - Critical Facilities
 - Potential Wildfire Impact Areas
 - Hazardous Material Locations
 - Tornadoes in the Last 50 Years
- H Flood Insurance Rate Maps Overview (2014)
- I Greenville County Risk Assessment Report
(Added by reference – see original report)
- J City of Greenville Hazard Mitigation Plan
- K City of Simpsonville Hazard Mitigation Plan
- L City of Ft Inn Hazard Mitigation Plan
- M City of Mauldin Hazard Mitigation Plan

Appendix K-C – Maps

City of Simpsonville

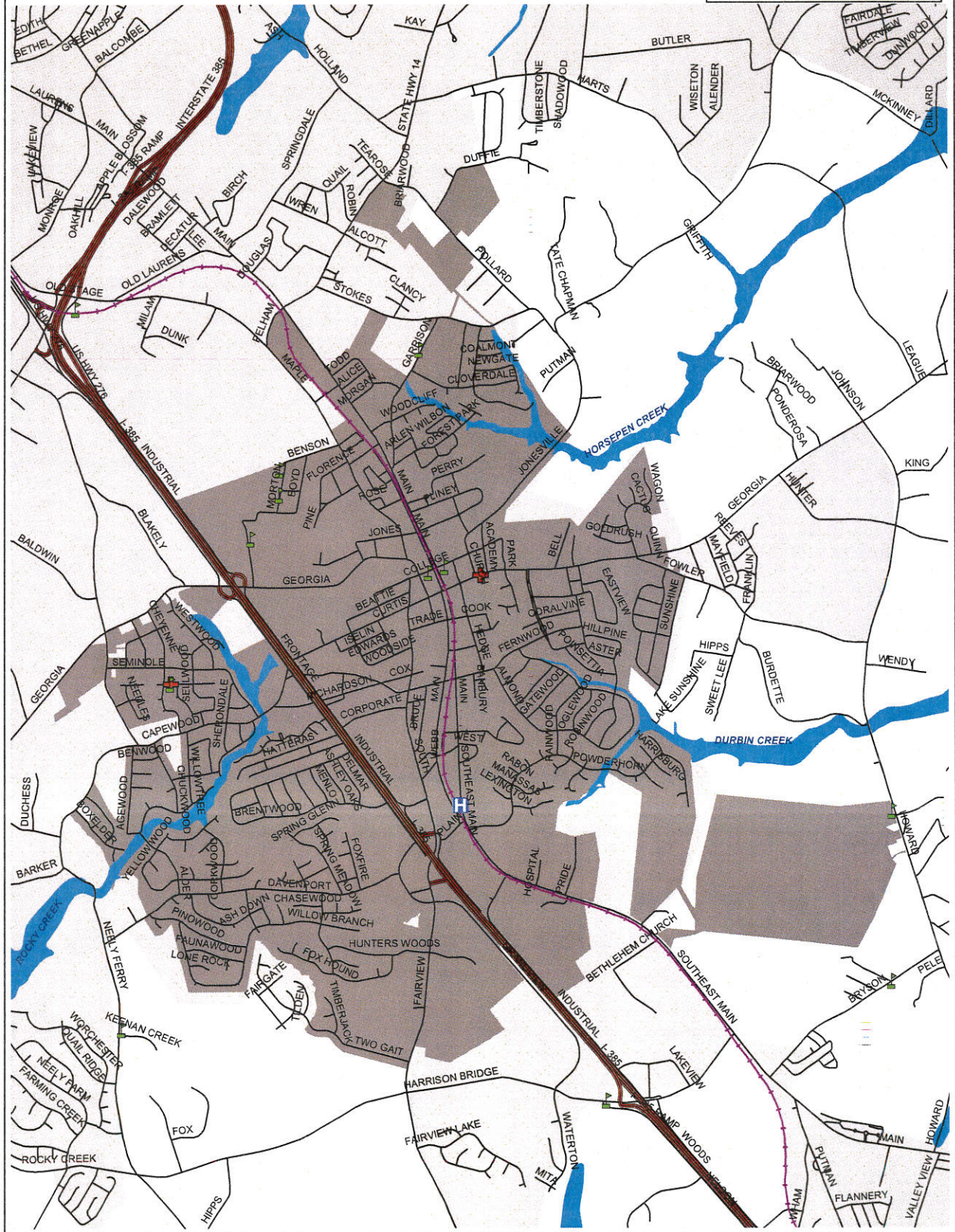
Critical Facilities

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Feet

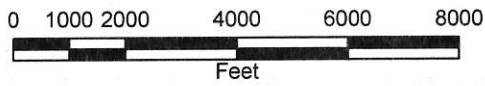


Legend

- Schools
- Hospitals
- Emergency Services
- Interstate
- 100-Year Floodplain
- Simpsonville
- Urbanized Area

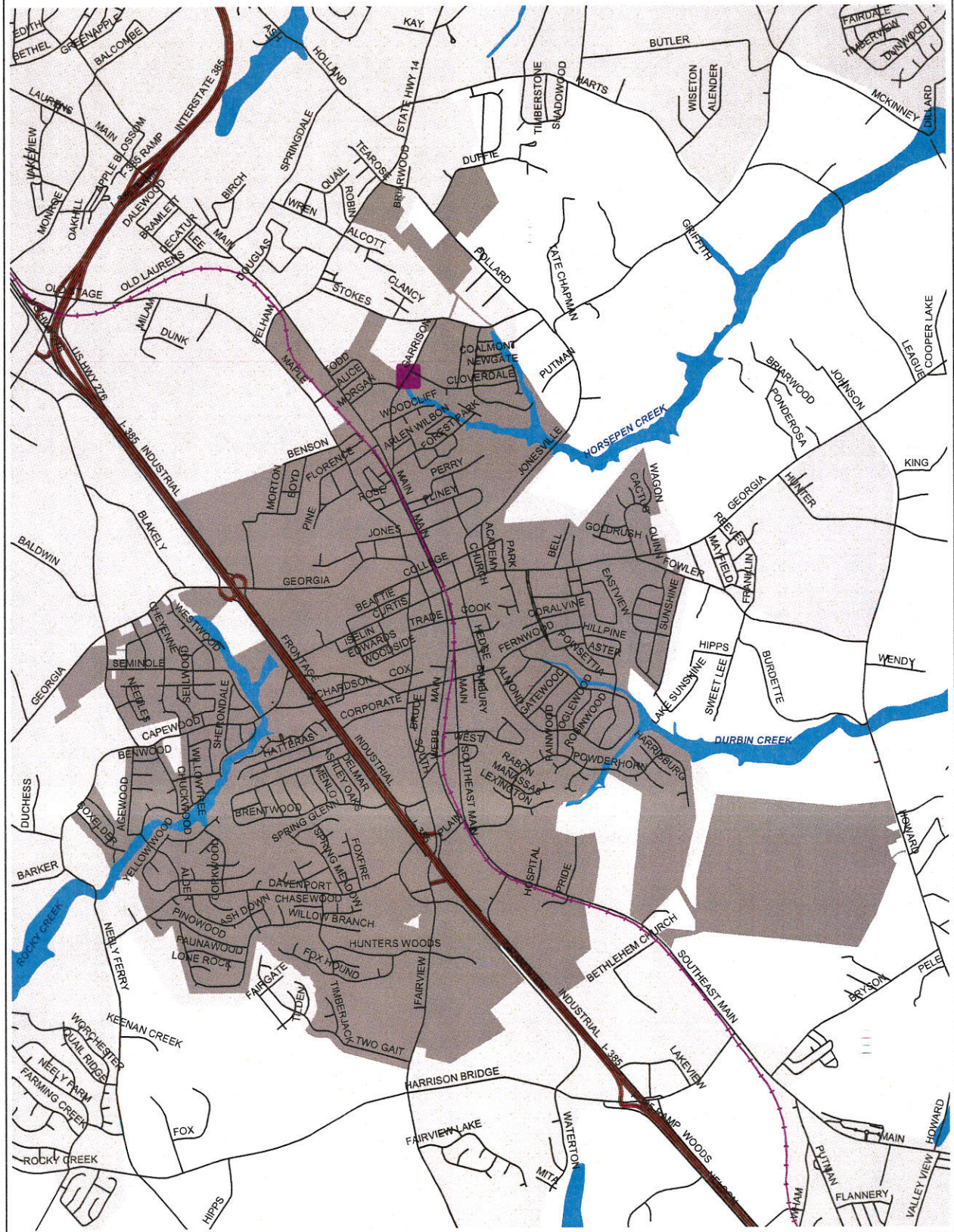


City of Simpsonville Flood Issues



Legend

- Flooding Problem Areas
- Interstate
- 100-Year Floodplain
- Simpsonville
- Urbanized Area








City of Simpsonville

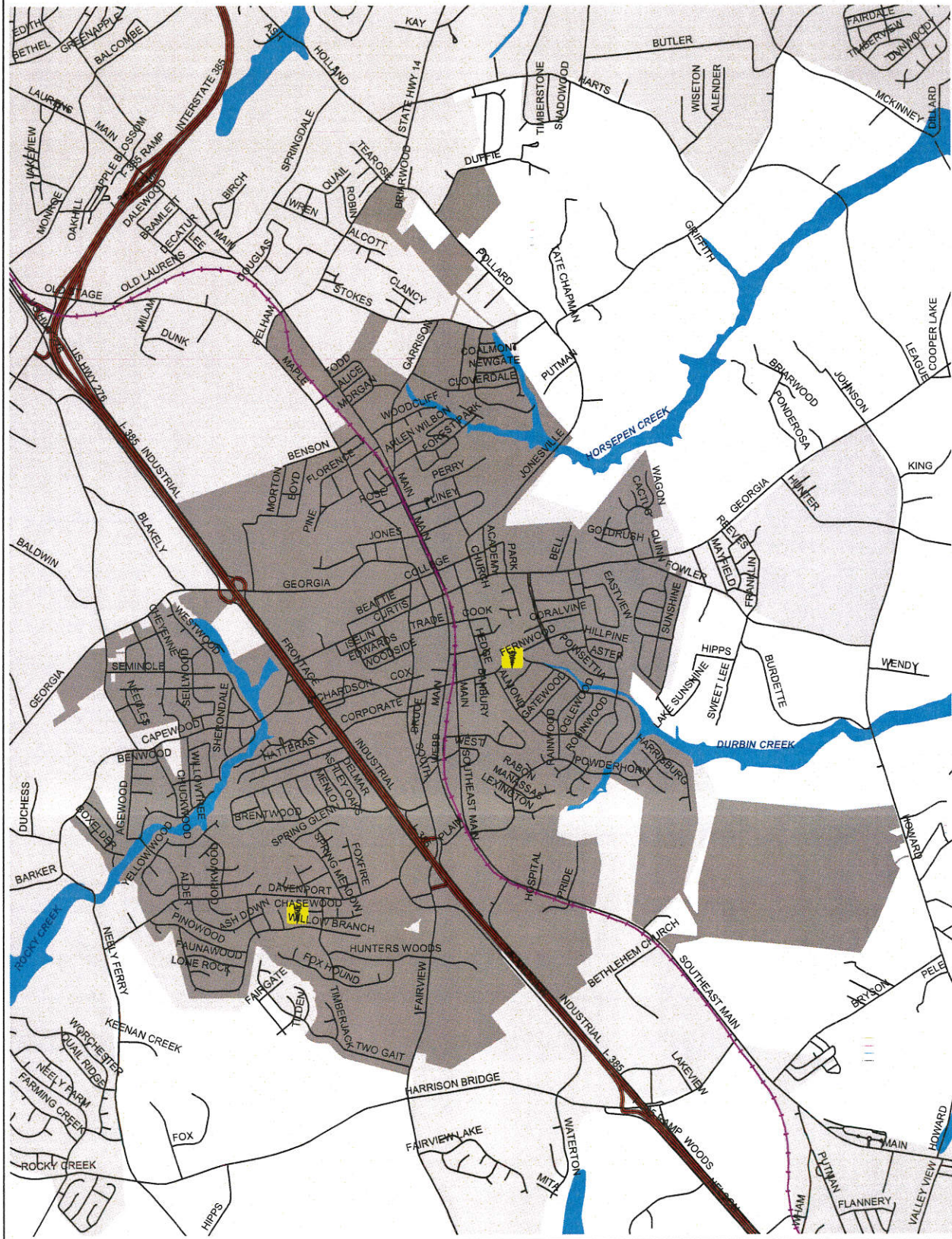
Tornadoes in the Last 50 Years

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Feet



Legend

-  Tornadoes
-  Interstate
-  100-Year Floodplain
-  Simpsonville
-  Urbanized Area



City of Simpsonville

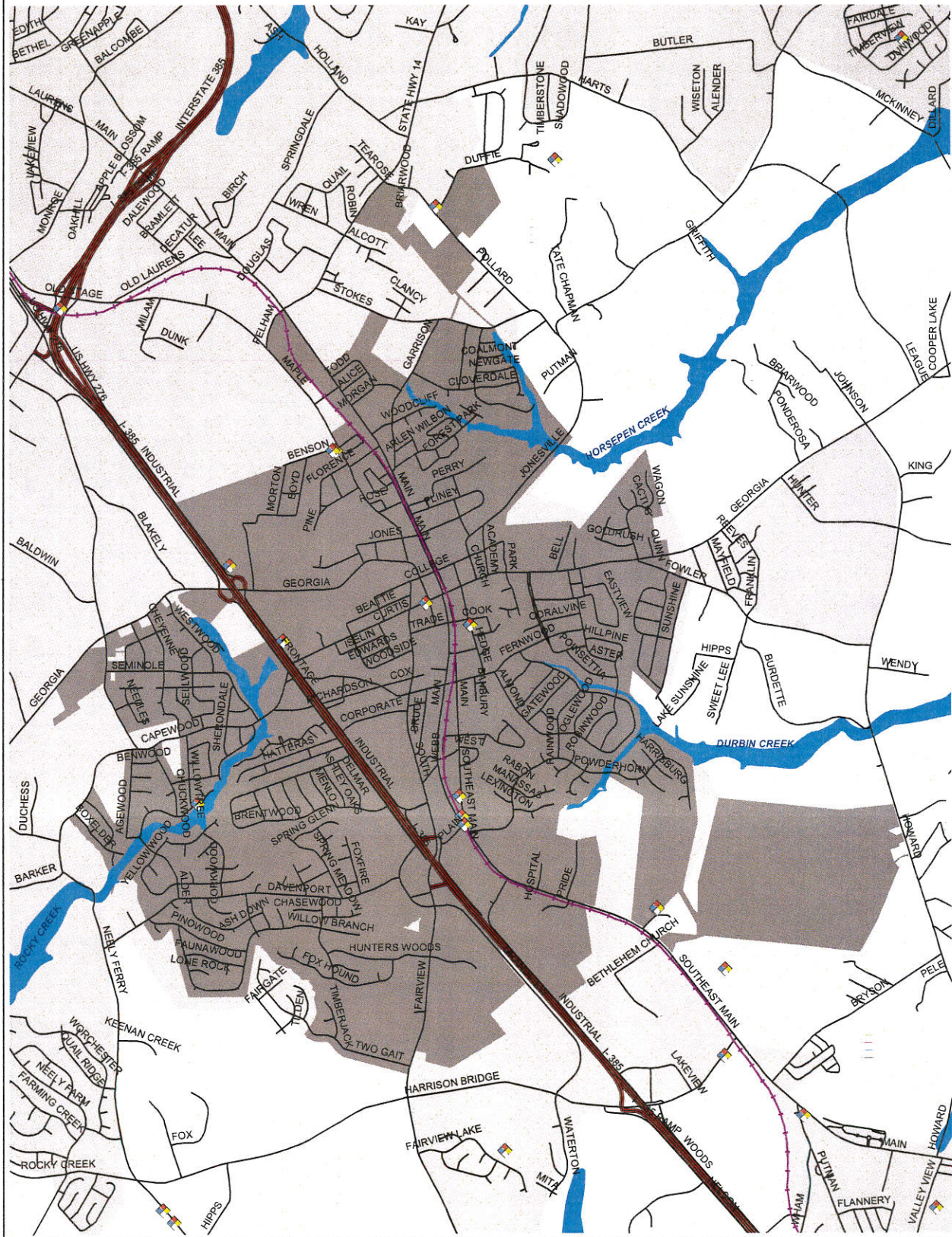
Hazardous Materials Locations

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Feet



Legend

- Hazardous Material
- Interstate
- 100-Year Floodplain
- Simpsonville
- Urbanized Area



City of Simpsonville

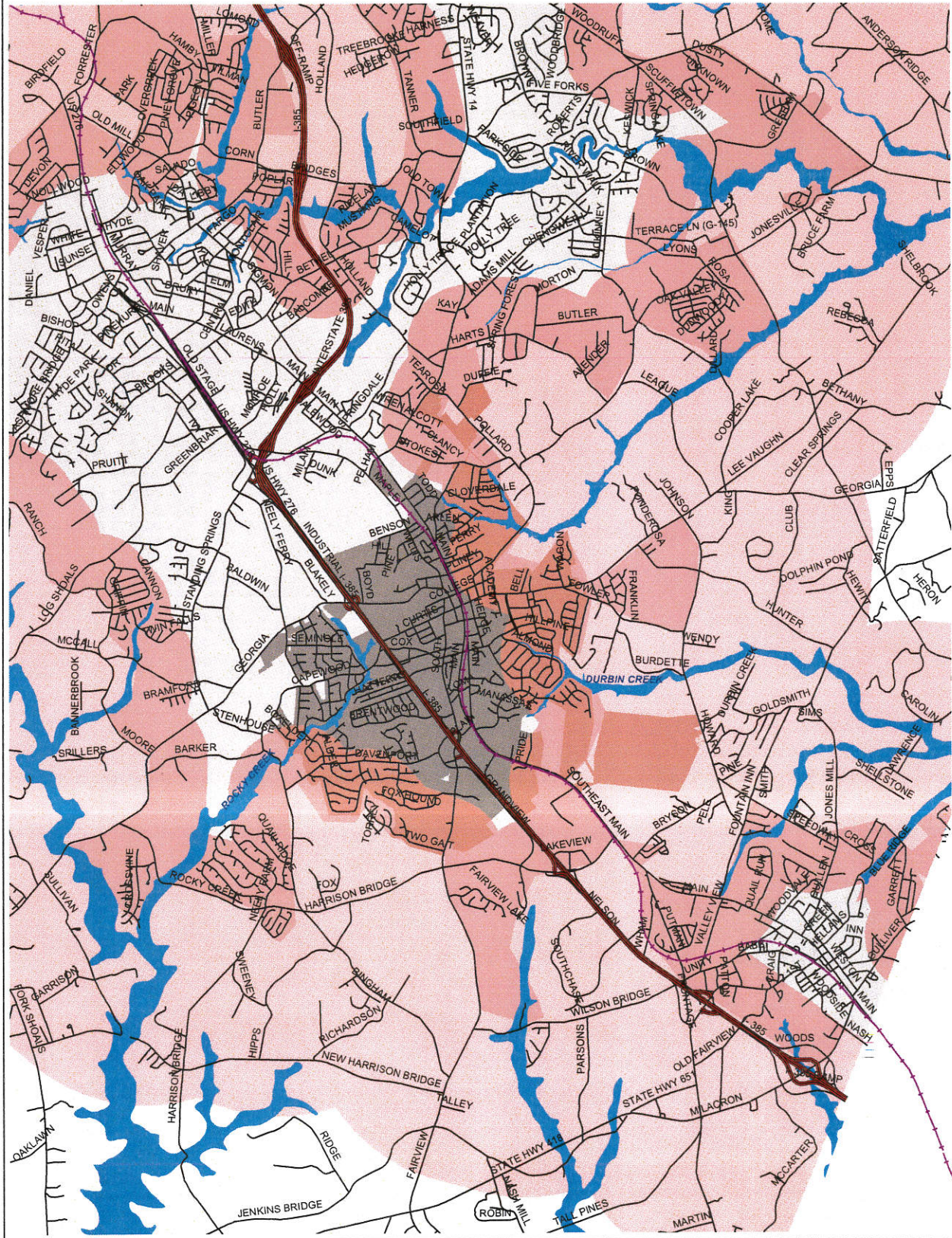
Potential Wildfire Impact Areas

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Feet



Legend

- Wildfire Impact Areas
- Interstate
- 100-Year Floodplain
- Simpsonville
- Urbanized Area



Appendix K-D – Plan Adoption

Appendix L - City of Fountain Inn Hazard Mitigation Plan

CITY OF FOUNTAIN INN
MUTI HAZARD MITIGATION ACTION PLAN

Section One

EXECUTIVE SUMMARY

In order for the City of Fountain Inn to take advantage of certain future multi hazard mitigation grant programs and/or FEMA and State reimbursements, the City is required to prepare an Action Plan and adopt the Greenville County Hazard Mitigation Plan.

The City of Fountain Inn is threatened by a number of natural hazards as well as manmade disasters. These hazards endanger the health and safety of the population of the community, jeopardize its economic vitality, and imperil the quality of its environment. Because of the importance of avoiding or minimizing the vulnerabilities to these hazards, the public and private sector interests of City of Fountain Inn has joined together with Greenville County Disaster Mitigation Committee to adopt the comprehensive plan that Greenville County has formulated in the publication of the document known as: "The Greenville County Hazard Mitigation Plan."

Key participants, organizations, and agencies involved in the development of its plan are the county agencies of Public Works, Codes Enforcement, Emergency Management, Soil and Water District, Planning Commission, Zoning, County Council, and Public safety. The City of Fountain Inn actively engaged in the planning process along with other groups and community associations.

The City of Fountain Inn has adopted the Greenville County Hazard Mitigation Plan which has the same goals and strategies as well as the same hazard risks that the City of Fountain Inn has.

The City of Fountain Inn has implemented the Following plans: Debris Management Plan that was approved by FEMA as well as State Emergency Management, Storm Water Management Program along with Greenville County under the NPDES Agreement, Emergency Evacuation Plan, Fire Prevention and Protection as well as Land Development.

The City of Fountain Inn recognizes that manmade threats are not mitigated. We also recognize that Greenville County has not listed manmade threats in their part of the Multi-jurisdictional Hazard Mitigation Plan.

STATE OF SOUTH CAROLINA }
 }
COUNTY OF GREENVILLE }

RESOLUTION NO. 2011-11

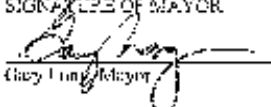
WHEREAS, the health and safety of all City of Fountain Inn citizens are threatened by potential natural and man-made disasters, which are caused by flood events, winter ice storms, tornadoes, severe storms, earthquakes, wildfires, hurricanes, and other natural disasters as well as man-made disasters from civil unrest, terrorist attacks and any other disasters, City of Fountain Inn deems it a public necessity to receive the Greenville County Hazard Mitigation Plan, and City of Fountain Inn Action Plan, which identifies measures for the safeguarding of City of Fountain Inn citizens' lives and property from the imminent hazard of natural and man-made disasters;

THEREFORE, BE IT RESOLVED, that City of Fountain Inn City Council hereby approves the adoption of the Greenville County Mitigation Plan, and City of Fountain Inn Action Plan,

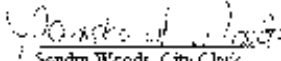
BE IT FURTHER RESOLVED, that from time to time this Plan may be revised, and that such revision shall be approved by the City of Fountain Inn Council.

ADOPTED this 10th Day of November, 2011, in City of Fountain Inn, Greenville County, South Carolina.

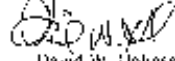
SIGNATURE OF MAYOR


Gary L. McElroy

ATTEST:


Sandra Woods, City Clerk
City of Fountain Inn
Greenville County

APPROVED AS TO FORM:


David W. Holmes
City Attorney

CITY OF FOUNTAIN INN
MULTI HAZARD MITIGATION ACTION PLAN
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| How to Handle Suspicious Package | Page 57 |

Mitigation Initiatives

The City of Fountain Inn has established a Disaster Mitigation Committee to regularly update the plan. This process includes working with Greenville County and their Committee. Below is a list of City of Fountain Inn Committee Members:

Committee Members:

| | |
|--------------------------|--------------|
| Mayor | Gary Long |
| City Administrator | Eddie Case |
| Public Works Director | Roger Case |
| Administrative Assistant | Lori Cooper |
| Fire Chief | Ken Kerber |
| Assistant Chief | Ronnie Myers |
| Police Chief | Keith Morton |
| Ft. Inn Natural Manager | Mike Pittman |
| City Attorney | David Holmes |

Meetings

The City of Fountain Inn encourages participation by all interested agencies, organizations, and individuals. The Committee is intended to represent a partnership between City of Fountain Inn and Greenville County, working together to create a disaster resistant community. One or more committee members will be present at all Greenville County Disaster Mitigation Meetings.

Responsibilities

It is the committee's responsibility to participate in planning and aiding Greenville County in the planning process to incorporate initiatives in developing the implementation of the mitigation plan.

Goals and Objectives

The City of Fountain Inn's goals are to provide education to the public and government officials, improving communications and response activities and protecting structures. The objective is to fully participate in the National Flood Insurance Program and the associate Community Rating System as well any and all Greenville County, State Emergency Management and FEMA programs related to Hazards.

Summary

Disaster Mitigation Planning is not a one time project, but rather an on-going process. The City of Fountain Inn has started the process by joining Greenville County in establishing a mechanism to keep their plan updated and relevant. Obtaining a resolution from the Fountain Inn City Council and Agreement with Greenville County will affirm the City's efforts to reduce damages and loss of life from future disasters.

CITY OF FOUNTAIN INN Hazard Mitigation Plan Update

Section Two

INTRODUCTION and PURPOSE

Introduction

The City of Fountain Inn has been established to make the population, neighborhoods, businesses and institutions of the community more resistant to the impacts of future disasters.

Purpose

The City of Fountain Inn agrees to work with Greenville County in order to provide a Methodical, Substantive Approach to Mitigation Plan to identify vulnerabilities to future disasters and to propose the mitigation plan to avoid or minimize those vulnerabilities. The City of Fountain Inn also will work toward Enhancing Public Awareness and Understanding in order to find ways to make the community as a whole more aware of all disasters. The City of Fountain Inn will continue to create specific projects and programs that are needed to eliminate or minimize the risks to specific hazards. We will promote compliance with State and Federal Program Requirements and Enhance Local Policies for Hazard Mitigation Capacity.

CITY OF FOUNTAIN INN HAZARD MITIGATION PLAN OPERATING PROCEDURES

The City of Fountain Inn has adopted the Greenville County Hazard Mitigation Plan and has established the following procedures under its' Action Plan.

The City of Fountain Inn identified hazards that threaten all or portions of the community. We use general information to estimate the relative risk of various hazards and compare analysis and planning efforts of the likelihood or probability that a hazard will impact an area, as well as the consequences of that impact to public health and safety, property, the economy, and the environment. We use flood plain maps and other information available to define hazard areas and estimate the relative risk of different hazards resulting from a hazard event.

The City of Fountain Inn works along side Greenville County Land Development Department as well as the Planning Department and existing policy, program and regulatory frame work to minimize vulnerabilities and to control growth and development from future disasters.

CITY OF FOUNTAIN INN HAZARD MITIGATION ACTION PLAN SUMMARY OF HAZARDS

The City of Fountain Inn has identified manmade threats in our mitigation plan. We do note that these hazards cannot be mitigated.

After September 11th we became more aware of how quick a manmade threat can occur and therefore decided to identify some of the threats that can occur.

Greenville County recognizes mitigated hazards only in their plan.

The following hazards can pose at least a minimal threat to City of Fountain Inn. This information was gathered by Greenville County as well as during research during the City Debris Management Plan as well as different sources that were collected.

WINTER STORMS: This type of hazard is commonly associated with precipitation in the form of ice or sleet and cold temperatures that cause major disruptions to many types of services and are dangerous to those with heat. Roads are covered in ice or blocked by fallen trees prevent emergency services from reaching those in need. Overhead lines are commonly torn down by fallen trees or weight of the ice on the lines leaving residents and businesses without electricity and heat. In addition, water lines freeze and break from cold temperatures and accumulated ice/snow on building roofs can cause structure failure. Direct and indirect costs associated with this hazard can be large and are often mitigated with federal and/or state funds.

This type of threat is a common threat to all portions of City of Fountain Inn. Over the last decade there have been a number of winter storm events that have severely impacted Fountain Inn.

FLOODS: This hazard is associated with large infrequent rainfall events or weak hurricanes or tropical storms that have moved inland. Flooding problem areas are commonly found in densely populated areas that have inadequate drainage systems or buildings located in flood prone areas. Flooding can also be associated with steeply sloped mountainous regions in the form of flash floods. These hazards are extremely dangerous due to the velocity of the moving water and debris. The City of Fountain Inn has very few flood issues. If rainfall exceeds more than 3" to 5" in less than an hour low lying areas are affected.

TORNADOES/HIGH WINDS: The high winds associated with tornadoes or microburst's can cause major disruptions, similar to the effects of winter storms; blocked roads, downed trees and damaged electricity lines. Tornadoes are commonly formed as part of larger thunderstorm systems or a spin off from hurricanes. People living in mobile or manufactured housing represent a particular vulnerability. The City of Fountain Inn

has experienced some weak systems some lasting for several hours.

SEVERE STORMS/THUNDERSTORMS: This hazard forms at the convergence of cold and warm, moist air masses, producing strong winds, hail, lightning, intense rainfall and tornadoes. These systems are commonly concentrated over a few square miles and have durations of several hours. Most occur in warmer months, but in the milder climates of the southeast, can form any time of the year. Damages from thunderstorms are the result of high winds and local flooding.

The City of Fountain Inn is similar to most portions of the State and region when considering the threat of potential thunderstorms. Most thunderstorms last an hour or two. These hazards can occur at any time within Fountain Inn.

EARTHQUAKES: This hazard involved the sudden quick movement of large pieces of earth, believed to be caused by the slipping of tectonic plates past one another, releasing energy to surface layers. This sudden motion can cause major destruction to buildings, roads, dams and other structures. In addition, underground utility lines can be ruptured.

Greenville County is located approximately 60 miles southeast of an epicenter located near Ashville, North Carolina. An epicenter is the estimated origin of the seismic waves that eventually reach the ground surface.

Although earthquakes have occurred in South Carolina in recent past, most are of a magnitude that they are not noticed by anyone other than a seismologist.

WILDFIRES: Wildfires can be an extremely hazardous event, especially on urban fringes that are in close proximity to wooded areas. Wildfires are commonly more frequent during drought periods, but can occur at any time during any given year. This hazard can cause a significant amount of damage.

HURRICANES: This hazard is characterized by powerful winds and drenching rains that can cover many hundreds of square miles and cause widespread flooding and wind damage, effectively shutting down impacted areas for days or weeks.

DAM/LEVEE FAILURE: Dam and levee structural integrity is vulnerable to failure to many causes.

DROUGHT/HEAT WAVE: This type of hazard is common across much of the United States, including areas in the northwest and southeast that normally accumulate large amount of annual rainfall. The amount of risk and associated damage vary with the degree and length of drought. Lack of sufficient water can cause major damage to farms and wildlife, as well as limit water supply and recreational uses.

LANDSLIDES/SINKHOLES: This type hazard is the result of natural geologic subsurface conditions that may exist without prior knowledge. Inadequate soil composition, such as expansive clays, unable to withstand applied pressures from building and roads contribute to the occurrence of these hazards.

CIVIL UNREST: This type of hazard is the result one or more forms of disturbance caused by a group of people typically in the form of protest against, major socio-political problems. The amount of risk and associated damage vary with the degree of the civil unrest. Burning structures, broken glass and destroyed buildings that have the potential of secondary impacts of wildfires.

TERRORIST ATTACKS: This type of hazard is politically and emotionally charged and defined as "terrorism involves violence and the threat of violence". This type of hazard can result in many forms from explosions, fires, chemical/biological, and contamination to burning structures and ultimately impacts the entire United States.

BOMB ATTACKS: This type of hazard is related to terrorist attacks and has become the primary weapon of the terrorist. The FBI in 1997 stated there were 3,163 actual and attempted bombing incidents in the US. Bomb Threats create sudden panic and fear. A bomb is deadly and can destroy lives, buildings and can cause major destruction.

Risk Evaluation: The Greenville County Mitigation Plan reports in detail the risks involved with each hazard listed above. The City of Fountain Inn concurs with this evaluation including the potential vulnerability and loss of properties.

Critical Facilities: Many facilities and systems in Greenville County as well as the City of Fountain Inn are very important to the health, safety and welfare of the community, especially during disasters caused by hazards. Therefore, high priority is given to assessing their vulnerabilities to future disasters and proposing mitigation initiatives to address identified vulnerabilities. The City of Fountain Inn will work closely with Greenville County on these vulnerabilities.

Summary

The City of Fountain Inn along with Greenville County believes that the fundamental reason for undertaking the hazard identification and vulnerability assessment process is to highlight vulnerabilities that need to be addressed by the development of proposed mitigation initiatives for incorporation into the Greenville County multi hazard mitigation plan. In addition, this process has made it obvious to the City of Fountain Inn Disaster Committee as well as the Greenville County Committee that more information is needed in order to provide thorough assessments. The City of Fountain Inn therefore will create mitigation initiatives to address any current data shortcomings. The City of Fountain Inn will continue to plan for future vulnerabilities until all facilities, systems, and neighborhoods have been assessed and their mitigation needs addressed.

**CITY OF FOUNTAIN INN HAZARD
MITIGATION ACTION PLAN
MITIGATION GOALS and PLAN IMPLEMENTATION**

Introduction

This section of the City of Fountain Inn Hazard Mitigation Action Plan describes the goals and objectives established by the City of Fountain Inn Disaster Committee, and the completed and anticipated actions for implementation and maintenance of this plan in an ongoing effort to achieve these goals.

Goals and Objectives for the Mitigation Plan

The City of Fountain Inn has adopted the Greenville County Disaster Mitigation Plan with established goals and objectives focusing on the efforts in the planning to achieve and end result that matches the unique needs, capabilities and desires of City of Fountain Inn and Greenville County.

- 1) City of Fountain Inn will work with Greenville County to develop, maintain, and Utilize hazard information
 - a) Data and information needed for defining hazards, risk areas and Vulnerabilities in the community will be obtained and shared
 - b) The capability to effectively utilize available data and information related To mitigation planning and program development will be available and shared with Greenville County
 - c) The effectiveness of mitigation initiatives implemented in the community Will be measured and documented
 - d) There will be a program to derive mitigation “lessons learned” from each Significant disaster event occurring in or near the City of Fountain Inn and Shared with Greenville County
- 2) The City will have the capability to initiate and sustain emergency response operations during and after a disaster
 - a) Communication systems supporting emergency services operations will be retrofitted or relocated to provide for effective communication during times of disaster
 - b) Designated evacuation shelters will be retrofitted or relocated to ensure their operability during and after disaster events
 - c) Emergency services organization will have the capability to detect emergency situations and promptly initiate emergency response operations
 - d) Local emergency services facilities will be assessed and City-owned service facilities will be retrofitted or relocated to withstand the impacts of disaster

- e) Response capabilities will be available to protect visitors, special needs individuals, and the homeless from disaster's health and safety impacts
- 3) The continuity of City operations will not be significantly disrupted by disasters
 - a) Measures will be implemented to alert City personnel of impending Disasters and corresponding action plans
 - b) Train key City employees in disaster response and operations
- 4) The policies and regulations of City government will support effective Hazard mitigation programming throughout the City
 - a) City government will establish and enforce building and land development Codes that are effective in addressing the hazards threatening the city
 - b) City government will protect high hazard natural areas from new or Continuing development
 - c) Land use policies, plans and regulations will discourage or prohibit Inappropriate location of structures or infrastructure components in areas of higher risk
 - d) Reconstruction and rehabilitation of structures and utilities in the City will incorporate appropriate hazard mitigation techniques
 - e) Regulations will be established and enforced to ensure that public and private property maintenance is consistent with minimizing vulnerabilities to disaster
 - f) The City will participate fully in the National Flood Insurance Program and the associated Community Rating System
- 5) Residents of the City will have homes, institutions, and places of employment that are less vulnerable to disasters
 - a) Programs for removal, relocation or retrofitting of vulnerable structures and utilities in hazard areas will be established and implemented
 - b) The vulnerability to disasters of schools, libraries, museums, and other institutions important to the daily lives of the city will be minimized
- 6) The economic vitality of the City will not be significantly threatened by a disaster
 - a) City government emergency response and disaster recovery plans will Appropriately consider the needs of key employers in the city
 - b) City government will encourage city businesses and industries to make Their facilities and operations disaster resistant
 - c) City government will implement programs to address public perceptions of city condition and functioning in the aftermath of a disaster

- 7) The availability and functioning of the City's infrastructure will not be Significantly disrupted by a disaster
 - a) City government will encourage hazard mitigation programming by Private sector organizations owning or operating city utilities
 - b) Routine maintenance of the city's infrastructure will be done to minimize the potential for system failure because of or during a disaster
 - c) Transportation facilities and systems serving the City will be constructed and/or retrofitted to minimize the potential for disruption during a disaster

- 8) All members of the City will understand the hazards threatening local areas and the techniques to minimize vulnerability to those hazards
 - a) All interested individuals will be encouraged to participate in hazard Mitigation planning and training activities
 - b) Education programs in risk communication and hazard mitigation will be established and implemented
 - c) Managers of public facilities will be knowledgeable in hazard mitigation techniques and the components of the city's mitigation plan
 - d) Technical training in mitigation planning and programming will be given to appropriate local government employees
 - e) The owners and operators of businesses and industries in the City will be knowledgeable in appropriate hazard mitigation techniques
 - f) The public living or working in defined hazard areas will be aware of that fact, understand their vulnerability and know appropriate mitigation techniques
 - g) The public will have facilitated access to information needed to understand their vulnerability to disasters and effective mitigation techniques

Priority Ranking for Proposed Mitigation Initiatives

This next section report, lists all the mitigation initiative currently in the City of Fountain Inn's Multi-Hazard Mitigation Plan, in the order of their priority scores. The priority scores are based on 9 separate prioritization criteria used by all the planning participants to allow the DMC to compare various mitigation initiatives. The specific priority scores are based on a numeric classification system explained in the following table:

| Priority Criterion | Numeric Score |
|--|---------------|
| Strategy Effectiveness | |
| No affect on Risk or Hazard | 0 |
| Affects several structures within the County | 1 |
| Affects many structures within the County | 2 |
| Affects most structures within the County | 3 |
| Percentage of Population Benefited | |
| Less than 10% benefited | 0 |
| 10% to 50% benefited | 1 |
| 51% to 75% benefited | 2 |
| Greater than 75% benefited | 3 |
| Time to Implement | |
| Cannot be implemented | 0 |
| Longer than one year | 1 |
| Within one year | 2 |
| Immediate | 3 |
| Time to Impact | |
| Cannot be implemented | 0 |
| Longer than one year | 1 |
| Within one year | 2 |
| Immediate | 3 |
| Cost to City | |
| Completely Unaffordable | 0 |
| Expensive, but manageable | 1 |
| Cost is easily managed | 2 |
| Little to no cost | 3 |
| Cost to Others | |
| Completely Unaffordable | 0 |
| Expensive, but manageable | 1 |
| Cost is easily managed | 2 |
| Little to no cost | 3 |
| Funding Source | |
| No known funding source available | 0 |
| Requires outside funding | 1 |
| Requires budget consideration | 2 |
| Within existing county budget | 3 |
| Community Support | |
| Opposed by the entire community | 0 |

| | |
|--|---|
| Acceptable only to those affected by the project | 1 |
| Some community opposition | 2 |
| Acceptable community wide | 3 |
| Project Feasibility | |
| Not possible | 0 |
| Accomplished with extensive design and planning | 1 |
| Accomplished with some design and planning | 2 |
| Easily accomplished | 3 |

It is possible to see from this table that the minimum priority rank for a proposed initiative would be zero (0), while the maximum would be twenty-seven (27). The priority ranking given through application of the nine criteria in the above table will remain constant through time because of the inherent characteristics of the proposed initiative, unless those characteristics are also modified.

All initiatives are listed by the priority score assigned to each as a result of the common process to characterize and prioritize mitigation initiatives that is used by all participants in the planning process. The priority score is a long-term characterization value directly associated with each specific initiative based on its own merits at the time it was first proposed by the individual participant. The priority score is intended to serve as a guideline for the DMC regarding the relative desirability of implementation of a specific mitigation initiative in relation to the other proposed initiatives incorporated into the plan.

All initiatives are prioritized in accordance with the consideration with the National Flood Insurance Program.

| Project Priority | Point Total | Project Feasibility | Community Support | Cost to Others | Funding Source | Cost to County | Time to Impact | Time to Implement | Population Impacted | Strategy Effectiveness | Priority Ranking | Project Description |
|---------------------------------|-------------|---------------------|-------------------|----------------|----------------|----------------|----------------|-------------------|---------------------|------------------------|------------------|--|
| A. Prevention | | | | | | | | | | | | |
| | 18.5 | 2 | 3 | 3 | 3 | .5 | .5 | 2 | 3 | 1.5 | | Perform bridge/culvert inspections |
| | 10.5 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1.5 | | Install monitoring stations for flood events |
| B. Public Education & Awareness | | | | | | | | | | | | |
| | 21.5 | 2 | 3 | 3 | 3 | 2 | 1.5 | 3 | 2 | 2 | | Develop a spill and industrial accident action plan |
| | 19.5 | 2 | 3 | 3 | 2 | 2 | 2 | 3 | 2 | 0 | | Improve communication between local school and parents |
| | 24 | 2 | 3 | 3 | 3 | 3 | 3 | 3 | 2 | 2 | | Develop alternatives to railroad scenario's |
| | 22 | 2 | 3 | 2 | 2 | 2 | 2 | 3 | 3 | 3 | | Enhance Hazards Education |
| C. Natural Resources Protection | | | | | | | | | | | | |
| | 10 | 1 | 1 | 1.5 | .5 | .5 | 1.5 | 1 | 1 | 2 | | Address stream bank erosion control (Durbin Creek) |
| D. Emergency Services | | | | | | | | | | | | |
| | 18 | 2 | 2 | 1 | 3 | 1 | 3 | 3 | 3 | 1 | | Provide backup generators for critical facilities |
| | 16 | 2 | 2 | 1.5 | 3 | 1 | 3 | 1.5 | 3 | 0 | | Develop an early warning system |
| | | | | | | | | | | | | Improve Radio Communications |
| | 18.5 | 2 | 3 | 3 | 3 | 3 | 1.5 | 2 | 1 | 0 | | Evaluation of Emergency Routes |
| | | | | | | | | | | | | Communications Protocol |
| E. Property Protection | | | | | | | | | | | | |
| | 18.5 | 2 | 2 | 2 | 1.5 | 3 | 2 | 3 | 1 | 2 | | Require a downstream Impact analysis for new development |
| F. Structural Projects | | | | | | | | | | | | |

Benefit-to-Cost Ratio

A key analytical measure commonly used in vulnerability assessments is the benefit to cost ratio, which expresses the estimated benefits, in dollars, in comparison to the estimated costs to implement and maintain the proposed mitigation initiative. For an initiative to be considered “cost effective”, the dollar value of the benefits derived needs to exceed the costs to implement and maintain the initiative, or, in other words, the benefit to cost ratio should be greater than 1.0. The process for calculating a benefit to cost ratio begins with estimating the direct and indirect costs of the “worse case” disaster scenario that the mitigation initiative is intended to address. If the initiative were to be implemented, these are the future costs that would be avoided, or, in other words, the “benefits” derived from implementing the initiative. Both direct costs of the disaster scenario are considered, such as structural damages, as well as indirect costs, such as lost wages. The total of the direct and indirect costs are then divided by the predicted life of the initiative, in years. This then gives the dollar benefits of the project on an annual basis. The cost side of the benefit to cost ratio is estimated by determining the estimated cost to initially implement the

proposal, such as initial construction cost for a “bricks and mortar” project, or the development costs for a training program. To this amount is then added any annual costs that implementation costs. Next, the approach then considers any “cost impact” of the proposal, or the costs that would be incurred by others in the City due to implementation of the initiative, such as the economic effect on new construction of adopting a more stringent building code. The cost impact figure is also annualized by the life of the project, and then any annual cost impact values, such as annual user fee or tax, is added to give a total annual cost impact. Finally, by dividing the annual cost of the “benefits” of the proposal by the annual cost and cost impact necessary to implement the proposal, a benefit to cost ratio is likely to be necessary at the time of actual implementation, applying to state or federal agencies for funding, or for the design and construction stage of development.

During the evaluation of all mitigation activities, a cost-benefit review was conducted to determine the suitability of all initiatives.

Initiative by Hazard

This section of the plan describes the proposed initiatives in the plan to address the hazards that have been identified as threatening the City of Fountain Inn. The table below presents the mitigation initiatives that have been proposed to address the identified hazards posing the most risk to Fountain Inn, as determined by the DMC. As described in this plan, the hazards are ranked based on risk from high to low as winter storms, wildfires, floods, thunderstorms, high winds, and earthquakes. This section is also another example of how the planning approach used by the City of Fountain Inn has effectively used the hazard identification and risk estimation process to guide formulation of proposed initiatives.

| Initiative Description by Hazard | Secondary Hazard(s) Mitigated |
|--|--------------------------------------|
| A. Winter Storms | |
| Develop a spill and industrial accidents action plan | D,E,G |
| Improve communication between local school and parents | All other natural Hazards |
| Develop alternatives to railroad scenario's | N/A |
| Provide backup generators for critical facilities | All other natural Hazards |
| Evaluation of Emergency Routes | All other natural Hazards |
| B. Drought/Heat Wave | |
| Enhanced Hazards Education | All other natural Hazards |
| C. Wildfires | |

| | |
|--|-----|
| D. Floods | |
| Perform bridge/culvert inspections | A |
| Require a downstream Impact analysis for new development | N/A |
| E. Tornado/High Winds | C |
| Develop an early warning system | |
| F. Thunderstorms | |
| G. Earthquakes | |

| Initiative Description | Responsible Party |
|---|---|
| A. Prevention | |
| Perform bridge/culvert inspections | USACE, City of Fountain Inn, Grants |
| Install monitoring stations for flood events | NWS, City of Fountain Inn |
| Upper Reedy Study | Floodplain Administrator, Planning Commission |
| B. Public Education & Awareness | |
| Enhance Hazard Education | City of Fountain Inn |
| Develop a spill & industrial accidents action | City of Fountain Inn, Grants |
| Improve communication between school and parents | City of Fountain Inn |
| Develop alternatives to railroad scenario's | City of Fountain Inn |
| C. Natural Resources Protection | |
| Address stream bank erosion control (Durbin Creek) | NRCS, City of Fountain Inn, Grants |
| D. Emergency Services | |
| Provide backup generators for critical facilities | City of fountain Inn, grants |
| Develop an early warning system | Public Works, Fire Department |
| Evaluation of Emergency Routes | Public Works, Fire Department |
| E. Property Protection | |
| Require a downstream Impact analysis for new construction | City of Fountain Inn |
| | |
| F. Structural Projects | |

Potential Funding Sources

Each initiative incorporated in the City of Fountain Inn Mitigation Plan Update has been ranked based on the ability to fund it, either within City budget or from outside funding sources. The DMC has consulted this list and developed a subset of the potential sources for the approved initiatives. Potential funding sources are assigned to initiatives by their

respective “Primary Area”, as necessary, regarding the likely funding source. These designations are shown in the Table below.

As of the current date on this plan, The City of Fountain Inn has not verified the true availability of all sources on this list. Some may no longer be available, while others may have come into existence since this list was developed. It is the expectation of the DMC that the agencies and organizations that sponsored a specific initiative would utilize the information given in this report to pursue funding opportunities to implement the initiative.

| Initiative Description | Funding Source Primary Area |
|--|--|
| A. Prevention | |
| Perform bridge/culvert inspections | Storm Water, Flood Control Structures, Measures/Grants |
| Install monitoring stations for flood events | Storm Water, Flood Control Structures, Measures/Grants |
| B. Public Education & Awareness | |
| Enhance Hazards Education | City of Fountain Inn, Public Education Grants |
| Develop a spill & industrial accidents action plan | City of Fountain Inn, Grants |
| Improve communication between school and parents | City of Fountain Inn, Grants |
| Develop alternatives to railroad scenario's | City of Fountain Inn, Grants |
| Weather Stations | County, Grants |
| C. Natural Resources Protection | |
| D. Emergency Services | |
| Provide backup generators for critical facilities | City of Fountain Inn, Grants |
| Develop an early warning system | City of Fountain Inn, Grants |
| Evaluate emergency routes | City of Fountain Inn, Grants |
| E. Property Protection | |
| F. Structural Projects | |

CITY OF FOUNTAIN INN MULTI HAZARD MITIGATION ACTION PLAN

Prevention

Land Development Regulations: The City of Fountain Inn works with Greenville County Land Development Regulation Department and Planning Department in all planning, zoning and subdivision regulations. The City of Fountain Inn adopted Land Development Regulations into the city ordinance.

Public Education and Awareness

The City of Fountain Inn is working with Greenville County in public education and awareness to insure that pertinent information is available and distributed to all City residents in order to reduce fatalities and risk during a disaster.

Debris Removal

The City of Fountain Inn has established a debris removal management plan approved by FEMA.

Emergency Service

The City of Fountain Inn helped in the Greenville County Planning Process of Early Warning System, Employee Training, and Gates at Flooded Intersections, Improve Radio Communications, Post-disaster Review Meetings and Community Emergency Response Training. All explanations are under the Greenville County Hazard Plan.

**CITY OF FOUNTAIN INN
MULTI HAZARD MITIGATION ACTION PLAN
POTENTIAL FUNDING SOURCES**

The City of Fountain Inn utilizes the same funding sources as Greenville County.

The following pages are available Funding Sources.

FUNDING REPORT by PRIMARY AREA

Primary Funding Area: Agriculture Assistance

Program: **Conservation Reserve**
Agency: Farm Service Agency, USDA
Agency Type: Federal
Phone: 202-720-1872
Webpage: www.fsa.usda.gov/dafp/cepd

Program: **Emergency Conservation**
Agency: Farm Service Agency, USDA
Agency Type: Federal
Phone: 202-720-7807
Webpage: www.fsa.usda.gov/pas/disaster

Program: **Emergency Loan System**
Agency: Farm Service Agency, Loan Making division, USDA
Agency Type: Federal
Phone: 202-720-7807
Webpage: www.fsa.usda.gov/pas/disaster/emloan

Program: **Environmental Quality Incentives Program**
Agency: Natural Resources Conservation Service, USDA
Agency Type: Federal
Phone: 202-720-1873
Webpage: www.epa.gov/owow/watershed/wacade

Program: **Farmland Protection**
Agency: Natural Resource Conservation Service, USDA
Agency Type: Federal
Phone: 202-690-0639
Webpage: www.info.usda.gov/nrcs/fpcp/fpp.htm

Program: **Noninsured Crop Disaster Assistance Program**
Agency: Farm Service Agency, USDA
Agency Type: Federal
Phone: 202-720-7807
Webpage: www.fsa.usda.gov/pas/disaster/default

Program: **Pesticide Environmental Stewardship Grants**
Agency: Office of Prevention, Pesticides, and Toxic Substances, EPA
Agency Type: Federal
Phone: 703-308-7035
Webpage: www.epa.gov/owow/watershed/wacade

Program: **Plant and Animal Disease, Pest Control, and Animal Care**
Agency: Animal and Plant Health Inspection Service, Dept. of Agriculture
Agency Type: Federal
Phone: 301-734-8792
Webpage: www.aphis.usda.gov

Program: **Soil and Water Conservation**
Agency: Natural Resource Conservation Service, USDA
Agency Type: Federal
Phone: 202-720-7730
Webpage: www.nrcs.usda.gov/NRCSPROG.html

Primary Funding Area: Communications

Program: **Public Telecommunications Facilities: Planning and Construction**
Agency: Public Telecommunications Facilities Program, Office of Telecommunications and Information Applications/NTIA, DOC
Agency Type: Federal
Phone: 202-482-5802
Webpage: aspe.os.dhhs.gov/cfda/p11550.htm

Primary Funding Area: Emergency Response Equipment

Program: **Assistance to Firefighters**
Agency: USFA, FEMA
Agency Type: Federal
Phone: 866-274-0960
Webpage: www.usfa.fema.gov/grants

Program: **Fire Management**
Agency: Fish and Wildlife Service, DOI
Agency Type: Federal
Phone: 202-205-1657
Webpage: www.fs.fed.us/fire/fire_new/manageme

Program: **State Domestic Equipment Support**
Agency: Office of Justice Programs, DOJ
Agency Type: Federal
Phone: 202-305-9887
Webpage: www.aspe.os.dhhs.gov/cfda/p16007.htm#i37

Program: **Wildland Urban Interface Community and Rural Fire Assistance**
Agency: Bureau of Land Management, DOI
Agency Type: Federal
Phone: 208-387-5150
Webpage: www.aspe.os.dhhs.gov/CFDA/p15228.htm

Primary Funding Area: General

Program: **Community Development Block Grants/Economic Development Initiative**
Agency: Community Planning and Development, HUD
Agency Type: Federal
Phone: 202-708-1871
Webpage: www.aspe.os.dhhs.gov/cfda/p14246.htm#i37

Program: **Community Outreach Partnership Center Program**
Agency: Office of Policy Development and Research, Grant
Agency Type: Federal
Phone: 202-708-1537
Webpage: www.aspe.os.dhhs.gov/cfda/p14511.htm

Program: **Disaster Assistance for Older Americans**
Agency: Administration of Aging, DHHS
Agency Type: Federal
Phone: 800-677-1116
Webpage: www.aoa.dhhs.gov

Program: **Emergency Federal Law Enforcement Assistance**
Agency: Office of Justice Programs, DOJ
Agency Type: Federal
Phone: 202-616-3458
Webpage: www.aspe.os.dhhs.gov/cfda/p16577.htm#i37

Program: **Emergency Management Institute (EMI)_ Resident Educational Program**
Agency: EMI, FEMA
Agency Type: Federal
Phone: 301-447-1000
Webpage: www.aspe.os.dhhs.gov/cfda/p83530.htm

Program: **Emergency Watershed Protection (EWP)**
Agency: USDA-NRCS
Agency Type: Federal
Phone: 864-467-2755
Webpage: www.nrcs.usda.gov/programs/ewp/

Program: **Environmental Protection Consolidated Grants-Program Support**
Agency: Grants Administration Division, EPA
Agency Type: Federal
Phone: 202-564-5325
Webpage: www.epa.gov/

Program: **Physical Disaster Loans**
Agency: Office of Disaster Assistance, SBA
Agency Type: Federal
Phone: 800-827-5722
Webpage: www.sba.gov/disaster/loans.html

Program: **Reimbursement for Firefighting on Federal Property**
Agency: US Fire Administration, FEMA
Agency Type: Federal
Phone: 301-447-1358
Webpage: www.aspe.os.dhhs.gov/cfda/p83007.htm#i37

Program: **Technology Development for Environmental Management**
Agency: Office of Science and Technology, Office of Environmental Management, DOE
Agency Type: Federal
Phone: 301-903-7425
Webpage: www.aspe.os.dhhs.gov/cfda/p81104.htm

Primary Funding Area: Infrastructure Systems

Program: **Airport Improvement Program**
Agency: Federal Aviation Administration, DOT
Agency Type: Federal
Phone: 202-267-3831
Webpage: www.aspe.os.dhhs.gov/cfda/p20106.htm

Program: **Bridge Alteration**
Agency: U.S. Coast Guard, DOT
Agency Type: Federal
Phone: 202-267-1977
Webpage: .aspe.os.dhhs.gov/cfda/p20007.htm

Program: **Capitalization Grants for Drinking Water State Revolving Funds**
Agency: Office of Ground Water and Drinking Water, EPA
Agency Type: Federal
Phone: 800-426-4791
Webpage: www.epa.gov/SAFEWATER/INDEX.ht

Program: **Community Development Block Grants/Entitlement Grants**
Agency: Community Planning and Development, HUD
Agency Type: Federal
Phone: 202-708-1577
Webpage: aspe.os.dhhs.gov/cfda/p14218.htm

Program: **Community Development Block Grants/State's**
Agency: Community Planning and Development, HUD
Agency Type: Federal
Phone: 202-708-1322
Webpage: aspe.os.dhhs.gov/cfda/p14228.htm

Program: **Economic Development: Technical Assistance**
Agency: water and Waste Rural Utilities Service, USDA
Agency Type: Federal
Phone: 202-690-2670
Webpage: www.usda.gov/rus/water/programs.htm

Program: **Emergency Relief**
Agency: Federal Highway Administration
Agency Type: Federal
Phone: 202-366-4655
Webpage: www.fhwa.dot.gov/

Program: **Emergency Well Construction and water Transport**
Agency: U.S. Army Corps of Engineers
Agency Type: Federal
Phone: 703-428-9055
Webpage: www.fsa.usda.gov/drought/finalreport/fi

Program: **Farm Labor Housing Loans and Grants**
 Agency: USDA
 Agency Type: Federal
 Phone: 202-720-1604
 Webpage: www.rurdev.usda.gov/mo/factflh.htm

Program: **Grants-in-Aid for Railroad Safety-State Participation**
 Agency: Federal Railroad Administration
 Agency Type: Federal
 Phone: 202-493-6300
 Webpage: aspe.os.dhhs.gov/cfda/p20303.htm

Program: **Highway Planning and Construction**
 Agency: Federal Highway Administration, DOT
 Agency Type: Federal
 Phone: 202-366-4853
 Webpage: aspe.os.dhhs.gov/cfda/p20205.htm

Program: **HOME Investment Partnerships Program**
 Agency: Community Planning and Development, HUD
 Agency Type: Federal
 Phone: 202-708-2470
 Webpage: aspe.os.dhhs.gov/cfda/p14239.htm

Program: **National Dam Safety**
 Agency: Mitigation Directorate, FEMA
 Agency Type: Federal
 Phone: 202-646-2704
 Webpage: aspe.os.dhhs.gov/cfda/p83550.htm#37

Program: **Pollution Control Loans**
 Agency: Small Business Administration
 Agency Type: Federal
 Phone: 800-U-ASK
 Webpage: www.epa.gov/owow/watershed/wacade

Program: **Resource Conservation and Development Loans**
 Agency: Water and Waste Rural Utilities Service, USDA
 Agency Type: Federal
 Phone: 202-690-2670

Program: **Rural Housing and Economic Development**
 Agency: Community Planning and Development
 Agency Type: Federal
 Phone: 202-708-2290
 Webpage: aspe.os.dhhs.gov/cfda/p14250.htm

Program: **Rural Rental Housing Loans**
 Agency: USDA
 Agency Type: Federal
 Phone: 202-720-1604
 Webpage: www.rurdev.usda.gov/rhs/ProgramBrie

Program: **State and Community Highway Safety**
Agency: Office of highway Safety, Federal Highway Administration
Agency Type: Federal
Phone: 202-366-6902
Webpage: aspe.os.dhhs.gov/cfda/p20600.htm#i37

Program: **Superfund Technical Assistance Grants for Citizen Groups at Priority Sites**
Agency: Office of emergency and remedial Response, EPA
Agency Type: Federal
Phone: 703-603-8889
Webpage: aspe.os.dhhs.gov/cfda/p66806.htm

Program: **Water Conservation Filed Services**
Agency: Department of Interior
Agency Type: Federal
Phone: 303-445-2945
Webpage: www.fsa.usda.gov/drought/finalreport/fi

Program: **Water Quality Cooperative Agreements**
Agency: Office of Wastewater Management, EPS
Agency Type: Federal
Phone: 202-564-0672
Webpage: aspe.os.dhhs.gov/cfda/p66463.htm

Primary Funding Area: New Public Buildings

Program: **Disaster Recovery Initiative**
Agency: Office of Community Planning and Development, HUD
Agency Type: Federal
Phone: 202-708-1112
Webpage: www.hud.gov

Program: **Economic Development Grants for Public Works and Infrastructure Development**
Agency: Public Works Division, Economic Development Administration, DOC
Agency Type: Federal
Phone: 202-482-5081
Webpage: www.doc.gov/eda

Primary Funding Area: Parks/Natural Areas- Development/Preservation

Program: **Brownfields Economic Redevelopment Initiative**
Agency: Office of Solid Waste and Emergency Response, EPA
Agency Type: Federal
Phone: 202-260-1223
Webpage: www.epa.gov/brownfields

Program: **Forestry Incentives Program**
 Agency: Natural Resources Conservation Service, USDA
 Agency Type: Federal
 Phone: 202-720-6521
 Webpage: www.epa.gov/owow/wtr1/watershed

Program: **National Forest Foundation Awards**
 Agency: National Forest Foundation
 Agency Type: Federal
 Phone: 202-496-4963
 Webpage: www.natlforests.org

Program: **Rivers, Trails and Conservation Assistance**
 Agency: Rivers, Trails and Conservation Assistance, National Park Service, DOI
 Agency Type: Federal
 Phone: 202-565-1200
 Webpage: aspe.os.dhhs.gov/cfda/p15921.htm

Program: **Stewardship Incentives Program**
 Agency: Forest Service, USDA
 Agency Type: Federal
 Phone: 202-720-6521
 Webpage: www.nrcs.usda.gov/NRCSProg.html

Program: **Wildlife Restoration**
 Agency: Fish and Wildlife Service, DOI
 Agency Type: Federal
 Phone: 703-358-2156
 Webpage: www.fws.gov

Primary Funding Area: Plans & Procedures

Program: **Community Assistance Program- State**
 Agency: Mitigation Directorate
 Agency Type: Federal
 Phone: 202-646-4621
 Webpage: www.fema.gov/mit/

Program: **Economic Adjustment Assistance for Disasters**
 Agency: Economic Development Administration, DOC
 Agency Type: Federal
 Phone: 202-482-5081
 Webpage: hom.doc.gov/

Program: **Emergency Management Performance Grants**
 Agency: FEMA
 Agency Type: Federal
 Phone: 202-646-7057
 Webpage: aspe.os.dhhs.gov/CFDA/p83552.htm

Program: **Habitat Conservation**
 Agency: National Oceanic and Atmospheric Administration, DOC
 Agency Type: Federal
 Phone: 301-713-0174
 Webpage: aspe.os.dhhs.gov/cfda/p114363.htm

Program: **Hazardous Materials Assistance**
Agency: Hazardous Materials Unit, Chemical and Radiological Preparedness Division, FEMA
Agency Type: Federal
Phone: 202-646-4542
Webpage: aspe.os.dhhs.gov/CFDA/p83012.htm#i

Program: **Superfund State Site: Specific Cooperation Agreements**
Agency: Office of Solid Waste and Emergency Response, EPA
Agency Type: Federal
Phone: 703-308-8506
Webpage: aspe.os.dhhs.gov/cfda/p66802.htm#i37
Program: **Surveys, Studies, Investigations and Special Purpose Grants**
Agency: Environmental Protection Agency
Agency Type: Federal
Phone: 202-260-2597
Webpage: aspe.os.dhhs.gov/cfda/p66606.htm

Program: **Watershed Assistance Grants**
Agency: Office of Wetlands, Oceans and Watersheds, EPA
Agency Type: Federal
Phone: 202-260-4538
Webpage: www.epa.gov/owow/watershed/wacade

Program: **Watershed Surveys and Planning**
Agency: Natural Resource Conservation Service, USDA
Agency Type: Federal
Phone: 202-720-4527
Webpage: aspe.os.dhhs.gov/cfda/p10906.htm

Program: **Community Services Block Grant**
Agency: Office of Community Services, Administration for Children and Families, DHHS
Agency Type: Federal
Phone: 202-401-9340
Webpage: www.acf.dhhs.gov/programs/ocs

Program: **Disaster Legal Services**
Agency: Human Services Division, Response and Recovery Directorate, FEMA
Agency Type: Federal
Phone: 202-646-4600
Webpage: www.fema.gov

Program: **Environmental Justice through Pollution Prevention**
Agency: Office of Pollution Prevention and Toxics, EPA
Agency Type: Federal
Phone: 703-841-0483
Webpage: www.epa.gov/owow/watershed/wacade

Program: **Hurricane Program**
Agency: Mitigation Directorate, FEMA
Agency Type: Federal
Phone: 202-646-3362
Webpage: www.fema.gov/mit/

Primary Funding Area: Public Education

Program: **CEPP Technical Assistance Grants**
Agency: Chemical Emergency Preparedness and Prevention Office, EPA
Agency Type: Federal
Phone: 202-564-7981
Webpage: aspe.os.dhhs.gov/cfda/p66810.htm

Program: **Pipeline Safety**
Agency: Research and Special Programs Administration, DOT
Agency Type: Federal
Phone: 202-366-4564
Webpage: aspe.os.dhhs.gov/cfda/p20700.htm

Program: **Water Pollution Control**
Agency: Environmental Protection Agency
Agency Type: Federal
Phone: 800-832-7828
Webpage: www.epa.gov/

Primary Funding Area: Retrofit Public/Historical Structures

Program: **Disaster Assistance for the Elderly**
Agency: Administration on Aging, DHHS
Agency Type: Federal
Phone: 202-619-2618
Webpage: www.aoa.dhhs.gov/

Program: **Environmental And Historic Preservation And Cultural Resources Programs**
Agency: FEMA
Agency Type: Federal
Phone: 202-646-3362
Webpage: www.fema.gov/mit/ep/index.htm

Program: **Historic Preservation Fund Grants-in-Aid**
Agency: National Park Service, Preservation Heritage Services Division
Agency Type: Federal
Phone: 202-343-9518
Webpage: www.nps.gov/parks.html

Primary Funding Area: River/Stream- Restoration Preservation

Program: **Non-point Source Implementation Grants**
Agency: Office of Water, EPA
Agency Type: Federal
Phone: 800-832-7828
Webpage: www.epa.gov/owow/nps/funding.html

Program: **Protection, Clearing and Straightening Channels**
Agency: U.S. Army Corps of Engineers
Agency Type: Federal
Phone: 202-272-8835
Webpage: aspe.os.dhhs.gov/cfda/P12109.htm

Primary Funding Area: Stafford Act

Program: **Community Disaster Loans**
Agency: Response and Recovery Directorate
Agency Type: Federal
Phone: 202-646-4066
Webpage: www.fema.gov/r-n-r

Program: **Crisis Counseling Assistance and Training**
Agency: Human Services Division, response and Recovery Directorate, FEMA
Agency Type: Federal
Phone: 202-646-3685
Webpage: www.fema.gov

Program: **Economic Injury Disaster Loans**
Agency: Office of Disaster Assistance, SBA
Agency Type: Federal
Phone: 202-205-6735
Webpage: www.sba.gov/disaster

Program: **Fire Suppression Assistance Program**
Agency: Response and Recovery Directorate, FEMA
Agency Type: Federal
Phone: 202-646-4535
Webpage: www.usga.fema.gov/fedguide/ch1-23.htm

Program: **Historic Properties, Repair and Restoration of Disaster-Damaged**
Agency: Infrastructure Support Division, FEMA
Agency Type: Federal
Phone: 202-646-3362
Webpage: www.fema.gov

Program: **Mitigation Assistance**
Agency: FEMA
Agency Type: Federal
Phone: 202-646-4600
Webpage: www.fema.gov/impact

Program: **Project Impact**
Agency: FEMA
Agency Type: Federal
Phone: 202-646-4600
Webpage: www.fema.gov/impact

Program: **Public Assistance Grant**
Agency: Infrastructure Support Division, Response and Recovery Directorate
Agency Type: Federal
Phone: 202-646-4600
Webpage: www.fema.gov/

Primary Funding Area: Storm Water, Flood Control Structures, Measures

Program: **Emergency Advance Measures for Flood Prevention**
Agency: U.S. Army Corps of Engineers
Agency Type: Federal
Phone: 202-272-0251
Webpage: aspe.os.dhhs.gov/CFDA/p12111.htm

Program: **Emergency Operations Flood Response and Post Flood Response**
Agency: U.S. Army Corps of Engineers
Agency Type: Federal
Phone: 202-272-0251
Webpage: www.usace.army.mil/business.html

Program: **Emergency Watershed Protection (EWP)**
Agency: Natural resources Conservation Service, USDA
Agency Type: Federal
Phone: 202-720-1604
Webpage: www.nrcs.usda.gov/NRCSPProg.html

Program: **Flood Control Projects (Small)**
Agency: U.S. Army Corps of Engineers
Agency Type: Federal
Phone: 202-761-1975
Webpage: aspe.os.dhhs.gov/CFDA/p12106.htm

Program: **Flood Damage Reduction**
Agency: U.S. Army Corps of Engineers
Agency Type: Federal
Phone: 202-272-0169
Webpage: www.usace.army.mil/public.html#Flood

Program: **Flood Mitigation Assistance Program**
Agency: Mitigation Directorate
Agency Type: Federal
Phone: 202-646-5621
Webpage: www.fema.gov/mit/icc_d.htm

Program: **Flood Plain Management Services**
Agency: U.S. Army Corps of Engineers
Agency Type: Federal
Phone: 202-272-0169
Webpage: www.usace.army.mil/

Program: **Flood Risk Reduction**
Agency: Farm Service Agency, USDA
Agency Type: Federal
Phone: 202-720-6521
Webpage: www.nrcs.usda.gov/NRCSProg.html

Program: **Hazard Mitigation Grant Program**
Agency: Mitigation Directorate
Agency Type: Federal
Phone: 202-646-3362
Webpage: www.fema.gov/mit/

Program: **Integrated Flood Observation and Warning System**
 Agency: Office of Hydrology, National Weather Service, National Oceanic
 Agency Type: Federal
 Phone: 609-261-6600
 Webpage: www.afws.net

Program: **National Flood Mitigation Fund**
 Agency: Mitigation Directorate
 Agency Type: Federal
 Phone: 202-646-4621
 Webpage: www.fema.gov/mit/

Program: **Protection of Essential Highway Bridge Approaches, and Public Works**
 Agency: U.S. Army Corps of Engineers
 Agency Type: Federal
 Phone: 202-761-1975
 Webpage: aspe.os.dhhs.gov/CFDA/p12105.htm

Program: **Snagging and Clearing for Flood Control**
 Agency: U.S. Army Corps of Engineers
 Agency Type: Federal
 Phone: 202-761-1975
 Webpage: www.usace.army.mil/business.html

Program: **Surface Transportation**
 Agency: Federal Highway Administration, ISTEA
 Agency Type: Federal
 Phone: 202-466-2636
 Webpage: www.tea21.org

Program: **Technical Assistance and Training Grants**
 Agency: Water and Waste Rural Utilities Service
 Agency Type: Federal
 Phone: 202-690-2670
 Webpage: www.usda.gov/rus/water/programs.htm

Program: **Water and Waste Disposal Grants**
 Agency: Water and Waste Rural Utilities Service, USDA
 Agency Type: Federal
 Phone: 202-690-2670
 Webpage: www.usda.gov/rus/water/programs.htm

Program: **Water and Waste Disposal Loans**
 Agency: Water and Waste Rural Utilities Service, USDA
 Agency Type: Federal
 Phone: 202-690-2670
 Webpage: www.usda.gov/rus/water/programs.htm

Program: **Watershed Protection and Flood Prevention**
 Agency: Natural Resources Conservation Service, USDA
 Agency Type: Federal
 Phone: 202-720-3534
 Webpage: www.ftw.nrcs.usda.gov/pl266/pl566.html

Primary Funding Area: Support Service

Program: **Weatherization Assistance for Low-Income Persons**
Agency: Office of energy Efficiency and Renewable Energy, DOE
Agency Type: Federal
Phone: 202-586-4074
Webpage: aspe.os.dhhs.gov/cfda/p81042.htm

Program: **Business and Industry Loans**
Agency: Rural Business-Cooperative Service, DOA
Agency Type: Federal
Phone: 202-690-4737
Webpage: aspe.os.dhhs.gov/cfda/p10768.htm

Program: **Centers for Disease Control and Prevention Investigations and Technical Assistance**
Agency: Center for Disease Control and Prevention, DHHS
Agency Type: Federal
Phone: 770-488-2700
Webpage: aspe.os.dhhs.gov/cfda/p93283.htm#i37

Program: **Community Facilities Loans and Grants**
Agency: Community Programs, Rural Housing Service, DOA
Agency Type: Federal
Phone: 202-720-1490
Webpage: aspe.os.dhhs.gov/cfda/p10766.htm

Program: **Cora Brown Fund**
Agency: Response and Recovery Directorate, FEMA
Agency Type: Federal
Phone: 202-646-3642
Webpage: aspe.os.dhhs.gov/cfda/p83538.htm#i37

Program: **Direct Housing: Natural Disaster**
Agency: Rural Housing Service, DOA
Agency Type: Federal
Phone: 202-720-1474
Webpage: aspe.os.dhhs.gov/cfda/p10445.htm

Program: **Disaster Housing Assistance**
Agency: Human Service Division, Response and Recovery Directorate
Agency Type: Federal
Phone: 202-646-4600
Webpage: www.fema.gov

Program: **Disaster Unemployment Assistance**
Agency: Human Services Division, Response and Recovery Directorate
Agency Type: Federal
Phone: 202-646-4600
Webpage: www.fema.gov

Program: **Economic Development- Support for Planning Organizations**
Agency: Economic Development Administration, Planning and Development assistance Division
 Department of Commerce
Agency Type: Federal
Phone: 202-482-5081
Webpage: hom.doc.gov/

Program: **Emergency Food and Shelter National Board**
Agency: HUD
Agency Type: Federal
Phone: 703-706-9660
Webpage: www.efsp.unitedway.org/efspnew/Page

Program: **Emergency Shelter**
Agency: Community Development and Planning, HUD
Agency Type: Federal
Phone: 202-708-1455
Webpage: www.hud.gov/offices/cpd/homeless/pro

Program: **Employment and Training Assistance- Dislocated Workers**
Agency: Employment and Training Assistance, DOL
Agency Type: Federal
Phone: 202-219-5690
Webpage: www.doleta.gov/

Program: **Grants for Public Works and Economic Development**
Agency: Public Works Division, Economic Development Administration, DOC
Agency Type: Federal
Phone: 202-482-5265
Webpage: aspe.os.dhhs.gov/cfda/p11300htm#i11

Program: **Home Investment Partnership Program**
Agency: Community Planning and Development, HUD
Agency Type: Federal
Phone: 800-245-2691
Webpage: www.hud.gov

Program: **Impact Aid Disaster Assistance Program**
Agency: Office of Elementary and Secondary Education, USDE
Agency Type: Federal
Phone: 202-401-2311
Webpage: www.ed.gov/offices/OESE/

Program: **Individual and Family Grants**
Agency: Human Services Division, Response and Recovery Directorate, FEMA
Agency Type: Federal
Phone: 202-646-3685
Webpage: aspe.os.dhhs.gov/cfda/p83543.htm#i37

Program: **Mortgage Insurance, Homes for Disaster Victims**
Agency: Single Family Development Division, Office of Insured Single Family Housing, HUD
Agency Type: Federal
Phone: 202-708-1455
Webpage: www.hudclips.org/cgi/index.cgi

Program: **Public Health and Social Services Emergency Fund**
Agency: Dept. Health and Human services
Agency Type: Federal
Phone: 301-443-1167
Webpage: aspe.os.dhhs.gov/CFDA/p93003.htm#i

Program: **Rural Business Enterprise Grants**
Agency: Rural Business-Cooperative Service, DOA
Agency Type: Federal
Phone: 202-720-1400
Webpage: aspe.os.dhhs.gov/cfda/p10769.htm

Program: **Rural Business Opportunity Grants**
Agency: Rural Business-Cooperative Service, USDA
Agency Type: Federal
Phone: 202-720-1400
Webpage: aspe.os.dhhs.gov/cfda/p10773.htm

Program: **Rural Housing Site Loans and Self: Help Housing Land Development Loans**
Agency: Rural Housing Service, DOA
Agency Type: Federal
Phone: 202-720-1474
Webpage: aspe.os.dhhs.gov/cfda/p10411.htm

Program: **SBA Disaster Assistance**
Agency: Small Business Administration
Agency Type: Federal
Phone: 202-205-6734
Webpage: www.disastercenter.com/laworder/sbal

Program: **Temporary Assistance for Needy Families**
Agency: Administration for Children and Families, Office of Family Assistance DHHS
Agency Type: Federal
Phone: 864-467-7797
Webpage: www.acf.dhhs.gov/programs/ofa/

Program: **Very Low to Moderate Income Housing Loans**
Agency: Rural Housing Service, DOA
Agency Type: Federal
Phone: 202-720-1474
Webpage: aspe.os.dhhs.gov/cfda/p10410.htm

Program: **Very Low-Income Housing repair Loans and Grants**
Agency: Rural H Service, DOA
Agency Type: Federal
Phone: 202-720-1474
Webpage: aspe.os.dhhs.gov/cfda/p10417.htm

Primary Funding Area: Training- Emergency Services

Program: **Chemical Emergency Preparedness and Prevention Technical Assistance Grants**
Agency: Chemical Emergency Preparedness and Prevention Office, EPA
Agency Type: Federal
Phone: 202-260-6657
Webpage: www.epa.gov/swercepp

Program: **Emergency Management Institute Training Assistance**
Agency: EMI, FEMA
Agency Type: Federal
Phone: 301-447-1000
Webpage: aspe.os.dhhs.gov/cfda/p83527.htm

Program: **Hazardous Materials Emergency Preparedness Grant**
Agency: Hazardous Materials Emergency Preparedness, DOT
Agency Type: Federal
Phone: 202-366-0001
Webpage: www.usfa.fema.gov/hazmat/hmep/bkgr

Program: **Hazardous Materials Training Program for Implementation of the Superfund Amendment and Reauthorization Act (SARA) of 1986**
Agency: FEMA
Agency Type: Federal
Phone: 202-646-4516
Webpage: www.fema.gov <http://www.fema.gov>

Program: **National Fire Academy Training Assistance**
Agency: National Fire Academy, US Fire Administration, FEMA
Agency Type: Federal
Phone: 301-447-1035
Webpage: aspe.os.dhhs.gov/cfda/p83009.htm

Primary Funding Area: Wetlands Development/Restoration

Program: **Capitalization Grants for Clean Water State Revolving Funds**
Agency: Assessment and Watershed Protection Division, Office of Wetlands, Oceans and Watersheds, EPA
Agency Type: Federal
Phone: 202-260-7166
Webpage: www.epa.gov/OWOW

Program: **Conservation Technical Assistance**
Agency: Natural Resources Conservation Service, USDA
Agency Type: Federal
Phone: 202-720-1604
Webpage: www.nrcs.usda.gov/NRCSProg.html#

Program: **Farmable Wetlands Pilot**
Agency: Farm Service Agency, USDA
Agency Type: Federal
Phone: 202-720-7807
Webpage: www.fsa.usda.gov/pas/disaster/default

Program: **Flood Hazard Mitigation and Riverine Ecosystem Restoration**
Agency: U.S. Army Corps of Engineers
Agency Type: Federal
Phone: 202-761-0115
Webpage: www.epa.gov.owow/watershed/wacade

Program: **North American Wetlands Conservation Act Grants**
Agency: Fish and Wildlife Service
Agency Type: Federal
Phone: 703-358-1784
Webpage: www.epa.gov/owow/watershed/wacade

Program: **Oil Spill Liability Trust Fund**
Agency: US Coast Guard, USDT
Agency Type: Federal
Phone: 202-267-2229
Webpage: www.uscg.mil/

Program: **Partners for Fish and Wildlife**
Agency: Fish and Wildlife Service, Branch of Habitat Restoration, USDI
Agency Type: Federal
Phone: 703-358-2201
Webpage: partners.fws.gov/

Program: **Sustainable Development Challenge Grant**
Agency: Office of Air and Radiation, EPA
Agency Type: Federal
Phone: 202-564-7400
Webpage: www.epa.gov/

Program: **Watershed Program and Flood Prevention (Small)**
Agency: Natural Resources Conservation Services, USDA
Agency Type: Federal
Phone: 202-720-3534
Webpage: www.nrcs.usda.gov/NRCSProg.html

Program: **Wetlands Conservation Projects**
Agency: Fish and Wildlife Service, North American Waterfowl and Wetlands Office, DOI
Agency Type: Federal
Phone: 703-358-1784
Webpage: www.fws.gov/cep/cwgfact.html

Program: **Wetlands Program Development Grants**
Agency: Office of Water, EPA
Agency Type: Federal
Phone: 800-832-7828
Webpage: www.epa.gov/owow/wetlands/2002gran

Program: **Wetlands Protection Grants**
Agency: Office of Water, EPA
Agency Type: Federal
Phone: 800-832-7828
Webpage: www.epa.gov/R5water/wshednps/pdf/w

Program: **Wetlands Reserve**
Agency: Natural Resources Conservation Service, USDA
Agency Type: Federal
Phone: 202-720-1067
Webpage: www.ftw.nrcs.usda.gov/pl566/pl566.html

Program: **Wildlife Habitat Incentives**
Agency: Natural Resources Conservation Service, USDA
Agency Type: Federal
Phone: 202-720-1067
Webpage: www.ftw.nrcs.usda.gov/pl566/pl566.html

CITY OF FOUNTAIN INN MULTI HAZARD MITIGATION ACTION PLAN

Background and Purpose

The City of Fountain Inn was actively involved with Greenville County in establishing the Multi Hazard Mitigation Plan. This plan was established to identify and recommend projects and programs that, when implemented, would eliminate, minimize, or otherwise mitigate the vulnerability of the people, property, environmental resources and economic vitality of the city and community to the impacts of future disasters. The City of Fountain Inn will continue to coordinate with Greenville County in our efforts to seek funding, continue to update the plan and procedures while participating in meetings and training workshops.

Overview of the Procedure

This procedure define the fundamental operations by The City of Fountain Inn in participating in the development, expansion and maintaining the hazard mitigation strategy

**CITY OF FOUNTAIN INN
CITY OFFICIALS
TELEPHONE NUMBERS**

| NAME | POSITION | HOME # | CELL # |
|--------------------|--------------------------|-----------------|---------------|
| Gary Long | Mayor | 862-5678 | 505-1164 |
| Mathew King | Mayor Pro-Tem | 862-5622 | 630-8909 |
| Eddie Case | City Administrator | 862-2776 | 505-0522 |
| Roger Case | Public Works Director | 862-4898 | 505-0571 |
| Lori Cooper | Administrative Assistant | 862-1094 | 505-0573 |
| Ken Kerber | Fire Chief | 862-0010 | 505-0560 |
| Ronnie Myers | Assistant Fire Chief | 862-5454 | 505-0561 |
| Keith Morton | Police Chief | 862-4461 (work) | 505-3862 |
| Michael Hamilton | Patrol Commander | 862-4461 (work) | 449-1397 |
| Michael Pittman | Gas Manager | 919-264-3215 | 303-3121 |
| Robert Singleterry | Streets Supervisor | 991-2463 | 303-3163 |

EMERGENCY TELEPHONE NUMBERS

UTILITIES

| | |
|--|--------------------------------------|
| Duke Energy | 24 Hours 1-800-827-5118 |
| Laurens Electric | 1-800-942-3141 864-682-3141 |
| Fountain Inn Natural Gas | 862-0042 862-4461 Nights/Weekends |
| Piedmont Natural Gas | 676-4278 |
| Clinton Newberry Natural Gas | 833-1862 |
| Suburban Propane Greenville | 269-3081 242-5203 |
| Suburban Propane Laurens | 682-3256 |
| Transco Natural Gas Pipeline District Office (Moore, SC) Gas Control (Houston, TX) | 576-5152 1-800-440-8475 |

EMERGENCY TELEPHONE NUMBERS

UTILITIES

| | |
|--|--------------------------------|
| Greenville Water System | 241-6000 |
| Engineering | 241-6100 |
| Laurens County Water & Sewer | 575-2360 Day 682-3259 Night |
| Western Carolina Sewer Authority/ReWa Overflows | 299-0260 299-4033 |
| Bellsouth | 1-877-737-2478 |
| Charter Communications | 1-800-567-0529 |
| Laurens County Public Works | 984-6812 |

ARSON

| | |
|--|----------------|
| Greenville County Sheriff Department Arson Unit | 271-5210 |
| Laurens County Sheriff Department | 984-4967 |
| South Carolina Law Enforcement Division Also Arson Unit | 1-803-737-9000 |
| US Bureau of ATF | 1-800-614-7947 |

HAZARDOUS MATERIALS

| | |
|---|----------------|
| Greenville County Haz-Mat Team | 244-2121 |
| Chem Trec | 1-800-424-9300 |
| 48 th Ordinance Detachment Fort Jackson (Bomb Disposal) | 1-803-751-5126 |
| Greenville County Sheriff Department Bomb Squad | 271-5210 |
| Department of Transportation | 1-803-765-5415 |

HAZARDOUS MATERIALS

| | |
|---|----------------|
| National Transportation Emergency Response Center | 1-800-424-8802 |
| Chemical Manufacturers Association Chemical Referral Center | 1-800-262-8200 |
| Department of Transportation Hazardous Materials Information Center | 1-202-366-4488 |
| Center for Disease Control (CDC) | 1-404-633-5313 |
| South Carolina Emergency Response Center | 1-803-253-6488 |
| South Carolina DHEC 24 Hour Emergency Number | 1-803-734-5424 |
| US Department of Transportation Office of Hazardous Materials & Transportation | 1-202-366-4488 |

LOCAL FIRE DEPARTMENTS

| | |
|------------------|----------|
| Simpsonville | 967-9545 |
| Mauldin | 288-5094 |
| South Greenville | 243-5650 |
| Greenpond | 862-2464 |

GOVERNMENT AGENCIES

| | |
|--|----------------|
| South Carolina Department of Natural Resources | 1-800-922-5431 |
| Governor's Office | 1-803-734-2100 |
| Lieutenant Governor's Office | 1-803-734-2080 |
| SC Emergency Management | 1-803-737-8836 |
| Homeland Security | 877-8006 |

ROADS/BRIDGES/RAILROAD

| | |
|----------------------------------|----------|
| South Carolina Highway Patrol | 241-1000 |
| State Road Repair | 241-1224 |
| Greenville County Road Repair | 467-7016 |
| Laurens County State Road Repair | 984-7632 |
| Laurens County Road Repair | 984-6812 |

ROADS/BRIDGES/RAILROAD CONTINUED

| | |
|----------------------------|----------|
| CSX Railroad | 255-4211 |
| Carolina Piedmont Railroad | 984-0040 |

HELICOPTER SERVICE

| | |
|--------------------------------------|-----------------------------|
| Greenville County Sheriff Department | 271-5210 |
| Carolina Aeronautics Commission | 1-800-922-0574 |
| Pager for Duty Hours | 734-1700 |
| Pager after Hours | 739-1034 |
| Life Reach | 1-800-327-2611 |
| Med Trans | 1-800-MED-TRANS (633-87267) |
| Federal Aviation Administration | 879-2155 |
| | 879-2156 |

WRECKER SERVICE

| | |
|---------------|----------|
| A & W | 862-3053 |
| M & J | 862-2628 |
| Morgan Towing | 862-5207 |

SAND

| | |
|---------------------------------------|----------|
| Thomas Concrete | 862-7400 |
| Metromont Concrete | 963-7048 |
| South Carolina Department of Highways | 235-1709 |

CRANE SERVICE

| | |
|------------------------|----------------|
| AME Crane Service | 1-800-868-0406 |
| Up to 175 Ton Capacity | 299-0406 |

WEATHER SERVICE

| | |
|--------------------------|----------|
| National Weather Service | 848-3859 |
|--------------------------|----------|

HOSPITALS

| | |
|-------------------------------------|----------|
| Hillcrest Emergency Services | 454-6163 |
| Greenville Memorial Trauma | 455-7000 |
| Greenville Memorial Children's Unit | 455-8860 |

SANITATION/LANDFILL

| | |
|--|----------|
| Greater Greenville Sanitation | 232-6721 |
| Greenville County Twinn Chimneys 1107 Augusta Rd. Honea Path, SC 29654 | 243-9672 |
| FCR-Casella Waste Systems/American Recycling 1240 White Horse Road Greenville, SC | 236-9628 |

HOMELAND SECURITY ADVISORIES and CORRESPONDING RESPONSES

| Homeland Security Advisory System Alert | Risk Assessment | Corresponding Security Action |
|--|----------------------------|---|
| Green | Low Risk | Normal Security Operations |
| Blue | Guarded Risk | Normal Security Operations |
| Yellow | Elevated Risk | Normal Security Operations, Heightened Awareness |
| Orange | High Risk | <ul style="list-style-type: none">• Restrictive Access may occur• Initiate perimeter checks |
| Red | Severe Risk | <ul style="list-style-type: none">• Encompass high-risk actions• Initiate container checks, as applicable• Preparation for building lockdown, if needed |

RESPONSE ACTION

Fire

Most fires start out small, but after a few minutes they can be out of control. It is important to act fast to sound an alarm and warn all people in the area immediately so they can get to a safe place.

If an evacuation is ordered due to a fire condition, the following below listed sequences would typically occur:

1. Floors will be instructed to evacuate to a safer area outside of the building.
2. Buildings with more than one story are instructed to evacuate by stairwells.
3. Instruct evacuees to remain calm and get as close to floor as possible while evacuating the building.
4. Fire Marshall has full control of building and will assess situation.

Earthquake

In the event of an earthquake the following procedure would apply:

1. Move away from windows, high shelving and outside doors.
2. Take cover underneath a desk, table or other heavy piece of furniture.
3. If there is no furniture around, brace yourself under an inside door.
4. Be prepared for aftershocks. Do not leave the protected area too soon.
5. During an earthquake, the safest place is right where you are. It is not safer outside the building. In fact, most injuries occur as people enter or leave a building, due to falling debris.
6. If inside, stay inside; if outdoors, stay in an open area.
7. Do not attempt to enter a building.
8. Stand-by for emergency announcements/instructions.

Hazardous Materials Incident

Hazardous Material or Haz-Mat response procedures will vary depending on whether a spill is small, medium, or large. Typically, as a safety precaution, any occupant of a facility who directly or indirectly encounters what they believe to be a hazardous substance should immediately evacuate the general area of the occurrence and report it right away so that proper assessment and potential action can be taken.

An encounter with a hazardous material can be direct or indirect. An example of a direct encounter would be coming in contact with the substance at its source. An indirect encounter, for example, would be encountering the vapors, away from the source, of a spilled liquid or expelled gas.

Suspicious Odor – External

- Stay inside your building until an assessment of the situation is conducted or a Public Address announcement is made with further instructions and/or information. Modern building ventilation systems are generally able to control the environment inside of a building. Therefore, it is safer to remain inside instead of evacuating out of the building into a potentially more hazardous atmosphere or environment.

Suspicious Odor- Internal

- If the odor is strong, offensive, irritating or causes respiratory distress, evacuate the area/building immediately.

Evacuation

Persons who encounter a spill or situation that they believe to be Haz-Mat related should immediately evacuate the area and if necessary, the premises. Ensure that Fire Department and/or Police Department are notified immediately. If additional evacuation is necessary, the process will be initiated by the Public Address System or by manual means.

Chemical Splashes

- Chemical splashes on the skin require immediate attention. Follow these steps:
- Go to the emergency shower or sink or nearest shower or sink.
- Remove any contaminated clothing.
- Wash the affected area with water thoroughly for 15 minutes.
- Seek medical attention.
- Notify building management or proper personnel.

Contamination

Care and consideration must be given to those who come into contact with a substance and may be potentially contaminated. If it is believed that someone has been contaminated and if it is safe to do so:

- Isolate those believed to be involved and/or contaminated by keeping them where they are. Do not leave the area where it is believed the contaminated person(s) are. By moving them around, it is possible to further contaminate other people and areas.
- If the area where the possible contaminated person(s) is located, is unsafe, move them as far away as safely possible, attempting to maintain isolation.
- Immediately contact 911 and building security or proper personnel.
- Await the arrival of help and follow the directions given by emergency personnel.

Biological Weapons

Toxins, i.e., poisons produced by living organisms and their synthetic equivalents, are classed as chemical warfare agents. Some typical examples of biological warfare agents might include:

- Anthrax
- Staphylococcal Enterotoxin B (SEB)
- Bubonic/Pneumonic Plague
- Cholera
- Smallpox

Chemical Weapons

Chemical warfare agents are defined as chemical substances, whether gaseous, liquid or solid, which might be employed because of their direct toxic effect on man, animals and plant. Or, any chemical that through its chemical effect on living processes, may cause death, temporary loss of performance, or permanent injury to people and animals. Some typical examples of chemical warfare agents might include:

- Sarin
- Tabun
- VX
- Soman
- Cyanide
- Mustard/Blistering agents

Action to Take

It is not always immediately known when a biological or chemical attack occurred. It is likely that the information initially received at an emergency communication center (911), would be conveyed in such a manner that would be consistent with a Hazardous Materials occurrence. Emergency personnel would then, most likely, dispatch the response as a reported possible Hazardous Materials Incident. Upon arrival of emergency response personnel and after further assessment it would then be determined that the occurrence was due to a biological or chemical weapon. During the event and until further assessment is made, you should:

- Remain calm.
- Stay in the building as the environment within can be reasonably controlled.
- Do not evacuate or go outside to see what is occurring as you can potentially be going into a hazardous environment and can become contaminated causing illness or death.
- Wait for instructions via the Public Address System or by other means.
- If you think that you or someone else has been contaminated, immediately isolate those believed to be involved and/or contaminated by keeping them where they are. Do not leave the area where it is believed the contaminated person(s) are. By moving them around, it is possible to further contaminate other people and areas.

- If the area where the possible contaminated person(s) is located is unsafe, move them as far away as safely possible, attempting to maintain isolation.
- Immediately contact 911 and/or proper personnel and advise them of the situation.
- Await the arrival of help and follow the directions given by emergency personnel. Do not use elevators. They may shut off to minimize the chimney effect of the elevator shafts (the pulling and pushing air within).

Civil Disturbance/Demonstration

Civil Disturbances, Demonstrations and Picketing- General Security Procedures

There are three basic categories of Civil Disturbance. They are:

| | |
|--------------------------|---|
| Demonstration & Protest: | A public display of disapproval of group feelings toward a person or a cause. A public demonstration or protest can include from a few people up to several hundred. Demonstrations and protests usually occur on a street or at public gathering places and can be stationary or moving in nature. |
| Rioting: | Public violence, looting, tumult, or disorder. A chaotic and unlawful disturbance of the public peace by three or more persons assembled together and acting with common intent. |
| Picketing: | A person or persons, typically posted by a labor organization, at a place of work or business affected by a labor dispute, strike or work stoppage. |

Overview of Civil Disturbance Procedure

Should a civil disturbance occur near the building, be prepared for possible conduct that could threaten the well being and safety of employees, tenants and visitors.

- Lock down building immediately
- Call 911 and proper personnel

Heightened Alert- Controlled Disturbance

Heightened alert status will be in effect when a known and publicly planned protest, demonstration or similar event is going to occur. The location of the event, the cause, reason and potential protest march routes for such an occurrence should be assessed to determine what potential threat level to building facilities may exist.

Lock Down

A building or facility wide lock down will occur when the protest, demonstration, riot or an event would directly threaten any building and when unauthorized and/or unlawful entry into the building(s) is imminent.

The lock down procedure for City of Fountain Inn will include the following:

- Securing of all perimeter doors, including access points having both street and interior access into the building.
- Securing of all loading dock doors.
- Powering off or placing into Riot Mode passenger elevators.
- A Public Address announcement to all occupants advising of the event.
- Communications and interaction with law enforcement and emergency personnel.
- Preparation for secondary actions, if needed, such as environmental actions.

Civil Disturbance Announcement

When a Civil Disturbance occurs outside of the Building/s occupants (employees) will be advised by a Public Address announcement. The typical announcement that will be made is:

“May I have your attention please? Due to a civil disturbance on the streets near the Building/s, Mayor and/or City Administrator and/or Police Chief requests that all City of Fountain Inn personnel remain in their offices until the situation is under control. Thank you for your cooperation.”

As soon as the announcement is completed and/or while it is being made, management will ensure that doors are secure.

Criminal/Violent Behavior

If an armed attacker is in the building there are a few important things to remember.

- Dial 911
- If faced with demands from the attacker, comply. Sudden movements may prove fatal. Move with caution.
- Become invisible. Take cover behind a closed door, file cabinet or other furniture.
- Try to notice the attackers distinguishing traits: clothing, ethnicity, weight, age, hair color, and presence of facial hair, type of weapon used, voice and presence of accent.
- Stay calm, signal for help.
- Follow police direction.

Bomb Threat or Discovery of Suspicious Package

An evacuation during a Bomb Threat Emergency will be very similar to a fire evacuation, however, it may differ somewhat depending on the circumstances of the threat. Follow the direction of emergency personnel.

- DO NOT use cell phones or any type of wireless two-way communication device.
- Remain calm.
- Evacuate as indicated, from area in a quiet and orderly fashion.
- Listen closely to Public Address Announcements or instructions from Emergency Personnel.

INCLEMENT WEATHER

*Whenever severe weather conditions are reported, managers may need to be activated as spotters to monitor for conditions, which may become serious or life threatening and then follow procedures for that particular condition.

- Move away from windows or any exterior glass.
- Evacuate to the center of the building and/or into a stairwell.

Monitoring

The National Weather Service should be monitored by Mayor, City Administrator and Department Heads.

Tornadoes or High Winds

A “Tornado Watch” is issued when atmospheric conditions are favorable for the development of tornadoes.

A “Tornado Warning” is issued when an actual tornado is in the area. If a “Tornado Warning” is issued in our area, it is a “call to action” to seek shelter immediately.

A “High Winds Warning” is issued when an approaching storm front or atmospheric condition indicate winds in excess of 50 miles per hour.

Public Warnings

Warnings will be broadcast by radio, television, or by local government agencies.

Action to Take

- Move away from the perimeter of the building and from exterior glass. This means staying away from windows, doors, atriums, lobbies, and outside walls.
- If you are in an exterior office, leave it and close the door.
- Go to interior rooms, hallways, center corridors, or stairwells. Sit down and protect yourself by putting your head as close to your knees as possible or kneel protecting your head.
- The stairwells are safe. DO NOT USE ELEVATORS.

- DO NOT go outside the building. There is high risk of being hurt by flying glass or debris.
- If you are trapped in an outside office, seek protection under a desk.
- Keep calm.
- If you have a radio or television, tune it to a local station for information.
- If a tornado should hit the building, persons should remain in the sheltered area until it passes. The area will be carefully inspected for downed electrical lines and other hazards.

Lightning

- Whenever lightning is severe, avoid leaving the building.
- Stay away from windows.
- Avoid open areas
- Avoid high places
- Avoid flag and light poles as well as communication towers, telephone lines & power lines
- Avoid metal bleachers
- Avoid metal fences or metal objects such as golf carts

Lightning Crouch

Put your feet together

Squat down

Tuck your head

Other Procedures

Power Outage

All buildings are equipped with emergency lighting system that will provide a limited amount of lights in case of an outage. Additionally lighting on all fire alarms and public address systems will remain operational, as does emergency lighting in stairwells.

- Remain Calm
- Remain at your workstation or gather in an area where there is emergency lighting.
- Disconnect or turn off electrical equipment so when power is restored, there will not be a surge of electrical power or initiate overload of the electrical system.
- Your telephone may not continue to operate, unless it is a power failure telephone.

Elevator Entrapment

During non-business hours and weekends, it is necessary to contact the respective Elevator Company (Shindler at 1-800-225-3123) or 911, as appropriate. The Elevator Company will immediately page and dispatch the “on-call” technician. If it is an emergency 911 operators will dispatch a rescues team.

Regular Entrapment

In the event of an elevator entrapment specific, procedures are in place to expedite the release process of those entrapped. During normal business hours, representatives from the respective Elevator Company will respond quickly.

MULTI HAZARD EMERGENCY EXERCISES

In accordance with the City of Fountain Inn Policies, all city owned buildings must exercise its building evacuation plan, at least once a year involving no less than 50% of its occupants. Every three years the city of Fountain Inn holds a “mock” disaster involving all department heads, city emergency personnel and residents.

The City of Fountain Inn yearly hold Tornado Drills for all city owned buildings. A tornado drill is a method of practicing to take cover in a specified location in the event that a tornado strikes an area.

A tornado drill consist of:

- * Plan of escape
- * Effects on building
- * Monitor weather conditions – watches and warnings
- * Reporting injuries

CITY OF FOUNTAIN INN NOTIFICATION OF MULTI HAZARD DRILL

Name of Building: _____

Address: _____

Contact Person: _____

Phone: _____

Date & Time of Drill: _____

Type of Drill: _____

TELEPHONE BOMB THREAT CHECKLIST

INSTRUCTIONS: Be Calm. Be Courteous. Listen. Do Not Interrupt the Caller.

YOUR NAME: _____ **TIME:** _____ **DATE:** _____

CALLER'S IDENTITY:

SEX: MALE _____ FEMALE _____ ADULT _____ JUVENILE _____ APPROXIMATE AGE _____ YEARS

ORIGIN OF CALL:

Local _____ Long Distance _____ Telephone Booth _____

VOICE CHARACTERISTICS

____ Loud ____ Soft
____ High Pitch ____ Deep
____ Raspy ____ Pleasant
____ Intoxicated Other: _____

SPEECH

____ Fast ____ Slow
____ Distinct ____ Distorted
____ Stutter ____ Nasal
____ Slurred Other: _____

LANGUAGE

____ Excellent ____ Good
____ Fair ____ Poor
____ Foul Other: _____

ACCENT

Local
Foreign
Race

MANNER

Calm
Rational
Coherent
Deliberate
Righteous

Angry
Irrational
Incoherent
Emotional
Laughing

BACKGROUND NOISES

Factory
Machines
Music
Office
Street Traffic

Trains
Animals
Quiet
Voices
Airplanes
Party

Pretend Difficulty Hearing- Keep Caller Talking- If Caller Seems Agreeable To Further Conversations, Ask Questions Like:

When will it go off? Certain Hour _____ Time Remaining _____

Where is it located? Building _____ Area _____

What kind of bomb? _____ What kind of package? _____

How do you know so much about the bomb? _____

What is your name and address? _____

Information about How to Recognize and Handle a Suspicious Package or Envelope

Some characteristics of suspicious packages and envelopes include the following:

- Inappropriate or unusual labeling
 - Excessive postage
 - Handwritten or poorly typed addresses
 - Misspellings of common words
 - Strange return address or no return address
 - Incorrect titles or title without a name
 - Not addressed to a specific person
 - Marked with restrictions, such as “Personal,” “Confidential,” or “Do not x-ray”
 - Marked with any threatening language
 - Postmarked from a city or state that does not match the return address
- Appearance
 - Powdery substance felt through or appearing on the package or envelope
 - Oily stains, discolorations, or odor
 - Lopsided or uneven envelope
 - Excessive packaging material such as masking tape, string, etc.
- Other suspicious signs
 - Excessive weight
 - Ticking sound
 - Protruding wires or aluminum foil

If a package or envelope appears suspicious, DO NOT OPEN IT.

Handling of Suspicious Packages or Envelopes*

- Do not shake or empty the contents of any suspicious package or envelope
- Do not carry the package or envelope, show it to others or allow others to examine it.
- CALL THE POLICE DEPARTMENT IMMEDIATELY.

Appendix M - City of Mauldin Hazard Mitigation Plan



CITY OF MAULDIN

APPENDIX M:

HAZARD MITIGATION PLAN



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Section One

EXECUTIVE SUMMARY

Section 1.1 BACKGROUND

Greenville County and its surrounding jurisdictions are vulnerable to a wide range of natural hazards, including Winter Storms, Tornadoes/High Winds, Severe storms/Thunderstorms, Drought, and Wildfires, and Earthquake. It is also vulnerable to human-caused hazards, including hazardous material and chemical spills and acts of terrorism. These hazards threaten the life and safety of residents in Greenville County, and have the potential to damage and/or destroy both public and private property, disrupt the local economy and impact the overall quality of life of individuals who live, work and enjoy recreation in the community.

While the threat from hazardous events may never be fully eliminated, hazard mitigation planning can assist by reducing the impact a hazard has upon the community and its citizens. A local Hazard Mitigation Plan (HMP) gives its citizen's a broad community vision and guiding principles for reducing hazard risks; and further proposes specific mitigation goals and actions to eliminate or reduce identified vulnerabilities. By stating the goals and objectives that the jurisdiction hopes to achieve, the plan can help to create an important connection between the public interest and the proposed mitigation strategy. The HMP can also serve as a vehicle for educating the public by increasing public awareness of the hazard risks facing them as residents and business owners of the community and by providing them with the tools and resources available for reducing those risks.

1.2 Hazard Mitigation Legislation

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Pub. Law 93-288, as amended), Section 409 sets forth the requirements that communities evaluate natural hazards within their respective jurisdictions and develop an appropriate plan of action to mitigate those hazards. The amended Stafford Act requires that the community identify potential hazards to the health, safety and well-being of its residents and identify and prioritize actions that can be taken by the community to mitigate those hazards – before disaster strikes. For communities to remain eligible for hazard mitigation assistance from the federal government, they must first prepare a Hazard Mitigation Plan.

Responsibility for fulfilling the requirements of Section 409 of the Stafford Act and administering the FEMA Hazard Mitigation Program, as outlined in the Code of Federal Regulations (44 CFR 206.405), has been delegated to the State of South Carolina, specifically the South Carolina Emergency Management Division (SCEMD). The new mitigation plan requirements (Section 322) emphasizes the need for state, Tribal and local entities to closely coordinate mitigation planning and implementation efforts.

Funding sources available with an approved HMP include: the Hazard Mitigation Grant program (HMGP) and the Pre-Disaster Mitigation (PDM) program, both of which are administered by the Federal Emergency Management Agency (FEMA) under the Department of Homeland Security. The Flood Insurance Reform Act of 2004 (P.L. 108-264) also created two new grant programs: Severe Repetitive Loss (SRL) and Repetitive Flood Claim (RFC); communities with an adopted and federally-approved HMP become pre-positioned and more apt to receive available mitigation funds before and after the next disaster strikes.

1.3 MULTI-JURISDICTIONAL PLAN ADOPTION

The City of Mauldin has joined together with Greenville County and other local governing bodies within the Golden Strip to comprehensively address hazard mitigation by adopting Greenville County's Multi-Jurisdictional Hazard Mitigation Plan as the governing document. This document identifies both the hazards and vulnerabilities that threaten Greenville County as a whole, and formulates mitigation actions and priorities to address them in Section 6.1. The City of Mauldin's Multi-Hazard Mitigation Plan (MHMP) builds upon previous research, planning and analysis performed by Greenville County and has been incorporated into the governing document as Appendix M.

1.4 CITY OF MAULDIN HAZARD MITIGATION PLAN

Hazard mitigation planning is intended to construct a framework for the prevention and reaction to disasters if and when they occur. The framework created by this plan will help to instill an ongoing effort to lessen the impact that disasters have on citizens and property within the City of Mauldin.

The City of Mauldin's Multi-Hazard Mitigation Plan is intended to address the following:

- Comprehensively address through mitigation both the natural and man-made hazards that affect Greenville County and the Golden Strip communities;
- Develop a stand-alone plan that specifically addresses Mauldin's vulnerability to natural and man-made hazards within our jurisdiction;
- Develop ongoing goals and actions to lessen the impact that disasters have on our community and its citizens;
- Establish and maintain grant eligibility by complying with the State and Federal legislative requirements for local hazard mitigation plans; and
- Increase public awareness and education by increasing local awareness of the risks associated with natural and man-made hazards.

Hazard mitigation can offer the following benefits to the City of Mauldin through achievement of stated goals:

- Saving lives and reducing injuries;
- Preventing or reducing property damage, and reducing economic losses;
- Maintaining critical facilities in functional order;

- Protecting infrastructure from damage; and
- Providing options to political leaders regarding hazard reduction.
- Improving inter and cross jurisdictional cooperation and coordination, primarily in regards to the reduction of natural hazard impacts;

1.5 SUMMARY OF PLAN CONTENTS

Section 2: *Planning Process*, provides a complete narrative description of the planning process used to prepare the Plan. This includes identification of participants on the Mauldin planning team, Greenville County Disaster Mitigation Committee, and planning partners from each participating jurisdiction. It also includes a summary of the opportunities given to encourage public participation during the drafting of the plan.

Section 3: *Community Profile* outlines the existing conditions within the City of Mauldin. The overview addresses the general demographics, topography, climate and other general information relevant to the community.

Section 4: *Hazards and Vulnerabilities* describes the type, location and extent of natural and man-made hazards that pose a risk to the City of Mauldin. This section also provides information on previous hazard event occurrences and probability of reoccurrence. A detailed summary is also included regarding NFIP insured structures within the jurisdiction and reports on properties that have been repetitively damaged by flood events.

Section 5: *Capability Assessment* analyzes the City's capacity to address the threats that natural and man-made hazards pose and also identifies those areas in which the City is already undertaking positive hazard mitigation efforts through existing policy and regulatory mechanisms.

Section 6: *Mitigation Strategies* describes the mitigation goals and objectives established by the Mauldin Disaster Mitigation Committee. This section also includes information regarding how mitigation measures will be prioritized, implemented, and administered.

Section 7: *Mitigation Action Plan* describes the method by which mitigation goals and strategies will be achieved including: the priority assigned to each action, department who is responsible for achieving the action, identifying potential funding sources, and a proposed implementation schedule for each.

Section 8: *Plan Implementation and Plan Maintenance* describes the measures the City of Mauldin has established to monitor the mitigation plan; provides a description of how, when, and by whom the mitigation plan and mitigation action will be evaluated; presents the criteria used to evaluate the plan and mitigation actions, and explains the manner in which the Plan will be regularly evaluated and updated to remain a current and meaningful planning document.

Appendices presents documentation as outlined within the plan – including the Plan Review Tool, meeting minutes, public meeting documentation and outreach materials, maps and critical facilities, and potential funding sources.

Section Two

PLANNING PROCESS

2.1 PLANNING PROCESS: TRANSITIONING TO A MULTI-JURISDICTIONAL HMP

In January 2013, Greenville County contacted several local municipal jurisdictions to garner interest in participating in a joint multi-jurisdictional hazard mitigation planning effort. The County received positive responses from the cities of Mauldin, Simpsonville, Greenville and Fountain Inn and in March hosted a meeting with the State Emergency Management office to begin coordinating the planning efforts (Appendix M-B).

In order to transition those municipalities with individual HMP's into the Greenville County's Multi-jurisdictional Hazard Mitigation Plan the following steps were identified:

1. Greenville County would serve as the base document and would be updated to show the planning partners from each jurisdiction and would explain how each jurisdiction participated in the overall plan update;
2. All jurisdictions would be represented in the risk assessment;
3. Each jurisdiction would prepare a list of their own mitigation goals and actions; and
4. Each jurisdiction would have to individually adopt the overall plan.

2.2 Mauldin's HMP and Hazard Mitigation Committee

The City of Mauldin's Multi-Hazard Mitigation plan (MHMP) was prepared under the guidance of the SC Emergency Management Division, and the combined efforts of the Mauldin Disaster Mitigation Committee (MDMC), Greenville County Disaster Mitigation Committee, and planning partners from each participating jurisdiction. Key participants and organizations involved in the development of both Mauldin's plan and updating of Greenville County's Multi-jurisdictional Hazard Mitigation Plan include the following:

- **City of Mauldin, Disaster Mitigation Committee (MDMC)**
Mayor Dennis Raines, Council Representative
Raymond C. Eubanks, City Administrator
Russell Sapp, Fire Chief/ Asst. City Administrator
Kimberly Hamel, Director of Business & Development, Floodplain Administrator
Bryan Turner, Chief of Police
Michael Lambert, Director of Public Works
- **Greenville County**
Robert Hall, Floodplain Administrator

- City of Greenville
Christian Crear, Environmental Engineer
- City of Simpsonville
Jay Crawford, Assistant Director of Public Works
John Laux, Public Works
- City of Fountain Inn
Lori Cooper, Public Works

The primary responsibility for development of the City of Mauldin Hazard Mitigation Plan was placed in the hands of the Business and Development Services Department under the direction of Kim Hamel, the Department Director and Local Floodplain and Zoning Administrator for the City and Director over Building Codes and Inspections. Ms. Hamel worked closely with all internal City departments involved in the plan, as well as the Greenville County Disaster Mitigation Committee and local jurisdictional planning participants to develop this document.

In August 2013, just prior to the establishment of the Mauldin DMC, Kim Hamel met with the office South Carolina Emergency Management (SCEMD) and Department of Natural Resources (Refer to Appendix M-B) to discuss the information that the City would need to provide to the County for inclusion into the base plan. The State discussed the plan review process and provided copies of the mitigation plan review tool, SCEMD Mitigation Idea Brochure and the SCEMD Local Hazard Mitigation Planning Timeline.

Following the meeting with SCEMD, it was determined that the MDMC would predominantly be comprised of administrative officials from the City and a representative from the Mauldin City Council. In an effort to garner public participation, the MDMC agreed to post a public survey on the city's website and also hold a minimum of three (3) public meetings that would provide ample opportunity for input and incorporation of ideas into the plan before presenting the final draft to the State Emergency Management office for review in March 2014.

Dealing with natural hazards and disasters is a team effort that is often comprised of various representatives from city /county management and administration, planning/zoning officials, public works, fire/police and other outside offices and utility providers. In an effort to efficiently address this "multi-disciplinary" aspect of hazard mitigation, MDMC members were selected based on the area of expertise and relation to the overall project. Members were charged with the responsibility of working through the planning process, and assisting in compiling the information, input and background required to develop the plan.

A series of meetings with the SCEMD, MDMC, select members from the GCDMC, and participating jurisdictions were held to receive input and to assist with the development the Mauldin Hazard Mitigation

Plan, each focusing on a specific aspect of the planning process. Email communication was also utilized between the planning groups to garner input and guidance when needed. The meeting minutes are located in chronological order in Appendix M-B.

2.3 Plan Development

The Local Mitigation Plan Review Tool (referenced as Appendix M- C) provided the plan development guidance represented in the plan. Preparation of the City of Mauldin's Multi-Hazard Mitigation Plan also included the following elements listed below:

- Meet the criteria described in the Disaster Mitigation Act of 2000 and Section 510 Floodplain Management Planning of the Community Rating System (CRS);
- Address winter/ice storms, drought/heat wave, flooding, tornado/high winds, thunderstorms, and earthquakes.
- Follow the ten (10) step Federal Emergency Management Agency (FEMA) planning process as outlined below:
 1. **Organize:** Create the Disaster Mitigation Committee (DMC) and develop a schedule for project completion. *The Mauldin DMC was created in August 2013. Mauldin's Hazard Mitigation Plan is being prepared in accordance with the schedule set forth by Greenville County for update to the base documents in 2015.*
 2. **Public Involvement:** Insure that the general public has an opportunity to provide input into the planning process. Three public meetings were held and a public survey was posted on the web for community input. (Appendix M-C)
 3. **Coordination:** Coordinate with appropriate individuals and organizations to insure adequate representation at various meetings. *The Mauldin DMC team met on 4 separate occasions to discuss the various hazards in Mauldin and develop and list of goals and strategies to mitigate hazards over the next 5 years (Appendix M-B).* In addition, Robert Hall, Floodplain Administrator and Lead Author for the Greenville County Multi-Jurisdictional Plan participated in a joint presentation with Kim Hamel (plan author) to introduce the plan to the Mauldin City Council on February 3, 2014. (Appendix M-C)
 4. **Hazard Assessment:** Identify and address applicable natural hazards relative to the City of Mauldin. Activities to include: review of existing plans; review of past events and claims data; and, obtaining input from committee members and the public. Completed at the meeting of the Mauldin Disaster Committee Meeting on February 10, 2014

5. **Problem Assessment:** Review available information, regarding the impact of hazards on public health and safety, infrastructure and property damage. Where possible, the impacts on property should be measured in dollar losses. Optional efforts include: utilizing HAZUS earthquake and flood/wind data to determine expected extent of damages and performing a facilities inventory. Provided in governing document, Appendix D-1.
6. **Goal Setting:** Establish goals and objectives for the plan. Completed at the meeting of the Mauldin Disaster Mitigation Committee meeting on February 11, 2014
7. **Mitigation Activities:** Determine mitigation activities relative to the hazards being considered and the unique characteristics of The City of Mauldin. The following six (6) basic mitigation strategies were to be considered: 1) Preventive Measures 2) Public Education and Awareness, 4) Natural Resource protection, 4) Emergency Services, 5) Property protection; and 6) Structural Projects. Completed at the meeting of the Mauldin Disaster Mitigation Committee in February 12, 2014.
8. **Draft Plan:** Prepare a draft plan containing a description of the planning process, the hazard assessment and problem analysis, the goals, and a summary of possible appropriate measures. The City of Mauldin draft plan is to be reviewed and open to comment during a public meeting. The draft plan will be incorporated in the Greenville County Multi-jurisdictional plan and will be made available for public review through placement on the City's website and/or other means appropriate for each jurisdiction represented. The plan will also be open to public comment through a joint, county-wide meeting. (Appendix M-B)
9. **Final Plan:** The final plan will be prepared considering comments from the internal review and the public. The final plan will be adopted by resolution of the Mauldin City Council and Greenville County Council.
10. **Implementation:** The Mauldin DMC and County DMC (as a whole) will review and revise the plan as required during the next five (5) year cycle.

To date, tasks 1-8 above have been completed and the draft plan is being prepared for review and approval. A copy of the council resolution adopting this plan will be attached to indicate that tasks eight (8) and nine (9) have been completed. Task 10 is an ongoing activity.

2.4 Mitigation Initiatives

In general, decisions regarding potential impacts of natural hazards and mitigation initiatives were driven from previous research, planning and analysis performed for Greenville County's Multi-Hazard Mitigation Plan (GCHMP). The Mauldin DMC met to discuss the natural hazards in common with all jurisdictions represented in the GCHMP and discussed specifically the hazards that Mauldin is more vulnerable to.

Following adoption of the Final plan, the Mauldin DMC will meet annually to review and update mitigation initiatives as necessary. This process includes soliciting additional mitigation initiatives, evaluating response to recent disasters, and tracking the progress of those initiatives already reviewed and approved.

2.5 Goals and Objectives

The Mauldin DMC has established eight (8) goals in the Mitigation Plan. These goals primarily focus on providing education to the public and governmental officials, improving communications and response activities; and protecting structures and infrastructure. Specific objectives were established for each goal and initiatives were approved to meet required objectives.

2.6 Summary

Hazard mitigation planning is not a one-time project, but rather an on-going process. The City of Mauldin started the planning process for the 2015 Greenville County HMP update in 2013 and is will continue to update the HMP as required to keep the plan active and relevant. The multi-jurisdictional approach to development of this HMP and incorporation of the County-wide risk assessment affirms our commitment to the hazard mitigation planning process.

Section Three

COMMUNITY PROFILE

3.1 Location, Climate and General Topography

Mauldin is located in the upper Piedmont province of the Appalachian Highlands region. The Piedmont area is characterized by rolling hills, and elevations in the Mauldin area range from 740' to 1020' above sea level.

Within the Greenville-Spartanburg metropolitan area, Mauldin is very centrally located, with excellent regional highway access. Mauldin residents can access virtually any point of interest in the metro area within a 30 minute drive. Downtown Greenville is approximately 20 minutes away by automobile, or 30 minutes via a new regional limited-stop bus route.

The City of Mauldin has a pleasant, temperate climate. Annual average low is 49 degrees, and average high is 71 degrees. Annual precipitation averages 50 inches.

History

The land area at the center of the City of Mauldin was known in the late 1800s as Butler's Crossroads, for Willis Butler, who owned a large farm at the intersection of the Laurens Road and Reedy River Road. The area also was known as Poplar Springs, for the Methodist Church and the school of that name located where Mauldin United Methodist Church presently is located.

The Greenville and Laurens railroad was built through the area in 1885, and the station built in 1886 was named "Mauldin" for Lt. Gov. William L. Mauldin, a Greenville businessman and president of the railroad. Lt. Gov. Mauldin is credited with changing the path of the railroad to serve the rural crossroads, rather than following an original plan that would have built the line farther to the east.

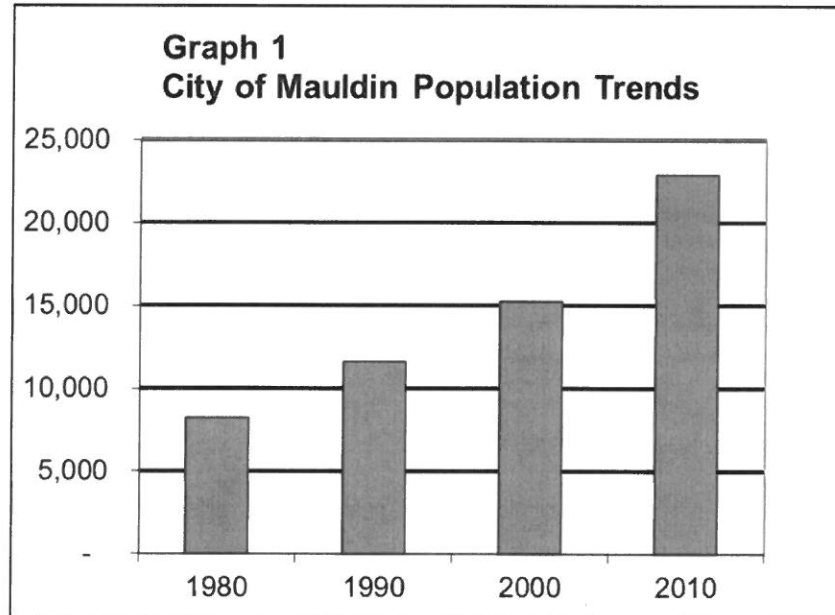
The economy in the late 1800s and early 1900s continued to be characterized by subsistence farming; cotton was the predominant cash crop, processed at a cotton gin adjacent to the railroad depot on what is now Jenkins Street and typically delivered to Conestee Mill. Unlike Greenville's five other cities, no textile mill or other industry developed in the Mauldin area in the first half of the 20th century, and consequently the area saw little growth.

Chartered as a town in 1910, Mauldin ceased operating as a municipality during the Great Depression. The area began growing during the 1940s, due to World War II and the proximity of Donaldson Air Force Base, a large and important training facility. A 16-inch water main was built southward from Greenville along Laurens Road in the early 1950s, and the state highway department widened Laurens Road in 1957. These two major infrastructure investments ensured the growth of the area, and the town resumed operating by holding municipal elections in 1957 electing Barbrey as its first post-Great Depression mayor.

Mauldin's proximity to the main highway from Greenville to Columbia and access to a plentiful water supply lured industry (C.F. Sauer, Her Majesty, Texize) and spurred home building on the surrounding farm lands. New suburban shopping centers and highway commercial development soon followed, transforming the rural crossroads into a thriving suburb of Greenville.

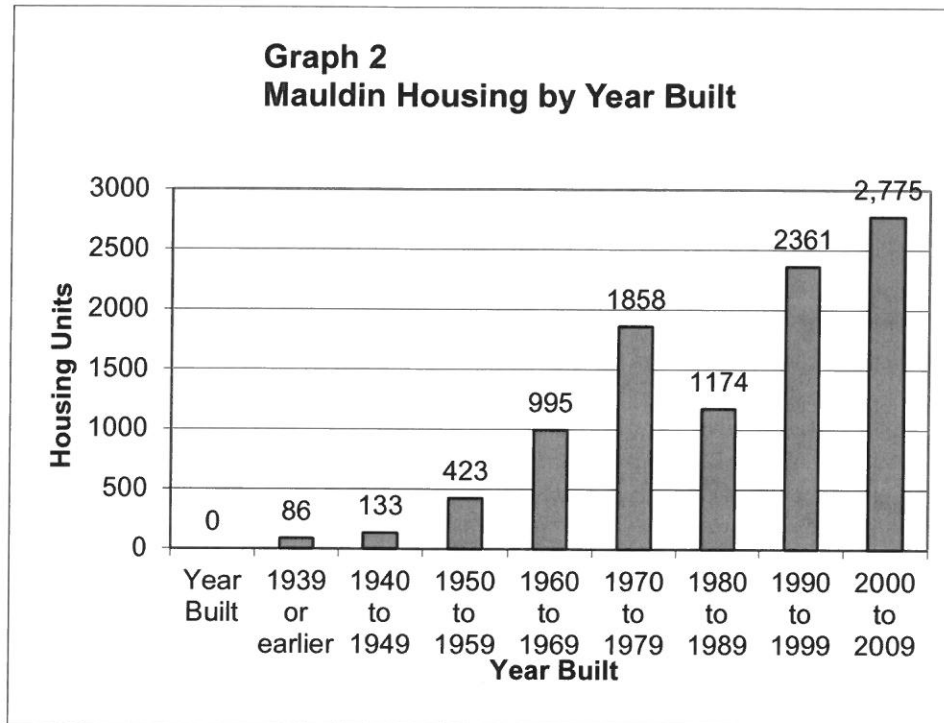
3.2 Population

Since 1960, Mauldin has consistently been among the fastest growing cities in South Carolina, and now is the state's 17th largest city (see Graph 1 below). The U.S. Census Bureau estimated the city's population in 2012 to be 23,808. The 2010 Census revealed a racially balanced population, 68.7 percent white, 22.5 percent black, 3.5 percent Asian, and 5.3 percent of other races. Median age is 37.1 years.



3.3 Housing

Mauldin has had steady, strong growth in housing for many years. The city's housing stock is relatively new, with few substandard housing units. Graph 2 illustrates the age of the city's housing.



The 2010 Census reported 9,929 housing units in Mauldin. Single family detached homes comprise 63.9 percent of Mauldin's housing stock. Attached single family homes have shown strong increases in the past 20 years, increasing to 14 percent of all houses in 2010. Multifamily units account for 20 percent of housing in Mauldin, and mobile homes and other types account for less than 2 percent. Only 5.75 percent of housing units were vacant in 2010. Owner-occupied units account for 67.6 percent of all occupied housing.

3.4 Economy

Mauldin has a diverse and strong local economy, with major employers in manufacturing, engineering services, and distribution services. Mauldin's regional transportation access is excellent, with I-85, I-185 (toll) and I-385 each within easy reach of most location in the city. Butler Road and Main Street (US-276) provide good arterial highway connections to the Interstates. Mauldin's easy access to the entire Upstate is further enhanced by the city's location at the geographic center of employment and population growth in the Upstate. Rail access is available on the Carolina Piedmont Railroad along US 276, allowing industries to receive and ship raw materials and heavy finished goods at low rates.

The City's ten largest employers are listed below in Table 1.

| Table 1 Major Employers in the City of Mauldin | | |
|---|-----------|----------------------------|
| Employer | Employees | Industry |
| Verizon | 1,235 | Telecommunications |
| C&S Wholesale | 1,036 | Distribution |
| Samsung/Alorica | 756 | Telecommunications |
| Charter Communications | 650 | Telecommunications |
| Jacobs Engineering | 642 | Engineering Services |
| Met Life | 387 | Finance/Insurance |
| Compix | 236 | Manufacturing |
| Coca Cola Bottling Co. | 225 | Manufacturing/Distribution |
| Morgan Advanced Materials | 204 | Manufacturing |
| C.F. Sauer | 200 | Manufacturing |
| Bon Secours | 172 | Health Care |

Mauldin has the highest median household income (\$54,032) in Greenville County, as illustrated in Table 2 below. Over 90 percent of the City's adult population holds a high school diploma, and only 7.6 percent of the city's residents live below the poverty level. Mauldin betters the state and national statistics on all three of these important economic indicators.

Table 2

Economic Status Indicators

U.S., S.C., Greenville County and Municipalities

| Jurisdiction | Median Household Income | Percent High School Graduates | Persons Below Poverty Level | Median Age |
|---------------------|--------------------------------|--------------------------------------|------------------------------------|-------------------|
| United States | 53,046 | 85.7% | 14.9% | 37.2 |
| South Carolina | 44,623 | 84.0% | 17.6% | 37.1 |
| Greenville County | 48,438 | 85.3% | 15.2% | 37.2 |
| Fountain Inn | 44,912 | 87.8% | 12.1% | 35.0 |
| Greenville | 41,553 | 85.7% | 18.6% | 34.6 |
| Greer | 41,929 | 82.7% | 19.3% | 33.9 |
| Mauldin | 54,032 | 90.5% | 7.6% | 37.1 |
| Simpsonville | 49,970 | 88.6% | 8.7% | 36.5 |
| Travelers Rest | 41,466 | 84.6% | 20.7% | 34.4 |

Sources:

2008-2012 American Community Survey, 5-year Estimates

2010 Census

The City of Mauldin consist of approximately 6,340 acres. Table 3 below provides a general breakdown of the land uses within the community.

Table 3: City of Mauldin Structural Property Valuation

| Land Use Description | No. of Parcels | Acreage | Building Value (\$) | Fair Market Value (\$) |
|-----------------------------|-----------------------|----------------|----------------------------|-------------------------------|
| Agricultural | 7 | 189 | \$ 864,298 | \$ 6,031,530 |
| Residential – Single Family | 8,003 | 2,995 | 971,331,723 | 1,194,935,100 |
| Residential – Multifamily | 40 | 215 | 107,822,562 | 125,526,090 |
| Manufactured Homes | 2 | 5.2 | 105,782 | 285,490 |
| Industrial | 13 | 171 | 28,764,210 | 43,536,810 |
| Commercial, Service, Office | 410 | 919 | 281,829,026 | 417,354,762 |
| Government & Schools | 37 | 366 | 293,870 | 14,274,370 |
| Vacant | 132 | 471 | N/A | 41,184,360 |
| Unknown | 36 | 80 | 17,615,845 | 31,471,320 |

*Greenville County GIS parcel data

Section Four

HAZARD IDENTIFICATION AND VULNERABILITIES

4.1 NATURAL HAZARDS

This section of the HMP identifies specific locations and facilities vulnerable to natural and man-made hazards with narrative, data and maps. As identified in Section I, Greenville County is vulnerable to a wide range of natural hazards, including: Winter Storms, Tornadoes/High Winds, Severe storms/Thunderstorms, Drought, Wildfires, and Earthquakes. The Greenville County Multi-Jurisdictional Hazard Mitigation Plan (GCHMP), Section 6: Hazards and Vulnerabilities, provides a detailed assessment and vulnerability analysis of the natural hazards affecting both Greenville County, the City of Mauldin and other jurisdictions represented in the plan.

There is, however, a degree of variation in the impact and vulnerability that the City of Mauldin has to both Flooding and Man-made hazards. For this reason, Section Four, *Hazard Identification and Vulnerabilities* is specifically dedicated to address Mauldin's vulnerability to these two hazards.

Where possible, maps have been provided to further clarify the impact area of a respective hazard type.

4.2 Recorded Flood Events

As indicated in the Appendix D of the governing base document (GCHMP), the SHELDES database recorded a total of 64 flooding events over the reporting cycle (1960-Present) with two of those occurring during the 2005 HMP cycle. Floods occurred in 29 of the years within the reporting period through 2009.

Flood events occurring during the 2010 HMP Cycle (also referenced in Appendix D in the GCHMP) were also recorded in June 2010, March 2011, and July 2012. Multiple roads experienced localized flooding during these events, with one closed temporarily. No homes were reported as having received flood damage.

In June 2013 heavy rains swept across Greenville County causing some road and yard flooding and a bridge failure at Neely Fairy Road. Some rain gages in the County recorded 3.75 inches of rain and numerous complaints were received regarding storm-water drain overflow causing damage to both homes and yards.

In July 2013, the City of Mauldin received 4.62 inches of rain within a two-hour period that caused flash flooding along two of the City's main corridors, East Butler Road and Hwy 276 (Main Street) causing flood damage to a number of businesses. Riverine flooding coupled with storm-water drain overflow also created localized flooding in several of the City's older subdivisions resulting in flood damage to 14 homes, six of them substantially damaged. Flood Damage to homes in this area have been reported in years 1995,

2002, 2003, 2004, 2005, 2013, some homes of which are now classified as a Repetitive or Severe Repetitive loss.

4.3 Flooding Conditions Relative to the City of Mauldin

The City of Mauldin is located along the ridge line that separates the Reedy River basin from the Enoree River basin. US Highway 276 generally follows the ridge between the Reedy and Enoree river basins through Mauldin.

In the Enoree river basin, the major creek systems within the Mauldin area are Gilder Creek and Little Gilder Creek, which drains the northeastern part of the planning area, and Bridge Fork Creek, which drains the east central part of the planning area. The Gilder Creek system is highly impacted by urban run-off and flooding problems are significant. The remaining wetlands provide important floodwater storage and filter sediments, improving water quality down-stream.

Major creeks in the Reedy River basin are Laurel Creek, which drains the northwestern part of Mauldin, and Ranch Creek, which drains the south central portion of the planning area. Tar Creek and Marrowbone Creek drain areas west of the Reedy River.

There are several different types of flooding that have the potential of affecting the City of Mauldin. These types of flooding are as follows:

- **Riverine Flooding:** this is the most common type of flooding. It occurs when a river or stream overflows its banks. In large rivers, it usually occurs after a serious, large-scale weather event. In streams, this can occur from more localized weather systems.
- **Flash Floods:** Flash floods typically encompass a quick rise of velocity water and large amounts of debris. Factors that contribute to flash flooding include the length and intensity of rain and the steepness of watershed and stream gradients. Other factors influencing flood floods include the amount of watershed vegetation, natural and artificial water storage, and the configuration of the streambed and floodplain. Because of the rapid rise of water levels, a large percentage of flood deaths occur from motorists who underestimate the depth and velocity of the floodwaters and attempt to cross flooded areas. This typically occurs when a weather event quickly drops an extensive amount of water in a short period of time.
- **Local Drainage or High Groundwater Levels:** Heavy precipitation from local weather events may provide flooding outside of delineated floodplains. If the local soil cannot handle precipitation through infiltration and runoff, the water may accumulate. During winter, frozen ground and accumulated snow can contribute to this problem. This type of flooding generally occurs in flat and urban areas.

The City of Mauldin administers local ordinances that regulate development within designated flood areas. The City also participates in the National Flood Insurance Program (NFIP) which rates areas within the City in regards to susceptibility of flooding.

The dominant sources of flooding in the City of Mauldin are riverine and flooding resulting from localized drainage issues during heavy periods of rain. According to the 2011 preliminary Flood Insurance Rate Maps (FIRM) approximately 6.6 percent of the City's land is located in a designated SFHA with 4.7 percent location in the 100-year floodplain and 1.9 percent within the floodway. The preliminary FIRM's and a Flood Insurance Study (FIS) for Greenville County has been in use since September 2011 and is scheduled to be in full affect in August 2014 (Appendix M-D, F-4). The Hazard vulnerability section of the plan will provide further details regarding the effects of flooding in the City of Mauldin.

4.4 Flood Hazard Vulnerability

Special Flood Hazard Areas within the City of Mauldin are illustrated in Appendix M, Map FM-1 and extend along most of the main branches and tributaries of Laurel Creek, Ranch Creek, Gilder Creek and the Reedy River. Most of Laurel Creek within the Mauldin planning area is bordered by undeveloped or semi-rural areas and few buildings encroach into floodplain in these locations. Ranch Creek is generally bordered by subdivisions that were developed post-firm, and subject to the floodplain regulations in place at the time.

Flooding is a significant problem along Gilder Creek in several subdivisions that were built in the 1960's and early 1970's before Special Flood Hazard Area (SFHA) were identified in Greenville County and the City of Mauldin. Libby Lane, Brookbend Court, Brookbend Road, and Shadecrest Drive are amongst the areas that have been most significantly impacted by recorded flood events.

4.5 Flood Hazard Extent

Based on the FEMA Flood Insurance Rate Maps, Greenville County, including the City of Maudlin has four primary flood zone designations: Zones A, AE, X and Shaded X. These flood zones vary according to levels of flood risk. Zone X is a moderate to low risk zone. However, is worthwhile to note that many flood related complaints received after a significant rain event are related to overflowing storm drains and culverts in Zone X areas, not rising streams.

Zone A areas have 1% annual average chance of flooding and a 26% chance of flooding over the life of a typical 30-year mortgage. Shaded X zones indicate areas with a 0.2% of flooding within any given year. The preliminary County-wide flood insurance study provides a comprehensive analysis of flood zones and provides flood elevation data on many previously unstudied areas. The 2004 and 2011 FEMA-City of Mauldin Flood Risk Map (FRM) associated with that study identifies flood risks within the City (refer to Appendix M-D SFHA-1 &2). Appendix M-D SFHA-3 & 4 contains the preliminary FIS map index showing the Flood Insurance Rate Map panes that were printed and are available for review.

Table 1 below provides information from the 2011 preliminary FIS and FIRM maps on the number of acres in the City of Mauldin that are in the FEMA defined 100-year floodplain.

Table 1 : CITY OF MAULDIN PROPERTY IN SFHA

| FLOOD ZONE | # of ACRES | % OF TOTAL |
|--------------|------------|------------|
| AE | 298 | 4.7 |
| Floodway | 118 | 1.9 |
| TOTAL | 416 | 6.6 |

* Greenville County GIS parcel data, Two Springs

4.6 Probability of Future Flood Hazards

Probability of Future Hazards within Greenville County, the City of Mauldin and participating jurisdictions is described in detail in Section 6.3 of the Greenville County Multi-jurisdictional Hazard Mitigation Plan (MJHMP). The data provided shows a high potential of occurrence for flooding.

Details regarding the probability of Flooding within Greenville County, including the City of Mauldin is as follows:

Table 2: PROBABILITY OF FLOODING IN GREENVILLE COUNTY

| HAZARD | Total # of data years | Historical # years w/ at least 1 event through 2009 | 2010 HMP Cycle No. of years w/ at least 1 Event | <u>Total # Events Years</u> # data Years (Frequency) | Future Probability of Occurrence (%) |
|--------|-----------------------|---|---|---|--------------------------------------|
| Floods | 53 | 29 | 4 | 0.62 | 62 |

* Greenville County GIS parcel data, Two Springs

4.7 Flood Risk Estimation and Evaluation

Refer to Section 6.4, in the governing base document, which describes the process that was used to determine the risk estimation on the prescribed list of natural hazards affecting Greenville County, the City of Mauldin and other participating jurisdictions.

The results of the flood hazard identification and risk estimation process for the Greenville County Planning Area is shown below in Table 3. The numeric references are also identified on the following page:

Table 3: Flood Hazard Identification and Risk Assessment

| Hazard | Probability of Occurrence | Area of Impact | Health and Safety | Property | Environment | Economic | Risk Rating |
|--|---------------------------|----------------|-------------------|----------|-------------|----------|-------------|
| Flooding | 4 | 1 | 1 | 1 | 1 | 2 | 24 |
| Probability of Occurrence = 4: every 25 years or less Area of Impact = 1: Less than 25% of developed area impacted Health and Safety = 1: Few injuries and illnesses Property = 1: Few properties destroyed or damaged Environmental = 1: Resourced damaged with short term recovery practical Economic = 2: Low direct and high indirect costs | | | | | | | |

* Greenville County Multi-Jurisdictional Plan

4.8 Flood Vulnerability Assessment

A. Existing Vulnerability

The following provides an estimate of existing vulnerability relating to the 100-year floodplain. Estimates for development within the floodplain is based on actual structures. Due to the fact that these properties must carry flood insurance, and are typically the focus of specific mitigation measures, it is important to address floodplain development in this manner.

Table 4. City of Mauldin Flood-prone Structures in SFHA, 100-year

| Land Use | # of Buildings | Bldg. Value (\$) | Acres | % of Total |
|--------------|----------------|---------------------|------------|-------------|
| Commercial | 5 | 3,501,520 | 43 | .68% |
| Industrial | 6 | 448,800 | 6 | .09% |
| Residential | 149 | 23,674,810 | 237 | 3.74% |
| Total | 160 | \$27,625,130 | 286 | 4.5% |

*Source: Greenville County Parcel Data – Fair Market Value, GIS Zoning – Two Springs, 2011 Preliminary FIRM

B. Future Vulnerability

The following table provides a breakdown of the development potential for portions of Mauldin falling within the 100-year floodplain.

Table 5. City of Mauldin Vacant Land by Zoning in SFHA-100 year floodplain

| Land Use | Total Vacant Acreage | Vacant Acreage in Floodplain | % of Total |
|--------------|----------------------|------------------------------|-------------|
| Commercial | 338 | 10 | 1% |
| Agricultural | 133 | 20 | 3% |
| Residential | 284 | 45 | 6% |
| Total | 755 | 75 | 100% |

*Source: Greenville County Parcel Data – Fair Market Value, GIS Zoning – Two Springs, 2011 Preliminary FIRM

C. Estimated Impact on Residential Development

As outlined above, there are approximately 45 acres of vacant land zoned for residential development within the City of Mauldin’s 100-year floodplain. Based on an average of 2.9 units per acre, this could result in an additional 131 residential units within the 100-year floodplain at build-out. If this development were to transpire, an additional 524 individuals (based on the average 4 person household) would be located within a FEMA-defined flood hazard area.

D. Repetitive Loss and Severe Repetitive Loss Structures

As indicated in Section 6.5.1 in governing base document, Greenville County, the City of Mauldin and other participating jurisdictions all participate in the Nation Flood Insurance Program (NFIP). Another indication of the hazards threatening the City of Mauldin and the risk posed by those hazards is to identify whether properties have been repeatedly damages by past flood events.

Under the National Flood Insurance Program, repetitive loss properties are of significant interest since they are prone to flood damage and are a substantial drain on program insurance funding. The City of Mauldin has identified 11 repetitive loss (RL) properties within our jurisdiction. Of the 11 homes identified, 8 are considered “severe repetitive loss” (SRL) properties. Flood damage reported on these homes date back to 1995, 2002, 2003, 2004, 2005, and most recently in 2013; of the years reported approximately \$994,535 in flood insurance claims were processed and paid. The locations of repetitive loss properties are subject to the Privacy Protection Act of 1974, but are shown in generality in Appendix M-D FM-2. It should be noted

that the RL and SRL homes identified in Mauldin are pre-firm, meaning the homes were constructed in a floodplain area before FIRM and FIS studies were available in Greenville County.

4.9 Man-made Hazards

While working through the planning process with the Mauldin Disaster Mitigation Committee (MDMC), it was determined that the City of Mauldin faces several man-made hazards that pose a potential threat to life and property. Although identifying and addressing man-made hazards is not a requirement under the Hazard Mitigation planning guidelines, it is recommended that they be identified and acknowledged within the context of the plan.

The MDMC has identified two man-made hazards and has attempted to address them within the context of this plan: Tier II or other hazardous chemical sites located within the City's corporate limits, and development encroaching on rail lines that traverse through the center of the City.

A. Hazardous Materials

Hazardous materials cover a broad category of substances that pose a potential risk to life, health, the environment or property when not properly contained. These hazardous materials may be in solid, liquid, or gaseous forms that exhibit explosive, flammable, combustible, corrosive, reactive, poisonous, biological, or radioactive characteristics.

Hazardous material incidents are usually accidental events that arise from human activities such as the manufacturing, transportation, storage, and use of hazardous materials. The consequences of such incidents are usually unintended. Incidents most often occur due to human error, natural hazards, or a breakdown in equipment or monitoring systems. An accidental or intentional release of hazardous materials could produce a health hazard to those in the area, downwind, and/or downstream with immediate, prolonged, and/or delayed effects. The spread of the material may additionally be defined by weather conditions and topography of the area.

A hazardous material incident can come from a fixed facility, transportation, or an intentional release such as terrorism. Fixed facilities are buildings and other stationary structures on a single site that manufacture, produce, use, transfer, store, supply, or distribute any hazardous materials. Examples of fixed facilities includes: rail yards, truck terminals, water treatment plants, swimming pools, gas stations, and supply stores containing substances such as fuel, farm chemicals, propane, fuel oil, paint, and small amounts of chlorine.

A hazardous material release may also occur due to a transportation accident. The most likely locations for a transportation-related hazardous material release are along the highways and major roads running throughout the City. Gas, propane, and other hazardous materials are delivered throughout the City year round. The need for gas, propane, fertilizers, and other toxic materials in daily life creates a larger risk for a hazardous materials release. Additionally, hazardous materials incidents can occur on railroads; rail access

on the Carolina Piedmont Railroad runs along US 276. This rail services a number of industrial manufacturing sites and businesses located in close proximity to the rail line.

HAZARD PROFILE

With a hazardous material release, whether accidental or intentional, there are potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release include:

- Weather conditions: affects how the hazard occurs and develops
- Micro-meteorological effects of buildings and terrain: alters dispersion of hazardous materials
- Non-compliance with applicable codes (e.g. building or fire codes) and maintenance failures (e.g. fire protection and containment features): can substantially increase the damage to the facility itself and to surrounding buildings

The severity of the incident is dependent not only on the circumstances described above, but also with the type of material released and the distance and related response time for emergency response teams.

1. Existing Vulnerability

Hazardous materials incidents can have an obvious, direct environmental impact and cause long-term, environmental damage. Water pollution is an immediate concern for direct human consumption, recreation, crop irrigation, and fish and wildlife consumption. Depending on the material, pollutants can bio-accumulate to differing degrees, affecting animals high on the food chain long after a spill. Hazardous material incidents would not likely affect geology, but could significantly impact soils and farmlands, requiring expensive remediation

In terms of location and extent, when a hazard material incident occurs in the City of Mauldin, there is a chance it will not only involve dirt or surface material but will also involve flowing water in ditches, rivers, or small streams. Other potential concerns for spills/leaks are icy road conditions during winter months, sabotage, and terrorism. Additionally, airborne releases of toxic gases have the widest area of vulnerability.

The City of Mauldin has a number of manufacturing and industrial businesses within our jurisdiction that house and utilize hazardous materials on a daily basis. This prompted the MDMC to begin an evaluation and assessment of all facilities that have Tier II reporting requirements.

In general, facilities that have Tier II reporting requirements contain materials that can be mildly to extremely (depending on the specific chemical) dangerous if mishandled, spilled, or burned. The MDMC in

conjunction with input from the Greenville County Emergency Management Division, identified the following ten (10) facilities in the City of Mauldin with Tier II reporting requirements. The majority of these facilities are located along the northern corridor of US 276, which also runs parallel to the rail line that provides delivery service to many of these locations. Locations of each site are also identified in Appendix M-D, Map HM-1.

City of Mauldin: Tier II Reporting Facilities

1. CF Sauer
2. New Horizon's Electric Cooperative
3. Daystrong Rubber Products
4. C&S Wholesale Groceries
5. BASF Mauldin Plant
6. Morgan AM & T
7. Woodward FST
8. Piedmont Coco-Cola
9. Roy Metal Finishing
10. CompX

CRITICAL FACILITIES EXPOSURE

To determine the types of uses and facilities that are at a high level of risk to exposure of a Hazardous Material incident, the City identified the major transportation routes (Interstates, highways, rail lines) that are most likely used to deliver material to identified Tier II facility locations. These vulnerable facilities are shown in Appendix M-D Map CF-2 and include schools, medical assisted living facilities, senior centers, medical facilities, and other public gathering points (e.g. parks, community centers and other points of interest). Additional points of interest were emergency response facility locations, including fire stations, emergency medical facilities, and police stations. If an incident occurred, there may need to be an evacuation of these facilities.

2. Future Vulnerability

POTENTIAL LOSSES

Most hazardous material releases do not usually have an effect on infrastructure, particularly underground infrastructure. Some critical facilities use hazardous materials to operate such as chlorine for water treatment and PCB's for electric transformers. Similarly, the contamination of the water supply may be treated like a hazardous material release. Propane, oil, and natural gas, necessary fuels for heating, can also be hazardous if released during their delivery due to their explosive potential. In addition, transportation may be limited if a key roadway or railway is blocked by an incident.

Possible losses to critical facilities include:

- Critical functional losses
- Contamination

- Structural and contents losses, if an explosion is present

Possible losses to structures include:

- Inaccessibility
- Contamination
- Structural and contents losses, if an explosion is present

Possible economic losses include:

- Business closures and associated business disruption losses

Possible ecologic losses include:

- Loss of wildlife
- Habitat damage
- Reduced air and water quality

Possible social losses include:

- Cancelled activities
- Emotional impacts of significant population losses and illnesses

The population impacts are often greater than the structural impacts during a hazardous material release. Depending on the material, the health impacts to humans can be long and short term. A release in the City of Mauldin could threaten the population. Greater population concentrations may be found in communities, special needs facilities, and businesses. Generally, an incident will affect only a subset of the total population at risk. In a hazardous material release, those in the immediate isolation area would have little to no warning, whereas, the population further away in the dispersion path may have some time to evacuate, depending on the weather conditions, material released, and public notification.

As the population increases, development will also continue to increase in these areas thereby exposing a greater number of individuals to the risk of a hazardous materials release. Increased development will lead to increased vulnerability and increased potential losses.

HAZARDOUS MATERIALS SUMMARY

Hazardous materials incidents can pose a series of threats to human safety and welfare, as well as the environment. Incidents likely occur regularly, but are not often of a size to cause a significant threat. However, it seems likely that incidents will continue and the potential for a significant release is present. Incidents often occur in conjunction with, or as a result of, natural hazards impacting facilities that house hazardous materials. Depending upon the materials released, as well as atmospheric conditions, an incident has the potential to cause significant disruption to the City of Mauldin along with injury or even death to residents in the immediate area.

Education is very important when it comes to hazardous material mitigation. Workers should receive proper training in the use, safety, and regulations regarding hazardous materials. Workers and emergency response personnel should be trained in the appropriate techniques and safety measures for dealing with spills and incidents. The general public should be made aware of the hazards of household chemical products and of methods for properly disposing of these products. The City of Mauldin Public Works department provides educational materials to inform citizens on the proper and safe ways of disposing household hazardous chemicals and materials.

Hazardous materials are best managed through suitable containment. When properly contained hazardous materials are unlikely to cause harm. The design of chemical containers for transportation and storage should be based on chemical and physical characteristics, the degree of hazard offered by the product, and to some extent on economic considerations. Most regulations and codes require containers to resist the most severe stresses that may reasonably be expected during normal handling, storage and use.

Hazard communication is also an important regulatory measure. Where required by the United States Department of Transportation (USDOT) regulations, hazard communication information is provided in the form of container markings and labels, vehicle placarding, and shipping paper entries. Facilities are required to identify chemicals in buildings, tanks and other storage facilities using the (National Fire Protection Association) NFPA 704 system.

USDOT regulations impose certain controls on the types of chemicals that may be shipped together, how they must be loaded and secured on vehicles, levels of allowable radiation exposure and radiological contamination and, for certain high level radioactive shipments, highway routing. Codes and zoning requirement may address allowable locations for chemical storage and use.

B. Rail Corridor

The Carolina Piedmont rail runs parallel with the US-276 Corridor that centrally traverses through the City of Mauldin. As illustrated in Appendix M-D on Map RC-1 the rail line runs directly through the center of the city's commercial district corridor, which is also within close proximity to residential development. It is difficult to mitigate or protect from the risk associated with existing development in close proximity to this rail corridor; however, the City can take steps to protect future growth. There are many risks associated with rail lines including: structural, stability, noise and vibration, and car derailment.

1. Existing Vulnerability

In an effort to identify and address risks associated with this hazard Map M-RC-1 defines a 100-foot buffer established and measured from the northern and southern edge of the corridor. The defined hazard area also illustrates the location of critical facilities, as well as area zoning to identify other uses at risk.

In addition, the following tables provides an overview of existing and potential vulnerability to property located within 100 feet of the existing CSX rail lines that traverses through the central area of the city limits.

Table 6: City of Mauldin Land Use and Property Vulnerability to the Railway Corridor

| Land Use / Zoning | # of developed properties within 100' buffer | Developed Acreage |
|-------------------|--|-------------------|
| Commercial | 0 | 0 |
| Industrial | 0 | 0 |
| Residential | 2 | 2.3 |
| Service | 0 | 0 |
| TOTAL | 2 | 2.3 |

*Source: Greenville County Parcel Data, GIS Zoning – Two Springs Consulting, LLC

2. Future Vulnerability

The following table provides an estimate of potential future vulnerability by identifying the development potential of vacant property within the defined 100-foot rail corridor hazard area:

Table 7: City of Mauldin Vacant Property by Zoning Class in Railway Corridor

| Land Use / Zoning | # of undeveloped properties | Undeveloped Acreage within the 100' railroad buffer |
|-------------------|-----------------------------|---|
| Commercial | 6 | 2.5 |
| Industrial | 4 | 4 |
| Residential | 2 | .03 |
| Service | 4 | .4 |
| TOTAL | 16 | 6.9 |

*Source: Greenville County Parcel Data, GIS Zoning – Two Springs Consulting, LLC

4.10 Land Use Trends and Potential Vulnerability

The MDMC recognizes that the way in which land is utilized, especially land within known hazard-prone areas, is a key measure of community vulnerability as some land uses, such as residential or industrial development, can be more susceptible to disaster-related damages than others. The MDMC also recognizes that its efforts, particularly when identifying the areas at risk from various hazards, is a key factor in guiding the careful use of land to minimize future vulnerabilities to disaster. When needed and desired, modifications to City plans, ordinances, codes and general policies will be proposed as mitigation initiatives for incorporation into this plan.

The City of Mauldin has taken several measures to control development from a vulnerability stand-point. Examples include: the continuous efforts put forth to amend zoning district and development standards to address separation of incompatible uses; revising the floodplain ordinance to exceed the minimum requirement of the National Flood Insurance Program, and adoption of the International Building Code Standards as amended by the State of South Carolina.

To address new building and infrastructure, the City will continue to enforce Zoning and Land Development Regulations and enforcement of the International Series Building-related and Fire codes, as well as the City of Mauldin Flood Damage Prevention Ordinance. Staff will also continue to monitor land use trends and amend as needed, the City's Comprehensive Plan that addresses future land use and development potential in the City.

4.11 Critical Facilities

The hazard mitigation planning guidelines require the City to identify all community/critical facilities, and determine if any of these structures or locations fall within a defined hazard area. These facilities and systems are very important to the health, safety and welfare of the community, especially during disasters caused by natural hazards. Therefore, high priority is given to assessing their vulnerabilities to future disasters and proposing mitigation initiatives to address identified vulnerabilities.

The MDMC created a list of critical facilities within our jurisdictional boundaries that includes: municipal buildings, police and fire stations, churches, medical and assisted living facilities and public and private schools (Appendix M-D, Critical Facilities List). To determine the facilities that may be at risk of exposure to a known hazard we compared the location of critical facilities to the identified flood hazard areas, and also searched for facilities that were located within 1 mile of the 276 rail corridor and Hazardous Material, Tier II locations.

The Table below illustrates those critical facilities that are at risk to exposure of a known hazard:

TABLE 8: CRITICAL FACILITIES EXPOSURE TO KNOW HAZARD AREAS

| FACILITY | | LOCATION | EXPOSURE TO HAZARD: |
|---|---------------------------------|------------------------|-----------------------------|
| UTILITIES | | | |
| 1 | Lauren Electric | 1201 E Butler Rd | |
| CITY & PUBLICLY OWNED FACILITIES | | | |
| 2 | Mauldin Sports Center | 101 City Center Drive | Rail , Hazard Material Site |
| 3 | Mauldin Senior Center | 203 Corn Road | Hazard Material Site |
| 4 | Public Works | 126 McDougall Court | Rail, Hazard Material Site |
| 5 | Mauldin Fire Dept. Headquarters | 9 East Butler Road | Rail , Hazard Material Site |
| 6 | Mauldin Fire Dept. | 802 Miller Road | Rail , Hazard Material Site |
| 7 | Mauldin Police Dept. | 5 East Butler Road | Rail , Hazard Material Site |
| 8 | Mauldin City Hall | 5 East Butler Road | Rail , Hazard Material Site |
| 9 | Jack Greer GC Library | 800 West Butler Road | |
| SCHOOLS | | | |
| 10 | Mauldin High | 701 E Butler Rd | Rail , Hazard Material Site |
| 11 | Mauldin Middle School | 1190 Holland Rd | Rail , Hazard Material Site |
| 12 | Mauldin Elementary | 1194 Holland Rd | Rail , Hazard Material Site |
| 13 | Bethel Elementary | 111 Bethel School Road | |
| 14 | Golden Strip Career Center | 1120 East Butler Road | |
| CHURCHES | | | |
| 15 | Grace Covenant | 739 North Main Street | Rail , Hazard Material Site |
| 16 | Mauldin United Methodist | 100 East Butler Road | Rail , Hazard Material Site |
| 17 | Mauldin First Baptist | 150 South Main Street | Rail , Hazard Material Site |
| 18 | Mauldin Wesleyan Church | 501 East Butler | Rail , Hazard Material Site |
| 19 | New Hope | 501 South Main Street | Rail , Hazard Material Site |
| 20 | Shiloh Christian | 406 East Butler Road | Rail , Hazard Material Site |
| 21 | Vedic Center | 518 Bethel Drive | Rail |
| 22 | Cathedral | 130 New Neely Ferry | Rail , Hazard Material Site |

| TABLE 8: CRITICAL FACILITIES EXPOSURE TO KNOW HAZARD AREAS | | | |
|---|--------------------------------------|------------------------|-----------------------------|
| FACILITY | | LOCATION | EXPOSURE TO HAZARD: |
| 23 | Messiah Lutheran | 1100 Log Shoals Road | Rail , Hazard Material Site |
| 24 | Brookwood Church | 576 Brookwood Pointe | |
| 25 | St Mary's Coptic Orthodox Church | 507 South Main | Rail , Hazard Material Site |
| 26 | Faith Renewed Outreach Center | 505 South Main | Rail , Hazard Material Site |
| 27 | New Harvest Ministries | 308 New Neely Ferry Rd | Rail , Hazard Material Site |
| 28 | Vision Of Victory Temple | 122 Miller Road | Rail , Hazard Material Site |
| 29 | Mauldin Church of God | 200 East Butler Road | Rail , Hazard Material Site |
| 30 | Horizon Presbyterian Church In | 1070 East Butler Road | |
| 31 | Northeast Church Of Christ Inc | 1131 Holland Road | Hazardous Material Site |
| 32 | Church of God Children's Home | South Main Street | Rail , Hazard Material Site |
| 33 | Connie Maxwell Children's Home | 300 Bethel Road | Rail , Hazard Material Site |
| MEDICAL FACILITIES (ASSISTED LIVING) | | | |
| 34 | NHC Healthcare/Mauldin LLC | 850 East Butler | Hazardous Material Site |
| 35 | Miller Oaks Village, Assisted living | 303 Miller Road | Rail , Hazard Material Site |

Appendix M-D, Map CF-1, and CF-2 illustrates the location of critical facilities and identifies their location in relation to sites that house Hazardous Materials.

4.12 Summary

It must be emphasized that the fundamental reason for undertaking the hazard identification and vulnerability assessment process is to highlight vulnerabilities that need to be addressed by the development of proposed mitigation initiatives for incorporation into the HMP. Because of the numerous facilities, systems and neighborhoods in Greenville County, the City of Mauldin and participating jurisdictions that need to be assessed for their vulnerability to disasters, this component of the mitigation planning process can be expected to be continued in future updates of the plan.

Section Five

CAPABILITY ASSESSMENT

This section of the HMP analyzes the City of Mauldin's capacity to address the threats that natural and man-made hazards pose; and also identifies those areas in which the City is already undertaking positive hazard mitigation efforts through existing policy and regulatory mechanisms. Additionally, this section outlines the City's organizational ability to carry out the objectives and implementing actions outlined within Section 7 of this plan. The Capability Assessment section contains the following subsections:

- A) Agency/Organizational Review
- B) Existing Policies and Program Review
- C) Legal Capability Review
- D) Fiscal Capability Review
- E) Political Acceptability Review

5.1 Agency/Organizational Review

The purpose of this subsection of the HMP is to list and describe all local government departments, agencies, and organizations that have a direct (or indirect) impact on hazard mitigation and/or hazard control through specific responsibilities in these areas, and to describe these responsibilities.

| Area of Responsibility | Description | Contact Persons and Telephone |
|--|--|---|
| Planning and Zoning, Building Review and Inspections, Flood Review and Permitting and Code Enforcement | The City of Mauldin has an adopted Comprehensive Plan (currently being updated), Land Development ordinance, zoning ordinance, and a flood damage prevention ordinance which it administers through its Business and Development Services Department. The City also has an appointed, seven-member Planning Commission, a seven-member Board of Zoning Appeals, Inspections and permitting (building, plumbing, electrical, HVAC) are administered to International Code Compliance (ICC) and State Fire Code. | Kim Hamel, Director 5 East Butler Road Mauldin, SC 29662 (864)234-3475 khamel@mauldincitysc.com |
| Fire | The City of Mauldin Fire Department maintains 4 fire stations and is currently staffed with 52 full-time employees, 2 volunteers and 6 Fire | Chief Russell Sapp Mauldin Fire Department 9 East Butler Road Mauldin, SC 29662 |

| | | |
|--|---|---|
| | <p>Explorers.</p> <p>The Department also supports Business and Development Services Department with plans reviews and compliance with IBC and IFC for building construction and fire code compliance per the State Law. The Fire Department also performs building and fire inspections in all commercial buildings annual as required by State Law.</p> | <p>(864) 289-5094</p> <p>rsapp@mauldinfire.com</p> |
| Roads/Streets/Sanitary Sewer/ Drainage / Parks Maintenance | <p>The City of Mauldin Public Works Departments consists of 35 employees and 5 Divisions including: Streets, Sewer, Sanitation, Parks, and Building Maintenance. The Department also supports the Business and Development Services Department by providing technical review on drainage and sewer connection plans and is responsible for encroachment permit reviews, street maintenance, and sewer main inspections.</p> | <p>Michael Lambert, Director</p> <p>126 McDougal Court</p> <p>Mauldin, SC 29662</p> <p>(864) 289-8991</p> <p>mlambert@mauldincitysc.com</p> |
| Parks | <p>The City of Mauldin Parks and Recreation Department is staffed with a full-time director, and comprehensive staff that oversees program development that includes a wide range of indoor and outdoor recreation opportunities.</p> <p>The City owns and operates six primary facilities including: four passive parks, a Senior Center and state of the art Sports Center.</p> | <p>Van Brannon, Director</p> <p>10 City Center Drive</p> <p>Mauldin, SC 29662</p> <p>(864) 335-4850</p> <p>vbrannon@mauldincitysc.com</p> |
| Police | <p>The City of Mauldin maintains a full service municipal police department consisting of 49 sworn officers, 10 civilian staff, 8 reserves and explorers. The Department also provides property maintenance and zoning enforcement support to the Business & Development Service Department.</p> | <p>Chief Bryan Turner</p> <p>5 East Butler Road</p> <p>Mauldin, SC 29662</p> <p>(864) 289-8906</p> <p>bturner@mauldinpolice.com</p> |

5.2 Existing Policies and Program Review

The purpose of this subsection of the Mauldin HMP is to describe the policies, programs, ordinances, and practices that the City of Mauldin has in place that affect hazard control and/or hazard mitigation. The City of Mauldin utilizes the following documents to guide growth, development, and infrastructure investment. When making amendments to or recommendations regarding these policy documents, the recommendations and findings presented in this plan will be taken into consideration.

1. Flood Damage and Prevention Ordinance

The City is a participant in the National Flood Insurance Program (NFIP). Each community that participates in the NFIP must adopt a flood damage prevention ordinance. In general, this ordinance requires the following provisions in all areas of special flood hazard (100-year floodplain) identified by the Federal Emergency Management Agency in its Flood Insurance Rate Map (FIRM):

- All new construction, substantial improvements or substantially damaged structures shall have the lowest flood elevated no less than 4-feet above the base flood elevation;
- All new construction and substantial improvements shall be anchored to prevent flotation, collapse, or lateral movement of the structure;
- All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damages;
- Electrical, heating, ventilation, plumbing, air conditioning equipment, 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 flooding;

In areas designated as floodways, no encroachments, including fill, new construction (including manufactured homes), substantial improvements, and other developments shall be permitted. There is a limited number of permitted uses within the floodway such as: general farming, nurseries, wildlife sanctuaries, lawns, gardens, play areas, provided the uses do not employ structures or fill. Substantial development of a permissible use is only permitted with a no-impact certification demonstrates through hydrologic and hydraulic analyses performed that the proposed encroachment would not result in any increase in the flood levels during the occurrence of the base flood.

Implementation responsibility is through the City's Business and Development Services Department where a joint permit and plan review is performed by the city's Building Official and Floodplain Administrator.

New Flood Insurance Rate Maps (FIMRS) have been in use by Greenville County (including the City of Mauldin) as part of a map modernization program initiated by South Carolina Department of Natural Resources (SCDNR) and the Department of Homeland Security – Federal Emergency Management

Agency (FEMA). The new maps include additions and/or modifications of: Base Flood Elevations (BFE's), flood depths, SFHA boundaries or zone designations; or the regulatory floodway. While the new FIRMS are still technically in the preliminary stage, Greenville County and the City of Mauldin are required to utilize these plans for determining construction requirements on structure proposed in SFHA. The new FIRM's are required to be adopted and in full effect in August of 2014 (Appendix M-D, F-4).

2. South Carolina State Building Code

The SC State Building Codes regulates for fire resistance, in addition to seismic, flooding, and high wind resilience. These codes are reviewed annually and amended as new requirements and materials are introduced. Building codes apply primarily to new construction, buildings undergoing renovation or substantial alterations.

Enforcement of the regulatory codes is provided by technical review staff in the City of Mauldin's Business and Developments Services Department, and extends beyond construction inspections to the advance review of plans. The Business and Development Services Department and other technical review staff from the Fire and Public Works Departments review construction plans and elects to approve or reject them or to require revisions. Construction cannot begin until local officials confirm that the plans are prepared in accordance with the code.

Once plans are approved and permits are issued, a building inspector must then visually monitor the construction of the building. The inspector's duty is to make sure that the project follows the plans as approved. Inspectors are empowered to stop work on projects that fail to conform to the plans. Any observed errors must be fixed before work can continue. The inspector must perform a final review before a Certificate of Occupancy is issued.

3. Zoning Ordinance

Zoning is the traditional and nearly ubiquitous tool available to local governments to control the use of land. Broad enabling authority for municipalities in South Carolina to engage in zoning is granted in S.C. Code of Laws § 6-29-.720. The statutory purpose for the grant of power is to promote health, safety, and general welfare of the community. Land "uses" controlled by zoning include the type of use (e.g., residential, commercial, industrial) as well as minimum specifications for use such as lot size, building height and setbacks, density of population, and the like. The local government is authorized to divide its territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, and special use districts or conditional use districts. Zoning ordinances consist of maps and written text.

The following provides a summary of zoning districts outlined within the City of Mauldin. These districts are identified on the Zoning Map located in Appendix M-D, ZM-1.

- **R-10** Single-Family Residential District
- **R-12** Single-Family Residential District
- **R-15** Single-Family Residential District
- **R-20** Single-Family Residential District
- **R-M and R-M1** Multiple-Family Residential District
- **CRD** Commercial Redevelopment District
- **O-D** Office District
- **C-1** Commercial Business District
- **C-2** Commercial District
- **PD** Planned Development District
- **S-1** Service District
- **I-1** Industrial District

4. Capital Improvements Plan

A Capital Improvements program is a planned schedule of capital expenditures for physical improvements within a local government's jurisdiction, usually over a five-year period, listed according to priority. The City of Mauldin maintains a Capital Improvements Plan that is overseen by the City Council and Administrator. Implementation of the programs is addressed annually through the City's annual budget ordinance.

5. Comprehensive Plan

The State of South Carolina requires all jurisdictions to maintain a land use planning mechanism that outlines a given locality's plans and policies relating to growth and development. State laws outline the minimum requirements that must be addressed within these documents as follows:

- Required Planning Process:
 - Inventory of existing conditions
 - Statement of goals and needs
 - Implementation strategies with time frames
- Required Planning Elements:
 - Population
 - Economic Development
 - Natural Resources
 - Cultural Resources – historic/housing districts
 - Community Facility
 - Housing
 - Land Use
 - Transportation

- **Priority Investment**

South Carolina requires that land use plans be reviewed and updated every five years. The City is currently in the process of updating the 2009 Mauldin Comprehensive Plan. This undertaking will enable the City to acknowledge the goals outlined through the Hazard Mitigation Plan within the comprehensive planning process.

6. Sewer Policies

The City of Mauldin aggressively pursues the policy that sewer service should be provided to all areas of the city as demand arises. The City of Mauldin's Public Works Department maintains 96 miles of sewer and provides wastewater services to more than 7,650 customers.

7. Stormwater Management

The Environmental Protection Agency (EPA) has begun implementation of Phase II of the Stormwater Management Plan. These policies apply to municipalities with populations greater than 10,000 and with densities of 1,000 per square mile. For municipalities that meet these parameters, submittal of a stormwater management plan is required.

Effective management of stormwater runoff offers a multitude of possible benefits that include: protection of wetlands and aquatic eco-systems, improved quality of receding water bodies, conservation of water resources, protection of public health through flood control, and improved operation and hydraulic characteristics of streams receiving run-off; all of which can cause higher peak flow rates that increase frequency and duration of bank full and sub-bank full flows. Increased occurrences in downstream flooding can also be reduced by lowering base flood levels, such as with traditional flood control methods that rely on the detention of the peak flows. They are generally not targeted to the reduction of flooding and in many cases have exacerbated the problems associated with changes in hydrology and hydraulics.

The City of Mauldin is a co-permittee with Greenville County Land Development who manages and oversees land disturbance, erosion control and stormwater runoff for development projects identified in the City of Mauldin. The land disturbance and stormwater programs enforced in the City of Mauldin are in compliance with the Phase I and Phase II Stormwater Management program.

8. Fire Department 10 Year Plan

The Fire Department created a 10-year plan in partnership with Greenville County in 2008. The purpose of the plan was to identify and fund long-term facility, equipment, and staffing needs in a growing area. This plan was adopted by resolution by both the City and County Councils and the funding for this plan came from a joint effort from both entities in the way of Bonds. Furthermore, the City budgeted

additional manpower to meet the needs of the department and Greenville County increased the mileage rate in the unincorporated area of the fire district to help fund the plan. Last June the ISO Rating in the Mauldin Fire District improved from a 3 to a 2 as a result of the implementation of the plan to date. The 10 year plan is updated annually to remove items purchased and to update the needs of the department.

5.3 Legal Capability Review

As a general rule, local governments have only that legal authority which is not expressly prohibited to them by their home state. This principle, that all power is vested in the State and can only be exercised to the extent it is delegated, is known as "Home Rule" and applies to all South Carolina political subdivisions.

Any mitigation measures that are undertaken by the local government in its regulatory capacity must be worded and enforced carefully within the parameters established by the state and federal constitutions, even when such measures are authorized by the General Statutes of South Carolina, and even when such measures are enacted in order to protect public health and safety by protecting the community from the impacts of natural hazards.

Within the limits of home rule and the federal and state constitutions, local governments in South Carolina have a wide latitude within which to institute mitigation programs, policies, and actions. All local government powers fall into one of four basic groups (although some governmental activities may be classified as more than one type of power): regulation, acquisition, taxation, and spending. Hazard mitigation measures can be carried out under each of the four types of powers. Following is a list of these powers and how they may be useful tools for hazard mitigation:

1. Regulation

a. General Police Power

Local governments in South Carolina may exercise regulatory powers in their jurisdictions. South Carolina General Statutes allow for exercise of the general police power on local governments, allowing them to enact and enforce ordinances which define, prohibit, regulate, or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health nuisances). Since hazard mitigation can be included under the police power (as protection of public health, safety, and welfare), towns, cities, and counties may include requirements for hazard mitigation in local ordinances. Local governments may also use their ordinance-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard.

b. Building Codes and Building Inspections

Many structural mitigation measures involve constructing and retrofitting homes, businesses, and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through the building code. South Carolina has a state compulsory building code which applies throughout the state. However, municipalities and counties may adopt codes for the respective areas if approved by the state as providing "adequate minimum standards." However, local regulations cannot be less restrictive than the State Code.

Local governments in South Carolina are also empowered to carry out building inspections. Cities have the responsibility to create an inspection department and enumerate its duties and responsibilities, which include enforcing state and local laws relating to the construction of buildings; installation of plumbing, electrical, heating systems, etc.; building maintenance; and other matters.

c. Land Use

Regulatory powers afforded local governments are the most basic manner in which a local government can control the use of land within its jurisdiction. Through various land use regulatory powers, a local government can control the amount, timing, density, quality, and location of new development; all these characteristics of growth can determine the level of vulnerability of the community in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, and to enact and enforce zoning ordinances and floodplain ordinances.

Floodway Regulation: Flood zone regulations state that the channel and a portion of the floodplain of all the state's streams will be designated as a floodway, either by the local government or by the state. The legislatively declared purpose of designating these areas as a floodway is to help control and minimize the extent of floods by preventing obstructions which inhibit water flow and increase flood height and damage and other losses (both public and private) in flood hazard areas, and to promote the public health, safety, and welfare of citizens of South Carolina in flood hazard areas.

To carry out this purpose, local governments are empowered to grant permits for the use of the floodways, including the placement of any artificial obstruction in the floodway. No permit is required for certain uses, including agricultural, wildlife and related uses; and ground level uses such as lawns, gardens, picnic grounds, play areas, hiking, horseback riding trails, parks, open space; and similar private and public recreational uses provided that they do not employ structures and fill. Existing artificial obstructions in the floodway may not be enlarged or replaced without a permit; local governments are empowered to acquire existing obstructions by purchase, exchange, or condemnation if necessary to avoid flood damages.

The procedures that are laid out for issuing permits for floodway use require the local government to consider the dangerous effects a proposed artificial obstruction may create by causing water to be backed

up or diverted; or the danger that the obstruction will be swept downstream to the injury of others; and by the injury or damage that may occur at the site of the obstruction itself. Local governments are to take into account anticipated development in the foreseeable future which may be adversely affected by the obstruction, as well as existing development.

Planning: In order to exercise the regulatory powers allowed through state law, local governments in South Carolina are required to create or designate a planning agency. The planning agency may perform a number of duties, including: make studies of the area; determine objectives; prepare and adopt plans for achieving those objectives; develop and recommend policies, ordinances, and administrative means to implement plans; and perform other related duties.

2. Acquisition

The power of acquisition can be a useful tool for pursuing mitigation goals. Local governments may find the most effective method for completely "hazard-proofing" a particular piece of property or area is to acquire the property (either in fee or a lesser interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. South Carolina legislation enables cities, towns, and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease, or eminent domain.

3. Taxation

Taxation is yet another power afforded to local governments by South Carolina law which can be used as a hazard mitigation tool. The power of taxation extends beyond merely the collection of revenue. Many communities set preferential tax rates for areas which are unsuitable for development (e.g., agricultural land, wetlands) and can be used to discourage development in hazardous areas.

Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending, or otherwise building or improving beach erosion control or flood and hurricane protection works within a designated area. This practice can serve to increase the cost of building in such areas, thereby discouraging development.

Because the usual methods of apportionment seem mechanical and arbitrary, and because the burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of services a city deems necessary within its boundaries. In addition, special assessments are useful in distributing to the new property owners the costs of the infrastructure required by new development.

4. Spending

The fourth major power that is provided for local governments through South Carolina law is the power to make expenditures in the public interest. Hazard mitigation principles should be made a routine part of all spending decisions made by the local government, including annual budgets and capital improvement plans.

A capital program is usually a timetable by which a city indicates the timing and level of municipal services it intends to provide over a specified duration. Capital programming, by itself, can be used as a growth management technique or hazard mitigation tool. By tentatively committing itself to a timetable for the provision of capital to extend municipal services, a community can control its growth to some extent. In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to municipal/utility services.

A Capital Improvement Program (CIP) that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth if the CIP is effective in directing growth away from environmentally sensitive or high hazard areas.

5.4 Fiscal Capability Review

There are many diverse sources of funding available to communities to implement local hazard mitigation plans, including both government and private programs. Often an organization with a particular focus will fund only part of a project. However, with coordination, the community can combine the funding efforts of one program with those of another, thereby serving multiple missions. The grant and loan programs described in the following pages of this plan are a significant, although certainly not a sole, source of funding options.

While federal and national programs carry out the bulk of disaster relief programs providing funds for mitigation, local governments are encouraged to open the search field as wide as possible, and include alternative funding sources to supplement the local hazard mitigation budget. For instance, local businesses and organizations will frequently support projects that benefit their customers or employees, or which constitute good "PR." Other groups or individuals may be willing to donate "in-kind" services, eliminating the need for cash. Often the in-kind and volunteer services of local community members can be counted toward the local share that is typically needed to match an outside source of funds.

Local governments may also engage in their own "fund-raising" efforts to pay for mitigation programs that benefit the community at large. The State of South Carolina has conferred upon cities, towns, and counties the power to levy property taxes for various purposes, including: ambulance services, rescue

squads, and other emergency medical services; natural disasters (flood protection); civil defense; drainage projects or programs; fire protection; hospitals; joint undertakings with other county, city, or political subdivisions; planning; sewage; solid waste; water; water resources; and watershed improvement projects. Thus, local governments are empowered to finance certain emergency management activities, including mitigation activities, with property taxes.

The following is a list and description of several funding sources which should be considered throughout the implementation of this plan for hazard mitigation, redevelopment, and post- disaster recovery:

- **Staff Resources** – Where possible the implementing actions outlined in Section 7 will be carried out by City staff through coordination with City, County, and regional agencies. Implementation of this plan through staff efforts will minimize the cost, and will serve to leverage funding required for action items needing financial backing.
- **General Funding** – If deemed necessary, several of the action items listed will require expenditures through the City’s general fund. Some of these expenses may come from departmental budgets or may be appropriated through the annual City Budget Ordinance.
- **Enterprise Funding** – This funding source refers to revenue generated through the sewer use fees. This is component of the City’s annual Budget process.
- **Federal Funding** – There are many federally-sponsored grant programs that may assist the City in implementing actions recommended through this plan. A comprehensive list of potential federal funding sources has been provided in Appendix M - B of this plan.

5.5 Political Acceptability Review

This subsection of the plan is intended to address the City’s “political willpower” to address hazards threats in a proactive manner. This “political willpower” is a significant component of a community’s capability to implement hazard mitigation. It is, however, a very difficult factor to assess and evaluate as it is constantly changing based on the turnover in elected officials and the (perceived and actual) frequency and severity of natural hazard events.

The following principles of political acceptability are applicable to the implementation of this plan, including all implementing actions outlined in Section 7:

- Independent of existing regulations that directly address hazard mitigation (e.g., floodplain management ordinance), hazard mitigation is not a goal that should be addressed *independent of* other goals and objectives of the City, due to limited local government resources; and
- Hazard mitigation should be considered and incorporated into policies, procedures and programs which affect land use and development, such as placement of roadways, location and building of public facilities, zoning ordinances, and extension of infrastructure necessary for growth; and
- Local revenues are insufficient to support hazard mitigation projects for mitigation of existing hazards at the local level; however, Federal and State grant funds for priority hazard mitigation projects should be pursued when available.
- One of local government's primary roles in implementing hazard mitigation is educating the public about the risks of natural hazards and how to reduce these risks and/or the costs of these risks.

Section SIX

MITIGATION STRATEGIES

6.1 Introduction

In order to establish this Hazard Mitigation Plan, the MDMC was charged with developing goals and objectives with specific implementing actions tied to each of the goal statements. The following provides definitions of how goals, objectives, and implementing action relate to one another:

- **Goals** – A broad based statement of intent that establishes the direction for the City of Mauldin Hazard Mitigation Plan. Goals state desired outcomes for the overall implementation process.
- **Objective** – The stated means of achieving each defined goal, or tasks to be executed in the process of achieving stated goals.
- **Implementing Actions** – A project specific strategy aimed at mitigation and involving a specific entity, interest, and funding mechanism.

The following table outlines the goals and objectives that the Mauldin Disaster Mitigation Committee used to guide development of the Hazard Mitigation Plan. The goals and objectives helped focus the group in the mitigation planning effort to achieve an end result that matches the unique needs of the Mauldin community.

TABLE 1: CITY OF MAULDIN MITIGATION GOALS AND OBJECTIVES

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|----------------------|--|
| Goal 1 | The City will have the capability to develop, implement, and maintain effective mitigation programs. |
| Objective 1.1 | The effectiveness of mitigation initiatives implemented in the community will be measured and documented. |
| Objective 1.2 | There will be a program to derive mitigation “lessons learned” from each significant disaster event occurring in or near the community. |
| Objective 1.3 | Up-to-date technical skills in mitigation planning and programming will be available as a resource to the community. |
| Objective 1.4 | Monitoring of pre and post mitigation programming will be given to appropriate local government employees. |
| Goal 2 | The City will have the capability to initiate and sustain emergency response operations during and after a disaster. |
| Objective 2.1 | Emergency services organizations will have the capability with personnel and equipment to detect emergency situations and promptly initiate emergency response operations. |

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| Objective 2.2 | Communication systems supporting emergency service operations will be available to provide for effective communications during times of disaster. |
| Objective 2.3 | Designated evacuations shelters will be capable of operating during and after disaster events. |
| Objective 2.4 | Local emergency services facilities will be assessed and City-owned service facilities will be capable of operating during a disaster event. |
| Objective 2.5 | Evacuation plans and routes shall be evaluated for known hazard areas. |
| Objective 2.6 | An independent, local response/communication plan will be developed for both immediate and long-term disaster events. |
| Goal 3 | The continuity of local government operations will not be significantly disrupted by disasters. |
| Objective 3.1 | Important local government records and documents will be protected from the impacts of disasters. |
| Objective 3.2 | Measures will be implemented to alert City personnel of impending disasters and corresponding action plans. |
| Objective 3.3 | City employees will be trained in disaster response and operations. |
| Objective 3.4 | Plans will be developed, and resources identified, to facilitate reestablishing local government operations after a disaster. |
| Goal 4 | The policies and regulations of the local government will support effective hazard mitigation programming throughout the community. |
| Objective 4.1 | All reconstruction or rehabilitation of local government facilities will incorporate techniques to minimize the physical or operational vulnerability to disasters. |
| Objective 4.2 | Land use policies, plans and regulations will discourage or prohibit inappropriate location of structures or infrastructure components in areas of higher risk. |
| Objective 4.3 | Local governments will establish and enforce building and land development codes that are effective in addressing the hazards threatening the community. |
| Objective 4.4 | New city owned facilities will be located outside of hazard areas and/or will be designed to not be vulnerable to the impacts of such hazards. |
| Objective 4.5 | Regulations will be established and enforced to ensure that public and private property maintenance is consistent with minimizing vulnerabilities to disaster. |
| Objective 4.6 | The City will continue to participate in the National Flood Insurance Program and will evaluate the benefits associated with joining the Community Rating System. |
| Goal 5 | The availability and functioning of the community's infrastructure will not be significantly disrupted by a disaster. |
| Objective 5.1 | The City will encourage hazard mitigation programming by private sector organizations owning or operating key community utilities. |
| Objective 5.2 | Routine maintenance of the community's infrastructure will be done to minimize the potential for system failure because of or during a disaster. |
| Objective 5.3 | Transportation facilities and systems serving the community will be constructed and/or retrofitted to minimize the potential for disruption during a disaster. |

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| Objective 5.4 | New city owned facilities will be located outside of hazard areas and/or will be designed to not be vulnerable to the impacts of such hazards. |
| Objective 5.5 | The City will establish and enforce building and land development codes that are effective in addressing the hazards threatening the community. |
| Objective 5.6 | Effective communication and coordination with State and Federal transportation entities, and local utility providers will minimize the potential of system failure during a disaster. |
| Goal 6 | The Mauldin community will understand the hazards threatening the area and will be informed of the techniques to minimize vulnerability to those hazards through public education. |
| Objective 6.1 | Education programs in risk communication and hazard mitigation will be established and implemented. |
| Objective 6.2 | The public will have facilitated access to information needed to understand their vulnerability to disasters and effective mitigation techniques. |
| Objective 6.3 | The public will have access to available resources necessary to determine vulnerability of hazards affecting their property and /or community. |
| Goal 7 | Key City employees will be trained to recognize hazards threatening local areas and the techniques to minimize vulnerability to those hazards. |
| Objective 7.1 | Interested individuals will be encouraged to participate in hazard mitigation planning and training activities. |
| Objective 7.2 | Managers of city owned facilities and public facilities will be knowledgeable in hazard mitigation techniques and the components of the City's mitigation plan. |
| Objective 7.3 | Technical training in mitigation planning and programming will be given to appropriate local government employees. |
| Goal 8 | The City will implement measures to protect the health, safety and welfare of the community when threatened by natural and man-made disasters |
| Objective 8.1 | Provisions will be provided to ensure adequate human relief during and following natural and man-made disasters. |
| Objective 8.2 | There will be adequate resources, equipment, and supplies to meet victim's health, and safety needs after a disaster. |
| Objective 8.3 | The vulnerability to disasters of schools, libraries, and other institutions important to the daily lives of the community will be minimized. |
| Objective 8.4 | Response capabilities will be available to protect special needs individuals from disaster's health and safety impacts. |
| Objective 8.5 | Facilities in the community posing an extra health or safety risk when damaged or disrupted will be made less vulnerable to the impacts of a disaster. |

6.2 Mitigation Strategies

In formulating the Mitigation Strategy for the City of Mauldin, a wide range of activities were considered in order to help achieve the established mitigation goals, in addition to addressing any specific hazard concerns. These activities were discussed during the Mauldin Disaster Mitigation Committee (MDMC) meetings. In general, all activities considered by the MDMC can be classified under one of the following six (6) broad categories of mitigation techniques:

- **Preventative Measures:** activities intended to keep hazard problems from getting worse, and are typically administered through government programs or regulatory actions that influence the way land is developed and buildings are built. They are particularly effective in reducing a community's future vulnerability, especially in areas where development has not occurred or capital improvements have not been substantial. Examples of preventative activities include regulatory methods such as: planning and zoning, building regulations, open space preservation, floodplain regulations and stormwater management, drainage system maintenance, and capital improvement programming.
- **Property Protection** includes actions that diminish the risk of structural damage through acquisition of land, relocation of buildings, building elevation, critical facilities protection, modifying high-risk structures, and flood-proofing high-risk structures.
- **Natural Resource Protection** includes activities that reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, and steep slopes. Examples include: floodplain protection, watershed management, riparian buffers, forest and vegetation management (e.g., fire resistant landscaping, fuel breaks, etc.), erosion and sediment control, wetland preservation and restoration, habitat preservation and slope stabilization.
- **Emergency Services** measures, although not typically considered a "mitigation" technique do minimize the impact of a hazard event on people and property. These are commonly actions taken immediately prior to, during, or in response to a hazard event. Examples would include: warning systems, evacuation planning and management, emergency response training and exercises, and sandbagging for flood protection.
- **Structural Mitigation** projects are intended to lessen the impact of a hazard by modifying the environmental natural progression of the hazard event through construction. They are usually designed by engineers and managed or maintained by public works staff. Examples include: channel modifications and storm sewers, diversion, detention and retention systems.

- **Public Education and Awareness** activities are used to advise residents, elected officials, business owners, potential property buyers, about hazards, hazardous areas, and mitigation techniques they can use to protect themselves and their property. Examples of measures to educate and inform the public include: Outreach projects, speaker series / demonstration events, hazard map information, real estate disclosure, library materials, school children educational programs and hazard expositions.

6.3 SELECTION OF MITIGATION TECHNIQUES

In order to determine the most appropriate mitigation techniques for the City of Mauldin, the MDMC members thoroughly reviewed and considered the findings of the Capability Assessment and Risk Assessment to determine the best activities for the community. Other considerations included the effect of each mitigation action on overall risk to life and property, its ease of implementation, its degree of political and community support, its general cost-effectiveness, and funding availability (if necessary).

Section Seven MITIGATION ACTION PLAN

7.1 Introduction

The Mitigation Action Plan, or MAP, provides a functional plan designed to achieve the mitigation goals established in Section 6: Mitigation Strategy, and will be maintained on a regular basis according to the plan maintenance procedures established in Section 8: Plan Maintenance Procedures.

Each proposed mitigation action has been identified as an effective measure (policy or project) to reduce the hazard risk for City of Mauldin. Each action is listed in the MAP in conjunction with background information such as priority, hazard(s) addressed and potential funding sources to implement the action should funding be required (not all proposed actions are contingent upon funding). Most importantly, implementation mechanisms are provided for each action, including the designation of a lead agency or department responsible for carrying the action out as well as a timeframe for its completion. These implementation mechanisms ensure that the City of Mauldin's Hazard Mitigation Plan remains a functional document that can be monitored for progress over time. The proposed actions are not listed in priority order, though each has been assigned a priority level of "high," "moderate" or "low" as described below.

Table 1: Key Elements of the Mitigation Action Plan

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|---|---|
| Hazard Addressed: | Hazard which the action addresses |
| Category: | Category of Mitigation Strategy that is met: Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, Public Education and Awareness |
| Goal / Objective Addressed: | Identifies the goal and objective that the action addresses from Section Six, Mitigation Strategies |
| Priority (High, Moderate, Low): | Prioritizing mitigation actions was based on the following four (4) factors: (1) effect on overall risk to life and property; (2) Ease of implementation; (3) political and community support; and (4) funding availability. |
| Lead Department Responsible/ Supported by: | Department(s) responsible for undertaking the action. |
| Potential Funding Sources: | Local, State, or Federal sources of funds are noted here, where applicable. |

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| Implementation Schedule: | Date by which the action the action should be completed. More information is provided when possible. |
|---------------------------------|---|

Section 7.2 MAULDIN Mitigation Action Plan

Hazards Addressed: 1 Severe Winter Weather/Ice Storm; 2 Severe Weather/ Thunderstorm; 3 Flooding; 4 Hail; 5 Lightning; 6 Drought/ Extreme Heat; 7 Tornado; 8 Hazardous Materials; 9 Rail Corridor

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 1 | Coordinate with local relief groups (i.e. the Red Cross) to promote public training classes and events related to hazard preparation. |
| Hazard Addressed: | All hazards |
| Category: | Public Education and Awareness |
| Goal/ Objective Addressed: | Goal 1: 1.1, Goal 6: 6.1,6.2 |
| Priority (High, Moderate, Low): | Moderate |
| Lead Department Responsible: | Fire |
| Supported by: | Police and Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 2-4 years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 2 | Set up a procedure for the Mauldin Disaster Mitigation Committee (MDMC) and other emergency management teams to meet following disaster to review response effectiveness and mitigation needs. |
| Hazard Addressed: | All hazards |
| Category: | Emergency Services, Preventative Measures |
| Goal / Objective Addressed: | Goal 1: 1.2 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Administration |
| Supported by: | Fire, Police, Business & Development, Public Works |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--------------------------|--|
| # 3 | Identify special needs populations and establish procedures for |

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| | providing transportation to shelters in case of a natural or man-made disaster. |
| Hazard Addressed: | All hazards |
| Category: | Emergency Services |
| Goal / Objective Addressed: | Goal 2: 2.3, and 8: 8.4 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Police |
| Supported by: | Fire |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1 – 2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 4 | Provide emergency back-up power to designated city owned critical facilities that are deemed for use during a disaster. |
| Hazard Addressed: | All Hazards |
| Category: | Emergency Services |
| Goal / Objective Addressed: | Goal: 2: 2.1,2.2, 2.4 and 3: 3.4 |
| Priority (High, Moderate, Low): | Low – several city buildings already have backup generators |
| Lead Department Responsible: | Public Works Fire, Administration |
| Support by: | |
| Potential Funding Sources: | General Funding, State or Federal Grant Funding |
| Implementation Schedule: | 4-5 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 5 | Review all city owned building projects to prevent location in hazardous areas and ensure construction mitigates for the risk of potential hazards. |
| Hazard Addressed: | 3, 8, 9 |
| Category: | Property Protection, Preventative Measures, Natural Resources |
| Goal / Objective Addressed: | Goal: 4: 4.4,4.5, and 5: 5.4,5.5 |
| Priority (High, Moderate, Low): | Low – no new public facilities are proposed at this time |
| Lead Department Responsible: | Business and Development Services |
| Supported by: | Fire, Administration |
| Potential Funding Sources: | Staff Resources, General Fund, State or Federal Funding |
| Implementation Schedule: | On going |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|---------------------------------|--|
| # 6 | Examine ways to identify and acquire parcels of land subject to the effects of disasters that could provide parks and open space in the community. |
| Hazard Addressed: | 3, 8, 9 |
| Category: | Property Protection, Preventative Measures, Natural Resource Protection |
| Goal / Objective Addressed: | Goal: 1: 1.4, 4: 4.6, and 7: 7.3 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible | Lead: Business & Development Services |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources, State and Federal Grant Funding |
| Implementation Schedule: | 1 -2 years, On -going |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|---------------------------------|---|
| # 7 | Review local codes to determine if they address the hazards identified for the community; make amendments, as needed. |
| Hazard Addressed: | All Hazards |
| Category: | Preventative Measures, Natural Resource Protection, Property Protection |
| Goal / Objective Addressed: | Goal: 4: 4.2,4.3,4.5 and 7:7.2, 7.3 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Lead: Business & Development Services |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1 -2 year, On-going |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|---------------------------------|--|
| # 8 | Identify roadways and traffic systems susceptible to natural and man-made hazards (i.e. flooding, chemical spills) and prioritize improvement projects to minimize disruption to the roadways. |
| Hazard Addressed: | 3, 8, 9 |
| Category: | Property Protection, Structural Mitigation, Preventative Measures |
| Goal / Objective Addressed: | Goal: 2: 2.5, 5: 5.2, 5.3, 5.6 |
| Priority (High, Moderate, Low): | Moderate |

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| Lead Department Responsible | Public Works |
| Supported by: | Fire, Business and Development |
| Potential Funding Sources: | Staff Resources, General Fund, State and Federal Grant Funding |
| Implementation Schedule: | 2-4 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 9 | Develop a display to be used at public events to provide information on natural hazards that threaten the area and what individuals can do reduce risks. |
| Hazard Addressed: | All Hazards |
| Category: | Public Education and Awareness, Preventative Measures |
| Goal / Objective Addressed: | Goal: 6: 6.1, 6.2 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible | Administration |
| Supported by: | Business and Development Services, Fire, Police, Public Works |
| Potential Funding Sources: | Staff Resources, General Fund |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 10 | Utilize the media for the distribution and publication of hazard information to promote pre-disaster planning. (i.e. website, news releases and regular public relation pieces to local newspapers and radio stations). |
| Hazard Addressed: | All Hazards |
| Category: | Public Education and Awareness. Preventative Measures |
| Goal / Objective Addressed: | Goal: 6: 6.1, 6.2 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible | Administration |
| Supported by: | Business and Development Services, Fire |
| Potential Funding Sources: | Staff Resources, General Fund |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--------------------------|--|
| # 11 | Identify stormwater drainage system failures and improve/repair capability of system to prevent localized flooding. |
| Hazard Addressed: | 1, 2, 3 |

| | |
|--|---|
| Category: | Preventative, Structural Mitigation, Property Protection, Natural Resource Protection |
| Goal / Objective Addressed: | Goal: 5:5.2, 5.6 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible | Public Works |
| Supported by: | Business and Development Services |
| Potential Funding Sources: | Staff Resources, General Fund, State and Federal Grant Funding |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 12 | Provide information to residents of the community regarding flood insurance, and NFIP standards. |
| Hazard Addressed: | 1, 2, 3 |
| Category: | Public Education and Awareness, Preventative, Property Protection |
| Goal / Objective Addressed: | Goal: 4, 4:6, and 6: 6.1, 6.2, 6.3 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible | Business & Development Services |
| Supported by: | Administrative |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 13 | Continue coordination and permitting efforts with Greenville County Land Development to enforce erosion control, and stormwater management for development projects within the city limits. |
| Hazard Addressed: | 1, 2, 3 |
| Category: | Preventative, Natural Resource Protection, Property Protection |
| Goal / Objective Addressed: | Goal 4: 4.2, 4.3, 4.5 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible | Business and Development Services |
| Supported by: | Public Works |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | Ongoing |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|-------------------|---|
| # 14 | Develop a Debris Removal Plan for the removal and storage of |

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| | storm debris. |
| Hazard Addressed: | 1,2,3,7 |
| Category: | Emergency Services, Natural Resource Protection |
| Goal / Objective Addressed: | Goal 2: 2.5,2.6,and 8:8.1, 8.2 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Public Works |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources, General Fund, State and Federal funding |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 15 | Update and improve evacuation plans to provide for safe evacuation routes prior to or following natural and manmade disasters. |
| Hazard Addressed: | 3,7,8,9 |
| Category: | Emergency Services, |
| Goal / Objective Addressed: | Goal 5, 5.2, 5.6 and 8: 8.2, 8.4 |
| Priority (High, Moderate, Low): | Moderate |
| Lead Department Responsible: | Fire |
| Supported by: | Police, Public Works |
| Potential Funding Sources: | Staff Resources, General Funds |
| Implementation Schedule: | 2-4 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 16 | Identify and analyze all city owned facilities to determine which structures may qualify for short and long term shelters. |
| Hazard Addressed: | 1,3,6, 7,8,9 |
| Category: | Emergency Services |
| Goal / Objective Addressed: | Goal: 2:2.3 and 8: 8.1,8.2 |
| Priority (High, Moderate, Low): | Moderate |
| Lead Department Responsible: | Fire |
| Supported by: | Police Administration |
| Potential Funding Sources: | Staff Resources, General Fund, State and Federal Funding |
| Implementation Schedule: | 2-4 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
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| # 17 | Survey critical emergency response facilities to identify risks posed to structures and seek funding to mitigate the problems. |
| Hazard Addressed: | All hazards |
| Category: | Emergency Services |
| Goal / Objective Addressed: | Goal: 2:2.4, and 3: 3.4 |
| Priority (High, Moderate, Low): | Moderate |
| Lead Department Responsible: | Fire |
| Supported by: | Public Works, Administration |
| Potential Funding Sources: | Staff Resources, General Fund |
| Implementation Schedule: | 2-4 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 18 | Formalize and update the local and regional shelter plan with Greenville County, and the American Red Cross, including shelter identification and staffing plans for various types/magnitudes of disasters. |
| Hazard Addressed: | 1,3,8,9 |
| Category: | Emergency Services |
| Goal / Objective Addressed: | Goal 2: 2.3, 2.6, and 8: 8.1, 8.2 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Fire |
| Supported by: | Police, Administration |
| Potential Funding Sources: | Staff Resources, General Funds |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|---------------------------------------|--|
| # 19 | Develop an annual disaster response training plan for city fire/EMS and police departments and improve capability of city to respond independently to small-scale and large-scale disaster events and to improve the integration of city staff/equipment into response parameters required by county EOP's. |
| Hazard Addressed: | All Hazards |
| Category: | Emergency Services |
| Goal / Objective Addressed: | Goal 1: 1.3, 2: 2.3, 2.5,2.6 and 8: 8.1, 8.2 |
| Priority (High, Moderate,Low): | Low |
| Lead Department Responsible: | Fire |
| Supported by: | Police, Administration |

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| Potential Funding Sources: | Staff Resources, General Funds |
| Implementation Schedule: | 4-5 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 20 | Increase coordination with neighboring jurisdictions with regards to hazard mitigation planning, permitting and land use development. |
| Hazard Addressed: | All hazards |
| Category: | Emergency Services, Preventative Measures, Natural Resource Protection, Property Protection |
| Goal / Objective Addressed: | Goal 2: 2.1,2.2, 2.5 and 3: 3.2, 3.4, and 4: 4.2, 4.4, 4.5 and 5: 5.2, 5.6 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Business and Development Services |
| Supported by: | Fire, Police, Public Works, Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1-2 years, Ongoing |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 21 | Conduct a PR campaign with the school system for education regarding potential hazards and emergency response plans for natural and man-made disasters. |
| Hazard Addressed: | All hazards |
| Category: | Public Education and Awareness, Emergency Services |
| Goal / Objective Addressed: | Goal: 2: 2.5, 2.6 6: 6.1 and 8: 8.3 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Police |
| Supported by: | Fire, Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--------------------------|--|
| # 22 | Strictly adhere to building, zoning, and Flood Damage Preventative ordinances adopted by the State and local government to minimize vulnerabilities to hazards. |
| Hazard Addressed: | 3, 5, 8 |
| Category: | Preventive Measures, Natural Resource Protection, Property |

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|---------------------------------------|--|
| | Protection, Structural Mitigation |
| Goal / Objective Addressed: | Goal: 1: 1.1, 1.3 and 4: 4.2, 4.3,4.5,4.6 and 5: 5.5 |
| Priority (High, Moderate,Low): | High |
| Lead Department Responsible: | Business and Development Services |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1-2 Years, Ongoing |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 23 | Establish data back-up options for critical data that is easily removed and accessed at different locations in case evacuations of public facilities is necessary. |
| Hazard Addressed: | All hazards |
| Category: | Emergency Services, Preventative |
| Goal / Objective Addressed: | Goal 2: 2.2, 3: 3.1, 3.4 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Administration |
| Supported by: | Fire |
| Potential Funding Sources: | Staff Resources, General Fund |
| Implementation Schedule: | 1-2 Years, Ongoing |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 24 | Analyze options of an early warning system for tornado's affecting the Mauldin area. |
| Hazard Addressed: | 7 |
| Category: | Prevention, Emergency Services |
| Goal / Objective Addressed: | Goal: 2: 2.2 and 8: 8.3 |
| Priority (High, Moderate, Low): | Low |
| Lead Department Responsible: | Fire |
| Supported by: | Police, Administration |
| Potential Funding Sources: | Staff Resources, State and Federal Grant Funding |
| Implementation Schedule: | 4-5 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|-------------------|---|
| # 25 | Monitor state and federal grant programs for opportunities that allow for the funding of expanded or improved communication equipment. |

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| Hazard Addressed: | All Hazards |
| Category: | Preventative Measures, Emergency Services |
| Goal / Objective Addressed: | Goals: 1: 1.4, 2: 2.2 |
| Priority (High, Moderate, Low): | Moderate |
| Lead Department Responsible: | Police |
| Supported by: | Fire, Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 2-4 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 26 | Provide more specific analysis of manmade hazards associated with the railroad corridor within the city's planning jurisdiction, identify high risk development along this corridor, and prioritize proposed property protection initiatives. |
| Hazard Addressed: | 8,9 |
| Category: | Preventative Measures, Property Protection |
| Goal / Objective Addressed: | Goal: 5: 5.3, 5.5 and 8: 8.1, 8.3, 8.5 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Business and Development Services |
| Supported by: | Fire, Administration |
| Potential Funding Sources: | Staff Resources, General Fund |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 27 | Develop a zoning overlay district along the railroad corridor that would serve to reduce subsequent development density, mitigate negative impacts, and preserve open space along the corridor. |
| Hazard Addressed: | 8,9 |
| Category: | Preventative Measures, Property Protection |
| Goal / Objective Addressed: | Goal: 5: 5.3, 5.5 and 8: 8.1, 8.3, 8.5 |
| Priority (High, Moderate, Low): | Moderate |
| Lead Department Responsible: | Business and Development Services |
| Supported by: | Fire, Administration |
| Potential Funding Sources: | Staff Resources, General Fund |
| Implementation Schedule: | 2 -4 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|-------------------|---|
| # 28 | Provide an annual review of development restrictions in floodplain |

| | |
|--|---|
| | areas and incorporate measures and design standards that limits density of development in floodplains, prohibits fill in the floodplain, and incorporates a stream buffer requirement to protect water resources and limit flood impacts. |
| Hazard Addressed: | 3 |
| Category: | Preventative Measures, Property Protection, Natural Resource Protection |
| Goal / Objective Addressed: | Goal: 4:4.2,4.3, 4.6 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Business & Development Services |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1-2 Years, Ongoing |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 29 | Maintain map of floodplain and flood prone areas on city website and at building inspection offices. |
| Hazard Addressed: | 3 |
| Category: | Preventative Measures, Property Protection |
| Goal / Objective Addressed: | Goal: 4:4.2, 4.6 , 6: 6.3 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Business & Development Services |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1-2 Years, Ongoing |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 30 | Establish and maintain a comprehensive GIS inventory of the existing city-maintained storm drainage system. |
| Hazard Addressed: | 1,2,3 |
| Category: | Preventative, Structural Mitigation |
| Goal / Objective Addressed: | Goal: 5.2,5.3,5.6 and |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Public Works |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources, General Fund |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 31 | Identify and map stormwater "hot spots" and develop a prioritized capital improvement plan for upgrade of substandard storm drainage components. |
| Hazard Addressed: | 1,2,3 |
| Category: | Preventative, Structural Mitigation |
| Goal / Objective Addressed: | Goal: 5.2,5.3,5.6 and |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Public Works |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources, General Fund, CIP, State and Federal Funding |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 32 | Identify areas for periodic clearing and maintenance of streams and watercourses in flood prone areas. |
| Hazard Addressed: | 3 |
| Category: | Preventative Measures, Property Protection |
| Goal / Objective Addressed: | Goal: 5: 5.2, 5.6 and 6: 6.1, 6.2 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Public Works |
| Supported by: | Business and Development Services, Administration |
| Potential Funding Sources: | Staff Resources, State and Federal Funding |
| Implementation Schedule: | 1-2 years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|--|
| # 33 | Educate and encourage owners of critical facilities to retrofit for lightning protection and evaluate city's public facilities lightning protection capabilities. |
| Hazard Addressed: | 5 |
| Category: | Preventative Measures, Property Protection |
| Goal / Objective Addressed: | Goal: 2: 2.3, 2.4 and 6: 6.2, 6.3 |
| Priority (High, Moderate, Low): | Moderate |
| Lead Department Responsible: | Business and Development Services |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 2-4 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|---------------------------------|--|
| # 34 | Evaluate rail crossing risks and develop schedule for mitigation of traffic hazards at high-risk rail crossings; incorporate this information into public awareness efforts. |
| Hazard Addressed: | 8,9 |
| Category: | Preventative Measures, Property Protection |
| Goal / Objective Addressed: | Goal: 5:5.1, 5.3 and 8:8.3 |
| Priority (High, Moderate, Low): | Moderate |
| Lead Department Responsible: | Administration |
| Supported by: | Fire |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 2-4 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|---------------------------------|--|
| # 35 | Incorporate into the City's Comprehensive Plan, "risk mapping" components of the hazard mitigation plan, including mapping of vulnerable critical facilities and residential/commercial development. |
| Hazard Addressed: | 8,9 |
| Category: | Preventative Measures, Property Protection |
| Goal / Objective Addressed: | Goal: 1: 1.1, 1.3, 4: 4.2, 4.3, 4.5, and 8: 8.1, 8.3, 8.5 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Business and Development Services |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1-2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|---------------------------------|--|
| # 36 | Evaluate Industrial Zoning District locations and development standards to address development density, separation of incompatible uses, and mitigation of negative impacts. |
| Hazard Addressed: | 8,9 |
| Category: | Preventative Measures, Property Protection |
| Goal / Objective Addressed: | Goal: 1: 1.1, 1.3, 4: 4.2, 4.3, 4.5, and 8: 8.1, 8.3, 8.5 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Business and Development Services |

Appendix M
City of Mauldin
Multi-Hazard Mitigation Plan

| | |
|-----------------------------------|-------------------------------|
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources, General Fund |
| Implementation Schedule: | 1 -2 Years |

| MITIGATION ACTION | TITLE OF ACTION (DESCRIPTION OF ACTION TO BE TAKEN) |
|--|---|
| # 37 | Mitigate flooding and stormwater run-off by limiting the percentage of impervious surfaces on undeveloped and developed parcels and by encouraging the use of pervious pavement, vegetative buffers, and islands in large parking areas. |
| Hazard Addressed: | 3 |
| Category: | Preventative Measures, Property Protection, Natural Resources Protection |
| Goal / Objective Addressed: | Goal: 4:4.2, 4.6 , 6: 6.3 |
| Priority (High, Moderate, Low): | High |
| Lead Department Responsible: | Business & Development Services |
| Supported by: | Administration |
| Potential Funding Sources: | Staff Resources |
| Implementation Schedule: | 1-2 Years, Ongoing |

Section Eight

PLAN MAINTENANCE AND IMPLEMENTATION PROCEDURES

8.1 Implementation and Integration

The City of Mauldin Hazard Mitigation Plan will commence with adoption of the document by the City Council. The Resolution of Adoption has been provided in Appendix M-B, RES-1. Upon adoption, the City of Mauldin Hazard Mitigation Plan faces the truest test of its worth; implementation. Implementation implies two concepts: action and priority. These are closely related. While this plan puts forth many worthwhile and high priority recommendations, the decision about which action to undertake first will be the first task facing the Mauldin Disaster Mitigation Committee (MDMC). There are two factors to consider in making that decision; the priority of the item and available funding. Thus, pursuing low or no-cost high-priority recommendations will have the greatest likelihood of success.

Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other city plans and regulatory mechanisms, such as the Capital Improvements Plan and the Mauldin Comprehensive Plan, currently underway. The City will utilize this plan as a starting point toward implementing policies and programs to reduce losses to life and property from natural hazards.

Hazard Mitigation is only successful when it is incorporated into the day-to-day functions and priorities of government and development. This integration is accomplished by constant efforts to network, identify, and highlight the multi-objective benefits to each program, and its stakeholders. This effort is achieved through the routine actions of monitoring implementation efforts, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and review of city and county programs for coordination and regional 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 more costly recommended actions. This will include creating and maintaining a bank of ideas on how any required local match or participation requirement can be met. When funding does become available, the MDMC will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, special district budgeted funds, state or federal earmarked funds, and grant programs, including those that can serve or support multi-objective implementing actions.

8.2 Role of the Mitigation Disaster Committee in Implementation and Maintenance

Each department involved in the City of Mauldin Hazard Mitigation is responsible for implementing specific mitigation actions as prescribed in the Mitigation Action Plan. Every proposed action listed in the Mitigation Action Plan is assigned to a specific “lead” agency or department in order to assign responsibility and accountability and increase the likelihood of subsequent implementation.

In addition to the assignment of a local lead department or agency, an implementation time period or a specific implementation date has been assigned in order to assess whether actions are being implemented in a timely fashion. The City will seek outside funding sources to implement mitigation projects in both the pre-disaster and post-disaster environments. When applicable, potential funding sources have been identified for proposed actions listed in the Mitigation Action Plan.

8.3 Monitoring, Evaluation, and Enhancement

Periodic revisions and updates of the Hazard Mitigation Plan are required to ensure that the goals of the Plan are kept current, taking into account potential changes in hazard vulnerability and mitigation priorities. In addition, revisions may be necessary to ensure that the Plan is in full compliance with applicable federal and state regulations. Periodic evaluation of the Plan will also ensure that specific mitigation actions are being reviewed and carried out according to the Mitigation Action Plan.

When determined necessary, the Mauldin Disaster Mitigation Committee shall meet annually to evaluate the progress attained and to revise, where needed, the activities set forth in the Plan. The findings and recommendations of the MDMC shall be documented in the form of a report that can be shared with interested City and County Council members. The MDMC will also meet following any disaster events warranting a re-examination of the mitigation actions being implemented or proposed for future implementation. This will ensure that the Plan is continuously updated to reflect changing conditions and needs within the City. The City Administrator will be responsible for reconvening the MDMC for these reviews.

Five (5) Year Plan Review

The Plan will be thoroughly reviewed by the MDMC every five years to determine whether there have been any significant changes in the City that may, in turn, necessitate changes in the types of mitigation actions proposed. New development in identified hazard areas, an increased exposure to hazards, an increase or decrease in capability to address hazards, and changes to federal or state legislation are examples of factors that may affect the necessary content of the Plan.

The plan review provides the MDMC officials with an opportunity to evaluate those actions that have been successful and to explore the possibility of documenting potential losses avoided due to the implementation of specific mitigation measures. The plan review also provides the opportunity to address mitigation actions that may not have been successfully implemented as assigned. The City Administrator will be responsible for reconvening the MDMC and conducting the five-year review.

During the five-year plan review process, the following questions will be considered as criteria for assessing the effectiveness and appropriateness of the Plan:

- Do the goals address current and expected conditions?
- Has the nature or magnitude of risks changed?

- Are the current resources appropriate for implementing the Plan?
- Are there implementation problems, such as technical, political, legal or coordination issues with other agencies?
- Have the outcomes occurred as expected?
- Did City Departments participate in the plan implementation process as assigned?

Following the five-year review, any revisions deemed necessary will be summarized and implemented according to the reporting procedures and plan amendment process outlined herein. Upon completion of the review and update/amendment process, the Mauldin Hazard Mitigation plan shall be submitted along with the Greenville County Multi-jurisdictional Hazard Mitigation Plan to the State Hazard Mitigation Officer at the South Carolina Emergency Management Division (SCEMD) for final review and approval in coordination with the Federal Emergency Management Agency (FEMA).

Disaster Declaration

Following a disaster declaration, the City of Mauldin Hazard Mitigation Plan will be revised as necessary to reflect lessons learned, or to address specific issues and circumstances arising from the event. It will be the responsibility of the City Administrator to reconvene the MDMC and ensure the appropriate stakeholders are invited to participate in the plan revision and update the process following declared disaster events.

Reporting Procedures

The results of the five-year review will be summarized by the MDMC in a report that will include an evaluation of the effectiveness of the Plan and any required or recommended changes or amendments.

The report will also include an evaluation of implementation progress for each of the proposed mitigation actions, identifying reasons for delays or obstacles to their completion along with recommended strategies to overcome them.

Plan Amendment Process

The Plan amendment process shall be in accordance with the standards defined in the governing document, Section 7.5.

8.4 Incorporation of Existing Planning Mechanism

The mitigation actions in Section 7 of this plan recommends using existing plans and/or programs to implement hazard mitigation in the City, where possible. This point is also emphasized previously in this Section. Based on this plan's capability assessment, the City has and continues to implement policies and programs to reduce losses to life and property from natural hazards. This plan builds upon the momentum developed through previous and related planning efforts and recommends implementing projects, where possible, through the following mechanisms:

- Mauldin Comprehensive Plan
- City Code of Regulations
- Flood Management Regulations

- Fire Code
- Mauldin Building Code
- Capital Improvement Plans and Budgets
- Other plans, regulations, and practices with a mitigation focus

8.5 Continued Public Involvement

Continued public involvement is also imperative to the overall success of the plan's implementation. The update process provides an opportunity to publicize success stories from plan implementation and seek additional public comment. A public hearing(s) to receive public comment on plan maintenance and updating will be held once within the context of the defined bi-annual review process. The plan maintenance and update process will include continued public involvement and input through attendance at designated committee meetings, web postings, and press releases to local media.