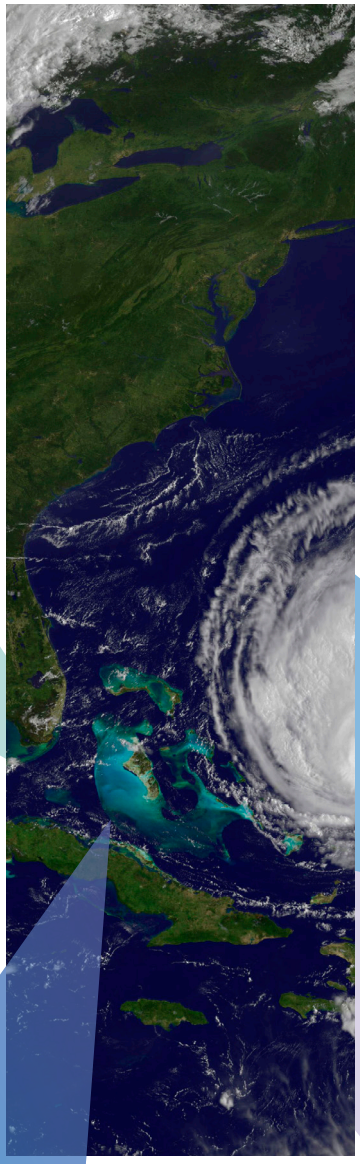
ATKINS

Davidson County, NC

Davidson County Multi-Jurisdictional Hazard Mitigation Plan

FINAL



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SECTION 1
INTRODUCTION

This section provides a general introduction to the Davidson County Multi-Jurisdictional Hazard Mitigation Plan. It consists of the following five subsections:

- 1.1 Background
- 1.2 Purpose
- 1.3 Scope
- 1.4 Authority
- 1.5 Summary of Plan Contents

1.1 BACKGROUND

Natural hazards, such as floods, hurricanes and winter storms are a part of the world around us. Their occurrence is natural and inevitable, and there is little we can do to control their force and intensity. We must consider these hazards to be legitimate and significant threats to human life, safety, and property.

Davidson County is located in the western portion of the Piedmont area of North Carolina. The County includes the Town of Denton, City of Lexington, Town of Midway, City of Thomasville, Town Wallburg and all unincorporated areas within the county. This area is vulnerable to a wide range of natural hazards such as hurricanes, floods, severe thunderstorms, and tornadoes. It is also vulnerable to human-caused hazards, including nuclear accidents and hazardous material spills. These hazards threaten the life and safety of residents in Davidson County and have the potential to damage or destroy both public and private property, disrupt the local economy, and impact the overall quality of life of individuals who live, work, and vacation in Davidson County.

While the threat from hazardous events may never be fully eliminated, there is much we can do to lessen their potential impact upon our community and our citizens. By minimizing the impact of hazards upon our built environment, we can prevent such events from resulting in disasters. The concept and practice of reducing risks to people and property from known hazards is generally referred to as *hazard mitigation*.

FEMA Definition of Hazard Mitigation:
"Any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards."

Hazard mitigation techniques include both structural measures (such as strengthening or protecting buildings and infrastructure from the destructive forces of potential hazards) and non-structural measures (such as the adoption of sound land use policies and the creation of public awareness programs). It is widely accepted that the most effective mitigation measures are implemented at the local government level, where decisions on the regulation and control of development are ultimately

made. A comprehensive mitigation approach addresses hazard vulnerabilities that exist today and in the foreseeable future. Therefore, it is essential that projected patterns of future development are evaluated and considered in terms of how that growth will increase or decrease a community's overall hazard vulnerability.

A key component in the formulation of a comprehensive approach to hazard mitigation is to develop, adopt, and update a local hazard mitigation plan as needed. A hazard mitigation plan establishes the broad community vision and guiding principles for reducing hazard risk, and further proposes specific mitigation actions to eliminate or reduce identified vulnerabilities.

The county and each of the five municipalities participating in the development of the Davidson County Multi-Jurisdictional Hazard Mitigation Plan have an existing hazard mitigation plan that has evolved over the years, as described in Section 2: *Planning Process*. This multi-jurisdictional plan draws from the previous plan to document the efforts of each jurisdiction to incorporate hazard mitigation principles and practices into routine government activities and functions. *At its core, the Plan recommends specific actions to minimize hazard vulnerability and protect residents from losses to those hazards that pose the greatest risk.* These mitigation actions go beyond simply recommending structural solutions to reduce existing vulnerability, such as elevation, retrofitting, and acquisition projects. Local policies on community growth and development, incentives for natural resource protection, and public awareness and outreach activities are examples of other actions considered to reduce Davidson County's vulnerability to identified hazards. The Plan remains a living document, with implementation and evaluation procedures established to help achieve meaningful objectives and successful outcomes over time.

1.1.1 The Disaster Mitigation Act and the Flood Insurance Reform Acts

In an effort to reduce the Nation's mounting natural disaster losses, the U.S. Congress passed the Disaster Mitigation Act of 2000 (DMA 2000) in order to amend the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 322 of DMA 2000 emphasizes the need for state, local and Tribal government entities to closely coordinate on mitigation planning activities and makes the development of a hazard mitigation plan a specific eligibility requirement for any local or Tribal government applying for federal mitigation grant funds. In short, if a jurisdiction is not covered by an approved mitigation plan, it will not be eligible for mitigation grant funds. These funds 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. Communities with an adopted and federally-approved hazard mitigation plan thereby become pre-positioned and more apt to receive available mitigation funds before and after the next disaster strikes.

Additionally, the Flood Insurance Reform Act of 2004 (P.L. 108-264) created two new grant programs, Severe Repetitive Loss (SRL) and Repetitive Flood Claim (RFC), and modified the existing Flood Mitigation Assistance (FMA) program. One of the requirements of this Act is that a FEMA-approved Hazard Mitigation Plan is now required if communities wish to be eligible for these FEMA mitigation programs. However, as of early 2014, these programs have been folded into a single Flood Mitigation Assistance (FMA) program.

This change was brought on by new, major federal flood insurance legislation that was passed in 2012 under the Biggert-Waters Flood Insurance Reform Act (P.L. 112-141) and the subsequent Homeowner Flood Insurance Affordability Act in 2014 which revised Biggert-Waters. These acts made several

changes to the way the National Flood Insurance Program is to be run, including raises in rates to reflect true flood risk and changes in how Flood Insurance Rate Map (FIRM) updates impact policyholders. These acts further emphasize Congress' focus on mitigating vulnerable structures.

The Davidson County Multi-Jurisdictional Hazard Mitigation Plan has been prepared in coordination with FEMA Region IV and the North Carolina Division of Emergency Management (NCEM) to ensure that the Plan meets all applicable FEMA and state requirements for hazard mitigation plans. A *Local Mitigation Plan Review Tool*, found in Appendix C, provides a summary of federal and state minimum standards and notes the location where each requirement is met within the Plan.

1.2 PURPOSE

The purpose of the Davidson County Multi-Jurisdictional Hazard Mitigation Plan is to:

- Complete update of existing plan to demonstrate progress and reflect current conditions;
- Increase public awareness and education about the plan and the planning process;
- Maintain grant eligibility for participating jurisdictions; and
- Maintain compliance with state and federal legislative requirements for local hazard mitigation plans.

1.3 SCOPE

The focus of the Davidson County Multi-Jurisdictional Hazard Mitigation Plan is on those hazards determined to be "high" or "moderate" risks to Davidson County, as determined through a detailed hazard risk assessment. Other hazards that pose a "low" or "negligible" risk will continue to be evaluated during future updates to the Plan, but they may not be fully addressed until they are determined to be of high or moderate risk. This enables the participating jurisdictions to prioritize mitigation actions based on those hazards which are understood to present the greatest risk to lives and property.

The geographic scope (i.e., the planning area) for the Plan includes all of Davidson County including all of its incorporated jurisdictions (see below) and unincorporated areas. **Table 1.1** indicates the participating jurisdictions.[1]

TABLE 1.1: PARTICIPATING JURISDICTIONS IN THE DAVIDSON COUNTY HAZARD MITIGATION PLAN

Davidson County	
Denton	Thomasville
Lexington	Wallburg
Midway	

[1] Although a portion of the City of High Point is located within Davidson County, the city is not covered by the Davidson County Hazard Mitigation Plan. Instead, the City of High Point is included in the Guilford County Hazard Mitigation Plan.

1.4 AUTHORITY

The Davidson County Multi-Jurisdictional Hazard Mitigation Plan has been developed in accordance with current state and federal rules and regulations governing local hazard mitigation plans and has been adopted by each participating jurisdiction in accordance with standard local procedures. Copies of the adoption resolutions for each participating jurisdiction are provided in Appendix A. The Plan shall be routinely monitored and revised to maintain compliance with the following provisions, rules, and legislation:

- Section 322, Mitigation Planning, of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as enacted by Section 104 of the Disaster Mitigation Act of 2000 (P.L. 106-390);
- FEMA's Final Rule published in the Federal Register, at 44 CFR Part 201 (201.6 for local mitigation planning requirements and 201.7 for Tribal planning requirements); and
- Flood Insurance Reform Act of 2004 (P.L. 108-264), Biggert-Waters Flood Insurance Reform Act of 2012 (P.L. 112-141) and the Homeowner Flood Insurance Affordability Act.

1.5 SUMMARY OF PLAN CONTENTS

The contents of this Plan are designed and organized to be as reader-friendly and functional as possible. While significant background information is included on the processes used and studies completed (i.e., risk assessment, capability assessment), this information is separated from the more meaningful planning outcomes or actions (i.e., mitigation strategy, mitigation action plan).

Section 2, ***Planning Process***, provides a complete narrative description of the process used to prepare the Plan. This includes the identification of participants on the planning team and describes how the public and other stakeholders were involved. It also includes a detailed summary for each of the key meetings held, along with any associated outcomes.

The ***Community Profile***, located in Section 3, provides a general overview of Davidson County, including prevalent geographic, demographic, and economic characteristics. In addition, building characteristics and land use patterns are discussed. This baseline information provides a snapshot of the planning area and helps local officials recognize those social, environmental, and economic factors that ultimately play a role in determining the region's vulnerability to hazards.

The Risk Assessment is presented in three sections: Section 4, ***Hazard Identification***; Section 5, ***Hazard Profiles***; and Section 6, ***Vulnerability Assessment***. Together, these sections serve to identify, analyze, and assess hazards that pose a threat to Davidson County. The risk assessment also attempts to define any hazard risks that may uniquely or exclusively affect specific areas of Davidson County.

The Risk Assessment begins by identifying hazards that threaten Davidson County. Next, detailed profiles are established for each hazard, building on available historical data from past hazard occurrences, spatial extent, and probability of future occurrence. This section culminates in a hazard risk ranking based on conclusions regarding the frequency of occurrence, spatial extent, and potential impact highlighted in each of the hazard profiles. In the vulnerability assessment, FEMA's Hazus®MH loss estimation methodology is used in conjunction with GIS analysis to evaluate known hazard risks by their relative long-term cost in expected damages. In essence, the information generated through the risk assessment serves a critical function as the participating jurisdictions in Davidson County seek to

determine the most appropriate mitigation actions to pursue and implement—enabling them to prioritize and focus their efforts on those hazards of greatest concern and those structures or planning areas facing the greatest risk(s).

The ***Capability Assessment***, found in Section 7, provides a comprehensive examination of Davidson County's capacity to implement meaningful mitigation strategies and identifies opportunities to increase and enhance that capacity. Specific capabilities addressed in this section include planning and regulatory capability, staff and organizational (administrative) capability, technical capability, fiscal capability, and political capability. Information was obtained through the use of a detailed survey questionnaire and an inventory and analysis of existing plans, ordinances, and relevant documents. The purpose of this assessment is to identify any existing gaps, weaknesses, or conflicts in programs or activities that may hinder mitigation efforts and to identify those activities that should be built upon in establishing a successful and sustainable local hazard mitigation program.

The *Risk Assessment*, and *Capability Assessment* collectively serve as a basis for determining the goals for the Davidson County Multi-Jurisdictional Hazard Mitigation Plan, each contributing to the development, adoption, and implementation of a meaningful and manageable *Mitigation Strategy* that is based on accurate background information.

The ***Mitigation Strategy***, found in Section 8, consists of broad goal statements as well as an analysis of hazard mitigation techniques for the jurisdictions participating in the Davidson County Multi-Jurisdictional Hazard Mitigation Plan to consider in reducing hazard vulnerabilities. The strategy provides the foundation for a detailed ***Mitigation Action Plan***, found in Section 9, which links specific mitigation actions for each jurisdiction to locally-assigned implementation mechanisms and target completion dates. Together, these sections are designed to make the Plan both strategic, through the identification of long-term goals, and functional, through the identification of immediate and short-term actions that will guide day-to-day decision-making and project implementation.

In addition to the identification and prioritization of possible mitigation projects, emphasis is placed on the use of program and policy alternatives to help make Davidson County less vulnerable to the damaging forces of hazards while improving the economic, social, and environmental health of the community. The concept of multi-objective planning was emphasized throughout the planning process, particularly in identifying ways to link, where possible, hazard mitigation policies and programs with complimentary community goals related to disaster recovery, housing, economic development, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety.

Plan Maintenance, found in Section 10, includes the measures that the jurisdictions participating in the plan will take to ensure the Plan's continuous long-term implementation. The procedures also include the manner in which the Plan will be regularly evaluated and updated to remain a current and meaningful planning document.

Municipality-specific **Annexes** have been created to include specific information for each municipality. Topics covered in the annexes include community profile, risk assessment, vulnerability, and capability assessment information. The mitigation actions relevant for each particular municipal jurisdiction are also included in the Annex.

SECTION 2
PLANNING PROCESS

This section describes the planning process undertaken to develop the Davidson County Multi-Jurisdictional Hazard Mitigation Plan. It consists of the following eight subsections:

- 2.1 Overview of Hazard Mitigation Planning
- 2.2 History of Hazard Mitigation Planning in Davidson County
- 2.3 Preparing the 2015 Plan
- 2.4 The Davidson County Hazard Mitigation Planning Team
- 2.5 Community Meetings and Workshops
- 2.6 Involving the Public
- 2.7 Involving the Stakeholders
- 2.8 Documentation of Plan Progress

44 CFR Requirement
44 CFR Part 201.6(c)(1): The plan shall include documentation of the planning process used to develop the plan, including how it was prepared, who was involved in the process and how the public was involved.

2.1 OVERVIEW OF HAZARD MITIGATION PLANNING

Local hazard mitigation planning is the process of organizing community resources, identifying and assessing hazard risks, and determining how to best minimize or manage those risks. This process culminates in a hazard mitigation plan that identifies specific mitigation actions, each designed to achieve both short-term planning objectives and a long-term community vision.

To ensure the functionality of a hazard mitigation plan, responsibility is assigned for each proposed mitigation action to a specific individual, department, or agency along with a schedule or target completion date for its implementation (see Section 10: *Plan Maintenance*). Plan maintenance procedures are established for the routine monitoring of implementation progress, as well as the evaluation and enhancement of the mitigation plan itself. These plan maintenance procedures ensure that the Plan remains a current, dynamic, and effective planning document over time that becomes integrated into the routine local decision making process.

Communities that participate in hazard mitigation planning have the potential to accomplish many benefits, including:

- saving lives and property,
- saving money,
- speeding recovery following disasters,
- reducing future vulnerability through wise development and post-disaster recovery and reconstruction,

- expediting the receipt of pre-disaster and post-disaster grant funding, and
- demonstrating a firm commitment to improving community health and safety.

Typically, communities that participate in mitigation planning are described as having the potential to produce long-term and recurring benefits by breaking the repetitive cycle of disaster loss. A core assumption of hazard mitigation is that the investments made before a hazard event will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, repair, recovery, and reconstruction. Furthermore, mitigation practices will enable local residents, businesses, and industries to re-establish themselves in the Davidson of a disaster, getting the community economy back on track sooner and with less interruption.

The benefits of mitigation planning go beyond solely reducing hazard vulnerability. Mitigation measures such as the acquisition or regulation of land in known hazard areas can help achieve multiple community goals, such as preserving open space, maintaining environmental health, and enhancing recreational opportunities. Thus, it is vitally important that any local mitigation planning process be integrated with other concurrent local planning efforts, and any proposed mitigation strategies must take into account other existing community goals or initiatives that will help complement or hinder their future implementation.

2.2 HISTORY OF HAZARD MITIGATION PLANNING IN DAVIDSON COUNTY

Each of the six participating jurisdictions has a previously adopted hazard mitigation plan. The FEMA approval dates for this plan is listed below:

- *Davidson County Hazard Mitigation Plan* (9/23/2015)
    - Town of Denton
    - City of Lexington
    - Town of Midway
    - City of Thomasville
    - Town of Wallburg

The plan was developed using the multi-jurisdictional planning process recommended by the Federal Emergency Management Agency (FEMA).

2.3 PREPARING THE 2015 PLAN

Hazard mitigation plans, are required to be updated every five years to remain eligible for federal mitigation funding. To simplify planning efforts, the jurisdictions in Davidson County decided to join together to create the *Davidson County Multi-Jurisdictional Hazard Mitigation Plan*. This allows resources to be shared amongst the participating jurisdictions and eases the administrative duties of all of the participants by combining the six jurisdictions into one multi-jurisdictional plan.

To prepare the Plan, a team led by the consulting firm called Atkins was hired to provide professional mitigation planning services. To meet planning requirements of the Community Rating System, the

region ensured that the planning process was facilitated under the direction of a professional planner. Nathan Slaughter from Atkins served as the lead planner for this project and is a member of the American Institute of Certified Planners (AICP). Further, CRS planning requirements from section 510 of the 2013 Coordinator's Manual are addressed throughout this plan. The intent is to try to maximize the number of CRS points for those jurisdictions that currently participate in the CRS program (City of Raleigh) and those that may wish to join in the future.

Per the contractual scope of work, the consultant team followed the mitigation planning process recommended by FEMA (Publication Series 386 and Local Mitigation Plan Review Guide) and recommendations provided by North Carolina Division of Emergency Management (NCEM) mitigation planning staff[1]. The Local Mitigation Plan Review Tool, found in Appendix C, provides a detailed summary of FEMA's current minimum standards of acceptability for compliance with DMA 2000 and notes the location where each requirement is met within this Plan. These standards are based upon FEMA's Final Rule as published in the Federal Register in Part 201 of the Code of Federal Regulations (CFR). The planning team used FEMA's Local Mitigation Plan Review Guide (October 2011) for reference as they completed the Plan.

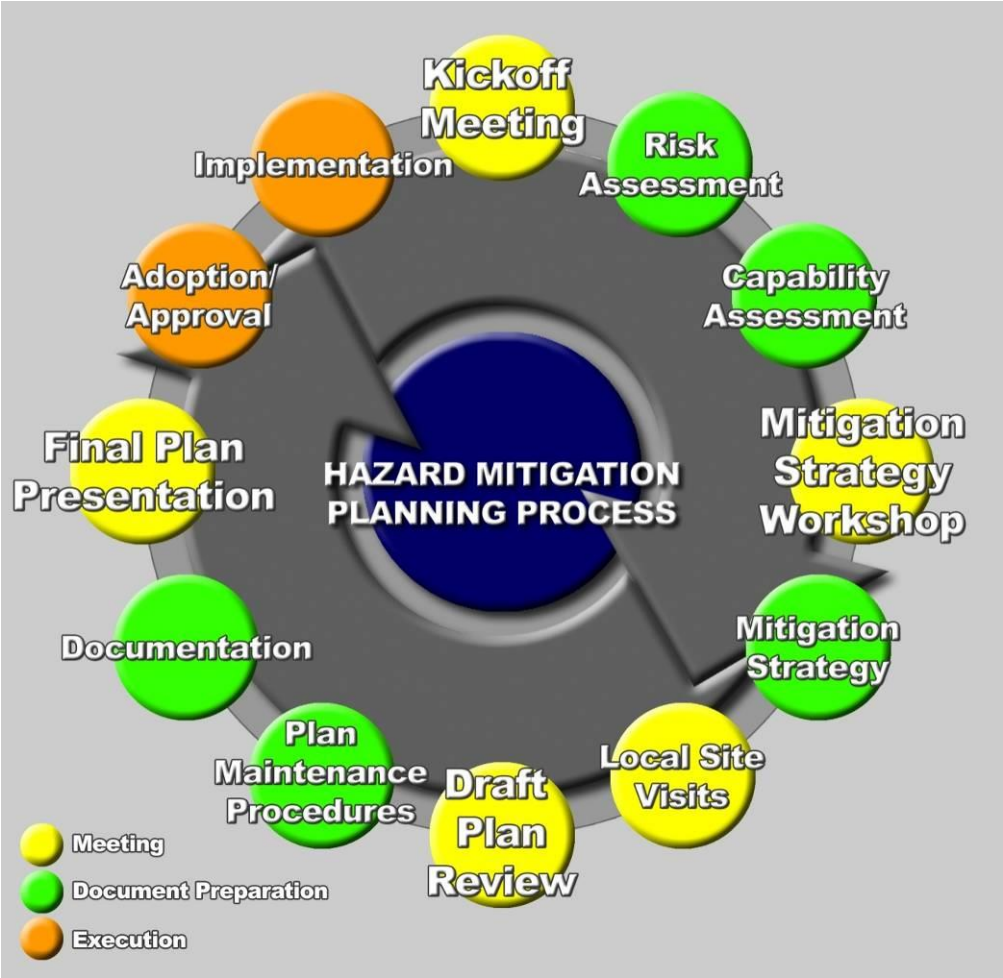
Although each participating jurisdiction had already participated in the plan in the past, plan update revisions based on FEMA's Local Mitigation Plan Guide were required. Key elements from the previous approved plan are referenced throughout the document (e.g., existing actions) and required a discussion of changes made. For example, all of the risk assessment elements needed to be updated to include most recent information. The Capability Assessment section includes updated information for all of the participating jurisdictions and the Mitigation Action Plan provides implementation status updates for all of the actions identified in the previous plans.

The process used to prepare this Plan included twelve major steps that were completed over the course of approximately six months beginning in January 2015. Each of these planning steps (illustrated in **Figure 2.1**) resulted in critical work products and outcomes that collectively make up the Plan. Specific plan sections are further described in Section 1: *Introduction*.

Over the past five years, the County and each participating jurisdiction have been actively working to implement the existing plan. This is documented in the Mitigation Action Plan through the implementation status updates for each of the Mitigation Actions. The Capability Assessment also documents changes and improvements in the capabilities of each participating jurisdiction to implement the Mitigation Strategy.

[1] A copy of the negotiated contractual scope of work between Davidson County and Atkins is available through Davidson County upon request.

FIGURE 2.1: MITIGATION PLANNING PROCESS FOR DAVIDSON COUNTY



As further detailed below, the planning process was conducted through a Hazard Mitigation Planning Team comprised primarily of local government staff from each of the participating jurisdictions and other stakeholders.

2.4 THE DAVIDSON COUNTY HAZARD MITIGATION PLANNING TEAM

In order to guide the development of this Plan, the County and the participating jurisdictions created the Davidson County Hazard Mitigation Planning Team. The Hazard Mitigation Planning Team represents a community-based planning team made up of representatives from various county and municipal departments, and other key stakeholders identified to serve as critical partners in the planning process.

Beginning in January 2015, the Hazard Mitigation Planning Team members engaged in regular discussions as well as local meetings and planning workshops to discuss and complete tasks associated with preparing the Plan. This working group coordinated on all aspects of plan preparation and provided valuable input to the process. In addition to regular meetings, committee members routinely communicated and were kept informed through an e-mail distribution list.

Specifically, the tasks assigned to the Hazard Mitigation Planning Team members included:

- participate in Hazard Mitigation Planning Team meetings and workshops
- provide best available data as required for the risk assessment portion of the Plan
- provide information that will help complete the Capability Assessment section of the plan and provide copies of any mitigation or hazard-related documents for review and incorporation into the Plan
- support the development of the Mitigation Strategy, including the design and adoption of regional goal statements
- help design and propose appropriate mitigation actions for their department/agency for incorporation into the Mitigation Action Plan
- review and provide timely comments on all study findings and draft plan deliverables
- support the adoption of the *2015 Davidson County Hazard Mitigation Plan*

Table 2.1 lists the members of the Hazard Mitigation Planning Team who were responsible for participating in the development of the Plan. Committee members are listed in alphabetical order by last name.

TABLE 2.1: MEMBERS OF THE DAVIDSON COUNTY HAZARD MITIGATION PLANNING TEAM

NAME	POSITION	DEPARTMENT / AGENCY
Ackerman, Mary Jane	Wellness Coordinator	Thomasville City Schools
Alwine, Donna	Town Clerk	Town of Wallburg
Bailey, Terry	911 Director	Davidson County 911
Bowling, Eddie	Firefighter	Thomasville Fire Department
Buck, Rex	Public Services Director	Davidson County Public Services
Cecil, Darren	Environmental Health Supervisor	Davidson County Health Department
Childress, Dwayne	Purchasing Director	Davidson County Purchasing
Clapp, Glenn	Emergency Management Coordinator	High Point Office of Emergency Management
Conrad, Wynn	Director of Maintenance	Davidson County Schools
Cornman, Guy	Planning and Zoning Director	Davidson County Planning and Zoning
Crook, Mark	Davidson County Maintenance Engineer	NCDOT
Erga, Margaret	Volunteer Planner	Red Cross
Erwin, Linda	GIS Manager	Davidson County GIS
Frye, Chuck	County Attorney	Davidson County Attorney
Gainey, Rebekah	Deputy Clerk	Lexington City Manager's Office
Gray, John	Town Manager	Town of Denton Town Manager
Grubb, Steve	Firefighter	Lexington Fire Department
Hancock, Tod	Safety and Risk Assistant	Davidson County Risk Management
Hanes, Alton	Emergency Management	Davidson County Emergency Services

NAME	POSITION	DEPARTMENT / AGENCY
	Coordinator	
Hartley, Phil	Fire Chief	Lexington Fire Department
Henderson, Lillian	Public Health Preparedness Coordinator	Davidson County Health Department
Hyatt, Robert	County Manager	Davidson County Manager
James, Larry	Emergency Services Director	Davidson County Emergency Services
Jarrett, Paul	Fire Shift Commander	City of Lexington Fire Department
Jones, Roger	Public Services Manager	City of Lexington Public Services and Engineering
Kattner, Mack	Police Captain	Thomasville Police Department
Kendall, Earl	Assistant Superintendent	Lexington City Schools
Leonard, Scott	County Planner	Davidson County Planning
Miller, Daniel	Risk/Safety Manager	Lexington Risk Management
Moorefield, Dale	Social Services Director	Davidson County Department of Social Services
Morris, Travis	Firefighter	Lexington Fire Department
Morrow, Lory	Superintendent	Davidson County Schools
Price, Jim	County Safety and Risk Manager	Davidson County Risk Management
Robbins, Mark	EMS Operations Manager	Davidson County Emergency Services
Scarboro, William	Police Captain	Lexington Police Department
Sheilds, Mandy	Disaster Program Specialist	Red Cross
Silver, Freddie	Fire Company Engineer	Lexington Fire Department
Sink, Mark	Interim Chief of Police	Lexington Police Department
Sink, Ron	CEO and General Manager	Davidson Water, Inc
Smith, Travis	Executive Director of Operations	Davidson County Schools
Spach, Roger	Water Resource Superintendent	City of Lexington Water and Sewer
Tarleton, Casey	Patrol Captain	Davidson County Sheriff's Office
Tuttle, Ricky	Area 10 Coordinator	NCEM
Ward, Danny	Fire Marshal	Davidson County Fire Marshal
Ward, Larry	Town Mayer	Town of Denton Mayor
White, Tracey	Utilities Services Manager	Lexington Public Utilities
Wingler, Keith	Business Development Manager	Energy United

Table 2.2 lists points of contact for jurisdictions who elected to designate Davidson County to represent their jurisdiction on the planning team, generally because they did not have the time or staff to be able to attend on their own. Although these members designated county officials to represent them at in-

person meetings, each was still contacted throughout the planning process and participated by providing suggestions and comments on the Plan via email and phone conversations. These members are listed in alphabetical order by last name below.

TABLE 2.1: MEMBERS DESIGNATING REPRESENTATIVES TO DAVIDSON COUNTY HAZARD MITIGATION PLANNING TEAM

NAME	POSITION	DEPARTMENT / AGENCY
Ryan Ross	Town Manager	Town of Midway

2.4.1 Multi-Jurisdictional Participation

The *Davidson County Multi-Jurisdictional Hazard Mitigation Plan* includes the county, and five incorporated municipalities. To satisfy multi-jurisdictional participation requirements, the county and its participating jurisdictions were required to perform the following tasks:

- Participate in mitigation planning workshops;
- Identify completed mitigation projects, if applicable; and
- Develop and adopt (or update) their local Mitigation Action Plan.

Each jurisdiction participated in the planning process and has developed a local Mitigation Action Plan unique to their jurisdiction. Each jurisdiction will adopt their Mitigation Action Plan separately. This provides the means for jurisdictions to monitor and update their Plan on a regular basis.

2.5 COMMUNITY MEETINGS AND WORKSHOPS

The preparation of this Plan required a series of meetings and workshops for facilitating discussion, gaining consensus and initiating data collection efforts with local government staff, community officials, and other identified stakeholders. More importantly, the meetings and workshops prompted continuous input and feedback from relevant participants throughout the drafting stages of the Plan. The following is a summary of the key meetings and community workshops held during the development of the plan update.[2] In many cases, routine discussions and additional meetings were held by local staff to accomplish planning tasks specific to their department or agency, such as the approval of specific mitigation actions for their department or agency to undertake and include in the Mitigation Action Plan.

January 22, 2015 Davidson County HMPC Meeting

[2] Copies of agendas, sign-in sheets, minutes, and handout materials for all meetings and workshops can be found in Appendix D.

January 22, 2015
First Regional Hazard Mitigation Planning Team Meeting – City of Lexington Police Training Facility

Nathan Slaughter, Project Manager from the project consulting team, Atkins started the meeting by welcoming the representatives from the county, participating municipal jurisdictions and other stakeholders. Mr. Slaughter led the kickoff meeting and began by providing an overview of the items to be discussed at the meeting and briefly reviewed each of the handouts that were distributed in the meeting packets (agenda, project description, and presentation slides). He then asked each of the meeting attendees to introduce themselves. Following introductions, he provided a brief overview of mitigation and discussed the Disaster Mitigation Act of 2000 and NC Senate Bill 300.

He discussed the key objectives of the planning process and gave a list of the participating jurisdictions for the plan and asked if there were any changes that needed to be made to the list. Mr. Slaughter then explained the six different categories of mitigation techniques (emergency services; prevention; natural resource protection; structural projects; public education and awareness; and property protection) and gave examples of each. This explanation culminated in an Ice Breaker Exercise for the attendees.

Mr. Slaughter instructed attendees on how to complete the exercise. Attendees were given an equal amount of fictitious FEMA money and asked to spend it in the various mitigation categories. Money could be thought of as grant money that communities received towards mitigation. Attendees were asked to target their money towards areas of mitigation that are of greatest concern for their community. Ideally, the exercise helps pinpoint areas of mitigation that the community may want to focus on when developing mitigation grants. The Ice Breaker Exercise results were to be reviewed and presented at the conclusion of the meeting.

Mr. Slaughter then explained the mitigation planning process and specific tasks to be accomplished for this project, including the planning process, risk assessment, capability assessment, mitigation strategy and action plan, and plan maintenance procedures.

The project schedule was presented along with the project staffing chart, which demonstrates the number of experienced individuals that will be working on this project. Mr. Slaughter then reviewed the roles and responsibilities of Atkins, the counties, and the participating jurisdictions. The presentation concluded with a discussion of the next steps to be taken in the project development, which included determining the members of the Hazard Mitigation Planning Team that should be present for the next meeting, addressing issues of regulation compliance, and fulfilling data collection needs.

The meeting was adjourned.

March 18, 2015
Second Hazard Mitigation Planning Team Meeting – City of Lexington Police Training Facility

Mr. Slaughter initiated the meeting with a review of the meeting handouts, which included an agenda, presentation slides, proposed goals for the plan, mitigation actions from the county's existing plan, and mitigation action worksheets for collecting information for any new mitigation actions. Mr. Slaughter reviewed the project schedule and stated that a draft of the Hazard Mitigation Plan would be presented to the Hazard Mitigation Council in May.

Ryan Wiedenman with Atkins then presented the findings of the risk assessment. He reviewed the Presidential Disaster Declarations that have impacted the county. He then explained the process for preparing Hazard Profiles and discussed how each hazard falls into one of four basic categories: Atmospheric, Hydrologic, Geologic, and Other. He indicated that each hazard must be evaluated and formally ruled out if it is not applicable to the study area, even where it seems obvious (such as in the case of volcano).

Mr. Wiedenman reviewed the Hazard Profiles and the following bullets summarize the information presented:

- DROUGHT. There have been eleven years (out of the past fourteen, 2000-2013) where drought conditions have been reported as severe, extreme or exceptional in Davidson County and future occurrences are likely.

- EXTREME HEAT. There has been 1 recorded extreme heat event reported by the National Climatic Data Center (NCDC) since 1998. However, heat extents of 107 degrees indicate that extreme heat is a hazard of concern for the county. Future occurrences are possible.

- HAILSTORM. There have been 90 recorded events since 1956. Future occurrences are highly likely.

- LIGHTNING. There have been 9 recorded lightning events since 1997, causing three injuries. There has been $642,697 in reported property damages. Future occurrences are highly likely.

- TORNADOES. There have been 14 recorded tornado events reported in the county since 1958. $25.8 million in property damages. 2 deaths and 22 injuries have been reported. Future occurrences are likely.

- HURRICANES AND TROPICAL STORMS. NOAA data shows that 45 storm tracks have come within 75 miles of Davidson County since 1859. 6 of these events were hurricanes, 23 were tropical storms and 16 were tropical depressions. Future occurrences are likely.

- SEVERE THUNDERSTORM WINDS. There have been 131 severe thunderstorm events reported since 1997 with $2.6 million in reported property damages. One death has been reported. Future occurrences are highly likely.

- WINTER STORM. There have been 55 recorded winter weather events in Davidson County since 1993 resulting in $6.2 million in reported property damages. Future occurrences are highly likely.

- EARTHQUAKES. There have been 3 recorded earthquake events in Davidson County since 1970. The strongest had a recorded magnitude of IV MMI. Future occurrences are possible.

- LANDSLIDE. There have been no recorded landslide events in Davidson County. Mr. Wiedenman asked the Hazard Mitigation Team to provide local information on landslide events, if available. Future occurrences are unlikely.

- DAM FAILURE. There are 112 dams in Davidson County, 15 of which are classified as high hazard dams. There have been no reported significant failures. Future occurrences are unlikely.

- EROSION. Erosion was identified in the previous county level plan, but as a relatively low concern. Future occurrences are possible.

- FLOOD. There have been 42 flood events recorded in Davidson County since 1996, resulting in $837,382 in property damage per NCDC. There have been 29 NFIP losses since 1978 and approximately $337,867 in claims. 6 repetitive loss properties in the county account for 15 of the recorded losses. Future occurrences are highly likely.

- HAZARDOUS MATERIALS INCIDENTS. There have been 182 reported hazardous materials events reported in the county. 17 serious events were reported. Future occurrences are highly likely.

- NUCLEAR ACCIDENT. Some of the county falls within the 50 mile buffer of McGuire Nuclear Station, but there have been no major incidents and future occurrences are unlikely.

- TERROR THREAT. There have been no historic terror events in the county, but several facilities were identified as potential targets and confirmed by the planning team.

- WILDFIRE. There is an average of 39 fires per year reported in Davidson County. Future occurrences are likely but major events are not common.

In concluding the review of Hazard Profiles, Mr. Wiedenman stated if anyone had additional information for the hazard profiles, or had concerns with any of the data presented, they should call or email him.

The results of the hazard identification process were used to generate a Priority Risk Index (PRI), which categorizes and prioritizes potential hazards as high, moderate or low risk based on probability, impact, spatial extent, warning time, and duration. The highest PRI was assigned to Thunderstorm/High Wind followed by Winter Storms and Freeze, Hazardous Materials Incident, Tornado, and Flood. The planning team agreed that Lightning should be moved from a low risk hazard to a moderate risk hazard as a result of the number of events being under reported.

Mr. Slaughter presented the Capability Assessment Findings. Atkins has developed a scoring system that was used to rank the participating jurisdictions in terms of capability in four major areas (Planning and Regulatory; Administrative and Technical; Fiscal; Political). Important capability indicators include National Flood Insurance Program (NFIP) participation, Building Code Effective Grading Schedule (BCEGS) score, Community Rating System (CRS) participation, and the Local Capability Assessment Survey conducted by Atkins.

Mr. Slaughter reviewed the Relevant Plans and Ordinances, Relevant Staff/Personnel Resources, and Relevant Fiscal Resources. All of these categories were used to rate the overall capability of the participating counties and jurisdictions. Most jurisdictions are in the low to moderate range for Planning and Regulatory Capability and in the limited range for Fiscal Capability. There is variation between the jurisdictions for Administrative and Technical Capability, mainly with respect to availability of planners and staff skilled in GIS. Based upon the scoring methodology developed by Atkins, it was determined that most of the participating jurisdictions have low to moderate capability to implement hazard mitigation programs and activities.

Mr. Slaughter also discussed the results of the public participation survey that was posted on several of the participating counties' and municipal websites. As of the meeting date, 19 responses had been

received, so the HMPT made a commitment to make another push to get the survey out to the public. Based on preliminary survey results, respondents felt that severe thunderstorms posed the greatest threat to their neighborhood, followed by HazMat Incident, and severe winter storm. 82 percent of the respondents were interested in making their homes more resistant to hazards. However, 44 percent don't know who to contact regarding reducing their risks to hazards.

Mr. Slaughter then reminded team members of the results of the icebreaker exercise from the first Hazard Mitigation Team meeting, where attendees were given "money" to spend on various hazard mitigation techniques. The results were as follows:

- Prevention
- Emergency Services
- Property Protection
- Structural Projects
- Public Education
- Natural Resource Protection

Mr. Slaughter gave an overview of Mitigation Strategy Development and presented the proposed goals for the plan based on a review of the goals in the existing county plan. The Hazard Mitigation Team accepted the proposed goals for the plan. Mr. Wiedenman then provided an overview and examples of suggested mitigation actions specifically tailored for Davidson County. Mr. Slaughter then asked each county and the municipalities to provide a status update for their existing mitigation actions (completed, deleted, or deferred) by March 12, 2015. Mr. Slaughter also discussed the Mitigation Action Worksheets to be completed for any new mitigation actions and requested that all worksheets be returned by March 12, 2015.

Mr. Slaughter thanked the group for taking the time to attend and the meeting was adjourned.

2.6 INVOLVING THE PUBLIC

44 CFR Requirement
44 CFR Part 201.6(b)(1): The planning process shall include an opportunity for the public to comment on the plan during the drafting stage and prior to plan approval.

An important component of the mitigation planning process involved public participation. Individual citizen and community-based input provides the entire planning team with a greater understanding of local concerns and increases the likelihood of successfully implementing mitigation actions by developing community "buy-in" from those directly affected by the decisions of public officials. As citizens become more involved in decisions that affect their safety, they are more likely to gain a greater appreciation of the hazards present in their community and take the steps necessary to reduce their impact. Public awareness is a key component of any community's overall mitigation strategy aimed at making a home, neighborhood, school, business or entire city safer from the potential effects of hazards.

Public involvement in the development of the *Davidson County Hazard Mitigation Plan* was sought using two methods: (1) public survey instruments were made available in hard copy and online; and (3) copies

of the draft Plan deliverables were made available for public review on county and municipal websites and at government offices. The public was provided two opportunities to be involved in the development of the regional plan at two distinct periods during the planning process: (1) during the drafting stage of the Plan; and (2) upon completion of a final draft Plan, but prior to official plan approval and adoption.

Additionally, each of the participating jurisdictions will hold public meetings before the final plan is officially adopted by the local governing bodies. These meetings will occur at different times once FEMA has granted conditional approval of the Plan. Adoption resolutions will be included in Appendix A.

2.6.1 Public Survey

The Hazard Mitigation Planning Team was successful in getting citizens to provide input to the mitigation planning process through the use of the *Public Participation Survey*. The *Public Participation Survey* was designed to capture data and information from residents of Davidson County that might not be able to attend public meetings or participate through other means in the mitigation planning process.

Copies of the *Public Participation Survey* were distributed to the Hazard Mitigation Planning Team to be made available for residents to complete at local public offices. A link to an electronic version of the survey was also posted on the county and municipal websites. A total of 50 survey responses were received, which provided valuable input for the Hazard Mitigation Planning Team to consider in the development of the plan update. Selected survey results are presented below.

- Approximately 43 percent of survey respondents had been impacted by a disaster, mainly winter/ice storms, hurricanes, severe storms/wind, and tornadoes.
- Respondents ranked Severe Winter / Ice Storm as the highest threat to their neighborhood (33 percent), followed by Severe Thunderstorm/High Wind (28 percent) and Tornado (13 percent).
- Approximately 32 percent of respondents have taken actions to make their homes more resistant to hazards and 84 percent are interested in making their homes more resistant to hazards.
- 66 percent of respondents do not know what office to contact regarding reducing their risks to hazards.
- Prevention, Emergency Services, and Public Education and Awareness were ranked as the most important activities for communities to pursue in reducing risks.

A copy of the survey is provided in Appendix B and a detailed summary of the survey results are provided in Appendix D.

2.7 INVOLVING THE STAKEHOLDERS

44 CFR Requirement
44 CFR Part 201.6(b)(2): The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other non-profit interests to be involved in the planning process.

At the beginning of the planning process for the development of this plan, the project consultant worked with the County Emergency Services Director to initiate outreach to stakeholders to be involved in the planning process. The project consultant sent out a list of recommended stakeholders provided from FEMA Publication 386-1 titled **Getting Started: Building Support for Mitigation Planning**. The list of recommended stakeholders is found in Appendix C of that publication (Worksheet #1: Build the Planning Team) and has been included in **Appendix D** of this plan to demonstrate the wide range of stakeholders that were considered to participate in the development of this plan. The Davidson County Emergency Services Director used that list for reference as he invited stakeholders to participate in the planning process.

In addition to the efforts described above, the Hazard Mitigation Planning Team encouraged more open and widespread participation in the mitigation planning process by designing and distributing the *Public Participation Survey*. These opportunities were provided for local officials, residents, businesses, academia, and other private interests in the region to be involved and offer input throughout the local mitigation planning process.

2.8 DOCUMENTATION OF PLAN PROGRESS

Progress in hazard mitigation planning for the participating jurisdictions in Davidson County is documented in this plan update. Since hazard mitigation planning efforts officially began in the Davidson County with the development of the initial Hazard Mitigation Plan, many mitigation actions have been completed and implemented in the participating jurisdictions. These actions will help reduce the overall risk to natural hazards for the people and property in Davidson County. The actions that have been completed are documented in the Mitigation Action Plan found in Section 9.

In addition, community capability continues to improve with the implementation of new plans, policies and programs that help to promote hazard mitigation at the local level. The current state of local capabilities for the participating jurisdictions is captured in Section 7: *Capability Assessment*. The participating jurisdictions continue to demonstrate their commitment to hazard mitigation and hazard mitigation planning and have proven this by developing the Hazard Mitigation Planning Team to update the Plan and by continuing to involve the public in the hazard mitigation planning process.

SECTION 3
COMMUNITY PROFILE

This section of the Plan provides a general overview of Davidson County and its participating municipalities. It consists of the following four subsections:

- 3.1 Geography and the Environment
- 3.2 Population and Demographics
- 3.3 Housing, Infrastructure, and Land Use
- 3.4 Employment and Industry

3.1 GEOGRAPHY AND THE ENVIRONMENT

Davidson County is located in the Piedmont region of central North Carolina. For the purposes of this plan, Davidson County comprises the Town of Denton, City of Lexington, Town of Midway, City of Thomasville, Town of Wallburg, and all unincorporated areas within the county. An orientation map is provided as **Figure 3.1**.

Davidson County consists of gently rolling terrain frequently broken by hills or shallow valleys formed by rivers and streams. An exception to this terrain is the Uwharrie Mountains located in the western and southwestern portions of the county. The Uwharries are the oldest mountain range in North America, and at one time the rose to nearly 20,000 feet above sea level. However, over time, they have been worn down to little more than high hills.

There are a wide variety of recreational activities for residents and tourists alike. These attractions include golfing, tennis, cycling, hunting, fishing, walking, hiking, and camping. One of the county's most famous attractions is the annual Lexington Barbecue Festival which brings over 100,000 visitors each October. Other local attractions include the Richard Childress Racing Museum, several vineyards, and "The Big Chair" located in Thomasville which is a symbol of Davidson County's furniture industry.

The total land area of each of the participating jurisdictions is presented in **Table 3.1**.

TABLE 3.1: TOTAL LAND AREAS OF PARTICIPATING JURISDICTIONS

Jurisdiction	Total Land Area
Davidson County	**552.7 square miles**
Denton	2.0 square miles
Lexington	18.0 square miles
Midway	7.7 square miles
Thomasville*	16.8 square miles
Wallburg	5.6 square miles

*A small portion of land (0.3 square miles) that makes up Thomasville is located in Randolph County.
Source: United States Census Bureau

According to the State Climate Office of North Carolina, Davidson County enjoys a moderate climate that is characterized by mild winters and hot, humid summers. In general, the spring months are marked by unpredictable weather and changes can occur rapidly with sunny skies yielding to severe thunderstorms in just a few hours. Precipitation is generally well distributed throughout the year and annual totals average 45 inches.

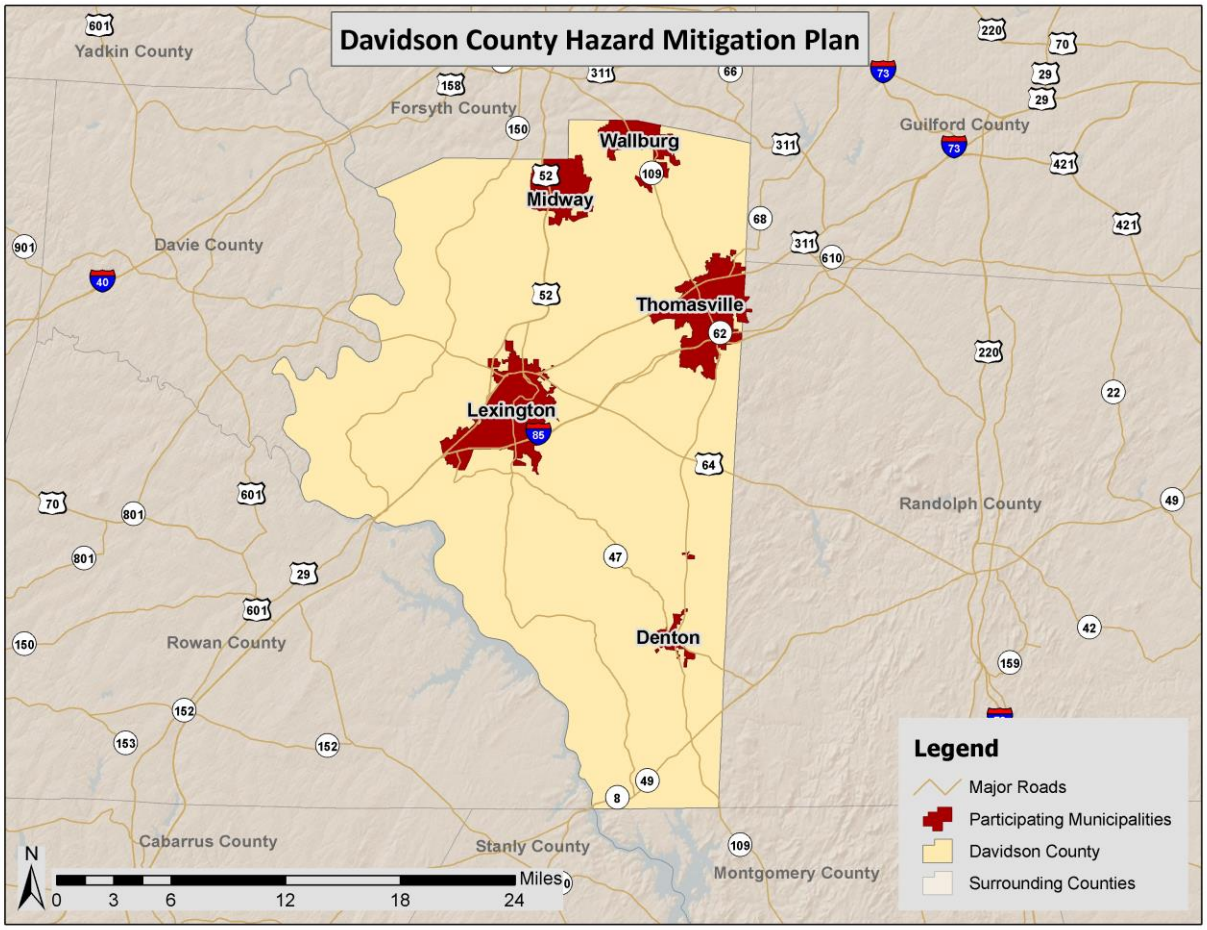
From December to February, the average high temperature ranges from the lower to mid 50s and low temperatures average around 30°F. However, the temperature drops to 10°F or 12°F about once during an average winter over central North Carolina. The mountains also act as a barrier preventing most wintery precipitation from entering the region, and snow and sleet is usually light and occurs on average once or twice per year.

In spring, temperatures begin to rise and the increase in average temperature is greater in April than in any other month. In general, the days are warm and the nights are cool during the spring months. Average high temperatures increase from 63°F in March to 79°F in May. There is a similar increase in average low temperatures, which are in the upper 30s in March and climb to the mid 50s in May. Additionally, tornadoes are most likely early in the spring; however, North Carolina is outside the principal tornado area of the United States.

Tropical air over central North Carolina brings warm temperatures and rather high humidity during the summer. Average high temperatures range from the mid to upper 80s and low temperatures average in the 60s. Summer rainfall is the most variable, and daily showers as well as periods of one to two weeks without rain are both common. Thunderstorms are also common events during the summer months.

Autumn is the season typified by the most rapidly changing temperature. The drop-off is greatest in October and continues through November. Average high temperatures begin in the lower 80s in September and fall to the low 60s by November. Average lows also drop significantly from the 59°F to about 38°F from September to November.

FIGURE 3.1: DAVIDSON COUNTY ORIENTATION MAP



3.2 POPULATION AND DEMOGRAPHICS

Lexington is the largest participating municipality by area but Thomasville has the largest population. Between 2000 and 2010, all of the participating jurisdictions except Lexington experienced population growth. Thomasville had the highest growth rate at around 35 percent. Population counts from the US Census Bureau for 1990, 2000, and 2010 for each of the participating jurisdictions are presented in **Table 3.2**.

TABLE 3.2: POPULATION COUNTS FOR PARTICIPATING JURISDICTIONS

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Davidson County	**126,677**	**147,246**	**162,878**	**10.6%**
Denton	1,292	1,450	1,636	12.8%
Lexington	16,581	19,953	18,931	-5.1%
Midway	--	--	4,679	--
Thomasville*	15,915	19,788	26,757	35.2%

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Wallburg	--	--	3,047	--

*The 2010 total population of Thomasville includes population (264 people) residing in Randolph County.
Source: United States Census Bureau

Based on the 2010 Census, the median age of residents of in Davidson County is 40.3. The racial characteristics of the participating jurisdictions are presented in **Table 3.3**. Generally, whites make up the majority of the population in the county accounting for over 84 percent of the population overall. However, several jurisdictions have much higher minority populations than others including Lexington, and Thomasville.

TABLE 3.3: DEMOGRAPHICS OF PARTICIPATING JURISDICTIONS

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Davidson County	**84.3%**	**8.9%**	**0.5%**	**1.2%**	**0.0%**	**3.6%**	**1.5%**	**6.4%**
Denton	98.4%	0.1%	0.1%	0.0%	0.0%	0.3%	1.0%	1.0%
Lexington	54.7%	28.4%	0.7%	2.9%	0.0%	10.7%	2.6%	16.3%
Midway	88.2%	8.2%	0.4%	0.5%	0.1%	1.7%	0.9%	3.5%
Thomasville	68.3%	19.6%	0.7%	1.1%	0.0%	8.1%	2.1%	14.4%
Wallburg	94.9%	0.9%	0.5%	0.8%	0.0%	1.8%	1.1%	3.1%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau

3.3 HOUSING, INFRASTRUCTURE, AND LAND USE

3.3.1 Housing

According to the 2010 US Census, there were 72,655 housing units in Davidson County, the majority of which are single family homes or mobile homes. Housing information for the participating jurisdictions is presented in **Table 3.4**. As shown in the table, Davidson County has a very low percentage of seasonal housing units across the jurisdictions; however, the unincorporated county has a slightly higher rate compared to the participating municipalities.

TABLE 3.4: HOUSING CHARACTERISTICS OF PARTICIPATING JURISDICTIONS

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2006-2010)
Davidson County	**62,432**	**72,655**	**2.0%**	**$128,200**
Denton	651	766	0.7%	$102,500
Lexington	8,510	8,938	0.3%	$105,100
Midway	--	1,963	0.1%	$152,400

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2006-2010)
Thomasville*	8,515	11,870	0.2%	$105,500
Wallburg	--	1,217	0.7%	$156,500

*The 2010 housing units for Thomasville include units (127 units) located in Randolph County.
Source: United States Census Bureau

3.3.2 Infrastructure

Transportation

There is one interstate that crosses Davidson County. Interstate 85 is the major east-west thoroughfare connecting the county to Rowan and Randolph Counties and it also runs through Lexington and Thomasville. There are also several US highways that cross Davidson County. US Routes 64 and 29 are two additional east-west thoroughfares that link the county to its neighboring counties (Randolph, Davie, and Rowan). The major north-south highway is US Route 52 which links the county to Forsyth and Rowan Counties.

Within Davidson County, a public transportation system serves participating local human service agencies as well as the general public. Service is also provided to Lexington and Thomasville.

Currently, there is no passenger rail service offered in Davidson County; however, Lexington is scheduled to receive passenger rail service by 2015. Both the Piedmont and Carolinian Amtrak trains do make special once-a-year stops in Lexington for the Barbecue Festival. Additionally, freight carriers such as Winston-Salem Southbound and Norfolk Southern serve the county.

The Piedmont Triad International Airport is the largest airport closest to Davidson County. It offers 10 daily non-stop commercial flights on 8 airlines and it is the third busiest airport in North Carolina. It is approximately 66 miles from the center of the county. Davidson County Airport, located in Lexington, also provides public air service to Davidson County as well as one other privately-owned airport, Hiatt Airport, located just outside of Thomasville. The Charlotte Douglas International Airport and Raleigh-Durham International Airport are two additional large airports that are also in fairly close proximity to the county.

Utilities

Electrical power in Davidson County is provided by one public utility, one electricity cooperative, and one municipality. Duke Energy Progress, the largest electric power holding company in the US, provides service across Davidson County. EnergyUnited is an electricity cooperative that also services the majority of the county, excluding a small area in the northeast portion of the county and a sliver along the northern county boundary. The City of Lexington also provides municipally-owned and operated electric service to its residents as well as other customers across much of Davidson County.

Sewer service providers in Davidson County are the City of Lexington, the City of Thomasville, the Town of Denton, and the Winston Salem Utilities Commission. The City of High Point (in Guilford County) has a sewage treatment facility that Davidson County may have the opportunity to jointly work with in the future.

Water is widely available throughout the county though it is not without limitations. Davidson Water, Inc. is a consolidation of five rural water systems and one of the first rural water systems in the nation. It serves all developed areas in Davidson County outside the municipalities of Lexington, Thomasville, and Denton, which each has its own municipal water system. The Handy Sanitary District serves the areas south of Denton.

Community Facilities

There are a number of public buildings and community facilities located throughout Davidson County. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 31 fire stations, 7 police stations, 10 EMS/rescue stations, and 39 public schools located within the study area.

Two major hospitals are located in Davidson County: Novant Health Thomasville Medical Center and Wake Forest Baptist Health – Lexington Medical Center. Novant Health Thomasville Medical Center is a general acute center with 146 beds and Wake Forest Baptist Health – Lexington Medical Center is also a general acute center with 94 beds.

There are also a number of county and municipal parks located throughout Davidson County, including Boone's Cave Park, Denton FarmPark and many community and neighborhood parks. High Rock Lake, Tuckertown Lake, and the Yadkin River also offer additional recreational opportunities in the county.

3.3.3 Land Use

Much of Davidson County is developed and relatively urbanized. However, there are some areas that are more sparsely developed. As shown in **Figure 3.1** above, there are several incorporated municipalities located throughout the study area, and these areas are where the county's population is generally concentrated. The incorporated areas are also where many businesses, commercial uses, and institutional uses are located. Land uses in the balance of the study area consist of a variety of types of residential, commercial, industrial, government, and recreational uses. Davidson County's land use pattern can be described as suburban sprawl. Population density is greater in the northern portion of the county while the southern portion is largely rural with primarily residential development. Local land use and associated regulations are further discussed in *Section 7: Capability Assessment.*

3.4 EMPLOYMENT AND INDUSTRY

The early modern economy in Davidson County was based on agriculture but it later transitioned to one based on textile and furniture manufacturing in the twentieth century up until the late 1990s. Today, Davidson County, like many communities, is grappling with the evolution of a manufacturing economy shifting to an economy based on the service industry.

According to the North Carolina Employment Security Commission (NCESC), in 2013 (the last full year with data available), Davidson County had an average annual employment of 71,433 workers and an average unemployment rate of 8.4 percent (compared to 8.0 percent for the state). The Manufacturing industry employed 21.9 percent of the county's workforce followed by Retail Trade (12.1%); Health Care and Social Assistance (11.2%); and Educational Services (10.4%). The American Community Survey (ACS) found the average annual median household income in Davidson County was $43,083 from 2009 to 2013 compared to $46,334 for the state of North Carolina.

SECTION 4
HAZARD IDENTIFICATION

This section describes how the planning team identified the hazards to be included this plan. It consists of the following five subsections:

- 4.1 Overview
- 4.2 Description of Full Range of Hazards
- 4.3 Disaster Declarations
- 4.4 Hazard Evaluation
- 4.5 Hazard Identification Results

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

4.1 OVERVIEW

Davidson County is vulnerable to a wide range of natural and human-caused hazards that threaten life and property. Current FEMA regulations and guidance under the Disaster Mitigation Act of 2000 (DMA 2000) require, at a minimum, an evaluation of a full range of natural hazards. An evaluation of human-caused hazards (i.e., technological hazards, terrorism, etc.) is encouraged, though not required, for plan approval. Davidson County has included both types of hazards.

Upon a review of the full range of natural hazards suggested under FEMA planning guidance, the participating jurisdictions in Davidson County (Denton, Lexington, Midway, Thomasville, and Wallburg) have identified a number of hazards that are to be addressed in their Multi-Jurisdictional Hazard Mitigation Plan. These hazards were identified through an extensive process that utilized input from the Davidson County Hazard Mitigation Planning Team members, research of past disaster declarations in the county[1], and review of the North Carolina State Hazard Mitigation Plan (2013). Readily available information from reputable sources (such as federal and state agencies) was also evaluated to supplement information from these key sources.

Table 4.1 lists the full range of natural hazards initially identified for inclusion in the Plan and provides a brief description for each. This table includes 25 individual hazards. Some of these hazards are considered to be interrelated or cascading, but for preliminary hazard identification purposes these individual hazards are broken out separately.

Next, **Table 4.2** lists the disaster declarations in Davidson County.

[1] A complete list of disaster declarations for Davidson County can be found below in Section 4.3.

Next, **Table 4.3** documents the evaluation process used for determining which of the initially identified hazards are considered significant enough to warrant further evaluation in the risk assessment. For each hazard considered, the table indicates whether or not the hazard was identified as a significant hazard to be further assessed, how this determination was made, and why this determination was made. The table works to summarize not only those hazards that *were* identified (and why) but also those that *were not* identified (and why not). Hazard events not identified for inclusion at this time may be addressed during future evaluations and updates of the risk assessment if deemed necessary by the Hazard Mitigation Planning Team during the plan update process.

Lastly, **Table 4.4** provides a summary of the hazard identification and evaluation process noting that 17 of the 25 initially identified hazards are considered significant enough for further evaluation through this Plan's risk assessment (marked with a "☑").

4.2 DESCRIPTION OF FULL RANGE OF HAZARDS

Table 4.1: DESCRIPTIONS OF THE FULL RANGE OF INITIALLY IDENTIFIED HAZARDS

Hazard	Description
ATMOSPHERIC HAZARDS	
Avalanche	A rapid fall or slide of a large mass of snow down a mountainside.
Drought	A prolonged period of less than normal precipitation such that the lack of water causes a serious hydrologic imbalance. Common effects of drought include crop failure, water supply shortages, and fish and wildlife mortality. High temperatures, high winds, and low humidity can worsen drought conditions and also make areas more susceptible to wildfire. Human demands and actions have the ability to hasten or mitigate drought-related impacts on local communities.
Hailstorm	Any storm that produces hailstones that fall to the ground; usually used when the amount or size of the hail is considered significant. Hail is formed when updrafts in thunderstorms carry raindrops into parts of the atmosphere where the temperatures are below freezing.
Heat Wave / Extreme Heat	A heat wave may occur when temperatures hover 10 degrees or more above the average high temperature for the region and last for several weeks. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when a "dome" of high atmospheric pressure traps hazy, damp air near the ground. Excessively dry and hot conditions can provoke dust storms and low visibility. A heat wave combined with a drought can be very dangerous and have severe economic consequences on a community.

Hurricane and Tropical Storm	Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and with a diameter averaging 10 to 30 miles across. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation and tornadoes. Coastal areas are also vulnerable to the additional forces of storm surge, wind-driven waves and tidal flooding which can be more destructive than cyclone wind. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea and Gulf of Mexico during the official Atlantic hurricane season, which extends from June through November.
Lightning	Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a “bolt” when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes, but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes thunder. On average, 73 people are killed each year by lightning strikes in the United States.
Nor’easter	Similar to hurricanes, nor’easters are ocean storms capable of causing substantial damage to coastal areas in the Eastern United States due to their associated strong winds and heavy surf. Nor'easters are named for the winds that blow in from the northeast and drive the storm up the East Coast along the Gulf Stream, a band of warm water that lies off the Atlantic coast. They are caused by the interaction of the jet stream with horizontal temperature gradients and generally occur during the fall and winter months when moisture and cold air are plentiful. Nor’easters are known for dumping heavy amounts of rain and snow, producing hurricane-force winds, and creating high surf that causes severe beach erosion and coastal flooding.
Severe Thunderstorm	Thunderstorms are caused by air masses of varying temperatures meeting in the atmosphere. Rapidly rising warm moist air fuels the formation of thunderstorms. Thunderstorms may occur singularly, in lines, or in clusters. They can move through an area very quickly or linger for several hours. Thunderstorms may result in hail, tornadoes, or straight-line winds. Windstorms pose a threat to lives, property, and vital utilities primarily due to the effects of flying debris and can down trees and power lines.
Tornado	A tornado is a violently rotating column of air that has contact with the ground and is often visible as a funnel cloud. Its vortex rotates cyclonically with wind speeds ranging from as low as 40 mph to as high as 300 mph. Tornadoes are most often generated by thunderstorm activity when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The destruction caused by tornadoes ranges from light to catastrophic depending on the intensity, size and duration of the storm.

Winter Storm and Freeze	Winter storms may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Blizzards, the most dangerous of all winter storms, combine low temperatures, heavy snowfall, and winds of at least 35 miles per hour, reducing visibility to only a few yards. Ice storms occur when moisture falls and freezes immediately upon impact on trees, power lines, communication towers, structures, roads and other hard surfaces. Winter storms and ice storms can down trees, cause widespread power outages, damage property, and cause fatalities and injuries to human life.
GEOLOGIC HAZARDS	
Earthquake	A sudden, rapid shaking of the Earth caused by the breaking and shifting of rock beneath the surface. This movement forces the gradual building and accumulation of energy. Eventually, strain becomes so great that the energy is abruptly released, causing the shaking at the earth's surface which we know as an earthquake. Roughly 90 percent of all earthquakes occur at the boundaries where plates meet, although it is possible for earthquakes to occur entirely within plates. Earthquakes can affect hundreds of thousands of square miles; cause damage to property measured in the tens of billions of dollars; result in loss of life and injury to hundreds of thousands of persons; and disrupt the social and economic functioning of the affected area.
Expansive Soils	Soils that will exhibit some degree of volume change with variations in moisture conditions. The most important properties affecting degree of volume change in a soil are clay mineralogy and the aqueous environment. Expansive soils will exhibit expansion caused by the intake of water and, conversely, will exhibit contraction when moisture is removed by drying. Generally speaking, they often appear sticky when wet, and are characterized by surface cracks when dry. Expansive soils become a problem when structures are built upon them without taking proper design precautions into account with regard to soil type. Cracking in walls and floors can be minor, or can be severe enough for the home to be structurally unsafe.
Landslide	The movements of a mass of rock, debris, or earth down a slope when the force of gravity pulling down the slope exceeds the strength of the earth materials that comprise to hold it in place. Slopes greater than 10 degrees are more likely to slide, as are slopes where the height from the top of the slope to its toe is greater than 40 feet. Slopes are also more likely to fail if vegetative cover is low and/or soil water content is high.
Land Subsidence	The gradual settling or sudden sinking of the Earth's surface due to the subsurface movement of earth materials. Causes of land subsidence include groundwater pumpage, aquifer system compaction, drainage of organic soils, underground mining, hydrocompaction, natural compaction, sinkholes, and thawing permafrost.
Tsunami	A series of waves generated by an undersea disturbance such as an earthquake. The speed of a tsunami traveling away from its source can range from up to 500 miles per hour in deep water to approximately 20 to 30 miles per hour in shallower areas near coastlines. Tsunamis differ from regular ocean waves in that their currents travel from the water surface all the way down to the sea floor. Wave amplitudes in deep water are typically less than one meter; they are often barely detectable to the human eye. However, as they approach shore, they slow in shallower water, basically causing the waves from behind to effectively "pile up", and wave heights to increase dramatically. As opposed to typical waves which crash at the shoreline, tsunamis bring with them a continuously flowing 'wall of water' with the potential to cause devastating damage in coastal areas located immediately along the shore.

Volcano	A mountain that opens downward to a reservoir of molten rock below the surface of the earth. While most mountains are created by forces pushing up the earth from below, volcanoes are different in that they are built up over time by an accumulation of their own eruptive products: lava, ash flows, and airborne ash and dust. Volcanoes erupt when pressure from gases and the molten rock beneath becomes strong enough to cause an explosion.
HYDROLOGIC HAZARDS	
Dam and Levee Failure	Dam failure is the collapse, breach, or other failure of a dam structure resulting in downstream flooding. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and severe property damage if development exists downstream of the dam. Dam failure can result from natural events, human-induced events, or a combination of the two. The most common cause of dam failure is prolonged rainfall that produces flooding. Failures due to other natural events such as hurricanes, earthquakes or landslides are significant because there is generally little or no advance warning.
Erosion	Erosion is the gradual breakdown and movement of land due to both physical and chemical processes of water, wind, and general meteorological conditions. Natural, or geologic, erosion has occurred since the Earth's formation and continues at a very slow and uniform rate each year.
Flood	The accumulation of water within a water body which results in the overflow of excess water onto adjacent lands, usually floodplains. The floodplain is the land adjoining the channel of a river, stream ocean, lake or other watercourse or water body that is susceptible to flooding. Most floods fall into the following three categories: riverine flooding, coastal flooding, or shallow flooding (where shallow flooding refers to sheet flow, ponding and urban drainage).
Storm Surge	A storm surge is a large dome of water often 50 to 100 miles wide and rising anywhere from four to five feet in a Category 1 hurricane up to more than 30 feet in a Category 5 storm. Storm surge heights and associated waves are also dependent upon the shape of the offshore continental shelf (narrow or wide) and the depth of the ocean bottom (bathymetry). A narrow shelf, or one that drops steeply from the shoreline and subsequently produces deep water close to the shoreline, tends to produce a lower surge but higher and more powerful storm waves. Storm surge arrives ahead of a storm's actual landfall and the more intense the hurricane is, the sooner the surge arrives. Storm surge can be devastating to coastal regions, causing severe beach erosion and property damage along the immediate coast. Further, water rise caused by storm surge can be very rapid, posing a serious threat to those who have not yet evacuated flood-prone areas.

OTHER HAZARDS	
Hazardous Materials Incident	Hazardous material (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the nation's highways and on the water. HAZMAT incidents consist of solid, liquid and/or gaseous contaminants that are released from fixed or mobile containers, whether by accident or by design as with an intentional terrorist attack. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind and possibly wildlife as well.
Nuclear Accident	A nuclear and radiation accident is defined by the International Atomic Energy Agency as "an event that has led to significant consequences to people, the environment or the facility. Often, this type of incident results from damage to the reactor core of a nuclear power plant which can release radioactivity into the environment. The degree of exposure from nuclear accidents has varied from serious to catastrophic.
Terror Threat	Terrorism is defined by FEMA as, "the use of force or violence against persons or property in violation of the criminal laws of the United States for purposes of intimidation, coercion, or ransom." Terrorist acts may include assassinations, kidnappings, hijackings, bomb scares and bombings, cyber attacks (computer-based), and the use of chemical, biological, nuclear and radiological weapons.
Wildfire	An uncontrolled fire burning in an area of vegetative fuels such as grasslands, brush, or woodlands. Heavier fuels with high continuity, steep slopes, high temperatures, low humidity, low rainfall, and high winds all work to increase risk for people and property located within wildfire hazard areas or along the urban/wildland interface. Wildfires are part of the natural management of forest ecosystems, but most are caused by human factors. Over 80 percent of forest fires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning.

4.3 DISASTER DECLARATIONS

Disaster declarations provide initial insight into the hazards that may impact the Davidson County planning area. Since 1989, 11 presidential disaster declarations have been reported in Davidson County. This includes five storms related to severe winter weather, one tornado event, and five hurricanes/tropical storms.

Table 4.2: DAVIDSON COUNTY DISASTER DECLARATIONS

Year	Disaster Number	Description
1989	827	Tornadoes
1989	844	Hurricane Hugo
1996	1087	Blizzard Of 96
1996	1103	Winter Storm
1996	1134	Hurricane Fran

Year	Disaster Number	Description
1999	1292	Hurricane Floyd Major Disaster Declarations
2000	1312	Severe Winter Storm
2002	1448	Severe Ice Storm
2003	1490	Hurricane Isabel
2004	1553	Hurricane Ivan
2014	4167	Severe Winter Storm

4.4 HAZARD EVALUATION

Table 4.3: DOCUMENTATION OF THE HAZARD EVALUATION PROCESS

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
ATMOSPHERIC HAZARDS			
Avalanche	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of the NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of US Forest Service National Avalanche Center website	• The United States avalanche hazard is limited to mountainous western states including Alaska, as well as some areas of low risk in New England. • Avalanche hazard was removed from the North Carolina State Hazard Mitigation Plan after determining the mountain elevation in Western North Carolina did have enough snow to produce this hazard. • Avalanche is not included in the previous Davidson County hazard mitigation plan. • There is no risk of avalanche events in North Carolina.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Drought	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of the NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of the North Carolina Drought Monitor website	• Drought is a normal part of virtually all climatic regimes, including areas with high and low average rainfall. • Droughts are discussed in NC State Hazard Mitigation Plan as a lesser hazard. • The NC State Hazard Mitigation Plan lists drought as a moderate hazard for the Piedmont 4 Region, which includes Davidson County. • Drought is included in the previous Davidson County hazard mitigation plan. • There are reports of drought conditions in each of the last fourteen years in Davidson County, according to the NC State Climate Office.
Hailstorm	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of NOAA NCDC Storm Events Database	• Although hailstorms occur primarily in the Midwestern states, they do occur in every state on the mainland U.S. Most inland regions experience hailstorms at least two or more days each year. • Hailstorm events are discussed in the NC State Hazard Mitigation Plan under the Severe Thunderstorm hazard. • Hail is included in the previous Davidson County hazard mitigation plan as an element of thunderstorms. • NCDC reports 90 hailstorm events (0.75 to 2.75 inch size hail) for Davidson County between 1956 and 2014. For these events there was almost $1.6 million (2014 dollars) in property damages.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Extreme Cold	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of the North Carolina State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of NOAA NCDC Storm Events Database	• Many areas of the United States are susceptible to extreme cold, including areas of North Carolina. • NCDC reports one extreme cold event for Davidson County and the lowest temperature recorded in the county was -6°F. • Extreme cold was discussed in the previous Davidson County hazard mitigation plan under the winter weather hazard so it was not captured separately in this update.
Heat Wave / Extreme Heat	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of the North Carolina State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of NOAA NCDC Storm Events Database	• Many areas of the United States are susceptible to heat waves, including North Carolina. • The NC State Hazard Mitigation Plan reports the central portion of the state as having a moderate vulnerability. • Heat wave was included in the previous Davidson County hazard mitigation plan. • NCDC reports one extreme heat event for Davidson County and the highest temperature recorded in the county was 107°F.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Hurricane and Tropical Storm	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Analysis of NOAA historical tropical cyclone tracks and National Hurricane Center Website • Review of NOAA NCDC Storm Events Database • Review of historical presidential disaster declarations • FEMA Hazus-MH storm return periods	• The Atlantic and Gulf regions are most prone to landfall by hurricanes and tropical storms. • Hurricane and tropical storm events are discussed in the NC State Hazard Mitigation Plan and are listed as a top hazard in the Piedmont 4 Region, which includes Davidson County. • Hurricanes and tropical weather were addressed in the previous Davidson County hazard mitigation plan. • NOAA historical records indicate 45 storm tracks have come within 75 miles of Davidson County since 1859. • NCDC reports 4 hurricane events since 1996 for Davidson County. • 5 out of 11 disaster declarations in Davidson County are directly related to hurricane events. • The 50-year return period peak gust for hurricane and tropical storm events in Davidson County is around 65 mph.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Lightning	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan Review of NOAA NCDC Storm Events Database • Review of Vaisala's NLDN Lightning Flash Density Map	• The central region of the Florida has the highest density of lightning strikes in the mainland U.S.; however, lightning events are experienced in nearly every region of the country. • Lightning events are discussed in the NC State Hazard Mitigation Plan as part of the severe thunderstorm hazard. • Lightning is discussed in the previous Davidson County hazard mitigation plan under the thunderstorm hazard. • NCDC reports 9 lightning events for Davidson County since 1997. These events have resulted in over $600,000 (2014 dollars) in property damage. • According to Vaisala's U.S. National Lightning Detection Network, Davidson County is located in an area that experienced an average of 3 to 5 lightning flashes per square kilometer per year between 1997 and 2010.
Nor'easter	NO	• Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of NOAA NCDC Storm Events Database	• Nor'easters are discussed in the state plan. The Piedmont Region, which includes Davidson County, has relatively low vulnerability compared to the state. • Nor'easters were not identified in the previous Davidson County hazard mitigation plan. • NCDC does not report any nor'easter activity for Davidson County. However, nor'easters may have affected the area as severe winter storms. In this case, the activity would be reported under winter storm events.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Severe Thunderstorm	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of NOAA NCDC Storm Events Database • Review of historical presidential disaster declarations	• Over 100,000 thunderstorms are estimated to occur each year on the U.S. mainland, and they are experienced in nearly every region. • Severe thunderstorm events are discussed in the NC State Hazard Mitigation Plan and are listed as a top hazard in the Piedmont 4 Region, which includes Davidson County. • Severe thunderstorm events were addressed in the previous Davidson County hazard mitigation plan. • NCDC reports 131 thunderstorm/high wind events in Davidson County since 1997. These events have resulted in 1 death and $2.6 million (2014 dollars) in property damage.
Tornado	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of NOAA NCDC Storm Events Database • Review of historical presidential disaster declarations	• From 1953 to 1993, North Carolina averaged 10 to 25 tornadoes per year. • Tornado events are discussed in the NC State Hazard Mitigation Plan. The Piedmont Region, which includes Davidson County, is the highest vulnerability in the state. • Tornado events were addressed in the previous Davidson County hazard mitigation plan. • NCDC reports 14 tornado events in Davidson County since 1958. These events have resulted in 2 recorded deaths, 22 injuries, and $25.8 million (2014 dollars) in property damage with the most severe event being an EF2. • 1 of the county's 11 disaster declarations was directly related to tornadoes.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Winter Storm and Freeze	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of NOAA NCDC Storm Events Database • Review of historical presidential disaster declarations	• Winter storms affect every state in the continental U.S. and Alaska. • Severe winter storms, including snow storms and ice storms, are discussed in the NC State Hazard Mitigation Plan. They are listed as a top hazard in the Piedmont 4 Region, which includes Davidson County. • Winter snow and ice storm events were addressed in the previous Davidson County hazard mitigation plan. • NCDC reports that Davidson County has been affected by 55 snow and ice events since 1993. These events resulted in $6.2 million (2014dollars) in damages but did not cause any deaths or injuries in Davidson County. • 5 of the county's 11 disaster declarations were directly related to winter storm events.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
GEOLOGIC HAZARDS			
Earthquake	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of the National Geophysical Data Center • USGS Earthquake Hazards Program website	• Although the zone of greatest seismic activity in the United States is along the Pacific Coast, eastern regions have experienced significant earthquakes. • Earthquake events are discussed in the NC State Hazard Mitigation Plan and Davidson County is considered to be at low to moderate risk to an earthquake event. • Earthquake was included in the previous Davidson County hazard mitigation plan. • Earthquakes have occurred in and around the State of North Carolina in the past. The state is affected by the Charleston and the New Madrid (near Missouri) Fault lines which have generated a magnitude 8.0 earthquake in the last 200 years. • 3 events are known to have occurred in the county according to the National Geophysical Data Center. The greatest MMI reported was a 4. • According to USGS seismic hazard maps, the peak ground acceleration (PGA) with a 10% probability of exceedance in 50 years for Davidson County is approximately 2 to 4%g. FEMA recommends that earthquakes be further evaluated for mitigation purposes in areas with a PGA of 3%g or more.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Expansive Soils	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of USDA Soil Conservation Service's Soil Survey	• The effects of expansive soils are most prevalent in parts of the Southern, Central, and Western U.S. • Expansive soils are identified in the NC State Hazard Mitigation Plan; however, the Piedmont 4 Region, which includes Davidson County, does not identify expansive soils as a top hazard. • Davidson County is located in an area that has little to no clay swelling potential. • The previous Davidson County Hazard Mitigation Plan did not identify expansive soils as a potential hazard.
Landslide	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of USGS Landslide Incidence and Susceptibility Hazard Map • Review of the North Carolina Geological Survey database of historic landslides	• Landslides occur in every state in the U.S, and they are most common in the coastal ranges of California, the Colorado Plateau, the Rocky Mountains, and the Appalachian Mountains. • Landslide/debris flow events are discussed in the state plan, and the Piedmont Region, which includes Davidson County, has moderate vulnerability compared to the rest of the state. • The previous Davidson County hazard mitigation plan addressed landslides. • USGS landslide hazard maps indicate that a low incidence rate is found across the county. • Data provided by NCGS indicate there are no recorded landslide events in the Davidson County. However, the dataset provided was incomplete.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Land Subsidence	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan	• Land subsidence affects at least 45 states, including North Carolina. However, because of the broad range of causes and impacts, there has been limited national focus on this hazard. • The state plan delineates certain areas that are susceptible to land subsidence hazards in North Carolina; however Davidson County has moderate vulnerability compared to the state. • The previous Davidson County hazard mitigation plan identified land subsidence under the sinkhole/erosion hazard, so it will be evaluated there in this plan.
Tsunami	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of FEMA "How-to" mitigation planning guidance (Publication 386-2, "Understanding Your Risks – Identifying Hazards and Estimating Losses).	• No record exists of a catastrophic Atlantic basin tsunami impacting the mid-Atlantic coast of the United States. • Tsunami inundation zone maps are not available for communities located along the U.S. East Coast. • Tsunamis are discussed in the state plan and described as a "greater" hazard for the state. However, the Piedmont Region, which includes Davidson County, scored a zero for tsunami hazard risk. • The previous Davidson County hazard mitigation plan did not address tsunamis. • FEMA mitigation planning guidance suggests that locations along the U.S. East Coast have a relatively low tsunami risk and need not conduct a tsunami risk assessment at this time.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Volcano	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of USGS Volcano Hazards Program website	• More than 65 potentially active volcanoes exist in the United States and most are located in Alaska. The Western states and Hawaii are also potentially affected by volcanic hazards. • There are no active volcanoes in North Carolina. • There has not been a volcanic eruption in North Carolina in over 1 million years. • No volcanoes are located near Davidson County.
HYDROLOGIC HAZARDS			
Dam and Levee Failure	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of North Carolina Division of Land Management website	• The National Inventory of Dams shows dams are located in every state. • Dam failure is discussed in the NC State Hazard Mitigation Plan and is listed a hazard for the Piedmont 4 Region, which includes Davidson County. • The previous Davidson County hazard mitigation plan addressed dam failure. • Of the 112 dams reported on the National Inventory of Dams, 15 are high hazard (13%). (High hazard is defined as "where failure or mis-operation will probably cause loss of human life").

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Erosion	YES	• Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan	• Coastal erosion is discussed in the NC State Hazard Mitigation Plan but only for coastal areas (there is no discussion of riverine erosion). Davidson County is not located in a coastal area. • Erosion is included as a hazard in the previous Davidson County hazard mitigation plan. • Riverine erosion remains a natural, dynamic, and continuous process that has the potential to affect Davidson County since several rivers/streams run through the county. This warrants inclusions as a potential hazard.
Flood	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of NOAA NCDC Storm Events Database • Review of historical disaster declarations • Review of FEMA DFIRM data • Review of FEMA's NFIP Community Status Book and Community Rating System (CRS)	• Floods occur in all 50 states and in the U.S. territories. • The flood hazard is thoroughly discussed in the NC State Hazard Mitigation Plan. Davidson County was found to have moderate vulnerability compared to the state. • The previous Davidson County hazard mitigation plan addresses flood hazard. • NCDC reports that Davidson County has been affected by 42 flood events since 1996. In total, these events caused 1 death and over $800,000 (2014 dollars) in property damages. • None of the county's Presidential Disaster Declarations were flood-related; however, five declarations were hurricane-related which caused flooding issues. • 8.5% of Davidson County is located in an identified floodplain (100- or 500-year). • Davidson County, Denton, Lexington, and Thomasville all participate in the NFIP.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Storm Surge	NO	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of NOAA NCDC Storm Events Database	• Given the inland location of Davidson County, storm surge would not affect the area. • Storm surge is discussed in the NC State Hazard Mitigation Plan under the hurricane hazard and indicates that the Piedmont 4 Region has zero vulnerability to storm surge. • The previous Davidson County hazard mitigation plan did not address storm surge. • No historical events were reported by NCDC.
OTHER HAZARDS			
Hazardous Materials Incident	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of the previous Davidson County hazard mitigation plan • Review EPA Toxic Release Inventory (TRI) • Review of USDOT Pipeline and Hazardous Materials Safety Administration (PHMSA) incident database	• Cities, counties, and towns where hazardous materials fabrication, processing, and storage sites are located, and those where hazardous waste treatment, storage or disposal facilities operate are at risk for hazardous materials events. • The previous Davidson County hazard mitigation plan did not include hazardous materials incidents; however, it is identified in other county planning documents. • 63 TRI facilities are located in Davidson County. • 17 of the 182 PHMSA-reported HAZMAT incidents in the county were classified as "serious" incidents. In total, these incidents have resulted in 1injury and over $25,000 (2014 dollars) in property damages.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Nuclear Accident	YES	• Review of IAEA data on the location of nuclear reactors • Review of the previous Davidson County hazard mitigation plan • Discussion with local officials about location of nuclear power stations	• The McGuire Nuclear Power Plant is located within 50 miles of the southwestern part of Davidson County. • The previous Davidson County hazard mitigation plan did not include nuclear accident; however, it is a hazard identified in other planning documents. • A nuclear accident is unlikely to occur, but could cause severe damage in the event of a major incident.
Terror Threat	YES	• Review of the previous Davidson County hazard mitigation plan • Review of local official knowledge	• The previous Davidson County hazard mitigation plan did not include terror threat; however, it is a hazard addressed in the County's Hazard Identification and Risk Assessment document. • There are several high profiles targets in the area that caused the planning team to determine that the hazard should be evaluated further.

Natural Hazards Considered	Was this hazard identified as a significant hazard to be addressed in the plan at this time? (Yes or No)	How was this determination made?	Why was this determination made?
Wildfire	YES	• Review of FEMA's Multi-Hazard Identification and Risk Assessment • Review of NC State Hazard Mitigation Plan • Review of the previous Davidson County hazard mitigation plan • Review of Southern Wildfire Risk Assessment (SWRA) Data • Review of the NC Division of Forest Resources website	• Wildfires occur in virtually all parts of the United States. Wildfire hazard risks will increase as low-density development along the urban/wildland interface increases. • Wildfires are discussed in the state plan as a "greater" hazard of concern but the Piedmont Region, which includes Davidson County, was found to have relatively low vulnerability compared to the state. • The previous Davidson County hazard mitigation plan addressed wildfire. • A review of SWRA data indicates that there are some areas of elevated concern in Davidson County. • According to the North Carolina Division of Forest Resources, Davidson County experiences an average of 39 fires each year which burn a combined 53.6 acres. • Wildfire hazard risks will increase as low-density development along the urban/wildland interface increases.

4.5 HAZARD IDENTIFICATION RESULTS

Table 4.4: Summary Results of the Hazard Identification and Evaluation Process

ATMOSPHERIC HAZARDS	GEOLOGIC HAZARDS
☐ Avalanche	☑ Earthquake
☑ Drought	☐ Expansive Soils
☑ Hailstorm	☑ Landslide
☐ Extreme Cold	☐ Land Subsidence
☑ Heat Wave / Extreme Heat	☐ Tsunami
☑ Hurricane and Tropical Storm	☐ Volcano
☑ Lightning	**OTHER HAZARDS**
☐ Nor'easter	☑ Hazardous Materials Incident
☑ Severe Thunderstorm	☑ Nuclear Accident
☑ Tornado	☑ Terror Threat
☑ Winter Storm and Freeze	☑ Wildfire
HYDROLOGIC HAZARDS	
☑ Dam and Levee Failure	
☑ Erosion	
☑ Flood	
☐ Storm Surge	

SECTION 5
HAZARD PROFILES

This section includes detailed hazard profiles for each of the hazards identified in the previous section (*Hazard Identification*) as significant enough for further evaluation in the Davidson County Hazard Mitigation Plan. It contains the following subsections:

- 5.1 Overview
- 5.2 Study Area
- 5.3 Drought
- 5.4 Extreme Heat
- 5.5 Hailstorm
- 5.6 Hurricane and Tropical Storm
- 5.7 Lightning
- 5.8 Thunderstorm Wind/High Wind
- 5.9 Tornado
- 5.10 Winter Storm and Freeze
- 5.11 Earthquake
- 5.12 Landslide
- 5.13 Dam and Levee Failure
- 5.14 Erosion
- 5.15 Flood
- 5.16 Hazardous Materials Incident
- 5.17 Nuclear Accident
- 5.18 Terror Threat
- 5.19 Wildfire
- 5.20 Conclusions on Hazard Risk
- 5.21 Final Determinations

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

5.1 OVERVIEW

This section includes detailed hazard profiles for each of the hazards identified in the previous section (*Hazard Identification*) as significant enough for further evaluation in Davidson County hazard risk assessment by creating a hazard profile. Each hazard profile includes a general description of the hazard, its location and extent, notable historical occurrences, and the probability of future occurrences. Each profile also includes specific items noted by members of the Davidson County Hazard Mitigation Planning Team as it relates to unique historical or anecdotal hazard information for Davidson County or a participating municipality within it.

The following hazards were identified:

- **Atmospheric**
  - Drought
  - Extreme Heat
  - Hailstorm
  - Hurricane and Tropical Storm

  - Lightning
  - Severe Thunderstorm (including straight-line winds)
  - Tornado
  - Winter Storm and Freeze
- **Geologic**
  - Earthquake
  - Landslide
- **Hydrologic**
  - Dam and Levee Failure
  - Erosion
  - Flood
- **Other**
  - Hazardous Materials Incident
  - Nuclear Accident
  - Terror Threat
  - Wildfire

5.2 STUDY AREA

Davidson County includes five municipalities: Denton, Lexington, Midway, Thomasville, and Wallburg. **Table 5.1** provides a summary table of the participating jurisdictions. In addition, **Figure 5.1** provides a base map, for reference, of Davidson County.

TABLE 5.1: PARTICIPATING JURISDICTIONS IN THE DAVIDSON COUNTY HAZARD MITIGATION PLAN

Davidson County	
Denton	Thomasville
Lexington	Wallburg
Midway	

FIGURE 5.1: DAVIDSON COUNTY BASE MAP

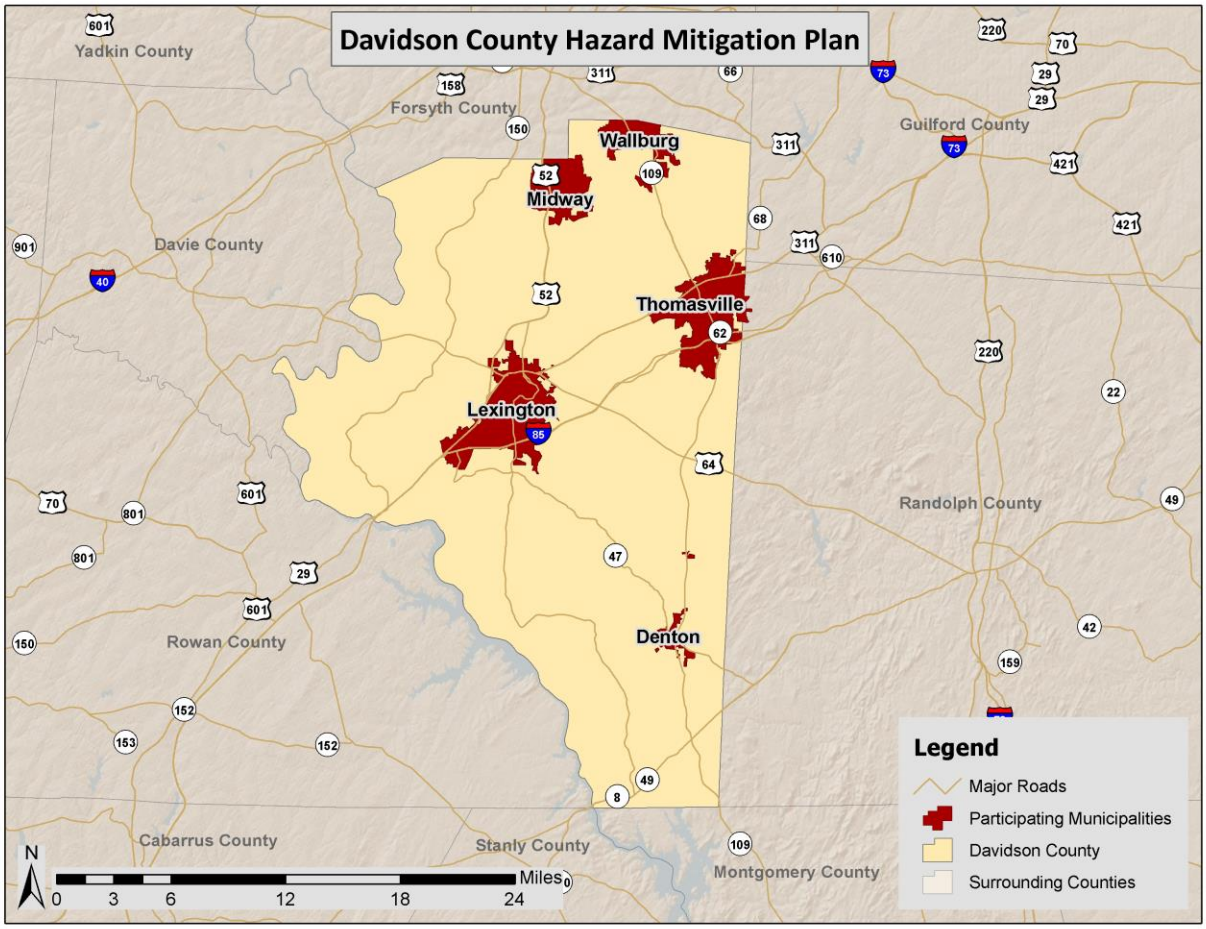


Table 5.2 lists each significant hazard for Davidson County and identifies whether or not it has been determined to be a specific hazard of concern for the 5 municipal jurisdictions and the county's unincorporated areas. This is the based on the best available data and information from the Davidson County Hazard Mitigation Planning Team. (● = hazard of concern)

TABLE 5.2SUMMARY OF IDENTIFIED HAZARD EVENTS IN DAVIDSON COUNTY

Jurisdiction	Atmospheric								Geologic		Hydrologic			Other			
	Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm	Earthquake	Landslide	Dam and Levee Failure	Erosion	Flood	HAZMAT	Nuclear Accident	Terror Threat	Wildfire
Davidson County																	
Denton	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Lexington	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Midway	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●
Thomasville	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●
Wallburg	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●

Jurisdiction	Atmospheric								Geologic		Hydrologic			Other			
	Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm	Earthquake	Landslide	Dam and Levee Failure	Erosion	Flood	HAZMAT	Nuclear Accident	Terror Threat	Wildfire
Unincorporated Area	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Atmospheric Hazards

5.3 DROUGHT

5.3.1 Background

Drought is a normal part of virtually all climatic regions, including areas with high and low average rainfall. Drought is the consequence of a natural reduction in the amount of precipitation expected over an extended period of time, usually a season or more in length. High temperatures, high winds, and low humidity can exacerbate drought conditions. In addition, human actions and demands for water resources can hasten drought-related impacts. Drought may also lead to more severe wildfires.

Droughts are typically classified into one of four types: 1) meteorological, 2) hydrologic, 3) agricultural, or 4) socioeconomic. **Table 5.3** presents definitions for these types of drought.

TABLE 5.3 DROUGHT CLASSIFICATION DEFINITIONS

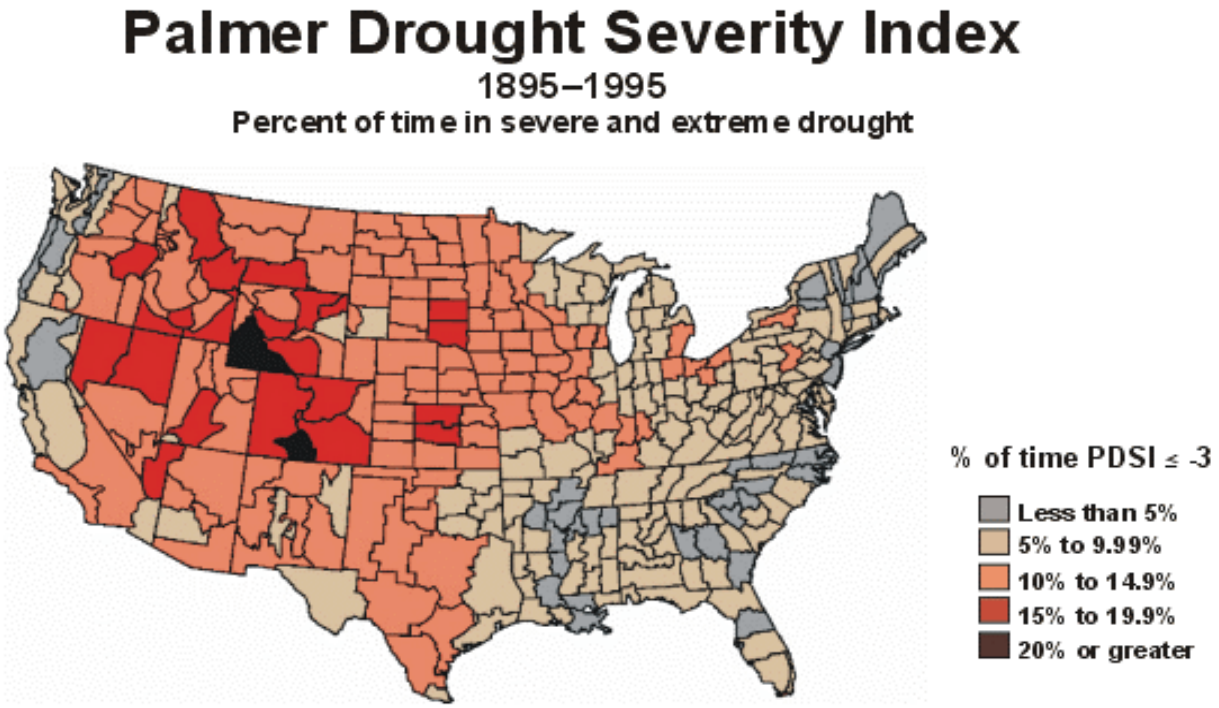
Meteorological Drought	The degree of dryness or departure of actual precipitation from an expected average or normal amount based on monthly, seasonal, or annual time scales.
Hydrologic Drought	The effects of precipitation shortfalls on stream flows and reservoir, lake, and groundwater levels.
Agricultural Drought	Soil moisture deficiencies relative to water demands of plant life, usually crops.
Socioeconomic Drought	The effect of demands for water exceeding the supply as a result of a weather-related supply shortfall.

Source: Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy, FEMA

Droughts are slow-onset hazards, but, over time, can have very damaging affects to crops, municipal water supplies, recreational uses, and wildlife. If drought conditions extend over a number of years, the direct and indirect economic impact can be significant.

The Palmer Drought Severity Index (PDSI) is based on observed drought conditions and range from -0.5 (incipient dry spell) to -4.0 (extreme drought). Evident in **Figure 5.2**, the Palmer Drought Severity Index Summary Map for the United Stated, drought affects most areas of the United States, but is less severe in the Eastern United States.

FIGURE 5.2: PALMER DROUGHT SEVERITY INDEX SUMMARY MAP FOR THE UNITED STATES



Source: National Drought Mitigation Center

5.3.2 Location and Spatial Extent

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. According to the Palmer Drought Severity Index, North Central North Carolina has a relatively low risk for drought hazard. However, local areas may experience much more severe and/or frequent drought events than what is represented on the Palmer Drought Severity Index map. Furthermore, it is assumed that Davidson County would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment.

5.3.3 Historical Occurrences

The North Carolina State Climate Office was used to ascertain historical drought events in Davidson County. The North Carolina State Climate Office reports PDSI data for North Carolina from 2000 to 2013. It classifies drought conditions by region on a scale of -6.00 to 6.00 where:

- 4.00 and above: Extremely Moist
- 3.00 to 3.99: Very Moist
- 2.00 to 2.99: Moderately Moist
- -1.99 to 1.99: Mid-Range
- -2.00 to -2.99: Moderate Drought

- -3.00 to -3.99: Severe Drought
- -4.00 and below: Extreme Drought

According to the North Carolina State Climate Office, the Central Piedmont Region, which includes Davidson County, experienced moderate to extreme drought occurrences in 11 of the last 14 years (2000-2013). **Table 5.4** shows the most severe drought condition reported for each year in the Central Piedmont Region, according to PDSI classifications. However, it should be noted that the most severe classification reported is based on monthly regional averages, and conditions in Davidson County may actually have been less or more severe than what is reported.

TABLE 5.4: HISTORICAL DROUGHT OCCURRENCES IN DAVIDSON COUNTY

extreme drought	severe drought	moderate drought	mid-range	moderately moist	very moist	extremely moist
-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

	Davidson County	
2000	-2.83	Moderate Drought
2001	-3.43	Severe Drought
2002	-4.98	Extreme Drought
2003	-0.38	Mid-range
2004	-2.04	Moderate Drought
2005	-2.37	Moderate Drought
2006	-2.62	Moderate Drought
2007	-4.16	Extreme Drought
2008	-4.37	Extreme Drought
2009	-1.08	Mid-range
2010	-2.53	Moderate Drought
2011	-3.44	Severe Drought
2012	-2.84	Moderate Drought
2013	-0.37	Mid-range

Source: North Carolina State Climate Office

Data from the National Climatic Data Center (NCDC) was also reviewed to obtain additional information on historical drought events in the county, but no events were reported in Davidson County.

5.3.4 Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of Davidson County has a probability level of likely (10 to 100 percent annual probability) for future drought events. This hazard may vary slightly by location but each area has an equal probability of experiencing a drought. However, historical information also indicates that there is a much lower probability for extreme, long-lasting drought conditions.

5.4 EXTREME HEAT

5.4.1 Background

Extreme heat, like drought, poses little risk to property. However, extreme heat can have devastating effects on health. Extreme heat is often referred to as a "heat wave." According to the National Weather Service, there is no universal definition for a heat wave, but the standard U.S. definition is any event lasting at least three days where temperatures reach ninety degrees Fahrenheit or higher. However, it may also be defined as an event at least three days long where temperatures are ten degrees greater than the normal temperature for the affected area. Heat waves are typically accompanied by humidity but may also be very dry. These conditions can pose serious health threats causing an average of 1,500 deaths each summer in the United States[1].

According to the National Oceanic and Atmospheric Administration, heat is the number one weather-related killer among natural hazards, followed by frigid winter temperatures[1]. The National Weather Service devised the Heat Index as a mechanism to better inform the public of heat dangers. The Heat Index Chart, shown in **Figure 5.3**, uses air temperature and humidity to determine the heat index or apparent temperature. **Table 5.5** shows the dangers associated with different heat index temperatures. Some populations, such as the elderly and young, are more susceptible to heat danger than other segments of the population.

FIGURE 5.3: HEAT INDEX CHART

Air Temp (in F) \ Relative Humidity (in percent)	0	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100
140	125																				
135	120	128																			
130	117	122	131																		
125	111	116	123	131	141																
120	107	111	116	123	130	139	148														
115	103	107	111	115	120	127	135	143	151												
110	99	102	105	108	112	117	123	130	137	143	150										
105	95	97	100	102	105	109	113	118	123	129	135	142	149								
100	91	93	95	97	99	101	104	107	110	115	120	126	132	138	144						
95	87	88	90	91	93	94	96	98	101	104	107	110	114	119	124	130	136				
90	83	84	85	86	87	88	90	91	93	95	96	98	100	102	106	109	113	117	122		
85	78	79	80	81	82	83	84	85	86	87	88	89	90	91	93	95	97	99	102	105	108
80	73	74	75	76	77	77	78	79	79	80	81	81	82	83	85	86	86	87	88	89	91
75	69	69	70	71	72	72	73	73	74	74	75	75	76	76	77	77	78	78	79	79	80
70	64	64	65	65	66	66	67	67	68	68	69	69	70	70	70	70	71	71	71	71	72

Source: National Oceanic and Atmospheric Administration

[1] http://www.noaawatch.gov/themes/heat.php

TABLE 5.5: HEAT DISORDERS ASSOCIATED WITH HEAT INDEX TEMPERATURE

Heat Index Temperature (Fahrenheit)	Description of Risks
80°- 90°	Fatigue possible with prolonged exposure and/or physical activity
90°- 105°	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and/or physical activity
105°- 130°	Sunstroke, heat cramps, and heat exhaustion likely, and heatstroke possible with prolonged exposure and/or physical activity
130° or higher	Heatstroke or sunstroke is highly likely with continued exposure

Source: National Weather Service, National Oceanic and Atmospheric Administration

In addition, NOAA has seventeen metropolitan areas participating in the Heat HealthWatch/Warning System in order to better inform and warn the public of heat dangers. A Heat HealthWatch is issued when conditions are favorable for an excessive heat event in the next 12 to 48 hours. A Heat Warning is issued when an excessive heat event is expected in the next 36 hours. Furthermore, a warning is issued when the conditions are occurring, imminent, or have a high likelihood of occurrence. Urban areas participate in the Heat Health Watch/Warning System because urban areas are at greater risk to heat affects. Stagnant atmospheric conditions trap pollutants, thus adding unhealthy air to excessively hot temperatures. In addition, the "urban heat island effect" can produce significantly higher nighttime temperatures because asphalt and concrete (which store heat longer) gradually release heat at night.

5.4.2 Location and Spatial Extent

Excessive heat typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire county is susceptible to extreme heat conditions.

5.4.3 Historical Occurrences

Data from the National Climatic Data Center was used to determine historical extreme heat and heat wave events in Davidson County. One event was reported:

July 22, 1998 – *Excessive Heat* – Excessive heat plagued central North Carolina during July 22 through July 23. Maximum temperatures reached the 98 to 103 degree range combined with dew points in the 78 to 80 degree range with little wind to give heat index values of around 110 degrees for several hours each afternoon. To make matters worse, the minimum temperatures did not fall below 80 at several locations and those that did achieved that feat for only an hour or two. Strong thunderstorms ended the 2 day excessive heat ordeal on the evening of the 23 when rain cooled the environment enough to send temperatures into the lower 70s at most locations.

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been recorded in Lexington since 1902. The recorded maximum for the county can be found below in **Table 5.6**:

TABLE 5.6: HIGHEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	07/29/1952	107

Source: State Climate Office of North Carolina

The State Climate Office also reports average maximum temperatures at various stations across the state. There is one station located in Davidson County in Lexington. **Table 5.7** shows the average maximum temperatures from 1971 to 2000 at the Lexington observation station which can be used as a general comparison for the county.

TABLE 5.7: AVERAGE MAXIMUM TEMPERATURE IN DAVIDSON COUNTY

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. Max (°F)	49.6 °F	54.4 °F	63.3 °F	72.5 °F	79.3 °F	85.5 °F	89.1 °F	87.4 °F	81.6 °F	71.9 °F	61.7 °F	52.6 °F

Source: State Climate Office of North Carolina

5.4.4 Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of Davidson County has a probability level of possible (1 to 10 percent annual probability) for future extreme heat events to impact the county.

5.5 HAILSTORM

5.5.1 Background

Hailstorms are a potentially damaging outgrowth of severe thunderstorms (thunderstorms are discussed separately in Section 5.8). Early in the developmental stages of a hailstorm, ice crystals form within a low-pressure front due to the rapid rising of warm air into the upper atmosphere and the subsequent cooling of the air mass. Frozen droplets gradually accumulate on the ice crystals until they develop to a sufficient weight and fall as precipitation. Hail typically takes the form of spheres or irregularly-shaped masses greater than 0.75 inches in diameter. The size of hailstones is a direct function of the size and severity of the storm. High velocity updraft winds are required to keep hail in suspension in thunderclouds. The strength of the updraft is a function of the intensity of heating at the Earth's surface. Higher temperature gradients relative to elevation above the surface result in increased suspension time and hailstone size. **Table 5.8** shows the TORRO Hailstorm Intensity Scale which is a way of measuring hail severity.

TABLE 5.8: TORRO HAILSTORM INTENSITY SCALE

	Intensity Category	Typical Hail Diameter (mm)*	Probable Kinetic Energy, J-m^2	mm to inch conversion (inches)	Typical Damage Impacts
H0	Hard Hail	5	0-20	0 - 0.2	No damage
H1	Potentially Damaging	5-**15**	>20	0.2 - 0.6	Slight general damage to plants, crops

	Intensity Category	Typical Hail Diameter (mm)*	Probable Kinetic Energy, J-m^2	mm to inch conversion (inches)	Typical Damage Impacts
H2	Significant	10-**20**	>100	0.4 - 0.8	Significant damage to fruit, crops, vegetation
H3	Severe	20-**30**	>300	0.8 - 1.2	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-**40**	>500	1.0 - 1.6	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-**50**	>800	1.2 - 2.0	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-**60**		1.6 - 2.4	Bodywork of grounded aircraft dented, brick walls pitted
H7	Destructive	50-**75**		2.0 - 3.0	Severe roof damage, risk of serious injuries
H8	Destructive	60-**90**		1.6 - 3.5	(Severest recorded in the British Isles) Severe damage to aircraft bodywork
H9	Super Hailstorms	75-**100**		3.0 - 3.9	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100			Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

Source: http://www.torro.org.uk/site/hscale.php

5.5.2 Location and Spatial Extent

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that Davidson County is uniformly exposed to severe thunderstorms; therefore, all areas of the county are equally exposed to hail which may be produced by such storms.

5.5.3 Historical Occurrences

According to the National Climatic Data Center, 90 recorded hailstorm events have affected Davidson County since 1956.[2] **Table 5.9** is a summary of the hail events in Davidson County. **Table 5.10** provides detailed information about each event that occurred in the county. In all, hail occurrences resulted in almost $957,000 (2014 dollars) in property damages.[3] Hail ranged in diameter from 0.75 inches to 2.75 inches. It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. It is likely that damages are greater than the reported value.

[2] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1956 through October 2014. It is likely that additional hail events have affected Davidson County. In addition to NCDC, the North Carolina Department of Insurance office was contacted for information. As additional local data becomes available, this hazard profile will be amended.

[3] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE 5.9: SUMMARY OF HAIL OCCURRENCES IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	6	0/0	$0
Lexington	24	0/0	$321,652
Midway	2	0/0	$0
Thomasville	10	0/0	$0
Wallburg	2	0/0	$0
Unincorporated Area	46	0/0	$1,286,609
DAVIDSON COUNTY TOTAL	**90**	**0/0**	**$1,608,261**

Source: National Climatic Data Center

TABLE 5.10: HISTORICAL HAIL OCCURRENCES IN DAVIDSON COUNTY

	Date	Magnitude	Deaths / Injuries	Property Damage*
Denton				
DENTON	7/28/1997	0.75 in.	0/0	$0
DENTON	3/20/1998	0.75 in.	0/0	$0
DENTON	5/13/1999	0.75 in.	0/0	$0
DENTON	4/26/2003	0.75 in.	0/0	$0
DENTON	5/3/2003	1.75 in.	0/0	$0
DENTON	5/3/2003	1.50 in.	0/0	$0
DENTON	7/28/1997	0.75 in.	0/0	$0
DENTON	3/20/1998	0.75 in.	0/0	$0
DENTON	5/13/1999	0.75 in.	0/0	$0
DENTON	4/26/2003	0.75 in.	0/0	$0
DENTON	5/3/2003	1.75 in.	0/0	$0
DENTON	5/3/2003	1.50 in.	0/0	$0
Lexington				
Lexington	4/1/1993	1.00 in.	0/0	$0
LEXINGTON	5/11/1996	1.25 in.	0/0	$0
LEXINGTON	6/19/1996	1.75 in.	0/0	$0
LEXINGTON	6/2/1997	0.75 in.	0/0	$0
LEXINGTON	5/1/1998	0.75 in.	0/0	$0
LEXINGTON	8/18/2000	0.75 in.	0/0	$0
LEXINGTON	3/9/2002	0.88 in.	0/0	$0
LEXINGTON	5/2/2003	1.00 in.	0/0	$0
LEXINGTON	5/3/2003	1.75 in.	0/0	$321,652
LEXINGTON	6/19/2005	0.75 in.	0/0	$0
LEXINGTON	4/25/2006	0.88 in.	0/0	$0
LEXINGTON	5/14/2006	0.88 in.	0/0	$0
LEXINGTON	5/18/2006	0.88 in.	0/0	$0
LEXINGTON	5/18/2006	1.00 in.	0/0	$0
LEXINGTON	5/20/2006	0.75 in.	0/0	$0
LEXINGTON	5/26/2006	0.75 in.	0/0	$0
LEXINGTON	6/11/2007	0.75 in.	0/0	$0

	Date	Magnitude	Deaths / Injuries	Property Damage*
LEXINGTON	6/11/2007	0.88 in.	0/0	$0
LEXINGTON ARPT	5/20/2008	0.88 in.	0/0	$0
LEXINGTON ARPT	9/30/2008	0.75 in.	0/0	$0
LEXINGTON ARPT	9/30/2008	0.75 in.	0/0	$0
LEXINGTON	2/28/2011	1.00 in.	0/0	$0
LEXINGTON	4/27/2011	1.00 in.	0/0	$0
LEXINGTON	3/24/2012	1.00 in.	0/0	$0
Midway				
MIDWAY	6/15/1998	0.88 in.	0/0	$0
MIDWAY	3/24/2012	1.00 in.	0/0	$0
Thomasville				
THOMASVILLE	5/1/1997	0.75 in.	0/0	$0
THOMASVILLE	4/17/1998	0.88 in.	0/0	$0
THOMASVILLE	5/1/1998	0.75 in.	0/0	$0
THOMASVILLE	8/5/2003	0.75 in.	0/0	$0
THOMASVILLE	5/19/2005	0.75 in.	0/0	$0
THOMASVILLE	10/21/2005	1.00 in.	0/0	$0
THOMASVILLE	6/11/2006	1.75 in.	0/0	$0
THOMASVILLE	5/20/2008	0.75 in.	0/0	$0
THOMASVILLE	2/28/2011	1.00 in.	0/0	$0
THOMASVILLE	5/14/2012	0.88 in.	0/0	$0
Wallburg				
WALLBURG	6/3/1998	0.75 in.	0/0	$0
WALLBURG	5/16/2011	1.00 in.	0/0	$0
Unincorporated Area				
DAVIDSON CO.	5/22/1956	2.00 in.	0/0	$0
DAVIDSON CO.	7/8/1975	0.75 in.	0/0	$0
DAVIDSON CO.	8/12/1975	0.75 in.	0/0	$0
DAVIDSON CO.	8/30/1984	0.75 in.	0/0	$0
DAVIDSON CO.	8/30/1984	1.75 in.	0/0	$0
DAVIDSON CO.	6/4/1985	1.75 in.	0/0	$0
DAVIDSON CO.	6/6/1985	2.75 in.	0/0	$0
DAVIDSON CO.	6/6/1985	0.75 in.	0/0	$0
DAVIDSON CO.	4/26/1986	0.88 in.	0/0	$0
DAVIDSON CO.	4/15/1987	1.75 in.	0/0	$0
DAVIDSON CO.	4/15/1987	1.75 in.	0/0	$0
DAVIDSON CO.	4/15/1987	1.75 in.	0/0	$0
DAVIDSON CO.	5/16/1988	0.75 in.	0/0	$0
DAVIDSON CO.	4/27/1989	1.00 in.	0/0	$0
DAVIDSON CO.	5/2/1990	1.50 in.	0/0	$0
DAVIDSON CO.	4/8/1991	0.75 in.	0/0	$0
DAVIDSON CO.	8/7/1991	1.75 in.	0/0	$0
DAVIDSON CO.	3/19/1992	0.75 in.	0/0	$0
High Rock Lake	7/18/1994	1.00 in.	0/0	$0
Near Midway	6/9/1995	1.00 in.	0/0	$0
NRN PORTION	7/2/1996	0.75 in.	0/0	$0

	Date	Magnitude	Deaths / Injuries	Property Damage*
WELCOME	4/17/1998	0.88 in.	0/0	$0
WELCOME	6/3/1998	0.75 in.	0/0	$0
GORDONTOWN	8/18/2000	1.00 in.	0/0	$0
HEALING SPGS	5/7/2002	0.88 in.	0/0	$0
WELCOME	4/29/2003	0.88 in.	0/0	$0
TYRO	5/3/2003	1.75 in.	0/0	$0
LINWOOD	5/3/2003	2.75 in.	0/0	$1,286,609
TYRO	8/5/2003	0.88 in.	0/0	$0
WELCOME	4/15/2007	0.75 in.	0/0	$0
HIGH ROCK	4/15/2007	1.75 in.	0/0	$0
HIGH ROCK	4/15/2007	0.75 in.	0/0	$0
ARCADIA	6/4/2007	1.00 in.	0/0	$0
WELCOME	6/11/2007	0.75 in.	0/0	$0
SNYDER	4/27/2008	0.75 in.	0/0	$0
ELLER	5/20/2008	0.75 in.	0/0	$0
SILVER VLY	5/20/2008	0.75 in.	0/0	$0
HUGHES	6/23/2008	0.75 in.	0/0	$0
NEWSOM	9/30/2008	0.88 in.	0/0	$0
GORDONTOWN	9/30/2008	0.75 in.	0/0	$0
ARCADIA	5/6/2009	0.75 in.	0/0	$0
LINWOOD	6/9/2009	0.75 in.	0/0	$0
WELCOME	3/28/2010	0.88 in.	0/0	$0
WELCOME	3/28/2010	1.00 in.	0/0	$0
LAKEVIEW	6/15/2010	1.00 in.	0/0	$0
LINWOOD	11/16/2011	1.00 in.	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

5.5.4 Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard (coinciding with thunderstorms), it is assumed that the entire county has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the county.

5.6 HURRICANE AND TROPICAL STORM

5.6.1 Background

Hurricanes and tropical storms are classified as cyclones and defined as any closed circulation developing around a low-pressure center in which the winds rotate counter-clockwise in the Northern Hemisphere (or clockwise in the Southern Hemisphere) and whose diameter averages 10 to 30 miles across. A tropical cyclone refers to any such circulation that develops over tropical waters. Tropical cyclones act as a “safety-valve,” limiting the continued build-up of heat and energy in tropical regions by maintaining the atmospheric heat and moisture balance between the tropics and the pole-ward

latitudes. The primary damaging forces associated with these storms are high-level sustained winds, heavy precipitation, and tornadoes.

The key energy source for a tropical cyclone is the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, warm sea surface temperature, rotational force from the spinning of the earth, and the absence of wind shear in the lowest 50,000 feet of the atmosphere. The majority of hurricanes and tropical storms form in the Atlantic Ocean, Caribbean Sea, and Gulf of Mexico during the official Atlantic hurricane season, which encompasses the months of June through November. The peak of the Atlantic hurricane season is in early to mid-September and the average number of storms that reach hurricane intensity per year in the Atlantic basin is about six.

As an incipient hurricane develops, barometric pressure (measured in millibars or inches) at its center falls and winds increase. If the atmospheric and oceanic conditions are favorable, it can intensify into a tropical depression. When maximum sustained winds reach or exceed 39 miles per hour, the system is designated a tropical storm, given a name, and is closely monitored by the National Hurricane Center in Miami, Florida. When sustained winds reach or exceed 74 miles per hour the storm is deemed a hurricane. Hurricane intensity is further classified by the Saffir-Simpson Scale (**Table 5.11**), which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense.

TABLE 5.11: SAFFIR-SIMPSON SCALE

Category	Maximum Sustained Wind Speed (MPH)	Minimum Surface Pressure (Millibars)
1	74–95	Greater than 980
2	96–110	979–965
3	111–129	964–945
4	130–156	944–920
5	157 +	Less than 920

Source: National Hurricane Center (2012)

The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds and barometric pressure, which are combined to estimate potential damage. Categories 3, 4, and 5 are classified as "major" hurricanes and, while hurricanes within this range comprise only 20 percent of total tropical cyclone landfalls, they account for over 70 percent of the damage in the United States. **Table 5.12** describes the damage that could be expected for each category of hurricane. Damage during hurricanes may also result from spawned tornadoes, storm surge, and inland flooding associated with heavy rainfall that usually accompanies these storms.

TABLE 5.12: HURRICANE DAMAGE CLASSIFICATIONS

Storm Category	Damage Level	Description of Damages	Photo Example
1	MINIMAL	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal flooding and minor pier damage.	
2	MODERATE	Some roofing material, door, and window damage. Considerable damage to vegetation, mobile homes, etc. Flooding damages piers and small craft in unprotected moorings may break their moorings.	
3	EXTENSIVE	Some structural damage to small residences and utility buildings, with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures, with larger structures damaged by floating debris. Terrain may be flooded well inland.	
4	EXTREME	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach areas. Terrain may be flooded well inland.	
5	CATASTROPHIC	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Flooding causes major damage to lower floors of all structures near the shoreline. Massive evacuation of residential areas may be required.	

Source: National Hurricane Center; Federal Emergency Management Agency

5.6.2 Location and Spatial Extent

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States. While coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland and they can affect Davidson County. All areas in Davidson County are equally susceptible to hurricane and tropical storms.

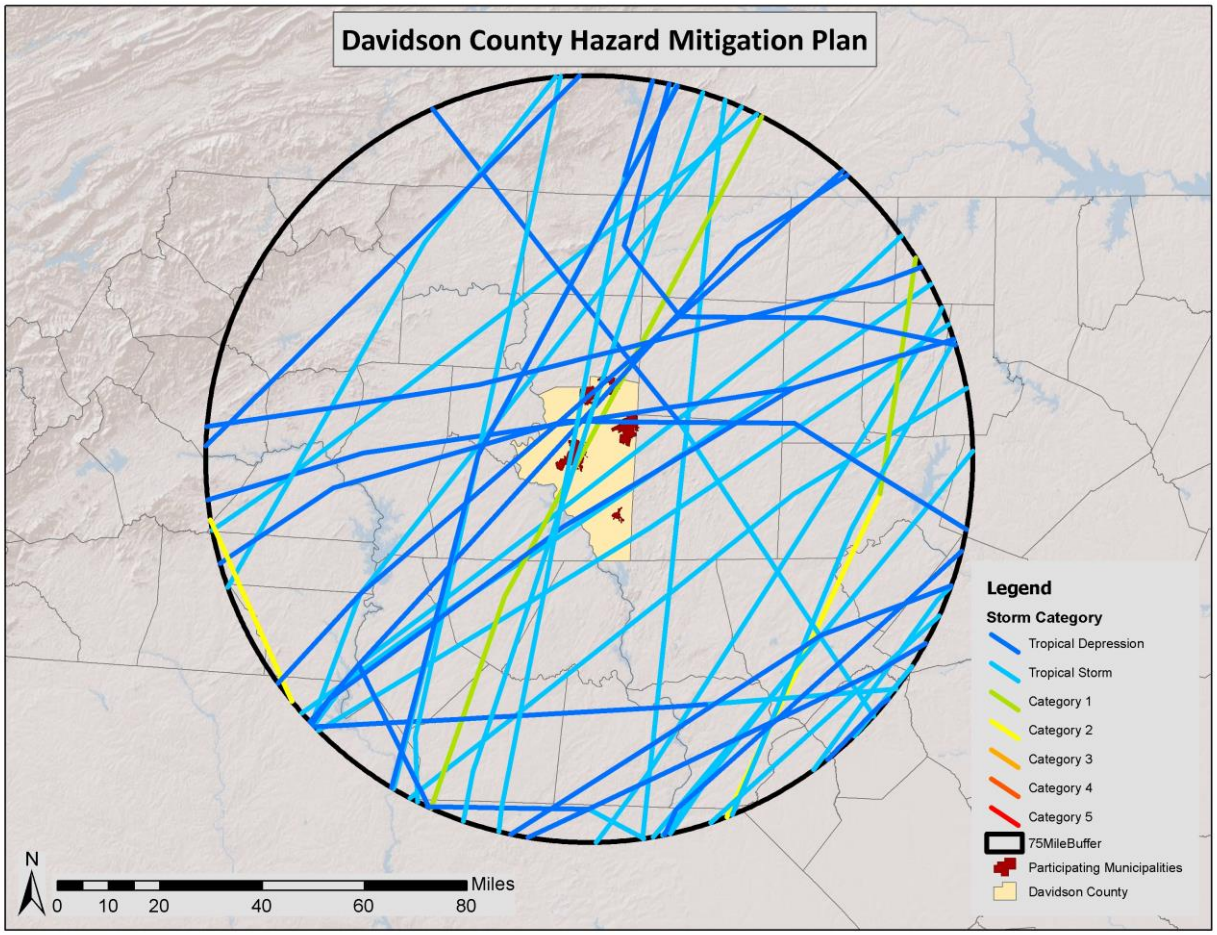
5.6.3 Historical Occurrences

According to the National Hurricane Center's historical storm track records, 45 hurricane/tropical storm tracks have passed within 75 miles of Davidson County since 1859.[4] This includes 6 hurricanes, 23 tropical storms and 16 tropical depressions.

Of the recorded storm events, 11 have traversed directly through Davidson County as shown in **Figure 5.4**. **Table 5.13** provides the date of occurrence, name (if applicable), maximum wind speed (as recorded within 75 miles of Davidson County), and Category of the storm based on the Saffir-Simpson Scale for each event.

[4] These storm track statistics do not include extra-tropical storms. Though these related hazard events are less severe in intensity, they may cause significant local impact in terms of rainfall and high winds.

FIGURE 5.4: HISTORICAL HURRICANE STORM TRACKS WITHIN 75 MILES OF DAVIDSON COUNTY



Source: National Oceanic and Atmospheric Administration; National Hurricane Center

TABLE 5.13: HISTORICAL STORM TRACKS WITHIN 75 MILES OF DAVIDSON COUNTY (1850–2014)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/17/1859	UNNAMED	40	Tropical Storm
10/4/1877	UNNAMED	50	Tropical Storm
9/12/1878	UNNAMED	60	Tropical Storm
9/11/1882	UNNAMED	40	Tropical Storm
10/12/1885	UNNAMED	40	Tropical Storm
6/22/1886	UNNAMED	40	Tropical Storm
9/10/1888	UNNAMED	35	Tropical Storm
9/24/1889	UNNAMED	45	Tropical Storm
8/28/1893	UNNAMED	75	Category 1
9/29/1896	UNNAMED	85	Category 2
7/13/1901	UNNAMED	35	Tropical Storm
6/16/1902	UNNAMED	35	Tropical Storm
9/23/1907	UNNAMED	35	Tropical Storm

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
8/31/1911	UNNAMED	25	Tropical Depression
9/3/1913	UNNAMED	40	Tropical Storm
8/3/1915	UNNAMED	35	Tropical Storm
9/23/1920	UNNAMED	35	Tropical Storm
10/3/1927	UNNAMED	40	Tropical Storm
8/11/1928	UNNAMED	30	Tropical Depression
10/2/1929	UNNAMED	50	Tropical Storm
9/6/1935	UNNAMED	45	Tropical Storm
10/20/1944	UNNAMED	50	Tropical Storm
9/18/1945	UNNAMED	50	Tropical Storm
10/9/1946	UNNAMED	30	Tropical Depression
8/28/1949	UNNAMED	40	Tropical Storm
8/31/1952	ABLE	45	Tropical Storm
7/10/1959	CINDY	30	Tropical Depression
8/30/1964	CLEO	25	Tropical Depression
6/9/1968	ABBY	25	Tropical Depression
5/26/1970	ALMA	25	Tropical Depression
9/8/1977	BABE	25	Tropical Depression
9/5/1979	DAVID	55	Tropical Storm
7/25/1985	BOB	55	Tropical Storm
8/18/1985	DANNY	25	Tropical Depression
8/29/1988	CHRIS	25	Tropical Depression
9/22/1989	HUGO	85	Category 2
7/21/1994	UNNAMED	20	Tropical Depression
9/6/1996	FRAN*	65	Category 1
7/24/1997	DANNY	30	Tropical Depression
9/5/1999	DENNIS	30	Tropical Depression
9/16/1999	FLOYD*	90	Category 2
9/18/2003	ISABEL*	85	Category 2
9/17/2004	IVAN*	20	Tropical Depression
9/28/2004	JEANNE	20	Tropical Depression
7/7/2005	CINDY	20	Tropical Depression

*Although the track of these storms traversed just outside of the 75 mile buffer area, they were included in the hazard history since a federal disaster area was declared for Davidson County as a result of the storm's impact.
Source: National Hurricane Center

The National Climatic Data Center reported four events associated with a hurricane or tropical storm in Davidson County since 1996. Additionally, Federal records indicate that five disaster declarations were made in 1989 (Hurricane Hugo), 1996 (Hurricane Fran), 1999 (Hurricane Floyd), 2003 (Hurricane Isabel), and 2004 (Hurricane Ivan) for the county.[5]

Flooding is often the greatest hazard of concern with hurricane and tropical storm events in Davidson County. Most events do not carry winds that are above that of the winter storms and straight line winds

[5] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

received by the county. Some anecdotal information is available for the major storms that have impacted that area as found below:

Hurricane Hugo – September 22-24, 1989
Hurricane Hugo was one of the largest storms on record in the Atlantic Basin that produced high winds and dumped heavy rains over much of North Carolina and South Carolina. Hugo reached a peak level of Category 5 on the Saffir-Simpson scale and made landfall near Isle of Palms in South Carolina as a Category 4, eventually passing over Charlotte and much of the surrounding area as a Category 1 storm. Although the storm caused its greatest damage in South Carolina, over 1,000 structures were destroyed or severely damaged in North Carolina, causing over $1 billion dollars in damages. Wind gusts reached over 40 mph and numerous trees were downed throughout much of south and western North Carolina.

Hurricane Fran – September 5-6, 1996
After being hit just a few weeks earlier by Hurricane Bertha, North Carolina was impacted by the one of the most devastating storms to ever make landfall along the Atlantic Coast. Fran dropped more than 10 inches of rain in many areas and had sustained winds of around 115 miles per hour as it hit the coast and began its path along the I-40 corridor central North Carolina. In the end, over 3 billion dollars in damages were reported in the state. Damages to infrastructure and agriculture added to the overall toll and more than 1.7 million people in the state were left without power.

Hurricane Floyd – September 16, 1999
Hurricane Floyd, combined with the weather conditions before and immediately after this hurricane, resulted in the most severe flooding and devastation in North Carolina history. In North Carolina, the storm resulted in 35 fatalities, over $3 billion in damages, 7,000 destroyed homes, 56,000 damaged homes, 1,500 people rescued from flooded areas, and more than 500,000 customers without electricity. Additionally, the flooding caused an estimated $813 million in agricultural losses affecting 32,000 farmers. There was also significant loss of livestock including 2,860,827 poultry, 28,000 swine, and 619 cattle.

Hurricane Isabel – September 18, 2003
Hurricane Isabel's worst impacts were along the cost of North Carolina where storm surge in Dare County in particular were extremely strong, damaging thousands of homes. The storm surge created a large inlet on Hatteras Island which left the community isolated for months. Further inland and across the state, trees were downed and power was lost by hundreds of thousands of residents. In most of the state, power was restored within a few days, but the effects to the economy and daily lives of citizens were significant.

Hurricane Ivan – September 16-17, 2004
Just a week and a half following Tropical Storm Frances, the remnants of Hurricane Ivan hit western North Carolina when many streams and rivers were already well above flood stage. The widespread flooding forced many roads to be closed and landslides were common across the mountain region. Wind gusts reached between 40 and 60 mph across the higher elevations of the Appalachian Mountains resulting in numerous downed trees. More than $13.8 million of federal aid was dispersed across North Carolina following Ivan.

5.6.4 Probability of Future Occurrences

Given the inland location of the county, it is more likely to be affected by remnants of hurricane and tropical storm systems (as opposed to a major hurricane) which may result in flooding or high winds. The probability of being impacted is less than coastal areas, but still remains a real threat to Davidson County due to induced events like flooding and erosion. Based on historical evidence, the probability level of future occurrence is likely (between 10 and 100 percent annual probability). Given the regional nature of the hazard, all areas in the county are equally exposed to this hazard. However, when the county is impacted, the damage could be catastrophic, threatening lives and property throughout the planning area.

5.7 LIGHTNING

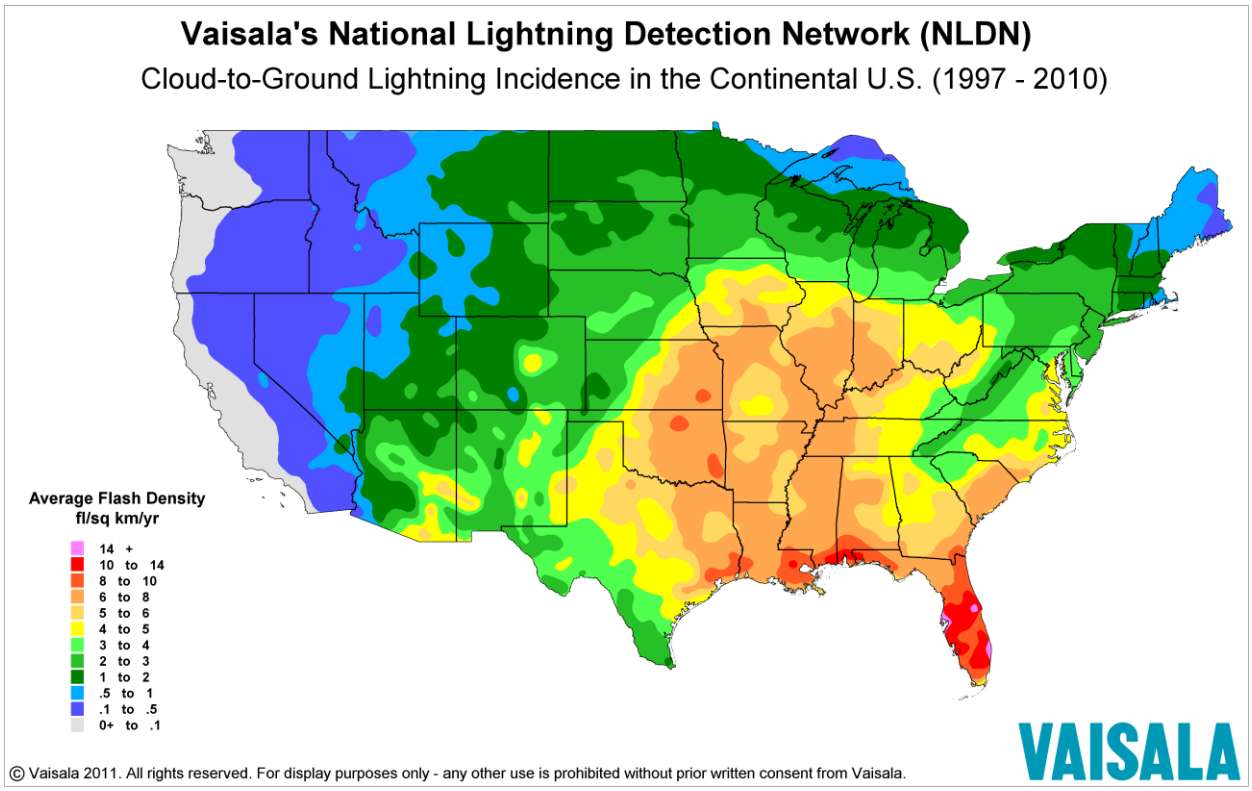
5.7.1 Background

Lightning is a discharge of electrical energy resulting from the buildup of positive and negative charges within a thunderstorm, creating a "bolt" when the buildup of charges becomes strong enough. This flash of light usually occurs within the clouds or between the clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air causes the thunder which often accompanies lightning strikes. While most often affiliated with severe thunderstorms, lightning may also strike outside of heavy rain and might occur as far as 10 miles away from any rainfall.

Lightning strikes occur in very small, localized areas. For example, they may strike a building, electrical transformer, or even a person. According to FEMA, lightning injures an average of 300 people and kills 80 people each year in the United States. Direct lightning strikes also have the ability to cause significant damage to buildings, critical facilities, and infrastructure largely by igniting a fire. Lightning is also responsible for igniting wildfires that can result in widespread damages to property.

Figure 5.5 shows a lightning flash density map for the years 1997-2010 based upon data provided by Vaisala's U.S. National Lightning Detection Network (NLDN®).

FIGURE 5.5: LIGHTNING FLASH DENSITY IN THE UNITED STATES



Source: Vaisala United States National Lightning Detection Network

5.7.2 Location and Spatial Extent

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of Davidson County is uniformly exposed to lightning.

5.7.3 Historical Occurrences

According to the National Climatic Data Center, there have been a total of nine recorded lightning events in Davidson County since 1993, as listed in summary **Table 5.14**.[6] These events resulted in over $45,000 (2014 dollars) in damages.[7] Furthermore, lightning caused 3 injuries throughout Davidson County. Detailed information on historical lightning events can be found in **Table 5.15**.

It is certain that more than nine events have impacted the county. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

[6] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1997 through October 2014. It is certain that additional lightning events have occurred in Davidson County. The State Fire Marshall's office was also contacted for additional information but none could be provided. As additional local data becomes available, this hazard profile will be amended.

[7] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE 5.14: SUMMARY OF LIGHTNING OCCURRENCES IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	0	0/0	$0
Lexington	4	0/1	$349,771
Midway	0	0/0	$0
Thomasville	2	0/0	$122,711
Wallburg	1	0/0	$131,593
Unincorporated Area	2	0/2	$38,622
DAVIDSON COUNTY TOTAL	**9**	**0/3**	**$642,697**

Source: National Climatic Data Center

TABLE 5.15: HISTORICAL OCCURRENCES IN DAVIDSON COUNTY

	Date	Deaths / Injuries	Property Damage*	Details
Denton				
None Reported	--	--	--	--
Lexington				
LEXINGTON	7/20/1998	0/1	$0	One man was struck by lightning. He was treated at the scene by local EMS.
LEXINGTON	8/31/2003	0/0	$64,330	A lightning strike set fire to an apartment building.
LEXINGTON	7/28/2005	0/0	$0	A house was struck by lightning in Holly Grove. Damage unknown.
LEXINGTON	6/25/2007	0/0	$285,441	Lightning struck the Southern Lunch restaurant on South Railroad Street burning the building down resulting in a total loss.
Midway				
None Reported	--	--	--	--
Thomasville				
THOMASVILLE	8/15/2002	0/0	$111,854	Lightning set fire to a house.
THOMASVILLE	7/27/2010	0/0	$10,857	A house at 3 Red Oak Court was damaged due to a lightning strike. A deck at the back of the home was destroyed and also the exterior of the home was damaged. Monetary damages were estimated.
Wallburg				
WALLBURG	7/22/2002	0/0	$131,593	Lightning started a fire in a home.

	Date	Deaths / Injuries	Property Damage*	Details
Unincorporated Area				
SOUTHMONT	8/20/1997	0/2	$0	TWO FIREFIGHTERS WERE STRUCK BY LIGHTNING WHILE RESPONDING TO A HOME ALARM SET OFF BY ANOTHER BOLT. BOTH MEN WERE TAKEN TO THE LEXINGTON MEMORIAL HOSPITAL, TREATED, THEN RELEASED.
SOUTHMONT	6/10/2009	0/0	$38,622	A mobile home in Southmont was totally destroyed when lightning struck the roof and then quickly spread through the entire home.

*Property Damage is reported in 2014 dollars; all damage may not have been reported.
Source: National Climatic Data Center

5.7.4 Probability of Future Occurrences

Although there was not a high number of historical lightning events reported throughout Davidson County via NCDC data, it is considered a regular occurrence, especially accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN®), Davidson County is located in an area of the country that experienced an average of 3 to 5 lightning flashes per square kilometer per year between 1997 and 2010. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the county.

5.8 THUNDERSTORM WIND / HIGH WIND

5.8.1 Background

Thunderstorms can produce a variety of accompanying hazards including wind (discussed here), hail, and lightning.[8] Although thunderstorms generally affect a small area, they are very dangerous and may cause substantial property damage.

Three conditions need to occur for a thunderstorm to form. First, it needs moisture to form clouds and rain. Second, it needs unstable air, such as warm air that can rise rapidly (this often referred to as the "engine" of the storm). Third, thunderstorms need lift, which comes in the form of cold or warm fronts, sea breezes, mountains, or the sun's heat. When these conditions occur simultaneously, air masses of varying temperatures meet, and a thunderstorm is formed. These storm events can occur singularly, in lines, or in clusters. Furthermore, they can move through an area very quickly or linger for several hours.

[8]Lightning and hail hazards are discussed as separate hazards in this section.

According to the National Weather Service, more than 100,000 thunderstorms occur each year, though only about 10 percent of these storms are classified as "severe." A severe thunderstorm occurs when the storm produces at least one of these three elements: 1) hail at least one inch in diameter, 2) a tornado, or 3) winds of at least 58 miles per hour.

Thunderstorm events have the capability of producing straight-line winds that can cause severe destruction to communities and threaten the safety of a population. Such wind events, sometimes separate from a thunderstorm event, are common throughout Davidson County. Therefore, high winds are also reported in this section.

High winds can form due to pressure of the Northeast coast that combines with strong pressure moving through the Ohio Valley. This creates a tight pressure gradient across the region, resulting in high winds which increase with elevation. It is common for gusts of 30 to 60 miles per hour during the winter months.

Downbursts are also possible with thunderstorm events. Such events are an excessive burst of wind in excess of 125 miles per hour. They are often confused with tornadoes. Downbursts are caused by down drafts from the base of a convective thunderstorm cloud. It occurs when rain-cooled air within the cloud becomes heavier than its surroundings. Thus, air rushes towards the ground in a destructive yet isolated manner. There are two types of downbursts. Downbursts less than 2.5 miles wide, duration less than 5 minutes, and winds up to 168 miles per hour are called "microbursts." Larger events greater than 2.5 miles at the surface and longer than 5 minutes with winds up to 130 miles per hour are referred to as "macrobursts."

5.8.2 Location and Spatial Extent

A wind event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. Also, Davidson County typically experiences several straight-line wind events each year. These wind events can and have caused significant damage. It is assumed that Davidson County has uniform exposure to a thunderstorm/wind event and the spatial extent of an impact could be large.

5.8.3 Historical Occurrences

According to NCDC, there have been 131 reported thunderstorm wind and high wind events since 1997 in Davidson County.[9] These events caused just over $2.6 million (2014 dollars) in damages.[10] There were reports of 1 fatality. **Table 5.16** summarizes this information. **Table 5.17** provides detailed thunderstorm wind and high wind event reports, including date, magnitude, and associated damages for each event.

[9] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through October 2014 and these high wind events are only inclusive of those reported by NCDC from 1996 through October 2014. It is likely that additional thunderstorm and high wind events have occurred in Davidson County. As additional local data becomes available, this hazard profile will be amended.

[10] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE 5.16: SUMMARY OF THUNDERSTORM / HIGH WIND OCCURRENCES IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	6	0/0	$22,125
Lexington	31	0/0	$110,977
Midway	3	0/0	$1,086
Thomasville	12	0/0	$0
Wallburg	6	0/0	$0
Unincorporated Area	73	1/0	$2,459,106
DAVIDSON COUNTY TOTAL	**131**	**1/0**	**$2,593,294**

Source: National Climatic Data Center

TABLE 5.17: HISTORICAL THUNDERSTORM / HIGH WIND OCCURRENCES IN DAVIDSON COUNTY

	Date	Type	Magnitude†	Deaths / Injuries	Property Damage*
Denton					
DENTON	7/16/1997	Thunderstorm Wind	50 kts.	0/0	$22,125
DENTON	7/21/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
DENTON	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
DENTON	6/10/2009	Thunderstorm Wind	50 kts. EG	0/0	$0
DENTON	7/27/2013	Thunderstorm Wind	50 kts. EG	0/0	$0
DENTON	4/25/2014	Thunderstorm Wind	50 kts. EG	0/0	$0
Lexington					
LEXINGTON	5/26/1998	Thunderstorm Wind	50 kts.	0/0	$0
LEXINGTON	7/1/1999	Thunderstorm Wind	50 kts.	0/0	$0
LEXINGTON	5/20/2000	Thunderstorm Wind	60 kts. E	0/0	$0
LEXINGTON	6/15/2000	Thunderstorm Wind	50 kts. E	0/0	$0
LEXINGTON	8/10/2000	Thunderstorm Wind	50 kts. E	0/0	$0
LEXINGTON	4/1/2001	Thunderstorm Wind	60 kts. E	0/0	$0
LEXINGTON	6/1/2002	Thunderstorm Wind	50 kts. E	0/0	$0
LEXINGTON	7/22/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	9/23/2003	Thunderstorm Wind	65 kts. EG	0/0	$0
LEXINGTON	5/26/2004	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	11/24/2004	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	6/7/2005	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	7/28/2005	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	4/3/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	4/17/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	4/17/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	5/26/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	6/23/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	6/11/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	6/25/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	8/21/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	3/4/2008	Thunderstorm Wind	52 kts. EG	0/0	$0
LEXINGTON	6/29/2008	Thunderstorm Wind	50 kts. EG	0/0	$0

	Date	Type	Magnitude†	Deaths / Injuries	Property Damage*
LEXINGTON	5/9/2009	Thunderstorm Wind	52 kts. EG	0/0	$0
LEXINGTON	8/20/2009	Thunderstorm Wind	50 kts. EG	0/0	$2,207
LEXINGTON	6/14/2010	Thunderstorm Wind	50 kts. EG	0/0	$108,567
LEXINGTON	6/18/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	7/4/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	1/30/2013	Thunderstorm Wind	50 kts. EG	0/0	$203
LEXINGTON ARPT	6/13/2013	Thunderstorm Wind	56 kts. MG	0/0	$0
LEXINGTON	4/25/2014	Thunderstorm Wind	50 kts. EG	0/0	$0
Midway					
MIDWAY	6/8/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
MIDWAY	6/11/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
MIDWAY	6/14/2010	Thunderstorm Wind	50 kts. EG	0/0	$1,086
Thomasville					
THOMASVILLE	7/4/1997	Thunderstorm Wind	50 kts.	0/0	$0
THOMASVILLE	5/7/1998	Thunderstorm Wind	50 kts.	0/0	$0
THOMASVILLE	5/20/2000	Thunderstorm Wind	60 kts. E	0/0	$0
THOMASVILLE	5/22/2001	Thunderstorm Wind	50 kts. E	0/0	$0
THOMASVILLE	5/2/2003	Thunderstorm Wind	60 kts. EG	0/0	$0
THOMASVILLE	6/8/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	10/14/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	7/12/2009	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	4/8/2010	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	8/11/2010	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	7/31/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
Wallburg					
WALLBURG	5/26/1998	Thunderstorm Wind	50 kts.	0/0	$0
WALLBURG	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
WALLBURG	8/2/2008	Thunderstorm Wind	50 kts. EG	0/0	$0
WALLBURG	6/9/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
WALLBURG	6/10/2013	Thunderstorm Wind	50 kts. EG	0/0	$0
WALLBURG	3/12/2014	Thunderstorm Wind	50 kts. EG	0/0	$0
Unincorporated Area					
DAVIDSON (ZONE)	2/16/1998	High Wind	45 kts.	0/0	$0
COUNTYWIDE	5/27/2000	Thunderstorm Wind	50 kts. E	0/0	$0
WELCOME	5/27/2000	Thunderstorm Wind	50 kts. E	0/0	$0
SOUTHMONT	8/18/2000	Thunderstorm Wind	50 kts. E	0/0	$0
SOUTHMONT	7/4/2001	Thunderstorm Wind	50 kts. E	0/0	$0
COUNTYWIDE	5/13/2002	Thunderstorm Wind	50 kts. E	0/0	$0
LINWOOD	6/2/2002	Thunderstorm Wind	50 kts. E	0/0	$0
JACKSON HILL	6/6/2002	Thunderstorm Wind	50 kts. E	0/0	$0
COUNTYWIDE	6/26/2002	Thunderstorm Wind	50 kts. E	0/0	$0
WELCOME	5/2/2003	Thunderstorm Wind	60 kts. EG	0/0	$0
COUNTYWIDE	11/19/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
DAVIDSON (ZONE)	3/7/2004	High Wind	65 kts. MG	0/0	$0

	Date	Type	Magnitude†	Deaths / Injuries	Property Damage*
ARCADIA	5/26/2004	Thunderstorm Wind	50 kts. EG	0/0	$0
WELCOME	3/8/2005	Thunderstorm Wind	50 kts. EG	0/0	$0
ARCADIA	9/20/2005	Thunderstorm Wind	50 kts. EG	0/0	$0
WELCOME	4/17/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
WELCOME	4/22/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
ARCADIA	9/28/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
HIGH ROCK	11/16/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
DAVIDSON (ZONE)	11/22/2006	Strong Wind	32 kts. EG	0/0	$0
DAVIDSON (ZONE)	4/16/2007	Strong Wind	47 kts. MG	0/0	$0
WELCOME	6/11/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
WELCOME	6/11/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
HEALING SPGS	6/11/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
HEALING SPGS	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
SOUTHMONT	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
CHURCHLAND	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
TYRO	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
HEALING SPGS	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
DAVIDSON (ZONE)	2/10/2008	Strong Wind	35 kts. EG	0/0	$5,498
WELCOME	6/29/2008	Thunderstorm Wind	50 kts. EG	0/0	$0
GLEN ANNA	7/22/2008	Thunderstorm Wind	50 kts. EG	0/0	$0
SILVER HILL	7/28/2008	Thunderstorm Wind	50 kts. EG	0/0	$0
GUM TREE	7/31/2008	Thunderstorm Wind	50 kts. EG	0/0	$0
DAVIDSON (ZONE)	1/7/2009	Strong Wind	43 kts. EG	0/0	$16,552
TYRO	6/9/2009	Thunderstorm Wind	50 kts. EG	0/0	$0
CHURCHLAND	6/9/2009	Thunderstorm Wind	50 kts. EG	0/0	$0
SILVER HILL	6/9/2009	Thunderstorm Wind	50 kts. EG	0/0	$0
HOLLY GROVE	6/9/2009	Thunderstorm Wind	50 kts. EG	0/0	$0
LINWOOD	6/10/2009	Thunderstorm Wind	50 kts. EG	0/0	$5,517
NEWSOM	8/22/2009	Thunderstorm Wind	50 kts. EG	0/0	$0
DAVIDSON (ZONE)	11/11/2009	Strong Wind	35 kts. EG	0/0	$11,035
DAVIDSON (ZONE)	12/9/2009	Strong Wind	40 kts. EG	1/0	$38,622
DAVIDSON (ZONE)	2/10/2010	High Wind	50 kts. EG	0/0	$1,086
ARCADIA	5/15/2010	Thunderstorm Wind	50 kts. EG	0/0	$4,343
ARCADIA	6/14/2010	Thunderstorm Wind	50 kts. EG	0/0	$1,086
GLEN ANNA	6/14/2010	Thunderstorm Wind	50 kts. EG	0/0	$0
CHURCHLAND	7/25/2010	Thunderstorm Wind	50 kts. EG	0/0	$0
REEDY CREEK	8/5/2010	Thunderstorm Wind	50 kts. EG	0/0	$1,086
REEDS XRDS	12/1/2010	Thunderstorm Wind	50 kts. EG	0/0	$0
DAVIDSON (ZONE)	2/25/2011	Strong Wind	38 kts. MG	0/0	$1,052,445
CHURCHLAND	2/28/2011	Thunderstorm Wind	50 kts. EG	0/0	$10,524
YADKIN COLLEGE	4/5/2011	Thunderstorm Wind	50 kts. EG	0/0	$999,823
DAVIDSON (ZONE)	4/28/2011	Strong Wind	49 kts. EG	0/0	$3,157
DAVIDSON (ZONE)	4/28/2011	Strong Wind	49 kts. EG	0/0	$3,157
DAVIDSON (ZONE)	4/28/2011	Strong Wind	49 kts. EG	0/0	$1,052
DAVIDSON (ZONE)	4/28/2011	Strong Wind	49 kts. EG	0/0	$5,262
DAVIDSON (ZONE)	4/28/2011	Strong Wind	49 kts. EG	0/0	$5,262

	Date	Type	Magnitude†	Deaths / Injuries	Property Damage*
DAVIDSON (ZONE)	4/28/2011	Strong Wind	49 kts. EG	0/0	$3,684
REEDY CREEK	5/13/2011	Thunderstorm Wind	50 kts. EG	0/0	$1,579
WELCOME	6/9/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
DAVIDSON CO.	6/18/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
CEDAR LODGE	6/18/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
LINWOOD	6/18/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
HUGHES	2/24/2012	Thunderstorm Wind	50 kts. EG	0/0	$0
REEDY CREEK	6/22/2012	Thunderstorm Wind	50 kts. EG	0/0	$5,156
YADKIN COLLEGE	10/18/2012	Thunderstorm Wind	50 kts. EG	0/0	$1,031
DAVIDSON (ZONE)	12/26/2012	Strong Wind	40 kts. EG	0/0	$10,311
SOUTHMONT	6/10/2013	Thunderstorm Wind	50 kts. EG	0/0	$15,243
REEDS XRDS	6/13/2013	Thunderstorm Wind	56 kts. EG	0/0	$254,055
REEDS XRDS	6/26/2013	Thunderstorm Wind	50 kts. EG	0/0	$2,032
GUM TREE	6/28/2013	Thunderstorm Wind	50 kts. EG	0/0	$508
HOLLY GROVE	6/28/2013	Thunderstorm Wind	50 kts. EG	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained ;MG = measured gust ;MS = measured sustained
Source: National Climatic Data Center

5.8.4 Probability of Future Occurrences

Given the high number of previous events, it is certain that wind events, including straight-line wind and thunderstorm wind, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for future wind events for the entire county.

5.9 TORNADO

5.9.1 Background

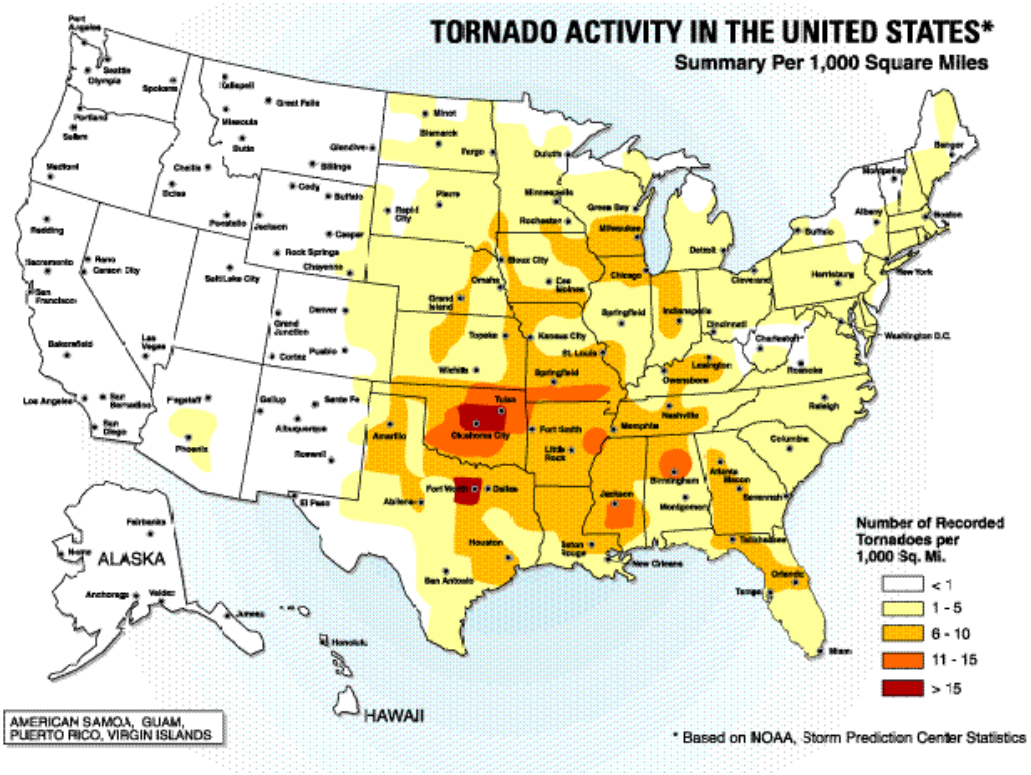
A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud extending to the ground. Tornadoes are most often generated by thunderstorm activity (but sometimes result from hurricanes and other tropical storms) when cool, dry air intersects and overrides a layer of warm, moist air forcing the warm air to rise rapidly. The damage caused by a tornado is a result of the high wind velocity and wind-blown debris, also accompanied by lightning or large hail. According to the National Weather Service, tornado wind speeds normally range from 40 miles per hour to more than 300 miles per hour. The most violent tornadoes have rotating winds of 250 miles per hour or more and are capable of causing extreme destruction and turning normally harmless objects into deadly missiles.

Each year, an average of over 800 tornadoes is reported nationwide, resulting in an average of 80 deaths and 1,500 injuries.[11] According to the NOAA Storm Prediction Center (SPC), the highest concentration of tornadoes in the United States has been in Oklahoma, Texas, Kansas, and Florida respectively. Although the Great Plains region of the Central United States does favor the development of the largest and most dangerous tornadoes (earning the designation of "tornado alley"), Florida experiences the greatest number of tornadoes per square mile of all U.S. states (SPC, 2002). **Figure 5.6**

[11] NOAA, 2009.

shows tornado activity in the United States based on the number of recorded tornadoes per 1,000 square miles.

FIGURE 5.6: TORNADO ACTIVITY IN THE UNITED STATES



Source: Federal Emergency Management Agency

Tornadoes are more likely to occur during the months of March through May and are most likely to form in the late afternoon and early evening. Most tornadoes are a few dozen yards wide and touch down briefly, but even small short-lived tornadoes can inflict tremendous damage. Highly destructive tornadoes may carve out a path over a mile wide and several miles long.

The destruction caused by tornadoes ranges from light to inconceivable depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction, including residential dwellings (particularly mobile homes). Tornadic magnitude is reported according to the Fujita and Enhanced Fujita Scales. Tornado magnitudes prior to 2005 were determined using the traditional version of the Fujita Scale (**Table 5.18**). Tornado magnitudes that were determined in 2005 and later were determined using the Enhanced Fujita Scale (**Table 5.19**).

TABLE 5.18: THE FUJITA SCALE (EFFECTIVE PRIOR TO 2005)

F-SCALE NUMBER	INTENSITY	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 to 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 forest 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-enforced 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.

Source: National Weather Service

TABLE 5.19: THE ENHANCED FUJITA SCALE (EFFECTIVE 2005 AND LATER)

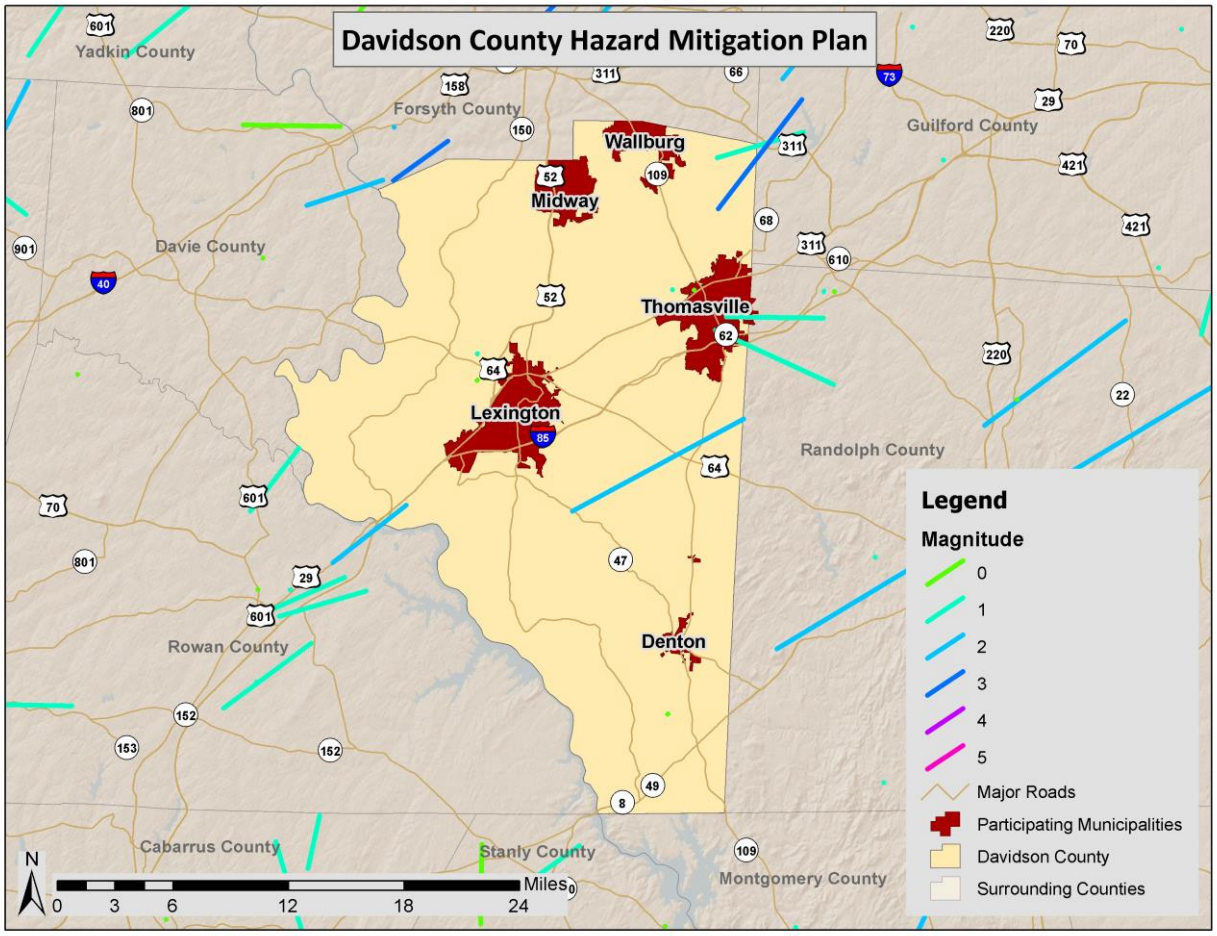
EF-SCALE NUMBER	INTENSITY PHRASE	3 SECOND GUST (MPH)	TYPE OF DAMAGE DONE
F0	GALE	65–85	Some damage to chimneys; breaks branches off trees; pushes over shallow-rooted trees; damages to sign boards.
F1	MODERATE	86–110	The lower limit is the beginning of hurricane wind speed; peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos pushed off the roads; attached garages may be destroyed.
F2	SIGNIFICANT	111–135	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light object missiles generated.
F3	SEVERE	136–165	Roof and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted.
F4	DEVASTATING	166–200	Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown and large missiles generated.
F5	INCREDIBLE	Over 200	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-enforced concrete structures badly damaged.

Source: National Weather Service

5.9.2 Location and Spatial Extent

Tornadoes occur throughout the state of North Carolina, and thus in Davidson County. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that Davidson County is uniformly exposed to this hazard. With that in mind, **Figure 5.7** shows tornado track data for many of the major tornado events that have impacted the county. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE 5.7: HISTORICAL TORNADO TRACKS IN DAVIDSON COUNTY



Source: National Weather Service Storm Prediction Center

5.9.3 Historical Occurrences

Tornadoes were responsible for one disaster declaration in Davidson County in 1989.[12] According to the National Climatic Data Center, there have been a total of 14 recorded tornado events in Davidson County since 1958 (**Table 5.20**), resulting in $25.8 million (2014 dollars) in property damages.[13] [14] In addition, 2 deaths and 22 injuries were reported (**Table 5.21)**. The magnitude of these tornadoes ranges from EF0 to EF2 in intensity, although an EF3 through EF5 event is possible. It is important to note that only tornadoes that have been reported are factored into this risk assessment. It is likely that a high number of occurrences have gone unreported over the past 64 years.

[12] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.
[13] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through October 2014. It is likely that additional tornadoes have occurred in Davidson County. As additional local data becomes available, this hazard profile will be amended.
[14] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE 5.20: SUMMARY OF TORNADO OCCURRENCES IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	0	0/0	$0
Lexington	0	0/0	$0
Midway	0	0/0	$0
Thomasville	2	0/0	$0
Wallburg	2	0/0	$886,868
Unincorporated Area	10	2/22	$24,962,578
DAVIDSON COUNTY TOTAL	**14**	**2/22**	**$25,849,446**

Source: National Climatic Data Center

TABLE 5.21: HISTORICAL TORNADO OCCURRENCES IN DAVIDSON COUNTY

	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Denton					
None Reported	--	--	--	--	--
Lexington					
None Reported	--	--	--	--	--
Midway					
None Reported	--	--	--	--	--
Thomasville					
THOMASVILLE	9/14/2007	EF0	0/0	$0	Law enforcement reported a tornado touchdown on HWY 52 northwest of Thomasville.
THOMASVILLE	9/14/2007	EF0	0/0	$0	Law enforcement reported a tornado touchdown on HWY 52 northwest of Thomasville.
Wallburg					
WALLBURG	5/7/1998	F1	0/0	$72,618	Many trees were blown on homes. Around 15 homes sustained serious damage. A service station lost most of its roof.
WALLBURG	3/28/2010	EF1	0/0	$814,250	An EF-1 tornado touched down in a wooded area south of Chestnut Street Extension where it caused extensive tree damage. The tornado proceeded northeast across Chestnut Street Extension where it caused minor damage to a single family residence when it ripped away the attached carport. The tornado tracked then tracked through a wooded area before it hit the Valley Mobile Home Park located off Sink Lake Road. Approximately 20 mobile homes were completely destroyed or damaged so severe that they can no longer be occupied. One of the destroyed mobile homes and a full

	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					size SUV was uplifted and displaced into an adjacent lake. There were four occupants inside the mobile home but remarkably no one was seriously injured. The tornado then lifted in a wooded area northeast of the mobile home park.
Unincorporated Area					
DAVIDSON CO.	7/29/1958	F0	0/0	$0	--
DAVIDSON CO.	2/18/1960	F1	0/0	$0	--
DAVIDSON CO.	5/11/1961	F0	0/0	$1,979	--
DAVIDSON CO.	5/28/1973	F1	0/0	$1,332,973	--
DAVIDSON CO.	6/17/1973	F1	0/2	$13,330	Tornado touched down north of Lexington damaging a mobile home and injuring a couple.
DAVIDSON CO.	3/24/1975	F1	0/0	$1,100,074	Tornado touched down near Thomasville and again at Archdale with some associated wind damage in the Sedgefield-Jamestown area. Damage about $300,000.
DAVIDSON CO.	10/8/1976	F1	0/0	$104,014	A tornado hit Fair Grove near Thomasville damaging several homes, trees, and utility lines. Damage about $20,000.
DAVIDSON CO.	3/19/1992	F0	0/0	$4,218	A tornado touched down in extreme northeastern Lincoln County blowing down and breaking off numerous trees, overturning an old mobile home, damaging the roofs of two homes, and damaging or destroying several small buildings or storage sheds. The tornado crossed Lake Norman and made landfall in Iredell County. There it damaged or destroyed seven boats, six piers, and three houses. Damage estimates were $50,000 in Lincoln County and $200,000 in Iredell County. The tornado/waterspout was well documented with video from several sources around Lake Norman and had a classic long funnel shape from a relatively high-based cloud that could be viewed from several miles around.
LAKEVIEW	3/28/2010	EF2	0/5	$1,357,083	An EF1 tornado exited Rowan County, crossing the Yadkin River and entered into Davidson County. Numerous hardwood trees were either sheared off or uprooted in a wooded area south of Seven Oaks Drive. A carport was ripped from a brick home on Seven Oaks Drive. Two out buildings were also destroyed.

	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					The tornado tracked northeast across an open field before it damaged a vacant steel framed flea market building. The tornado glanced the southeastern corner of the main flea market building, tearing it away from the remainder of the building. Debris from the metal building was found approximately one mile downstream from the site. Sections of sheet metal from the building were found twisted around several tree and high tension power lines. In the adjacent Chestnut Grove Mobile Home Park, located at the intersection of Clark Road and Wind Hill Drive, three mobile homes were completely destroyed with three other mobile homes sustaining significant damage. The tornado reached EF2 intensity here with wind of 110 to 120 mph. The tornado dissipated in a wooded area northeast of Clark Road.
SILVER HILL	11/16/2011	EF2	2/15	$21,048,907	A tornado with a nearly continuous damage path of approximately 12.5 miles was found about 5 miles east of Linwood in Davidson County to about 10 miles northwest of Asheboro in Randolph County. Damage along the path was found to be EF-1 to EF-2 on the Enhanced Fujita tornado rating scale, with wind speeds between 90 and 135 mph. At approximately 6:05 pm EST, the initial tornado touchdown was in the form of snapped and uprooted trees along NC Highway 47, near the Parks Road Intersection. The first occurrence of structural damage was to single family homes in the nearby Silver Ridge Subdivision, off of Allred Road. Roofs were lifted off multiple homes and mostly exterior walls were blown out. This damage was consistent with EF-2 tornado intensity. The roof of one of the homes had been carried about 150 yards into the yard of another home. An outbuilding, whose contents were swept about 50 feet into the side yard adjacent to the home was also completely destroyed. Trees were toppled mostly in toward the center of the track of the tornado. Only minor injuries were noted to residents. The tornado

	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
					continued east northeastward to Old Burkhart Road where it blew a trailer a couple of hundred feet downwind, downed power lines, and toppled a tree through a residence. The tornado then tracked through a small community on Meadow Run Lane. Two homes slide off their foundations, including the home where two fatalities occurred when the home slid down the edge of a steep embankment. An automobile was also blown into an adjacent stand of trees at the top of the embankment. Damage here is consistent with EF-2 tornado intensity. The tornado traveled east northeastward and caused structural damage mainly in the form of roof damage, to several businesses, including the roofing of a Lowes distribution center, Skippers Seafood Restaurant and a Giddy-Kwik service station. Additionally, a nearby former marine dealer sustained extensive damage when the exterior walls and roof of this building was blown into the adjacent parking lot. The next structural damage occurred at the Laurel Drive AAA Mobile Home Park. The most significant damage here was a tree toppled through the rear of one of the homes. Another home shifted from the foundation. Tree damage in this area appeared to be more minor than surrounding areas, and damage throughout the mobile home park was consistent with EF-1 intensity. In total, 60 homes were damaged. Of the 60 homes damaged, 25 homes were destroyed, and at least 5 businesses were destroyed.

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

5.9.4 Probability of Future Occurrences

According to historical information, tornado events are not an annual occurrence for the county. However, given the county's location in the southeastern United States and history of tornadoes, an occurrence is possible every few years. While the majority of the reported tornado events are small in terms of size, intensity, and duration, they do pose a significant threat should Davidson County experience a direct tornado strike. The probability of future tornado occurrences affecting Davidson County is likely (10 to 100 percent annual probability).

5.10 WINTER STORM AND FREEZE

5.10.1 Background

A winter storm can range from a moderate snow over a period of a few hours to blizzard conditions with blinding wind-driven snow that lasts for several days. Events may include snow, sleet, freezing rain, or a mix of these wintry forms of precipitation. Some winter storms might be large enough to affect several states, while others might affect only localized areas. Occasionally, heavy snow might also cause significant property damages, such as roof collapses on older buildings. All winter storm events have the potential to present dangerous conditions to the affected area.

Snow Storms
Larger snowfalls pose a greater risk, reducing visibility due to blowing snow and making driving conditions treacherous. A heavy snow event is defined by the National Weather Service as an accumulation of 4 of more inches in 12 hours or less. A blizzard is the most severe form of winter storm. It combines low temperatures, heavy snow, and winds of 35 miles per hour or more, which reduces visibility to a quarter mile or less for at least 3 hours. Winter storms are often accompanied by sleet, freezing rain, or an ice storm. Such freeze events are particularly hazardous as they create treacherous surfaces.

Ice Storms
Ice storms, which are much more common in Davidson County than snow storms, are defined as storms with significant amounts of freezing rain and are a result of cold air damming (CAD). CAD is a shallow, surface-based layer of relatively cold, stably-stratified air entrenched against the eastern slopes of the Appalachian Mountains. With warmer air above, falling precipitation in the form of snow melts, then becomes either super-cooled (liquid below the melting point of water) or re-freezes. In the former case, super-cooled droplets can freeze on impact (freezing rain), while in the latter case, the re-frozen water particles are ice pellets (or sleet). Sleet is defined as partially frozen raindrops or refrozen snowflakes that form into small ice pellets before reaching the ground. They typically bounce when they hit the ground and do not stick to the surface. However, it does accumulate like snow, posing similar problems and has the potential to accumulate into a layer of ice on surfaces. Freezing rain, conversely, usually sticks to the ground, creating a sheet of ice on the roadways and other surfaces.

All of the winter storm elements – snow, low temperatures, sleet, ice, etcetera – have the potential to cause significant hazard to a community. Even small accumulations can down power lines and tree limbs and create hazardous driving conditions. Furthermore, communication and power may be disrupted for days.

5.10.2 Location and Spatial Extent

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. Davidson County is accustomed to severe winter weather conditions and often receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire county has uniform exposure to a winter storm or freeze.

5.10.3 Historical Occurrences

Winter weather has resulted in five disaster declarations in Davidson County. This includes the Blizzard of 1996, one subsequent 1996 winter storm, a severe winter storm in 2000, an ice storm in 2002 and a severe winter storm in 2014.[15] The National Climatic Data Center does not report winter storm events at the municipal level, however, there have been a total of 55 recorded winter storm events and 1 extreme cold event in Davidson County since 1996 (**Table 5.22**).[16] These events resulted in $6.2 million (2014 dollars) in damages.[17] Detailed information on the recorded winter storm events can be found in **Table 5.23**.

TABLE 5.22: SUMMARY OF WINTER STORM EVENTS IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Davidson County	55	0/0	$6,200,000

Source: National Climatic Data Center

TABLE 5.23: HISTORICAL WINTER STORM EVENTS IN DAVIDSON COUNTY

	Date	Type of Storm	Deaths / Injuries	Property Damage*
Davidson County				
DAVIDSON (ZONE)	1/6/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/11/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/2/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/16/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/8/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/13/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/29/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/23/1998	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/2/1999	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/20/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/22/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/24/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/28/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/19/2000	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	2/12/2001	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/3/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/23/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/16/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/27/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/13/2003	Winter Weather	0/0	$0

[15] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.
[16] These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is likely that additional winter storm conditions have affected Davidson County.
[17] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

	Date	Type of Storm	Deaths / Injuries	Property Damage*
DAVIDSON (ZONE)	1/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/15/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/30/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/15/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/1/2007	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/7/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/17/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/19/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/13/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/22/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/4/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/1/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/18/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/30/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/29/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/5/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/2/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/16/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/25/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/10/2011	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/26/2013	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/28/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/11/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2014	Winter Storm	0/0	$0
DAVIDSON (ZONE)	3/3/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/6/2014	Ice Storm	0/0	$6,200,000
DAVIDSON (ZONE)	3/17/2014	Winter Weather	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been recorded in Lexington since 1902. The recorded minimum for the county can be found below in **Table 5.24**.

TABLE 5.24: LOWEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	01/21/1985	-6

Source: State Climate Office of North Carolina

There have been several severe winter weather events in Davidson County. The text below describes two of the major events (one snow and one ice event) and associated impacts on the county. Similar impacts can be expected with most severe winter weather.

1996 Winter Storm – January 6-8, 1996
This storm left two feet of snow in some areas and several thousand citizens without power for up to nine days. Although shelters were opened, some roads were impassible for many days. This event caused considerable disruption to business, industry, schools, and government services.

2002 Ice Storm – December 4-5, 2002
An ice storm produced up to an inch of freezing rain in central North Carolina impacting 40 counties. A total of 24 people were killed, and as many as 1.8 million people were left without electricity. Additionally, property damage was estimated at almost $100 million. New records were also set for traffic accidents and school closing durations. The scale of destruction was comparable to that of hurricanes that have impacted the state, such as Hurricane Fran in 1996. The storm cost the state $97.2 million in response and recovery.

Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

5.10.4 Probability of Future Occurrences

Winter storm events will remain a regular occurrence in Davidson County due to its location in the western half of the state. According to historical information, Davidson County generally experiences several winter storm events each year. Therefore, the annual probability is highly likely (100 percent).

Geologic Hazards

5.11 EARTHQUAKE

5.11.1 Background

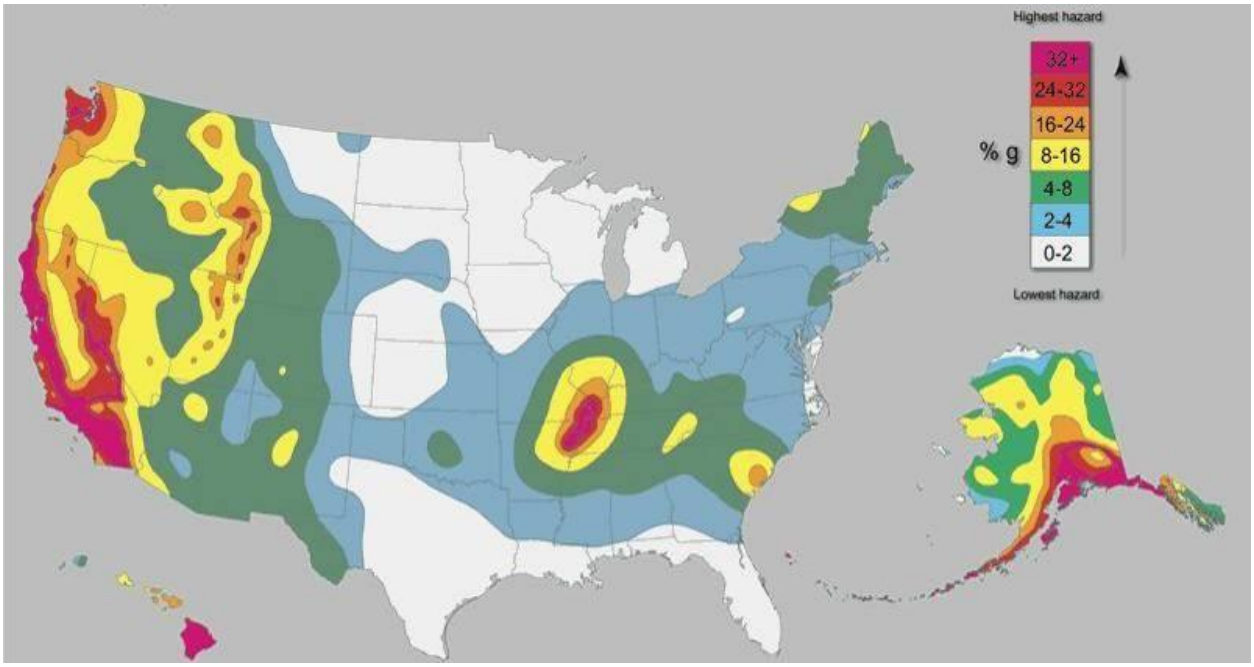
An earthquake is movement or trembling of the ground produced by sudden displacement of rock in the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons, and disrupt the social and economic functioning of the affected area.

Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the amplitude and duration of the shaking, which are directly related to the earthquake size, distance from the fault, site, and regional geology. Other damaging earthquake effects include landslides, the down-slope movement of soil and rock (mountain regions and along hillsides), and liquefaction, in which ground soil loses the ability to resist shear and flows much like quick sand. In the case of liquefaction, anything relying on the substrata for support can shift, tilt, rupture, or collapse.

Most earthquakes are caused by the release of stresses accumulated as a result of the rupture of rocks along opposing fault planes in the Earth's outer crust. These fault planes are typically found along borders of the Earth's 10 tectonic plates. The areas of greatest tectonic instability occur at the perimeters of the slowly moving plates, as these locations are subjected to the greatest strains from plates traveling in opposite directions and at different speeds. Deformation along plate boundaries causes strain in the rock and the consequent buildup of stored energy. When the built-up stress exceeds the rocks' strength a rupture occurs. The rock on both sides of the fracture is snapped, releasing the stored energy and producing seismic waves, generating an earthquake.

The greatest earthquake threat in the United States is along tectonic plate boundaries and seismic fault lines located in the central and western states; however, the Eastern United State does face moderate risk to less frequent, less intense earthquake events. **Figure 5.8** shows relative seismic risk for the United States.

FIGURE 5.8: UNITED STATES EARTHQUAKE HAZARD MAP



Source: United States Geological Survey

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude (**Table 5.25**). Each unit increase in magnitude on the Richter Scale corresponds to a 10-fold increase in wave amplitude, or a 32-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using roman numerals, ranging from "I" corresponding to imperceptible (instrumental) events to "XII" for catastrophic (total destruction). A detailed description of the Modified Mercalli Intensity Scale of earthquake intensity and its correspondence to the Richter Scale is given in **Table 5.26**.

TABLE 5.25: RICHTER SCALE

RICHTER MAGNITUDES	EARTHQUAKE EFFECTS
< 3.5	Generally not felt, but recorded.
3.5 - 5.4	Often felt, but rarely causes damage.
5.4 - 6.0	At most slight damage to well-designed buildings. Can cause major damage to poorly constructed buildings over small regions.
6.1 - 6.9	Can be destructive in areas up to about 100 kilometers across where people live.
7.0 - 7.9	Major earthquake. Can cause serious damage over larger areas.
8 or >	Great earthquake. Can cause serious damage in areas several hundred kilometers across.

Source: Federal Emergency Management Agency

TABLE 5.26: MODIFIED MERCALLI INTENSITY SCALE FOR EARTHQUAKES

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
I	INSTRUMENTAL	Detected only on seismographs.	
II	FEEBLE	Some people feel it.	< 4.2
III	SLIGHT	Felt by people resting; like a truck rumbling by.	
IV	MODERATE	Felt by people walking.	
V	SLIGHTLY STRONG	Sleepers awake; church bells ring.	< 4.8
VI	STRONG	Trees sway; suspended objects swing, objects fall off shelves.	< 5.4
VII	VERY STRONG	Mild alarm; walls crack; plaster falls.	< 6.1
VIII	DESTRUCTIVE	Moving cars uncontrollable; masonry fractures, poorly constructed buildings damaged.	
IX	RUINOUS	Some houses collapse; ground cracks; pipes break open.	< 6.9
X	DISASTROUS	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread.	< 7.3
XI	VERY DISASTROUS	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards.	< 8.1
XII	CATASTROPHIC	Total destruction; trees fall; ground rises and falls in waves.	> 8.1

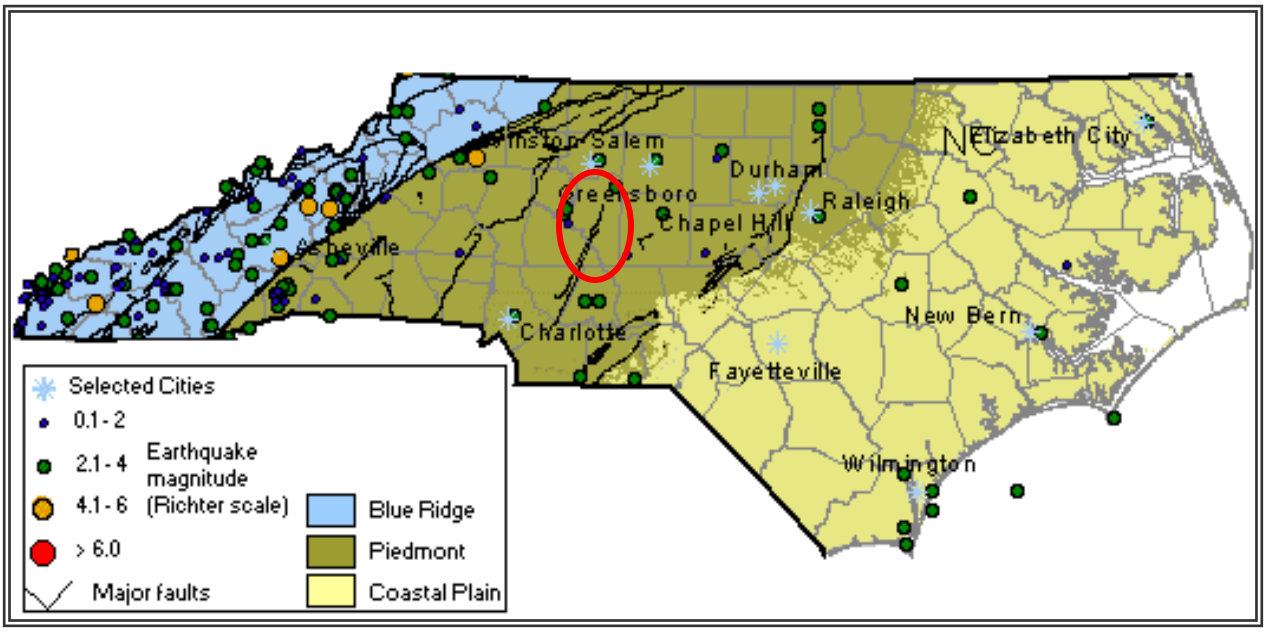
Source: Federal Emergency Management Agency

5.11.2 Location and Spatial Extent

Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there

are several smaller fault lines throughout North Carolina. **Figure 5.9** is a map showing geological and seismic information for North Carolina.

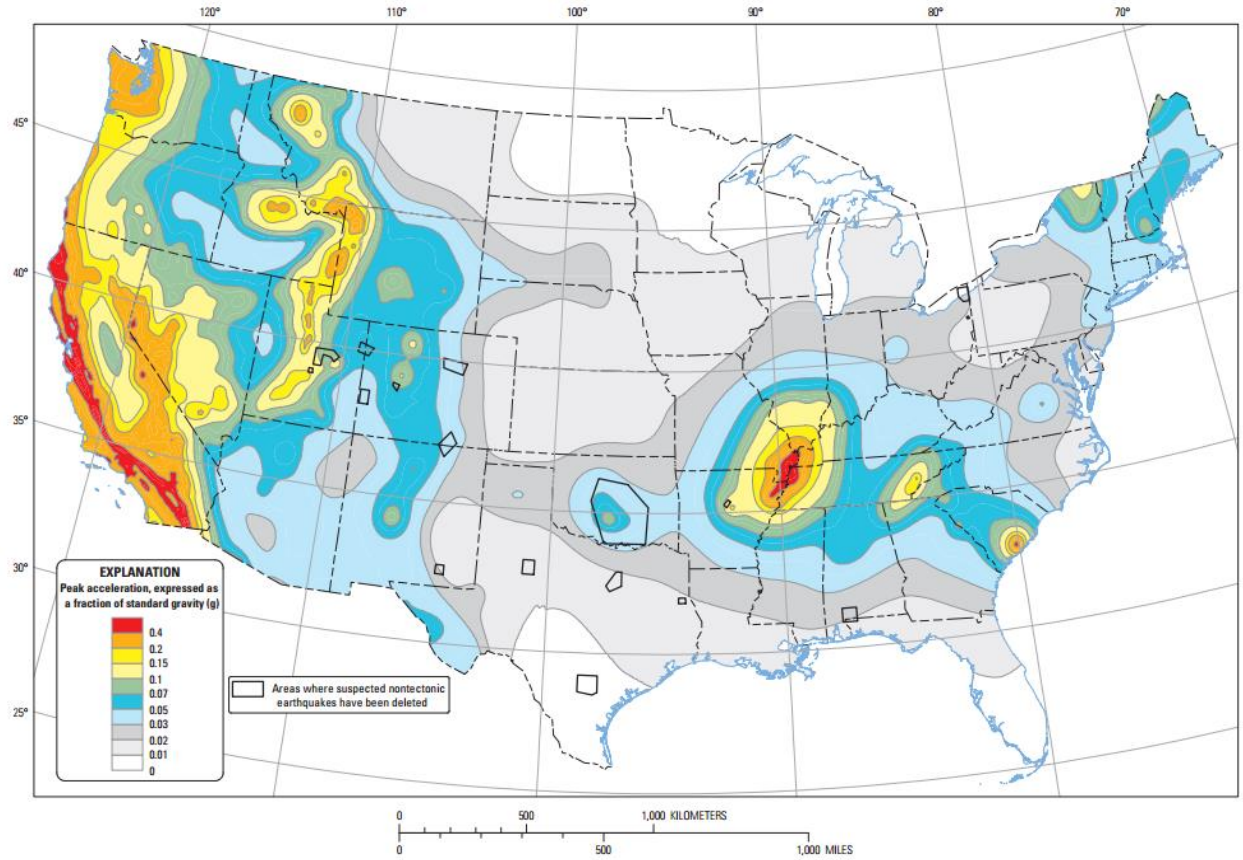
FIGURE 5.9: GEOLOGICAL AND SEISMIC INFORMATION FOR NORTH CAROLINA



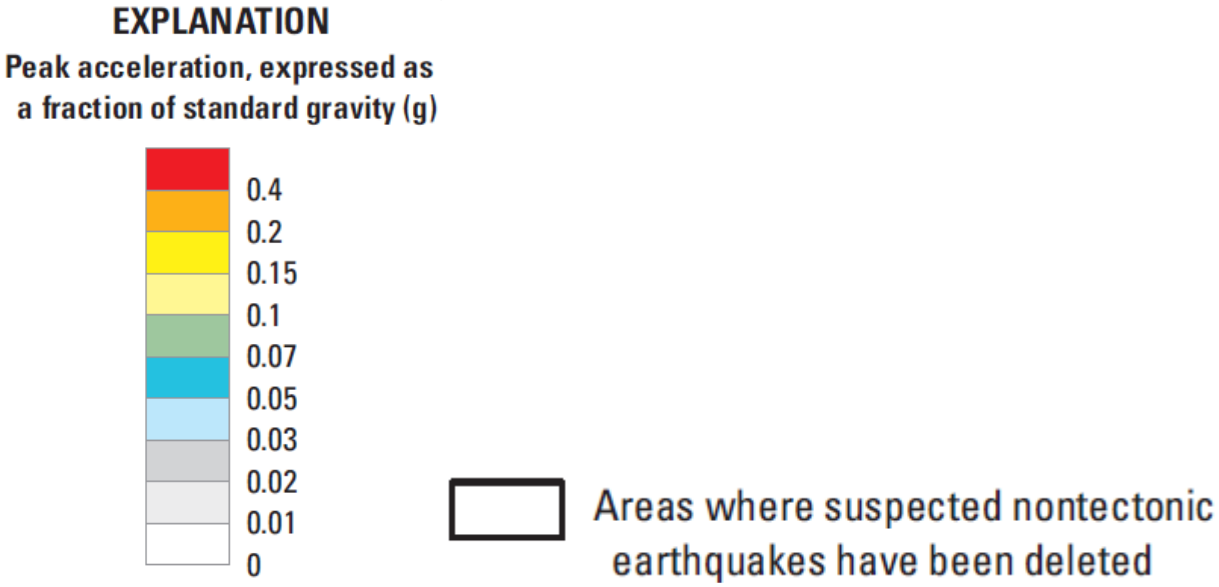
Source: North Carolina Geological Survey

Figure 5.10 shows the intensity level associated with Davidson County, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, all of Davidson County lies within an approximate zone of 0.03 to 0.05 peak ground acceleration. This indicates that the county as a whole exists within an area of low to moderate seismic risk.

FIGURE 5.10: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

5.11.3 Historical Occurrences

At least three earthquakes are known to have affected Davidson County since 1970. The strongest of these measured a IV on the Modified Mercalli Intensity (MMI) scale. **Table 5.27** provides a summary of earthquake events reported by the National Geophysical Data Center between 1638 and 1985. **Table 5.28** presents a detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known).[18]

TABLE 5.27: SUMMARY OF SEISMIC ACTIVITY IN DAVIDSON COUNTY

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Denton	1	III	3.3
Lexington	1	--	4.7
Midway	--	--	--
Thomasville	--	--	--
Wallburg	1	III	< 4.8
Unincorporated Area	--	--	--
DAVIDSON COUNTY TOTAL	**3**	**IV**	**< 4.8**

Source: National Geophysical Data Center

TABLE 5.28: SIGNIFICANT SEISMIC EVENTS IN DAVIDSON COUNTY (1638-1985)

Location	Date	Epicentral Distance	Magnitude	MMI
Denton				
Denton	9/13/1976	124.0 km	3.3	III
Lexington				
Lexington	11/30/1973	334.0 km	4.7	--
Midway				
None Reported	--	--	--	--
Thomasville				
None Reported	--	--	--	--
Wallburg				
Wallburg	9/10/1970	113.0 km	--	III
Unincorporated Area				
None Reported	--	--	--	--

Source: National Geophysical Data Center

In addition to those earthquakes specifically affecting Davidson County, a list of earthquakes that have caused damage throughout North Carolina is presented below in **Table 5.29.**

[18] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

TABLE 5.29: EARTHQUAKES WHICH HAVE CAUSED DAMAGE IN NORTH CAROLINA

Date	Location	Richter Scale (Magnitude)	MMI (Intensity)	MMI in North Carolina
12/16/1811 - 1	NE Arkansas	8.5	XI	VI
12/16/1811 - 2	NE Arkansas	8.0	X	VI
12/18/1811 - 3	NE Arkansas	8.0	X	VI
01/23/1812	New Madrid, MO	8.4	XI	VI
02/071812	New Madrid, MO	8.7	XII	VI
04/29/1852	Wytheville, VA	5.0	VI	VI
08/31/1861	Wilkesboro, NC	5.1	VII	VII
12/23/1875	Central Virginia	5.0	VII	VI
08/31/1886	Charleston, SC	7.3	X	VII
05/31/1897	Giles County, VA	5.8	VIII	VI
01/01/1913	Union County, SC	4.8	VII	VI
02/21/1916	Asheville, NC	5.5	VII	VII
07/08/1926	Mitchell County, NC	5.2	VII	VII
11/03/1928	Newport, TN	4.5	VI	VI
05/13/1957	McDowell County, NC	4.1	VI	VI
07/02/1957	Buncombe County, NC	3.7	VI	VI
11/24/1957	Jackson County, NC	4.0	VI	VI
10/27/1959 **	Chesterfield, SC	4.0	VI	VI
07/13/1971	Newry, SC	3.8	VI	VI
11/30/1973*	Alcoa, TN	4.6	VI	VI
11/13/1976	Southwest Virginia	4.1	VI	VI
05/05/1981	Henderson County, NC	3.5	VI	VI

*This event is accounted for in the Davidson County occurrences.

** Conflicting reports on this event, intensity in North Carolina could have been either V or VI

Source: This information compiled by Dr. Kenneth B. Taylor and provided by Tiawana Ramsey of NCEM. Information was compiled from the National Earthquake Center, Earthquakes of the US by Carl von Hake (1983), and a compilation of newspaper reports in the Eastern Tennessee Seismic Zone compiled by Arch Johnston, CERI, Memphis State University (1983).

5.11.4 Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting Davidson County is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the county. The annual probability level for the county is estimated between 1 and 10 percent (possible).

5.12 LANDSLIDE

5.12.1 Background

A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation, which is driven by gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction or erosion, earthquakes, volcanic eruptions, and changes in groundwater levels.

There are several types of landslides: rock falls, rock topple, slides, and flows. Rock falls are rapid movements of bedrock, which result in bouncing or rolling. A topple is a section or block of rock that rotates or tilts before falling to the slope below. Slides are movements of soil or rock along a distinct surface of rupture, which separates the slide material from the more stable underlying material. Mudflows, sometimes referred to as mudslides, mudflows, lahars or debris avalanches, are fast-moving rivers of rock, earth, and other debris saturated with water. They develop when water rapidly accumulates in the ground, such as heavy rainfall or rapid snowmelt, changing the soil into a flowing river of mud or "slurry." Slurry can flow rapidly down slopes or through channels and can strike with little or no warning at avalanche speeds. Slurry can travel several miles from its source, growing in size as it picks up trees, cars, and other materials along the way. As the flows reach flatter ground, the mudflow spreads over a broad area where it can accumulate in thick deposits.

Landslides are typically associated with periods of heavy rainfall or rapid snow melt and tend to worsen the effects of flooding that often accompanies these events. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly.

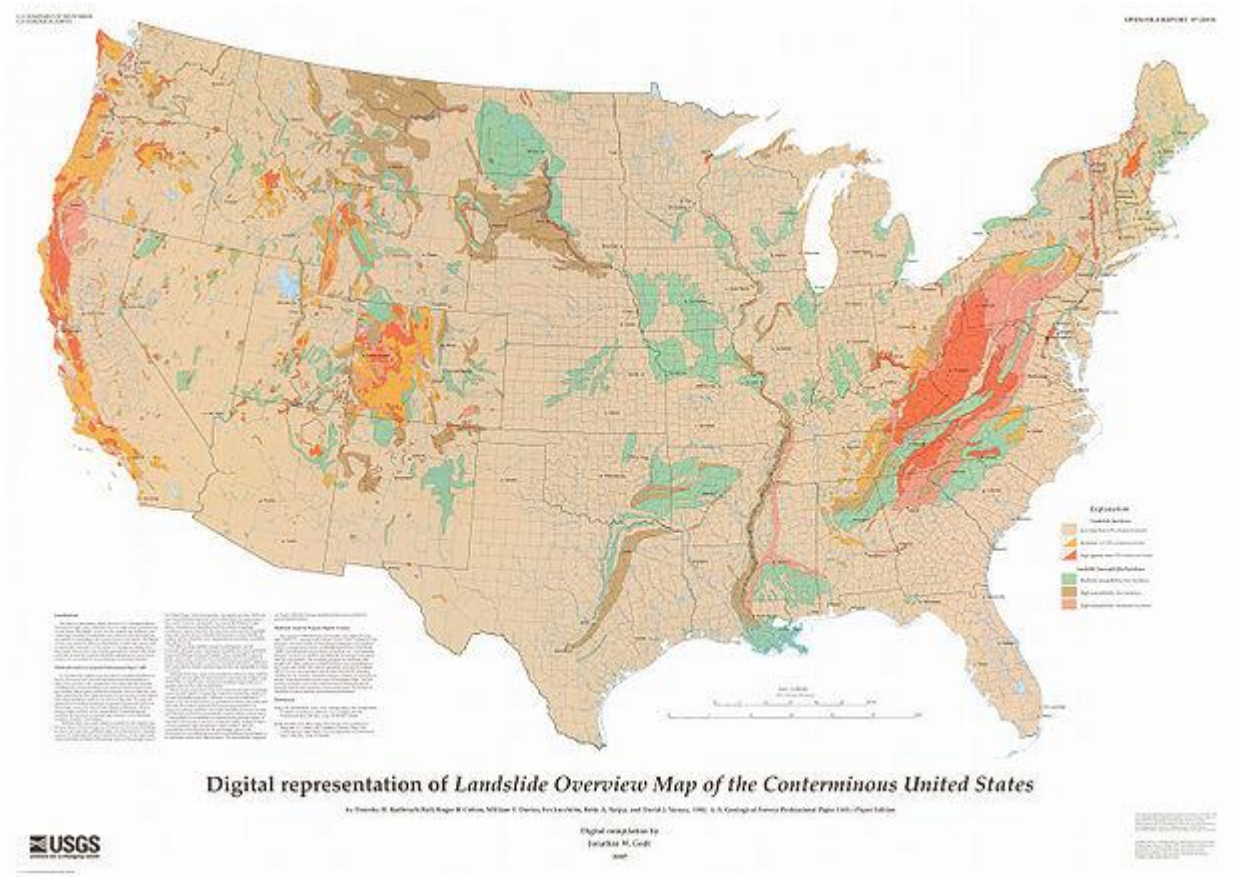
Among the most destructive types of debris flows are those that accompany volcanic eruptions. A spectacular example in the United States was a massive debris flow resulting from the 1980 eruptions of Mount St. Helens, Washington. Areas near the bases of many volcanoes in the Cascade Mountain Range of California, Oregon, and Washington are at risk from the same types of flows during future volcanic eruptions.

Areas that are generally prone to landslide hazards include previous landslide areas, the bases of steep slopes, the bases of drainage channels, and developed hillsides where leach-field septic systems are used. Areas that are typically considered safe from landslides include areas that have not moved in the past, relatively flat-lying areas away from sudden changes in slope, and areas at the top or along ridges set back from the tops of slopes.

According to the United States Geological Survey, each year landslides cause $5.1 billion (2009 dollars) in damage and between 25 and 50 deaths in the United States.[19] **Figure 5.11** delineates areas where large numbers of landslides have occurred and areas that are susceptible to landsliding in the conterminous United States.[20]

[19] United States Geological Survey (USGS). United States Department of the Interior. "Landslide Hazards – A National Threat." 2005.
[20] This map layer is provided in the U.S. Geological Survey Professional Paper 1183, Landslide Overview Map of the Conterminous United States, available online at: http://landslides.usgs.gov/html_files/landslides/nationalmap/national.html.

FIGURE 5.11: LANDSLIDE OVERVIEW MAP OF THE CONTERMINOUS UNITED STATES[21]



Landslide Incidence		Landslide Susceptibility/Incidence	
	Low Incidence (less than 1.5% of area involved)		Moderate susceptibility/low incidence
	Moderate Incidence (1.5%-15% of area involved)		High susceptibility/low incidence
	High Incidence (greater than 15% of area involved		High susceptibility/moderate incidence

Source: United States Geological Survey

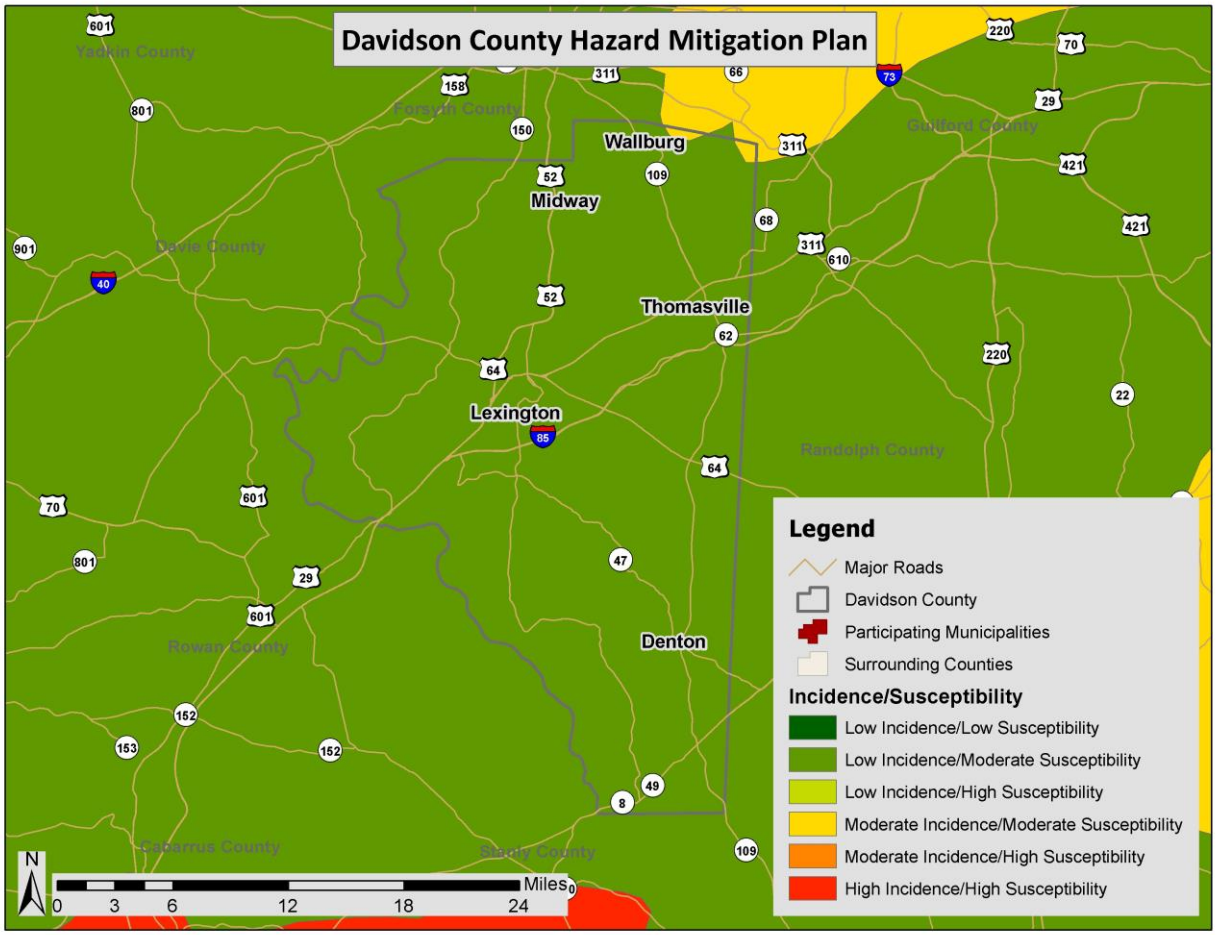
5.12.2 Location and Spatial Extent

Landslides occur along steep slopes when the pull of gravity can no longer be resisted (often due to heavy rain). Human development can also exacerbate risk by building on previously undevelopable steep slopes and constructing roads by cutting through hills or mountains. Landslides are possible throughout Davidson County, though the risk is relatively low.

[21] Susceptibility not indicated where same or lower than incidence. Susceptibility to landsliding was defined as the probable degree of response of [the areal] rocks and soils to natural or artificial cutting or loading of slopes, or to anomalously high precipitation. High, moderate, and low susceptibility are delimited by the same percentages used in classifying the incidence of landsliding. Some generalization was necessary at this scale, and several small areas of high incidence and susceptibility were slightly exaggerated.

According to **Figure 5.12** below, a very small area in the northern part of the county has moderate landslide activity, however, the vast majority of the county has low landslides activity. There is moderate susceptibility to landslides across the entire county.

FIGURE 5.12: LANDSLIDE SUSCEPTIBILITY AND INCIDENCE MAP OF DAVIDSON COUNTY



Source: United States Geological Survey

5.12.3 Historical Occurrences

Relatively flat topography throughout most of Davidson County makes the planning area less susceptible to landslides. Most landslides are caused by heavy rainfall in the area. Building on steep slopes that was not previously possible also contributes to risk. Although no landslide incidents have been reported in the county, it should be noted that the North Carolina Geologic Survey (NCGS) emphasized the dataset provided was incomplete. Therefore, there may be historical landslide occurrences that were not reported. Some incidence mapping has also been completed throughout the western portion of North Carolina though it is not complete either. Again, it should be noted that it is possible more incidents have occurred than what is mapped. Since no incidents were reported, a map was not produced to show the location of previous events.

5.12.4 Probability of Future Occurrences

Based on historical information and the USGS susceptibility index, the probability of future landslide events is unlikely (less than 1 percent probability). Local conditions may become more favorable for landslides due to heavy rain, for example. This would increase the likelihood of occurrence. It should also be noted that some areas in Davidson County have greater risk than others given factors such as steepness on slope and modification of slopes.

Hydrologic Hazards

5.13 DAM AND LEVEE FAILURE

5.13.1 Background

Worldwide interest in dam and levee safety has risen significantly in recent years. Aging infrastructure, new hydrologic information, and population growth in floodplain areas downstream from dams and near levees have resulted in an increased emphasis on safety, operation, and maintenance.

There are approximately 80,000 dams in the United States today, the majority of which are privately owned. Other owners include state and local authorities, public utilities, and federal agencies. The benefits of dams are numerous: they provide water for drinking, navigation, and agricultural irrigation. Dams also provide hydroelectric power, create lakes for fishing and recreation, and save lives by preventing or reducing floods.

Though dams have many benefits, they also can pose a risk to communities if not designed, operated, and maintained properly. In the event of a dam failure, the energy of the water stored behind even a small dam is capable of causing loss of life and great property damage if development exists downstream. If a levee breaks, scores of properties may become submerged in floodwaters and residents may become trapped by rapidly rising water. The failure of dams and levees has the potential to place large numbers of people and great amounts of property in harm's way.

5.13.2 Location and Spatial Extent

The North Carolina Division of Energy, Mineral, and Land Resources provides information on dams, including a hazard potential classification. There are three hazard classifications—high, intermediate, and low—that correspond to qualitative descriptions and quantitative guidelines. **Table 5.30** explains these classifications.

TABLE 5.30: NORTH CAROLINA DAM HAZARD CLASSIFICATIONS

Hazard Classification	Description	Quantitative Guidelines
Low	Interruption of road service, low volume roads	Less than 25 vehicles per day
	Economic damage	Less than $30,000
Intermediate	Damage to highways, Interruption of service	25 to less than 250 vehicles per day
	Economic damage	$30,000 to less than $200,000
High	Loss of human life*	Probable loss of 1 or more human lives
	Economic damage	More than $200,000
	*Probable loss of human life due to breached roadway or bridge on or below the dam.	250 or more vehicles per day

Source: North Carolina Division of Energy, Mineral, and Land Resources

According to the North Carolina Division of Energy, Mineral, and Land Resources, there are 112 dams in Davidson County.[22] **Figure 5.13** shows the dam location and the corresponding hazard ranking for each. Of these dams, 15 are classified as high hazard potential. These high hazard dams are listed in **Table 5.31** and more detailed information for each dam is listed in the jurisdiction-specific annexes.

TABLE 5.31: DAVIDSON COUNTY HIGH HAZARD DAMS

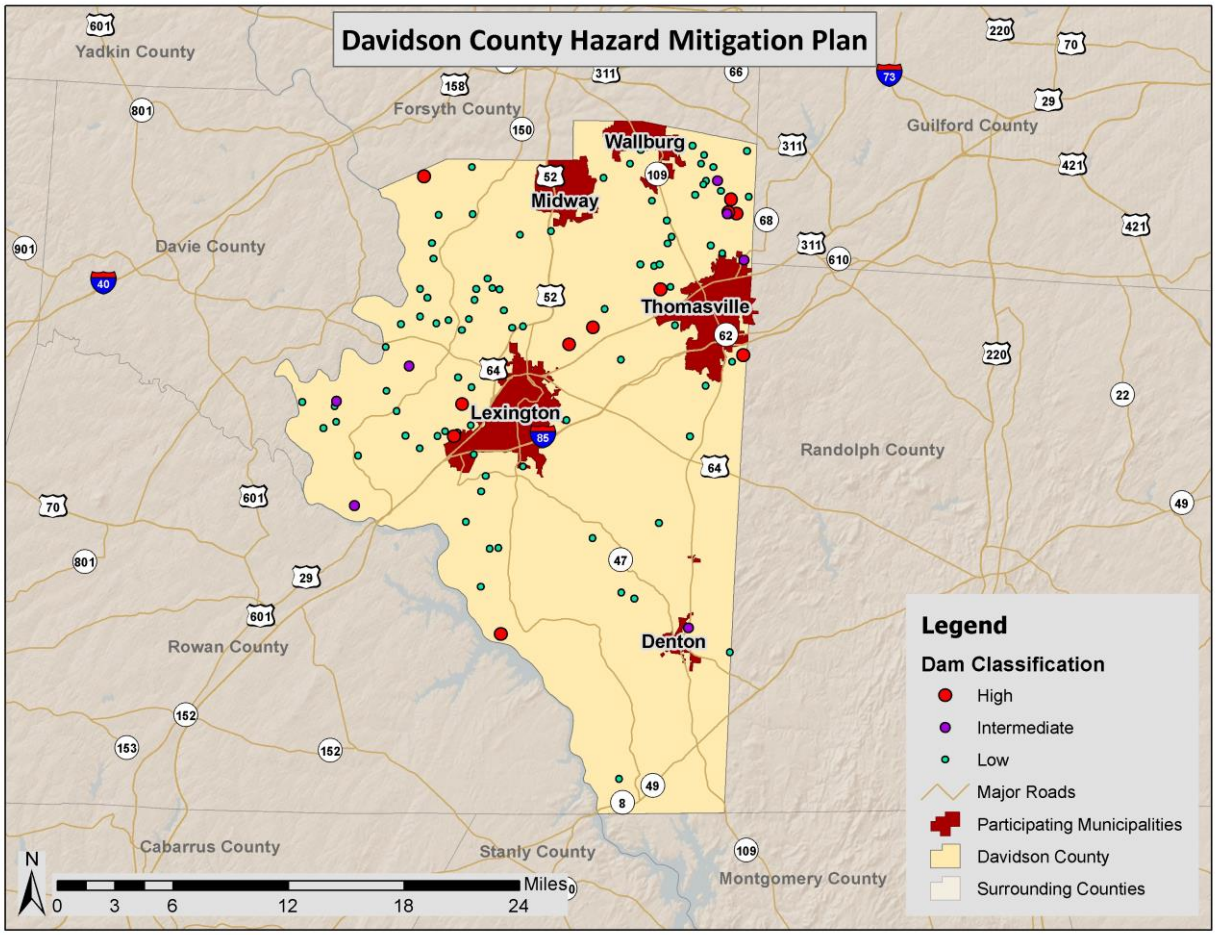
Dam Name	Hazard Potential	Surface Area (acres)	Max Capacity (Ac-ft)	Owner Type
Denton				
None Reported	--	--	--	--
Lexington				
None Reported	--	--	--	--
Midway				
None Reported	--	--	--	--
Thomasville				
None Reported	--	--	--	--
Wallburg				
None Reported	--	--	--	--
Unincorporated Area				
Merry Hills Lake Dam	High	3.8	38	Private
Davis Lake Dam #1	High	1.2	12	Private
Glossons Lake Dam #2	High	2.0	36	Private
Lexington Storage Reservoir Dam	High	9.0	110	Local Gov
Lake Tom-A-Lex Dam	High	650.0	11,180	Local Gov
Johnson Dam	High	5.2	75	Private
Joe Bales Dam	High	1.8	12	Private
Freeman Lake Dam	High	1.0	5	Private
Tucker Dam	High	1.8	23	Private

[22] The December 2, 2014 list of high hazard dams obtained from the North Carolina Division of Energy, Mineral, and Land Resources (http://portal.ncdenr.org/web/lr/dams) was reviewed and amended by local officials to the best of their knowledge.

Dam Name	Hazard Potential	Surface Area (acres)	Max Capacity (Ac-ft)	Owner Type
Cedar Lodge Dam Lower	High	3.5	29	Private
Cedar Lodge Dam Upper	High	3.0	21	Private
Sapona Country Club Dam	High	8.0	66	Private
Jerry Clinard Lake Dam	High	1.5	11	Private
Martin Lake Dam	High	2.5	26	Private
Yachtmans Point Dam	High	6.5	44	Private

Source: North Carolina Division of Energy, Mineral, and Land Resources, 2013

FIGURE 5.13: DAVIDSON COUNTY DAM LOCATION AND HAZARD RANKING



Source: North Carolina Division of Energy, Mineral and Land Resources, 2013

It should be noted that dam regulations for classifying dams was recently changed. As a result, generally more dams are classified as high hazard.

5.13.3 Historical Occurrences

According to local sources and a review of the past hazard mitigation plan, there has been no history of dam breach in Davidson County.

5.13.4 Probability of Future Occurrence

Given the current dam inventory and historic data, a dam breach is unlikely (less than 1 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events. No further analysis will be completed in Section 6: *Vulnerability Assessment* as more sophisticated dam breach plans (typically completed by the U.S. Army Corp of Engineers) have been completed for dams of concern in the county.

5.14 EROSION

5.14.1 Background

Erosion is the gradual breakdown and movement of land due to both physical and chemical processes of water, wind, and general meteorological conditions. Natural, or geologic, erosion has occurred since the Earth's formation and continues at a very slow and uniform rate each year.

There are two types of soil erosion: wind erosion and water erosion. Wind erosion can cause significant soil loss. Winds blowing across sparsely vegetated or disturbed land can pick up soil particles and carry them through the air, thus displacing them. Water erosion can occur over land or in streams and channels. Water erosion that takes place over land may result from raindrops, shallow sheets of water flowing off the land, or shallow surface flow, which becomes concentrated in low spots. Stream channel erosion may occur as the volume and velocity of water flow increases enough to cause movement of the streambed and bank soils. Major storms, such hurricanes in coastal areas, may cause significant erosion by combining high winds with heavy surf and storm surge to significantly impact the shoreline.

An area's potential for erosion is determined by four factors: soil characteristics, vegetative cover, topography climate or rainfall, and topography. Soils composed of a large percentage of silt and fine sand are most susceptible to erosion. As the clay and organic content of these soils increases, the potential for erosion decreases. Well-drained and well-graded gravels and gravel-sand mixtures are the least likely to erode. Coarse gravel soils are highly permeable and have a good capacity for absorption, which can prevent or delay the amount of surface runoff. Vegetative cover can be very helpful in controlling erosion by shielding the soil surface from falling rain, absorbing water from the soil, and slowing the velocity of runoff. Runoff is also affected by the topography of the area including size, shape, and slope. The greater the slope length and gradient, the more potential an area has for erosion. Climate can affect the amount of runoff, especially the frequency, intensity, and duration of rainfall and storms. When rainstorms are frequent, intense, or of long duration, erosion risks are high. Seasonal changes in temperature and rainfall amounts define the period of highest erosion risk of the year.

During the past 20 years, the importance of erosion control has gained the increased attention of the public. Implementation of erosion control measures consistent with sound agricultural and construction operations is needed to minimize the adverse effects associated with harmful chemicals run-off due to wind or water events. The increase in government regulatory programs and public concern has resulted

in a wide range of erosion control products, techniques, and analytical methodologies in the United States. The preferred method of erosion control in recent years has been the restoration of vegetation.

5.14.2 Location and Spatial Extent

Erosion in Davidson County is typically caused by flash flooding events. Unlike coastal areas, where the soil is mainly composed of fine grained particles such as sand, Davidson County soils have much greater organic matter content. Furthermore, vegetation also helps to prevent erosion in the area. Erosion occurs in Davidson County, particularly along the banks of rivers and streams, but it is not an extreme threat to any of the participating counties and jurisdictions. No areas of concern were reported by the planning team.

5.14.3 Historical Occurrences

Several sources were vetted to identify areas of erosion in Davidson County. This includes searching local newspapers, interviewing local officials, and reviewing previous hazard mitigation plans. Little information could be found beyond the hazard mitigation plan; however, the last plan update classified erosion as a relatively low concern as the magnitude was determined to be mild.

5.14.4 Probability of Future Occurrences

Erosion remains a natural, dynamic, and continuous process for Davidson County, and it will continue to occur. The annual probability level assigned for erosion is possible (between 1 and 10 percent). However, given the lack of historical events, location, data, and threat to life or property, no further analysis will be done in Section 6: *Vulnerability Assessment*.

5.15 FLOOD

5.15.1 Background

Flooding is the most frequent and costly natural hazard in the United States and is a hazard that has caused more than 10,000 deaths since 1900. Nearly 90 percent of presidential disaster declarations result from natural events where flooding was a major component.

Floods generally result from excessive precipitation and can be classified under two categories: general floods, precipitation over a given river basin for a long period of time along with storm-induced wave action, and flash floods, the product of heavy localized precipitation in a short time period over a given location. The severity of a flooding event is typically determined by a combination of several major factors, including stream and river basin topography and physiography, precipitation and weather patterns, recent soil moisture conditions, and the degree of vegetative clearing and impervious surface.

General floods are usually long-term events that may last for several days. The primary types of general flooding include riverine, coastal, and urban flooding. Riverine flooding is a function of excessive precipitation levels and water runoff volumes within the watershed of a stream or river. Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall produced by hurricanes, tropical storms, and other large coastal storms. Urban flooding occurs where manmade

development has obstructed the natural flow of water and decreased the ability of natural groundcover to absorb and retain surface water runoff.

Most flash flooding is caused by slow-moving thunderstorms in a local area or by heavy rains associated with hurricanes and tropical storms. However, flash flooding events may also occur from a dam or levee failure within minutes or hours of heavy amounts of rainfall or from a sudden release of water held by a retention basin or other stormwater control facility. Although flash flooding occurs most often along mountain streams, it is also common in urbanized areas where much of the ground is covered by impervious surfaces.

The periodic flooding of lands adjacent to rivers, streams, and shorelines (land known as a floodplain) is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

Floodplains are designated by the frequency of the flood that is large enough to cover them. For example, the 10-year floodplain will be covered by the 10-year flood and the 100-year floodplain by the 100-year flood. Flood frequencies, such as the 100-year flood, are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Another way of expressing the flood frequency is the chance of occurrence in a given year, which is the percentage of the probability of flooding each year. For example, the 100-year flood has a 1 percent chance of occurring in any given year and the 500-year flood has a 0.2 percent chance of occurring in any given year.

5.15.2 Location and Spatial Extent

There are areas in Davidson County that are susceptible to flood events. Special flood hazard areas in Davidson County were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM).[23] This includes Zone AE (1-percent annual chance floodplain with elevation) and Zone X500 (0.2-percent annual chance floodplain). According to GIS analysis, of the 552.7 square miles of land that make up Davidson County, there are 48.1 square miles of land in zone AE (1-percent annual chance floodplain/100-year floodplain) and 1.3 square miles of land in zone X500 (0.2-percent annual chance floodplain/500-year floodplain). The county totals are presented below in **Table 5.32**.

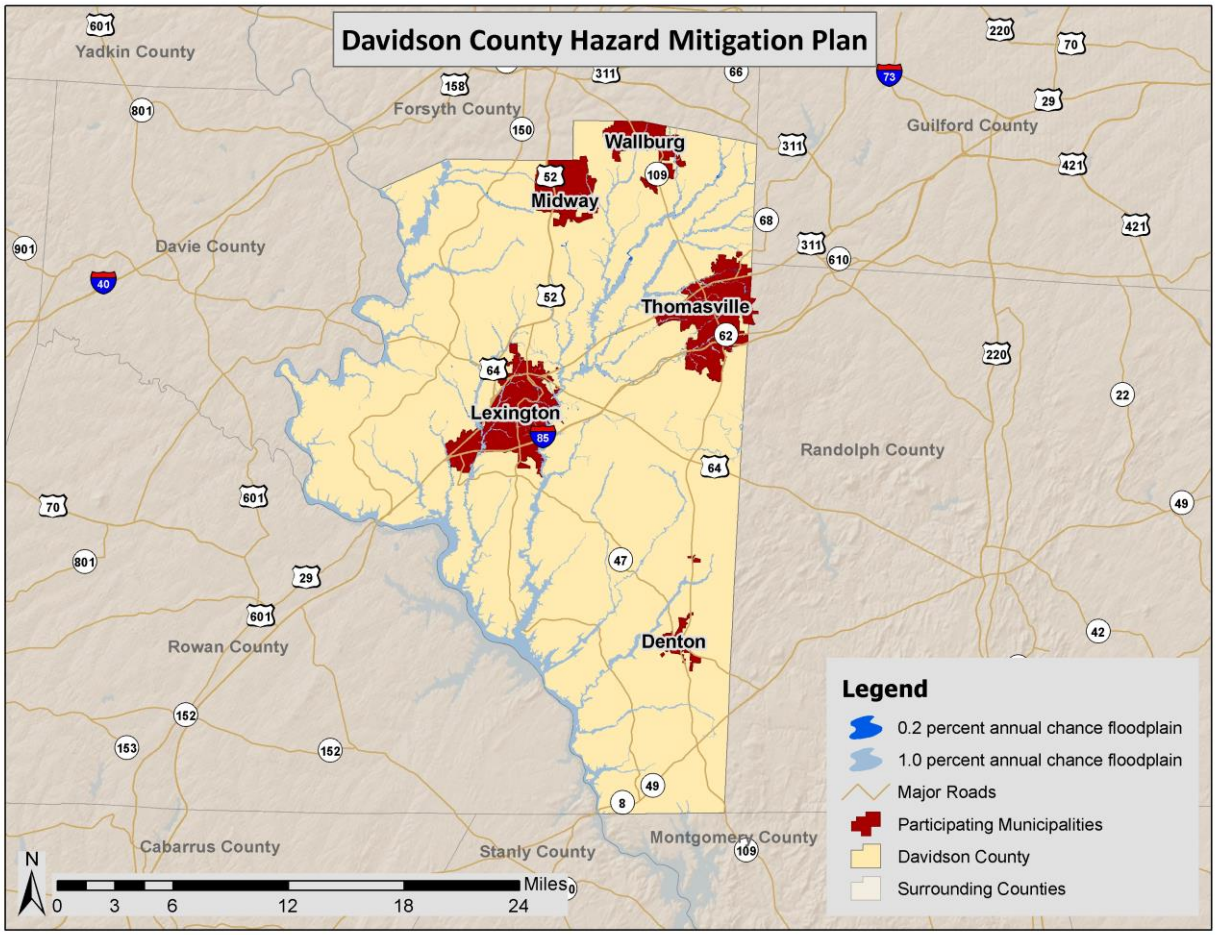
TABLE 5.32: SUMMARY OF FLOODPLAIN AREAS IN DAVIDSON COUNTY

Location	100-year area (square miles)	500-year area (square miles)
Denton	0.0	0.0
Lexington	2.8	0.2
Midway	0.2	0.0
Thomasville	0.9	0.1
Wallburg	0.3	0.0
Unincorporated Area	43.9	1.0
DAVIDSON COUNTY TOTAL	**48.1**	**1.3**

[23] The county-level DFIRM used for Davidson County was updated in 2009.

These flood zone values account for 8.9 percent of the total land area in Davidson County. It is important to note that while FEMA digital flood data is recognized as best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Flooding and flood-related losses often do occur outside of delineated special flood hazard areas. **Figure 5.14** illustrates the location and extent of currently mapped special flood hazard areas for Davidson County based on best available FEMA DFIRM data.

FIGURE 5.14: SPECIAL FLOOD HAZARD AREAS IN DAVIDSON COUNTY



Source: Federal Emergency Management Agency

Additional, more detailed county-level and jurisdiction-level maps can be found in the annexes.

5.15.3 Historical Occurrences

Information from the National Climatic Data Center was used to ascertain historical flood events. The National Climatic Data Center reported a total of 42 events throughout Davidson County since 1996.[24] A summary of these events is presented in **Table 5.33**. These events accounted for over $800,000 (2014

[24] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is likely that additional occurrences have occurred and have gone unreported.

dollars) in property damage throughout the county and 1 death.[25] Specific information on flood events for each jurisdiction, including date, type of flooding, and deaths and injuries, can be found in **Table 5.34**.

TABLE 5.33: SUMMARY OF FLOOD OCCURRENCES IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	1	0/0	$0
Lexington	11	0/0	$1,086
Midway	0	0/0	$0
Thomasville	11	0/0	$0
Wallburg	0	0/0	$0
Unincorporated Area	19	0/0	$836,296
DAVIDSON COUNTY TOTAL	**42**	**0/0**	**$837,382**

Source: National Climatic Data Center

TABLE 5.34: HISTORICAL FLOOD OCCURRENCES IN DAVIDSON COUNTY

	Date	Type	Deaths / Injuries	Property Damage*
Denton				
DENTON	9/18/2002	Flash Flood	0/0	$0
Lexington				
LEXINGTON	7/1/1999	Flash Flood	0/0	$0
LEXINGTON	7/4/2001	Flash Flood	0/0	$0
LEXINGTON	2/22/2003	Flash Flood	0/0	$0
LEXINGTON	6/8/2003	Flash Flood	0/0	$0
LEXINGTON	7/29/2003	Flash Flood	0/0	$0
LEXINGTON	7/17/2004	Flash Flood	0/0	$0
LEXINGTON	6/14/2006	Flash Flood	0/0	$0
LEXINGTON	6/23/2006	Flash Flood	0/0	$0
LEXINGTON	6/27/2006	Flash Flood	0/0	$0
LEXINGTON	7/13/2010	Flash Flood	1/0	$1,086
LEXINGTON	7/8/2011	Flash Flood	0/0	$0
Midway				
None Reported	--	--	--	--
Thomasville				
THOMASVILLE	9/3/1996	Flash Flood	0/0	$0
THOMASVILLE	4/17/1998	Flood	0/0	$0
THOMASVILLE	8/9/2003	Flash Flood	0/0	$0
THOMASVILLE	8/17/2003	Flash Flood	0/0	$0
THOMASVILLE	8/31/2003	Flash Flood	0/0	$0
THOMASVILLE	9/8/2004	Flash Flood	0/0	$0
THOMASVILLE	6/27/2006	Flash Flood	0/0	$0

[25] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

	Date	Type	Deaths / Injuries	Property Damage*
THOMASVILLE	8/27/2008	Flash Flood	0/0	$0
THOMASVILLE	7/13/2009	Flash Flood	0/0	$0
THOMASVILLE	9/30/2010	Flash Flood	0/0	$0
THOMASVILLE	9/30/2010	Flash Flood	0/0	$0
Wallburg				
None Reported	--	--	--	--
Unincorporated Area				
LAKEVIEW, LINWOOD	9/4/1996	Flash Flood	0/0	$0
COUNTYWIDE	7/23/1997	Flash Flood	0/0	$0
COUNTYWIDE	9/4/1998	Flash Flood	0/0	$0
JACKSON HILL	6/25/2001	Flash Flood	0/0	$0
DAVIDSON (ZONE)	3/20/2003	Flood	0/0	$0
DAVIDSON (ZONE)	4/10/2003	Flood	0/0	$0
NORTH CENTRAL PORTION	9/23/2003	Flash Flood	0/0	$836,296
COUNTYWIDE	9/27/2004	Flash Flood	0/0	$0
GORDONTOWN	5/22/2010	Flash Flood	0/0	$0
NEWSOM	8/19/2010	Flash Flood	0/0	$0
SILVER VLY	9/30/2010	Flash Flood	0/0	$0
GUM TREE	6/28/2011	Flash Flood	0/0	$0
COTTON GROVE	7/8/2011	Flash Flood	0/0	$0
LAMBETH	7/8/2011	Flash Flood	0/0	$0
OLD MILL	5/15/2012	Flood	0/0	$0
GORDONTOWN	8/11/2012	Flash Flood	0/0	$0
GLEN ANNA	7/11/2013	Flash Flood	0/0	$0
WELCOME	8/17/2013	Flash Flood	0/0	$0
SILVER VLY	3/7/2014	Flood	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

5.15.4 Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of November 2014, there have been 29 flood losses reported in Davidson County through the National Flood Insurance Program (NFIP) since 1978, totaling over $300,000 in claims payments. A summary of these figures for each jurisdiction is provided in **Table 5.35**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in Davidson County were either uninsured, denied claims payment, or not reported.

TABLE 5.35: SUMMARY OF INSURED FLOOD LOSSES IN DAVIDSON COUNTY

Location	Number of Policies	Flood Losses	Claims Payments
Denton	0	0	$0
Lexington	28	5	$25,649
Midway*	--	--	--
Thomasville	58	9	$82,810

Location	Number of Policies	Flood Losses	Claims Payments
Wallburg*	--	--	--
Unincorporated Area	187	15	$229,408
DAVIDSON COUNTY TOTAL	**273**	**29**	**$337,867**

*This community does not participate in the National Flood Insurance Program. Therefore, no values are reported.
Source: Federal Emergency Management Agency, National Flood Insurance Program

5.15.5 Repetitive Loss Properties

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 140,000 repetitive loss properties nationwide.

As of August 2014, there are 6 non-mitigated repetitive loss properties located in Davidson County, which accounted for 15 losses and over $184,000 in claims payments under the NFIP. The average claim amount for these properties is $12,268. Three of the properties are single-family residential buildings, and the remaining three are non-residential (commercial). Without mitigation these properties will likely continue to experience flood loses. **Table 5.36** presents detailed information on repetitive loss properties and NFIP claims and policies for Davidson County.

TABLE 5.36: SUMMARY OF REPETITIVE LOSS PROPERTIES IN DAVIDSON COUNTY

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Denton	0	--	0	$0	$0	$0	$0
Lexington	2	1 single-family; 1 non-residential	4	$24,888	$0	$24,888	$6,222
Midway*	--	--	--	--	--	--	--
Thomasville	2	1 single-family; 1 non-residential	6	$24,492	$0	$24,492	$4,082
Wallburg*	--	--	--	--	--	--	--
Unincorporated Area	2	1 single-family; 1 non-residential	5	$43,478	$91,167	$134,645	$26,929
DAVIDSON COUNTY TOTAL	**6**		**15**	**$92,857**	**$91,167**	**$184,024**	**$12,268**

* These communities do not participate in the National Flood Insurance Program. Therefore, no values are reported.
Source: National Flood Insurance Program

5.15.6 Probability of Future Occurrences

Flood events will remain a threat in Davidson County, and the probability of future occurrences will

remain highly likely (100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above, which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain).

It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout Davidson County. For example, Lexington has more floodplain and thus a higher risk of flood than other municipalities. Mitigation actions may be warranted, particularly for repetitive loss properties.

Other Hazards

5.16 HAZARDOUS MATERIALS INCIDENTS

5.16.1 Background

Hazardous materials can be found in many forms and quantities that can potentially cause death; serious injury; long-lasting health effects; and damage to buildings, homes, and other property in varying degrees. Such materials are routinely used and stored in many homes and businesses and are also shipped daily on the nation's highways, railroads, waterways, and pipelines. This subsection on the hazardous material hazard is intended to provide a general overview of the hazard, and the threshold for identifying fixed and mobile sources of hazardous materials is limited to general information on rail, highway, and FEMA-identified fixed HAZMAT sites determined to be of greatest significance as appropriate for the purposes of this plan.

Hazardous material (HAZMAT) incidents can apply to fixed facilities as well as mobile, transportation-related accidents in the air, by rail, on the nation's highways, and on the water. Approximately 6,774 HAZMAT events occur each year, 5,517 of which are highway incidents, 991 are railroad incidents, and 266 are due to other causes.[26] In essence, HAZMAT incidents consist of solid, liquid, and/or gaseous contaminants that are released from fixed or mobile containers, whether by accident or by design as with an intentional terrorist attack. A HAZMAT incident can last hours to days, while some chemicals can be corrosive or otherwise damaging over longer periods of time. In addition to the primary release, explosions and/or fires can result from a release, and contaminants can be extended beyond the initial area by persons, vehicles, water, wind, and possibly wildlife as well.

HAZMAT incidents can also occur as a result of or in tandem with natural hazard events, such as floods, hurricanes, tornadoes, and earthquakes, which in addition to causing incidents can also hinder response efforts. In the case of Hurricane Floyd in September 1999, communities along the Eastern United States were faced with flooded junkyards, disturbed cemeteries, deceased livestock, floating propane tanks, uncontrolled fertilizer spills, and a variety of other environmental pollutants that caused widespread toxological concern.

Hazardous material incidents can include the spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of a hazardous material, but exclude: (1) any release which results in exposure to poisons solely within the workplace

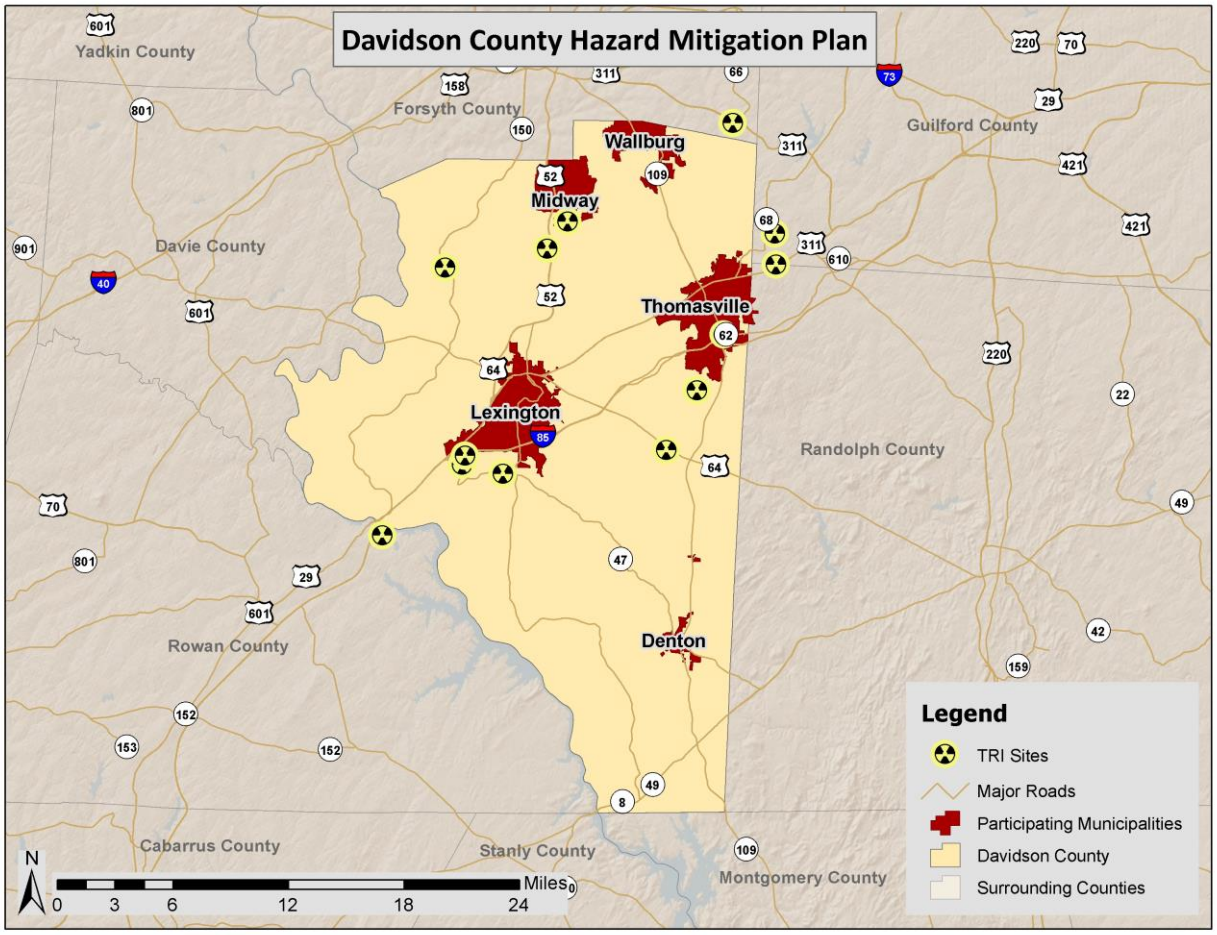
[26] FEMA, 1997.

with respect to claims which such persons may assert against the employer of such persons; (2) emissions from the engine exhaust of a motor vehicle, rolling stock, aircraft, vessel or pipeline pumping station engine; (3) release of source, byproduct, or special nuclear material from a nuclear incident; and (4) the normal application of fertilizer.

5.16.2 Location and Spatial Extent

As a result of the 1986 Emergency Planning and Community Right to Know Act (EPCRA), the Environmental Protection Agency provides public information on hazardous materials. One facet of this program is to collect information from industrial facilities on the releases and transfers of certain toxic agents. This information is then reported in the Toxic Release Inventory (TRI). TRI sites indicate where such activity is occurring. Davidson County has 12 TRI sites. These sites are shown in **Figure 5.15.**

FIGURE 5.15: TOXIC RELEASE INVENTORY (TRI) SITES IN DAVIDSON COUNTY



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the county via roadways and rail. Many roads in the county are subject to hazardous materials transport and all roads that permit hazardous material transport are considered potentially at risk to an incident.

5.16.3 Historical Occurrences

The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) lists historical occurrences throughout the nation. A "serious incident" is a hazardous materials incident that involves:

- a fatality or major injury caused by the release of a hazardous material,
- the evacuation of 25 or more persons as a result of release of a hazardous material or exposure to fire,
- a release or exposure to fire which results in the closure of a major transportation artery,
- the alteration of an aircraft flight plan or operation,
- the release of radioactive materials from Type B packaging,
- the release of over 11.9 galls or 88.2 pounds of a severe marine pollutant, or
- the release of a bulk quantity (over 199 gallons or 882 pounds) of a hazardous material.

However, prior to 2002, a hazardous materials "serious incident" was defined as follows:

- a fatality or major injury due to a hazardous material,
- closure of a major transportation artery or facility or evacuation of six or more person due to the presence of hazardous material, or
- a vehicle accident or derailment resulting in the release of a hazardous material.

There have been a total of 182 recorded HAZMAT incidents in Davidson County since 1972 (**Table 5.37**). These events resulted in about $25,000 (2014 dollars) of property damage as well as 1 injury. **Table 5.38** presents detailed information on historical HAZMAT incidents in Davidson County as reported by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA).

TABLE 5.37: SUMMARY OF HAZMAT INCIDENTS IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	2	0/0	$543
Lexington	35	0/0	$14,613
Midway	0	0/0	$0
Thomasville	50	0/0	$10,311
Wallburg	1	0/0	$0
Unincorporated Area	94	0/1	$0
DAVIDSON COUNTY TOTAL	**182**	**0/1**	**$25,467**

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE 5.38: HAZMAT INCIDENTS IN DAVIDSON COUNTY

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
Denton							
I-1978060572	5/27/1978	DENTON	Highway	No	0/0	$0	0
I-2010070585	4/21/2010	DENTON	Highway	Yes	0/0	$543	6,497.7 LGA

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
Lexington							
I-1975080152	6/28/1975	LEXINGTON	Highway	No	0/0	$0	0
I-1976090957	9/22/1976	LEXINGTON	Highway	No	0/0	$0	15 LGA
I-1977010370	1/5/1977	LEXINGTON	Highway	No	0/0	$0	0
I-1977050284	4/26/1977	LEXINGTON	Highway	Yes	0/0	$0	600 LGA
I-1978070519	7/11/1978	LEXINGTON	Highway	No	0/0	$0	4 LGA
I-1978081661	8/14/1978	LEXINGTON	Highway	No	0/0	$0	0
I-1979010700	12/1/1978	LEXINGTON	Rail	Yes	0/0	$0	36,000 LGA
I-1979050940	5/4/1979	LEXINGTON	Highway	No	0/0	$0	25 LGA
I-1979110717	10/18/1979	LEXINGTON	Highway	No	0/0	$0	0
I-1979120077	11/28/1979	LEXINGTON	Highway	No	0/0	$0	45 LGA
I-1980060806	4/26/1980	LEXINGTON	Highway	No	0/0	$0	1 LGA
I-1988030384	2/9/1988	LEXINGTON	Highway	No	0/0	$0	15 LGA
I-1989010281	12/10/1988	LEXINGTON	Highway	No	0/0	$0	5 LGA
I-1989010277	12/20/1988	LEXINGTON	Highway	No	0/0	$0	5 LGA
I-1989050421	4/19/1989	LEXINGTON	Highway	No	0/0	$0	20 LGA
I-1989100027	9/15/1989	LEXINGTON	Rail	No	0/0	$0	0
I-1990030651	11/14/1989	LEXINGTON	Rail	Yes	0/0	$0	6,000 LGA
I-1990080504	8/7/1990	LEXINGTON	Highway	No	0/0	$0	5 LGA
I-1992080731	6/8/1992	LEXINGTON	Highway	No	0/0	$0	0.5 LGA
I-1993090749	8/24/1993	LEXINGTON	Highway	No	0/0	$0	0.25 LGA
I-1994050427	4/27/1994	LEXINGTON	Highway	Yes	0/0	$3,195	316 LGA
I-1996030432	2/16/1996	LEXINGTON	Highway	Yes	0/0	$0	5,247.5 LGA
I-1998050019	4/7/1998	LEXINGTON	Highway	No	0/0	$0	5 LGA
I-1998081325	7/29/1998	LEXINGTON	Highway	No	0/0	$0	1 LGA
I-2000060674	6/2/2000	LEXINGTON	Highway	No	0/0	$0	0.125 LGA
I-2001060065	5/5/2001	LEXINGTON	Highway	No	0/0	$0	10 LGA
I-2003020935	5/31/2002	LEXINGTON	Highway	Yes	0/0	$0	8,400 LGA
I-2004091116	9/10/2004	LEXINGTON	Highway	No	0/0	$0	25 LGA
E-2007050072	4/19/2007	LEXINGTON	Highway	Yes	0/0	$11,418	80 SLB
I-2010030475	3/9/2010	LEXINGTON	Highway	Yes	0/0	$0	1,255 LGA
I-2010030475	3/9/2010	LEXINGTON	Highway	Yes	0/0	$0	189 LGA
I-2010030475	3/9/2010	LEXINGTON	Highway	Yes	0/0	$0	417 LGA
I-2010030475	3/9/2010	LEXINGTON	Highway	Yes	0/0	$0	735 LGA
I-2010030475	3/9/2010	LEXINGTON	Highway	Yes	0/0	$0	189 LGA
E-2011090505	9/28/2011	LEXINGTON	Highway	No	0/0	$0	0.015625 LGA
Midway							
None Reported	--	--	--	--	--	--	--
Thomasville							
I-1972020197	1/25/1972	THOMASVILLE	Highway	No	0/0	$0	0
I-1973070664	7/25/1973	THOMASVILLE	Highway	No	0/0	$0	0
I-1974070057	6/23/1974	THOMASVILLE	Highway	No	0/0	$0	0
I-1974100387	10/1/1974	THOMASVILLE	Highway	No	0/0	$0	0
I-1975070643	7/11/1975	THOMASVILLE	Highway	No	0/0	$0	0
I-1975070642	7/16/1975	THOMASVILLE	Highway	No	0/0	$0	0
I-1975070955	7/18/1975	THOMASVILLE	Highway	No	0/0	$0	0

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
I-1975110813	11/18/1975	THOMASVILLE	Highway	No	0/0	$0	0
I-1975120541	12/11/1975	THOMASVILLE	Highway	No	0/0	$0	0
I-1976080207	5/30/1976	THOMASVILLE	Highway	No	0/0	$0	0
I-1976070506	6/10/1976	THOMASVILLE	Highway	No	0/0	$0	0
I-1976070972	7/20/1976	THOMASVILLE	Highway	No	0/0	$0	4 LGA
I-1976080914	8/14/1976	THOMASVILLE	Highway	No	0/0	$0	0
I-1976080830	8/19/1976	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1976100792	10/16/1976	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1976110726	10/25/1976	THOMASVILLE	Highway	No	0/0	$0	0
I-1977040950	4/8/1977	THOMASVILLE	Highway	No	0/0	$0	0
I-1977050794	5/6/1977	THOMASVILLE	Highway	No	0/0	$0	0
I-1977061323	5/26/1977	THOMASVILLE	Highway	No	0/0	$0	10 LGA
I-1977061324	6/8/1977	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1977070358	6/18/1977	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1977080527	7/18/1977	THOMASVILLE	Highway	No	0/0	$0	0
I-1977081292	8/5/1977	THOMASVILLE	Highway	No	0/0	$0	0
I-1977081625	8/19/1977	THOMASVILLE	Highway	No	0/0	$0	8 LGA
I-1978010732	1/4/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978020098	1/31/1978	THOMASVILLE	Highway	No	0/0	$0	5 LGA
I-1978020099	1/31/1978	THOMASVILLE	Highway	No	0/0	$0	0
I-1978040402	4/1/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978060110	5/16/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978061434	6/6/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978070301	6/27/1978	THOMASVILLE	Highway	No	0/0	$0	0
I-1978070309	7/2/1978	THOMASVILLE	Highway	No	0/0	$0	3 LGA
I-1978071619	7/7/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978080786	7/26/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978091353	9/17/1978	THOMASVILLE	Highway	No	0/0	$0	60 LGA
I-1978100270	9/19/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978100090	9/19/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978100515	9/26/1978	THOMASVILLE	Highway	No	0/0	$0	0
I-1979020098	1/22/1979	THOMASVILLE	Highway	No	0/0	$0	0
I-1979031094	3/13/1979	THOMASVILLE	Highway	No	0/0	$0	2 LGA
I-1979070636	6/30/1979	THOMASVILLE	Highway	No	0/0	$0	2 LGA
I-1979120319	11/28/1979	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1980020366	2/1/1980	THOMASVILLE	Highway	No	0/0	$0	0
I-1980040512	3/28/1980	THOMASVILLE	Highway	No	0/0	$0	0
I-1994060998	6/2/1994	THOMASVILLE	Highway	No	0/0	$0	10 LGA
I-1995071271	6/21/1995	THOMASVILLE	Highway	No	0/0	$0	5 LGA
I-2002030402	11/28/2001	THOMASVILLE	Highway	No	0/0	$0	7 LGA
I-2004010574	1/9/2004	THOMASVILLE	Highway	No	0/0	$0	60 LGA
I-2009040370	3/30/2009	THOMASVILLE	Highway	No	0/0	$0	5 LGA
E-2012120308	11/20/2012	THOMASVILLE	Highway	Yes	0/0	$10,311	1,500 SLB
Wallburg							
I-1978020238	1/24/1978	WALLBURG	Highway	No	0/0	$0	5 LGA

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
Unincorporated Area							
I-1979092020	8/11/1979	LINWOOD	Rail	No	0/0	$0	20 LGA
I-1982120213	11/15/1982	LINWOOD	Rail	No	0/0	$0	2 LGA
I-1983010161	12/15/1982	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1983120049	11/7/1983	LINWOOD	Rail	No	0/0	$0	0
I-1986050028	3/22/1986	LINWOOD	Rail	No	0/0	$0	10 LGA
I-1987030466	2/14/1987	LINWOOD	Rail	No	0/0	$0	0.25 LGA
I-1987080382	5/27/1987	LINWOOD	Rail	No	0/0	$0	6 LGA
I-1987100505	9/15/1987	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1988020146	2/2/1988	LINWOOD	Rail	No	0/0	$0	0.12 LGA
I-1990050686	7/22/1989	LINWOOD	Rail	No	0/0	$0	0.25 LGA
I-1990050687	8/12/1989	LINWOOD	Rail	No	0/0	$0	0.25 LGA
I-1990030271	3/8/1990	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1990040192	4/2/1990	LINWOOD	Rail	No	0/0	$0	25 LGA
I-1991050421	4/15/1990	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1990060810	6/11/1990	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-1990100493	9/26/1990	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1991020424	2/12/1991	LINWOOD	Rail	No	0/0	$0	0.25 LGA
I-1991060008	5/24/1991	LINWOOD	Rail	No	0/0	$0	25 SLB
I-1991120304	12/6/1991	LINWOOD	Rail	No	0/0	$0	20 LGA
I-1992020149	2/10/1992	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1992080859	7/29/1992	LINWOOD	Rail	No	0/0	$0	0.25 LGA
I-1992090240	9/2/1992	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-1992100574	9/28/1992	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1992110423	10/26/1992	LINWOOD	Rail	No	0/0	$0	0
I-1993020393	2/3/1993	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-1993040140	3/29/1993	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-1993040143	3/29/1993	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-1993060479	5/3/1993	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-1993060252	5/22/1993	LINWOOD	Rail	No	0/0	$0	5 LGA
I-1993100534	9/26/1993	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-1993120185	10/15/1993	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1993120183	10/15/1993	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-1994051134	4/12/1994	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-1994070817	5/18/1994	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-1994061672	5/20/1994	LINWOOD	Rail	No	0/0	$0	0.03125 LGA
I-1995090500	8/23/1995	LINWOOD	Highway	No	0/0	$0	0.5 LGA
I-1996030302	2/15/1996	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1996040338	2/28/1996	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1996060810	5/31/1996	LINWOOD	Rail	No	0/0	$0	0.13 GCF
I-1996100005	9/13/1996	LINWOOD	Rail	Yes	0/0	$0	150 LGA
I-1997020199	1/21/1997	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1997020198	1/24/1997	LINWOOD	Rail	No	0/0	$0	1 LGA
I-1997030892	2/23/1997	LINWOOD	Rail	No	0/0	$0	50 LGA
I-1997030946	3/9/1997	HIGH POINT	Highway	No	0/0	$0	3 LGA
I-1997060097	5/11/1997	LINWOOD	Rail	No	0/0	$0	0.13368 GCF

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
I-1997060681	5/27/1997	HIGH POINT	Highway	No	0/0	$0	1 LGA
I-1997070305	6/25/1997	HIGH POINT	Highway	No	0/0	$0	1 LGA
I-1997070307	6/25/1997	LINWOOD	Rail	No	0/0	$0	25 LGA
I-1997090187	7/24/1997	LINWOOD	Highway	No	0/0	$0	10 LGA
I-1997100194	9/7/1997	LINWOOD	Rail	No	0/0	$0	2 LGA
I-1998101287	10/1/1998	HIGH POINT	Highway	No	0/0	$0	15 LGA
I-1998110541	10/26/1998	HIGH POINT	Highway	No	0/0	$0	2 LGA
I-1998121078	11/28/1998	LINWOOD	Rail	No	0/0	$0	0.13368 GCF
I-1999030173	2/15/1999	HIGH POINT	Highway	No	0/0	$0	3 LGA
I-1999081293	7/2/1999	WELCOME	Highway	No	0/0	$0	1 LGA
I-1999080688	8/4/1999	HIGH POINT	Highway	No	0/0	$0	1 LGA
I-1999121561	11/29/1999	LINWOOD	Rail	No	0/0	$0	0
I-2000020601	2/6/2000	LINWOOD	Rail	No	0/0	$0	1 LGA
I-2000100379	2/17/2000	HEALING SPRINGS	Highway	No	0/0	$0	5 LGA
I-2000040293	3/21/2000	WELCOME	Highway	No	0/0	$0	0.5 LGA
I-2000061376	5/30/2000	LINWOOD	Rail	No	0/0	$0	2 LGA
I-2001010648	12/20/2000	LINWOOD	Rail	No	0/0	$0	1 LGA
I-2001061436	6/12/2001	HIGH POINT	Highway	No	0/0	$0	10 LGA
I-2001091653	8/30/2001	LINWOOD	Rail	No	0/0	$0	0
I-2002040189	3/1/2002	HIGH POINT	Highway	No	0/1	$0	10 LGA
I-2002051172	4/11/2002	HIGH POINT	Highway	No	0/0	$0	0.003905 LGA
I-2003040360	3/27/2003	HIGH POINT	Highway	No	0/0	$0	1 LGA
I-2003050487	4/15/2003	LINWOOD	Rail	No	0/0	$0	10 LGA
I-2003080478	7/26/2003	LINWOOD	Rail	No	0/0	$0	0
I-2003120751	11/25/2003	LINWOOD	Rail	No	0/0	$0	0
I-2003120770	11/27/2003	LINWOOD	Rail	No	0/0	$0	0
I-2004010078	12/2/2003	HIGH POINT	Highway	No	0/0	$0	15 LGA
I-2004071243	4/2/2004	HIGH POINT	Highway	No	0/0	$0	15 LGA
I-2004060542	5/20/2004	LINWOOD	Rail	No	0/0	$0	0
I-2004080847	7/10/2004	LINWOOD	Rail	No	0/0	$0	0
I-2005020752	1/10/2005	LINWOOD	Rail	No	0/0	$0	0.13368 GCF
I-2005040230	3/12/2005	LINWOOD	Rail	No	0/0	$0	0.01671 GCF
I-2005051269	5/7/2005	LINWOOD	Rail	No	0/0	$0	0.03532 GCF
I-2005060739	6/6/2005	LINWOOD	Rail	Yes	0/0	$0	10 LGA
I-2005090801	8/20/2005	LINWOOD	Rail	No	0/0	$0	0.125 LGA
I-2005110876	10/16/2005	LINWOOD	Rail	No	0/0	$0	2 LGA
I-2006050171	4/1/2006	LINWOOD	Rail	No	0/0	$0	5 LGA
X-2007120073	12/4/2007	LINWOOD	Rail	No	0/0	$0	0.01671 GCF
X-2008040316	4/18/2008	LINWOOD	Rail	No	0/0	$0	1 LGA
X-2008100165	10/9/2008	LINWOOD	Rail	No	0/0	$0	0.01671 GCF
X-2008120141	11/29/2008	LINWOOD	Rail	No	0/0	$0	0.01671 GCF
I-2010040432	4/14/2010	WELCOME	Highway	Yes	0/0	$0	264.18 LGA
X-2010050064	5/5/2010	LINWOOD	Rail	No	0/0	$0	1 LGA
X-2012010012	1/3/2012	Linwood	Rail	No	0/0	$0	2 LGA
X-2012020196	2/26/2012	Linwood	Rail	No	0/0	$0	2 LGA
X-2012050247	5/18/2012	Linwood	Rail	No	0/0	$0	1 LGA

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
X-2012100038	10/1/2012	Linwood	Rail	No	0/0	$0	5 LGA
X-2013040192	4/10/2013	Linwood	Rail	No	0/0	$0	2 LGA
X-2013080201	7/27/2013	Linwood	Rail	No	0/0	$0	3 LGA

*Property damage is reported in 2014 dollars.
Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

5.16.4 Probability of Future Occurrence

Given the location of 13 toxic release inventory sites in Davidson County and prior roadway and railway incidents it is highly likely that a hazardous material incident may occur in the county (100 percent annual probability). However, county and municipal officials are mindful of this possibility and take precautions to prevent such an event from occurring. Additionally, there are detailed plans in place to respond to an occurrence.

5.17 NUCLEAR ACCIDENT

5.17.1 Background

A nuclear and radiation accident is defined by the International Atomic Energy Agency as "an event that has led to significant consequences to people, the environment or the facility. Often, this type of incident results from damage to the reactor core of a nuclear power plant which can release radioactivity into the environment. The degree of exposure from nuclear accidents has varied from serious to catastrophic.

By some estimates, over 50 percent of nuclear accidents that have ever occurred were in the United States.[27] However, it is also important to note that generally, nuclear accidents are a rare occurrence. Many incidents are extremely well known due to their large-scale impact and serious effects on people and the environment.

One of the most notorious accidents in the United States was the Three Mile Island accident which occurred in 1979 and released small amounts of radioactive gases and iodine into the environment. Although no deaths have been directly attributed to the accident, it invoked a strong public reaction and demonstrated the potential dangers associated with nuclear power generation.

McGuire Nuclear Power Plant, which is the plant located closest to Davidson County, is a 2,258 megawatt power plant that began commercial operation in 1981. It has pressurized water reactors and operates with a very high level of security.

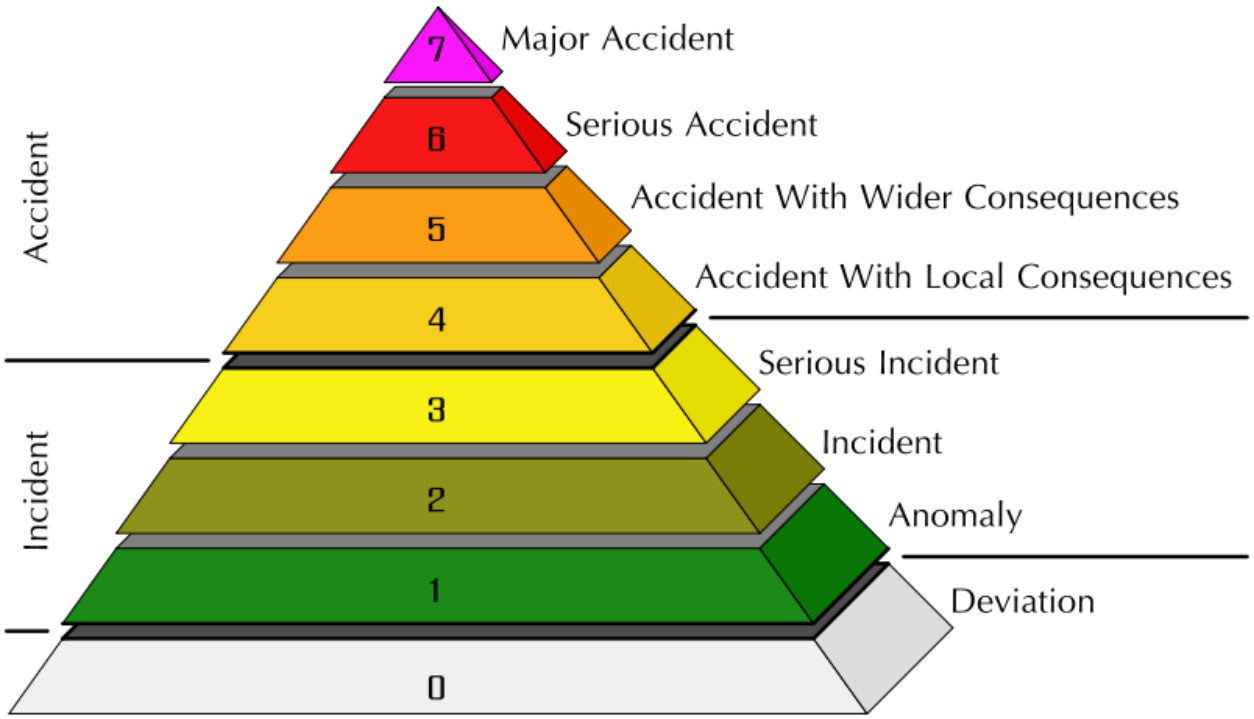
5.17.2 Location and Spatial Extent

The southwestern half of the county is at risk to a nuclear incident. Areas in this part of the county are susceptible due to their relative proximity to the McGuire Nuclear Power Plant. The International

[27] Benjamin K. Sovacool. A Critical Evaluation of Nuclear Power and Renewable Electricity in Asia *Journal of Contemporary Asia*, Vol. 40, No. 3, August 2010, pp. 393–400.

Atomic Energy Association has developed a scale called the International Nuclear and Radiological Event Scale (INES) which provides a quantitative means of assessing the extent of a nuclear event. This scale, like the MMI used for earthquakes, is logarithmic which means that each increasing level on the scale represents an event 10 times more severe than the previous level (**Figure 5.16**).

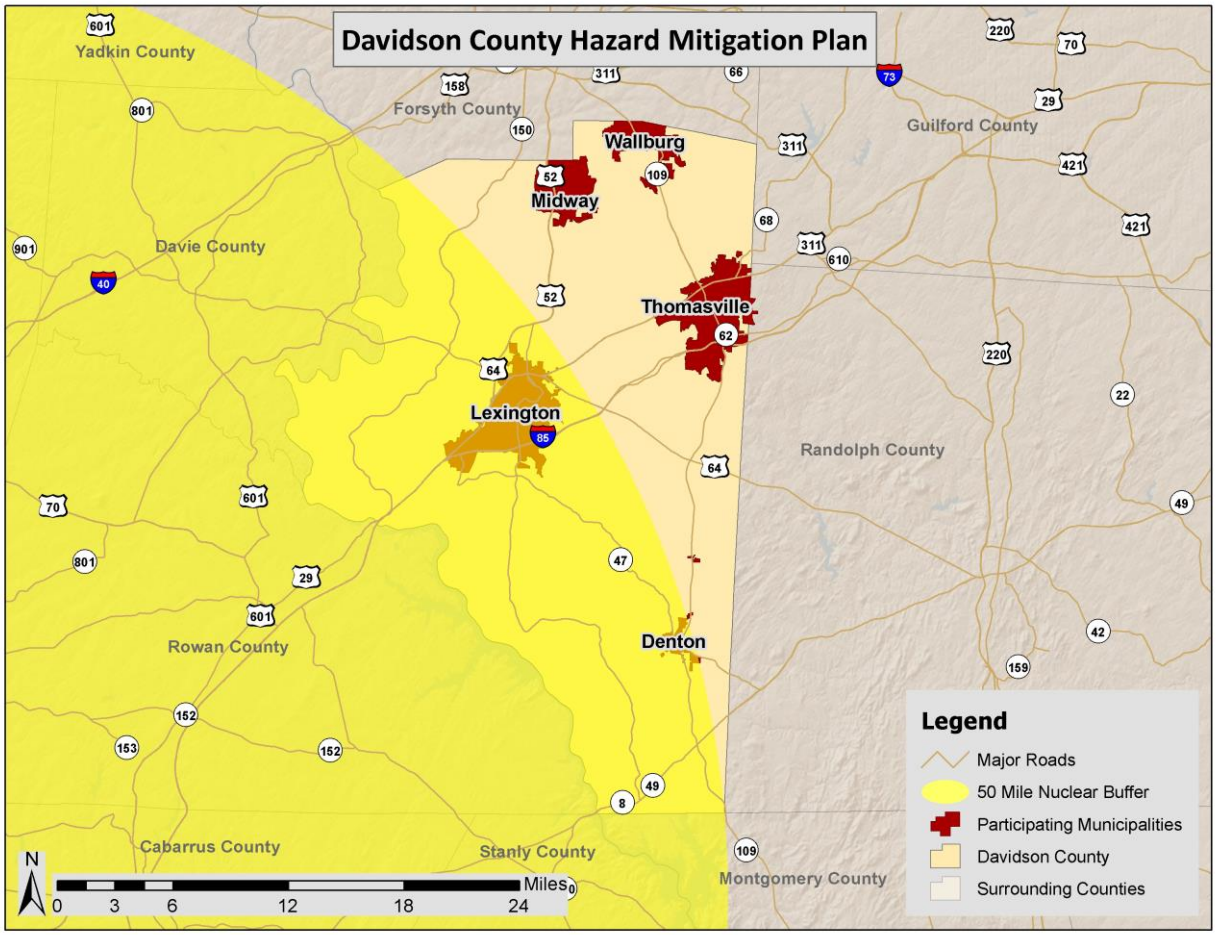
FIGURE 5.16: INTERNATIONAL NUCLEAR EVENT SCALE



Source: International Atomic Energy Agency

The Nuclear Regulatory Commission defines two emergency planning zones around nuclear plants. Areas located within 10 miles of the station are considered to be within the zone of highest risk to a nuclear incident and this radius is the designated evacuation radius recommended by the Nuclear Regulatory Commission. Within the 10-mile zone, the primary concern is exposure to and inhalation of radioactive contamination. The most concerning effects in the secondary 50-mile zone are related to ingestion of food and liquids that may have been contaminated. None of the county is located within the 10-mile radius of the power plant; however, much of the county is located within this 50-mile radius which is still considered to be at risk from a nuclear incident (**Figure 5.17**).

FIGURE 5.17: NUCLEAR POWER PLANT INCIDENT HAZARD ZONES IN DAVIDSON COUNTY



Source: International Atomic Energy Agency

5.17.3 Historical Occurrences

Although there have been no major nuclear events at the McGuire Nuclear Power Plant, there is some possibility that one could occur as there have been incidents in the past in the United States at other facilities and at facilities around the world.

5.17.4 Probability of Future Occurrences

A nuclear event is a very rare occurrence in the United States due to the intense regulation of the industry. There have been incidents in the past, but it is considered unlikely (less than 1 percent annual probability).

5.18 TERROR THREAT

5.18.1 Background

Terrorism is defined in the United States by the Code of Federal Regulations as: "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives."[28] Academic literature identifies some overarching political goals that terrorism seeks to achieve, including spreading anxiety and alarm among immediate victims, families, and the general public; eliminating opponents and destroying symbolic targets; and generating direct damage on society, such as affecting business confidence. In the following sections, some general background information about terrorism is presented prior to the county's hazard identification and risk assessment findings.

There are two general types of terrorist groups: network and hierarchical. The type of organization a group adopts largely depends on how long the group has existed. More recently developed groups tend to organize or adapt to the possibilities of the network model. Older, more established groups lean toward the hierarchical structure and are often more associated with violence of a political nature.[29] Terrorist acts can be committed by large, formally organized groups with terrorist cells in different parts of the world, or they can originate from smaller groups or individuals from a small city or domestic "homegrown" location. In the United States, terrorists that are "homegrown" do not belong to a defined group, may operate very effectively "under the radar," and may pose the biggest threat initially at the local level.[30]

5.18.2 Location and Spatial Extent

A terror threat could potentially occur at any location in the county. However, the very definition of a terrorist event indicates that it is most likely to be targeted at a critical or symbolic resource/location/event. Ensuring and protecting the continuity of critical infrastructure and key resources (CIKR) of the United States is essential to the Nation's security, public health and safety, economic vitality, and way of life. CIKR includes physical and/or virtual systems or assets that, if damaged, would have a detrimental impact on national security, including large-scale human casualties, property destruction, economic disruption, and significant damage to morale and public confidence. **Table 5.39** lists the U.S. Department of Homeland Security's (DHS) identified main critical infrastructure sectors.

[28] U.S. Code of Federal Regulations. 23 C.F.R. Section 0.85
[29] Terrorism Research. *Terrorist groups*. Retrieved December 27, 2011, from http://www.terrorism-research.com/groups/
[30] *Ibid*.

TABLE 5.39: U.S. DEPARTMENT OF HOMELAND SECURITY CRITICAL INFRASTRUCTURE SECTORS

- Agriculture and Food
- Banking and Finance
- Chemical
- Commercial Facilities
- Communications
- Critical Manufacturing
- Dams
- Defense Industrial Base
- Emergency Services
- Energy
- Government Facilities
- Healthcare and Public Health
- Information Technology
- National Monuments and Icons
- Nuclear Reactors, Materials, and Waste
- Postal and Shipping
- Transportation Systems
- Water

Although all critical facilities (see Section 6: *Vulnerability Assessment*) are at a heightened level of risk in Davidson County, there are several facilities and events in the county that have been identified as the likely primary targets. These are listed in **Table 5.40**.

TABLE 5.40: FACILITIES/EVENTS AT ELEVATED RISK OF TERROR THREAT IN DAVIDSON COUNTY

Critical Facility
Denton
None Identified
Lexington
Barbecue Festival (held annually, late October)
Davidson County Airport
Lexington Memorial Hospital
Midway
None Identified
Thomasville
Everybody's Day Festival (held annually, late September)
National Guard Armory (Thomasville)
Thomasville Medical Center
Wallburg
None Identified
Unincorporated Area
Linwood Switch Yard- Norfolk Southern Railroad
Public Water Supply System
Transcontinental Gas Plant

Source: Local Governments

5.18.3 Historical Occurrences

Although there have been no major terror events in Davidson County, there is some possibility that one could occur in the future as there have been incidents in the United States in the past and there are several facilities/events that could be potential targets.

5.18.4 Probability of Future Occurrences

Davidson County has had no recorded terrorist events. Due to no recorded incidents against the county, the probability of future occurrences of a terrorist attack is unlikely (less than 1 percent annual probability).

5.19 WILDFIRE

5.19.1 Background

A wildfire is any outdoor fire (i.e. grassland, forest, brush land) that is not under control, supervised, or prescribed.[31] Wildfires are part of the natural management of forest ecosystems, but may also be caused by human factors.

Nationally, over 80 percent of forest fires are started by negligent human behavior such as smoking in wooded areas or improperly extinguishing campfires. The second most common cause for wildfire is lightning. In North Carolina, a majority of fires are caused by debris burning.

There are three classes of wildland fires: surface fire, ground fire, and crown fire. A surface fire is the most common of these three classes and burns along the floor of a forest, moving slowly and killing or damaging trees. 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. Wildfires are usually signaled by dense smoke that fills the area for miles around.

Wildfire probability depends on local weather conditions, outdoor activities such as camping, debris burning, and construction, and the degree of public cooperation with fire prevention measures. Drought conditions and other natural hazards (such as tornadoes, hurricanes, etc.) increase the probability of wildfires by producing fuel in both urban and rural settings.

Many individual homes and cabins, subdivisions, resorts, recreational areas, organizational camps, businesses, and industries are located within high wildfire hazard areas. Furthermore, the increasing demand for outdoor recreation places more people in wildlands during holidays, weekends, and vacation periods. Unfortunately, wildland residents and visitors are rarely educated or prepared for wildfire events that can sweep through the brush and timber and destroy property within minutes.

Wildfires can result in severe economic losses as well. Businesses that depend on timber, such as paper mills and lumber companies, experience losses that are often passed along to consumers through higher prices and sometimes jobs are lost. The high cost of responding to and recovering from wildfires can deplete state resources and increase insurance rates. The economic impact of wildfires can also be felt in the tourism industry if roads and tourist attractions are closed due to health and safety concerns.

State and local governments can impose fire safety regulations on home sites and developments to help curb wildfire. Land treatment measures such as fire access roads, water storage, helipads, safety zones,

[31] Prescription burning, or "controlled burn," undertaken by land management agencies is the process of igniting fires under selected conditions, in accordance with strict parameters.

buffers, firebreaks, fuel breaks, and fuel management can be designed as part of an overall fire defense system to aid in fire control. Fuel management, prescribed burning, and cooperative land management planning can also be encouraged to reduce fire hazards.

5.19.2 Location and Spatial Extent

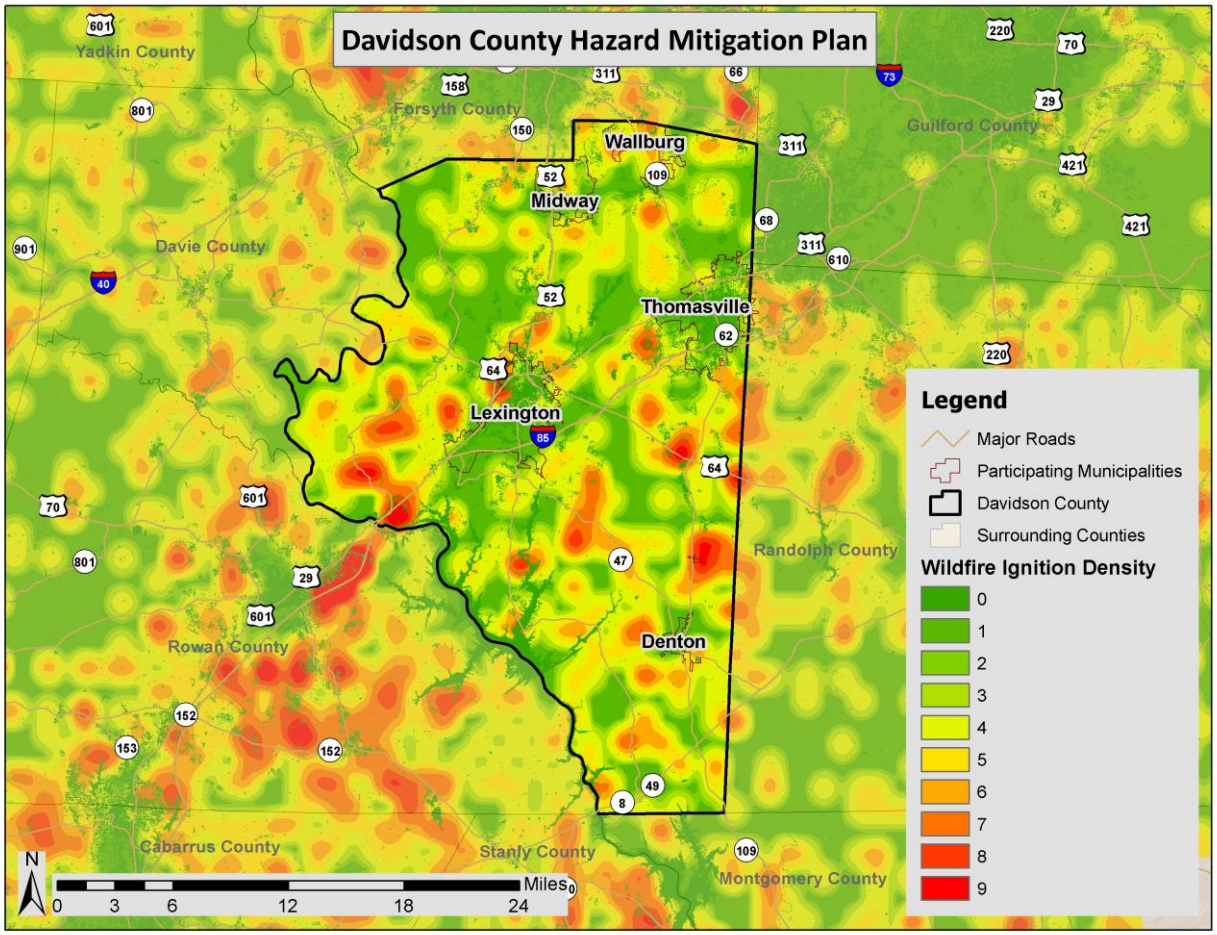
The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below gives an indication of historic location in Davidson County.

5.19.3 Historical Occurrences

Figure 5.18 shows the Wildfire Ignition Density in Davidson County based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[32]

[32] Southern Wildfire Risk Assessment, 2014.

FIGURE 5.18: WILDFIRE IGNITION DENSITY IN DAVIDSON COUNTY



Source: Southern Wildfire Risk Assessment

Based on data from the North Carolina Division of Forest Resources (NCDFR) from 2005 to 2014, Davidson County experienced an average of 39 wildfires annually which burn a combined average of 53.6 acres per year. The data indicates that most of these fires are small, averaging 1.4 acres per fire. **Table 5.41** lists the number of reported wildfire occurrences in the county between the years 2005 and 2014.

TABLE 5.41: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	27	53	47	36	16	40	48	30	47	46
Number of Acres	55.3	56.5	84.5	39.7	19	40.6	46.5	146.3	26.3	21.7

Source: North Carolina Division of Forest Resources

Since 2009, the NCDFR has also kept data on the number of structures damaged/destroyed. This information is presented in **Table 5.42**.

TABLE 5.42: STRUCTURES DAMAGED/DESTROYED BY WILDFIRE IN DAVIDSON COUNTY

Year	2009	2010	2011	2012	2013	2014
Davidson County						
Number of Structures	0	2	11	6	8	9
Cost of Damages to Structures	$0	$1,500	$13,600	$10,500	$14,600	$17,800

Source: North Carolina Division of Forest Resources

In addition, the North Carolina Department of Insurance collects fire data and reports it on an annual basis. This data is included in **Table 5.43** to supplement the NCDFR data.

TABLE 5.43: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

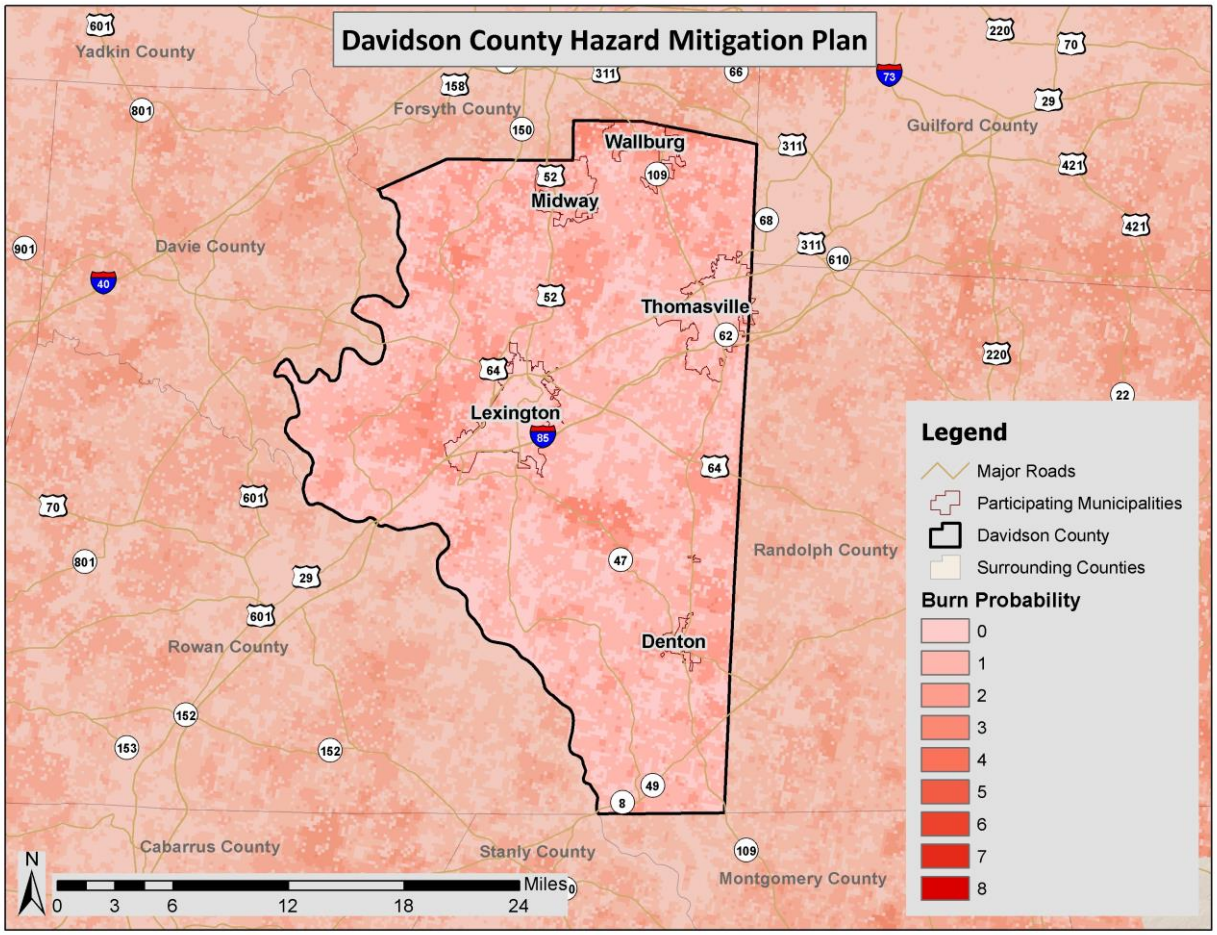
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	28	74	195	187	120	167	176	116	141	242
Property Loss	$0	$5,300	$650	$1,050	$1,550	$230	$1,940	$1,202	$10,700	$8,380

Source: North Carolina Department of Insurance

5.19.4 Probability of Future Occurrences

Wildfire events will be an ongoing occurrence in Davidson County. **Figure 5.19** shows that there is some probability a wildfire will occur throughout the county. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to Davidson County for future wildfire events is likely (10 to 100 percent annual probability).

FIGURE 5.19: BURN PROBABILITY IN DAVIDSON COUNTY



Source: Southern Wildfire Risk Assessment

5.20 CONCLUSIONS ON HAZARD RISK

The hazard profiles presented in this section were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

5.20.1 Hazard Extent

Table 5.44 describes the extent of each natural hazard identified for Davidson County. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE 5.44:EXTENT OF DAVIDSON COUNTY HAZARDS

Atmospheric Hazards	
Drought	Drought extent is defined by PDSI classifications which include Extremely Moist, Very Moist, Mid-Range, Moderate Drought, Severe Drought, and Extreme Drought classifications (pages 5:5-5:6). According to the PDSI classifications, the most severe drought condition is Extreme. Davidson County has received this ranking 3 times over the 14-year reporting period.
Extreme Heat	The extent of extreme heat can be defined by the maximum temperature reached. The highest temperature recorded in Davidson County is 107 degrees Fahrenheit (reported on July 29, 1952).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in Davidson County was 2.75 inches (reported on June 6, 1985 and May 3, 2003). It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5 (Table 5.11). The greatest classification of hurricanes to traverse directly through Davidson County was an unnamed storm in 1893 which reached a maximum wind speed of 65 knots in the county. Although the county is much more likely to be impacted by the remnants of a hurricane or tropical storm, it is possible that a storm can impact the county directly.
Lightning	According to the Vaisala flash density map (Figure 5.5), Davidson County is located in an area that experiences 3 to 5 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Thunderstorm Wind / High Wind	Thunderstorm extent is defined by the number of thunder events and wind speeds reported. The strongest recorded wind event in Davidson County was reported on September 23, 2003 and March 7, 2004, both at 65 knots (approximately 75 mph). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by tornado occurrences in the US provided by FEMA (Figure 5.6) as well as the Fujita/Enhanced Fujita Scale (Tables 5.18 and 5.19). The greatest magnitude reported in Davidson County was an EF2 (last reported on November 16, 2011). It should be noted that an EF5 tornado is possible.
Winter Storm and Freeze	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest 24-hour snowfall reported in the county was 20.3 inches on February 12, 1905. Due to unpredictable variations in snowfall throughout the county, extent totals will vary for each participating jurisdiction and reliable data on snowfall totals is not abundantly available. In addition, the lowest temperature reached in the county was -6 degrees Fahrenheit (January 21, 1985).
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale (Table 5.25) and the Modified Mercalli Intensity (MMI) scale (Table 5.26) and the distance of the epicenter from Davidson County. According to data provided by the National Geophysical Data Center, the greatest MMI to impact the county was IV (moderate) with a correlating Richter Scale measurement of approximately 4.7 (reported on November 30, 1973). The epicenter of this earthquake was located 334.0 km away.

Landslide	As noted above in the landslide profile, the landslide data provided by the North Carolina Geological survey is incomplete. This provides a challenge when trying to determine an accurate extent for the landslide hazard. However, when using the USGS landslide susceptibility index, extent can be measured with incidence, which is generally low throughout Davidson County. However, there are some very small areas of moderate incidence. Additionally, there is moderate susceptibility throughout the county.
Hydrologic Hazards	
Dam Failure	Dam failure extent is defined using the North Carolina Division of Energy, Mineral, and Land Resources criteria (Table 5.30). Of the 112 dams in Davidson County, 15 are classified as high-hazard.
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records available for Davidson County.
Flood	Flood extent can be measured by the amount of land and property in the floodplain as well as flood height and velocity. The amount of land in the floodplain accounts for 8.95 percent of the total land area in Davidson County. Flood depth and velocity are recorded via United States Geological Survey stream gages throughout the county. While a gage does not exist for each participating jurisdiction, there is one at or near many areas. The greatest peak discharge recorded for the county was reported on July 21, 1919. Water reached a discharge of 85,000 cubic feet per second. Although the stream gage height was not available for this event, the greatest gage height in the county at a different gage was recorded on December 4, 1962 at 28.40 feet. Additional peak discharge readings and gage heights are in the table below.

Location/Jurisdiction	Date	Peak Discharge (cfs)	Gage Height (ft)
Davidson County			
North Potts Creek at Linwood	5/28/1990	1,540	9.51
Leonard Creek near Bethesda	9/22/1979	531	4.59
Abbotts Creek at Lexington	9/25/1947	14,800	22.12
Flat Swamp Creek near Lexington	4/5/1957	1.020	24.91
Yadkin River at High Rock	7/21/1919	85,000	--
Cabin Creek near Jackson Hill	4/7/1964	1,050	22.89
Beaverdam Creek Trib near Denton	12/4/1962	1,800	28.40

Other Hazards	
Hazardous Materials Incident	According to USDOT PHMSA, the largest hazardous materials incident reported in the county was 36,000 LGA released on the railroad on July 11, 1978. It should be noted that larger events are possible.

Nuclear Accident	Although there is no history of a nuclear accident at the McGuire Power Plant, other events across the globe and in the United States in particular indicate that an event is possible. Since several national and international events were Level 7 events on the INES, the potential for a Level 7 event at McGuire is possible.
Terror Threat	There is no history of terror threats in Davidson County; however; it is possible that one of these events could occur. If this were to take place, the magnitude of the event could range on the scale of critical damage with many fatalities and injuries to the population.
Wildfire	Wildfire data was provided by the North Carolina Division of Forest Resources and is reported annually by county from 2005-2014. Analyzing the data indicates the following wildfire hazard extent for the county. • The greatest number of fires to occur in any year was 53 in 2006. • The greatest number of acres to burn in a single year occurred in 2012 when 146.3 acres were burned. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.

5.20.2 Priority Risk Index

In order to draw some meaningful planning conclusions on hazard risk for Davidson County, the results of the hazard profiling process were used to generate countywide hazard classifications according to a "Priority Risk Index" (PRI). The purpose of the PRI is to categorize and prioritize all potential hazards for Davidson County as high, moderate, or low risk. Combined with the asset inventory and quantitative vulnerability assessment provided in the next section, the summary hazard classifications generated through the use of the PRI allows for the prioritization of those high hazard risks for mitigation planning purposes, and more specifically, the identification of hazard mitigation opportunities for the jurisdictions in Davidson County to consider as part of their proposed mitigation strategy.

The prioritization and categorization of identified hazards for Davidson County is based principally on the PRI, a tool used to measure the degree of risk for identified hazards in a particular planning area. The PRI is used to assist the Davidson County Hazard Mitigation Planning Team in gaining consensus on the determination of those hazards that pose the most significant threat to the county based on a variety of factors. The PRI is not scientifically based, but is rather meant to be utilized as an objective planning tool for classifying and prioritizing hazard risks in Davidson County based on standardized criteria.

The application of the PRI results in numerical values that allow identified hazards to be ranked against one another (the higher the PRI value, the greater the hazard risk). PRI values are obtained by assigning varying degrees of risk to five categories for each hazard (probability, impact, spatial extent, warning time, and duration). Each degree of risk has been assigned a value (1 to 4) and an agreed upon weighting factor[33], as summarized in **Table 5.45**. To calculate the PRI value for a given hazard, the assigned risk value for each category is multiplied by the weighting factor. The sum of all five categories equals the final PRI value, as demonstrated in the example equation below:

[33] The Hazard Mitigation Planning Team, based upon any unique concerns or factors for the planning area, may adjust the PRI weighting scheme during future plan updates.

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

According to the weighting scheme and point system applied, the highest possible value for any hazard is 4.0. When the scheme is applied for Davidson County, the highest PRI value is 2.8 (thunderstorm/high wind). Prior to being finalized, PRI values for each identified hazard were reviewed and accepted by the members of the Hazard Mitigation Planning Team.

TABLE 5.45: PRIORITY RISK INDEX FOR DAVIDSON COUNTY

PRI Category	Degree of Risk			Assigned Weighting Factor
	Level	Criteria	Index Value	
Probability	Unlikely	Less than 1% annual probability	1	30%
	Possible	Between 1 and 10% annual probability	2	
	Likely	Between 10 and 100% annual probability	3	
	Highly Likely	100% annual probability	4	
Impact	Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.	1	30%
	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple deaths/injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.	3	
	Catastrophic	High number of deaths/injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
Spatial Extent	Negligible	Less than 1% of area affected	1	20%
	Small	Between 1 and 10% of area affected	2	
	Moderate	Between 10 and 50% of area affected	3	
	Large	Between 50 and 100% of area affected	4	
Warning Time	More than 24 hours	Self explanatory	1	10%
	12 to 24 hours	Self explanatory	2	
	6 to 12 hours	Self explanatory	3	
	Less than 6 hours	Self explanatory	4	
Duration	Less than 6 hours	Self explanatory	1	10%
	Less than 24 hours	Self explanatory	2	
	Less than one week	Self explanatory	3	
	More than one week	Self explanatory	4	

5.20.3 Priority Risk Index Results

Table 5.46 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this section, as well as input from the Hazard Mitigation Planning Team. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE 5.46: SUMMARY OF PRI RESULTS FOR DAVIDSON COUNTY

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Atmospheric Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Extreme Heat	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Hailstorm	Highly Likely	Minor	Moderate	6 to 12 hours	Less than 6 hours	**2.5**
Hurricane and Tropical Storm	Likely	Limited	Large	More than 24 hours	Less than 24 hours	**2.6**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Thunderstorm / High Wind	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Tornado	Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.7**
Winter Storm and Freeze	Highly Likely	Limited	Moderate	More than 24 hours	Less than 1 week	**2.8**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Landslide	Unlikely	Minor	Small	Less than 6 hours	Less than 6 hours	**1.5**
Hydrologic Hazards						
Dam and Levee Failure	Unlikely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.1**
Erosion	Possible	Minor	Small	More than 24 hours	More than 1 week	**1.8**
Flood	Highly Likely	Minor	Moderate	6 to 12 hours	Less than 1 week	**2.7**
Other Hazards						
Hazardous Materials Incident	Highly Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.8**
Nuclear Accident	Unlikely	Limited	Moderate	6 to 12 hours	Less than 1 week	**2.1**
Terror Threat	Unlikely	Critical	Small	Less than 6 hours	Less than 24 hours	**2.2**
Wildfire	Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.3**

5.21 FINAL DETERMINATIONS

The conclusions drawn from the hazard profiling process for Davidson County, including the PRI results and input from the Hazard Mitigation Planning Team, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table 5.47**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of Davidson County. A more

quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment*. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

TABLE 5.47: CONCLUSIONS ON HAZARD RISK FOR DAVIDSON COUNTY

HIGH RISK	Thunderstorm / High Wind Winter Storm and Freeze Hazardous Materials Incident Tornado Flood
MODERATE RISK	Hurricane and Tropical Storm Drought Hailstorm Lightning Wildfire
LOW RISK	Terror Threat Extreme Heat Dam and Levee Failure Nuclear Accident Earthquake Erosion Landslide

SECTION 6
VULNERABILITY ASSESSMENT

This section identifies and quantifies the vulnerability of the jurisdictions within Davidson County to the significant hazards identified in the previous sections (*Hazard Identification and Profiles*). It consists of the following subsections:

- 6.1 Overview
- 6.2 Methodology
- 6.3 Explanation of Data Sources
- 6.4 Asset Inventory
- 6.5 Vulnerability Assessment Results
- 6.6 Conclusions on Hazard Vulnerability

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44 CFR Requirement
44 CFR Part 201.6(c)(2)(ii): The risk assessment shall include a description of the jurisdiction's vulnerability to the hazards described in paragraph (c)(2)(i) of this section. The description shall include an overall summary of each hazard and its impact on the community. The plan should describe vulnerability in terms of: (A) The types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard areas; (B) An estimate of the potential losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate; (C) Providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

6.1 OVERVIEW

This section builds upon the information provided in Section 4: *Hazard Identification and* Section 5*: Hazard Profiles* by identifying and characterizing an inventory of assets in Davidson County. In addition, the potential impact and expected amount of damages caused to these assets by each identified hazard event is assessed. The primary objective of the vulnerability assessment is to quantify exposure and the potential loss estimates for each hazard. In doing so, Davidson County and the participating jurisdictions may better understand their unique risks to identified hazards and be better prepared to evaluate and prioritize specific hazard mitigation actions.

This section begins with an explanation of the methodology applied to complete the vulnerability assessment, followed by a summary description of the asset inventory as compiled for jurisdictions in Davidson County. The remainder of this section focuses on the results of the assessment conducted.

6.2 METHODOLOGY

This vulnerability assessment was conducted using three distinct methodologies: (1) A stochastic risk assessment; (2) a geographic information system (GIS)-based analysis; and (3) a risk modeling software analysis. Each approach provides estimates for the potential impact of hazards by using a common,

systematic framework for evaluation, including historical occurrence information provided in the *Hazard Identification* and *Hazard Profiles* sections. A brief description of the three different approaches is provided on the following pages.

6.2.1 Stochastic Risk Assessment

The stochastic risk assessment methodology was applied to analyze hazards of concern that were outside the scope of hazard risk models and the GIS-based risk assessment. This involves the consideration of annualized loss estimates and impacts of current and future buildings and populations. Annualized loss is the estimated long-term weighted average value of losses to property in any single year in a specified geographic area (i.e., municipal jurisdiction or county). This methodology is applied primarily to hazards that do not have geographically-definable boundaries and are therefore excluded from spatial analysis through GIS. A stochastic risk methodology was used for the following hazards:

- Dam Failure
- Drought
- Erosion
- Extreme Heat
- Hailstorm
- Lightning
- Terror Threat
- Thunderstorm Wind / High Wind
- Tornado
- Winter Storm and Freeze

With the exception of Dam Failure, Erosion, and Terror Threat, the hazards listed above are considered atmospheric and have the potential to affect all current and future buildings and all populations. **Table 6.1** provides information about all improved property in Davidson County that is vulnerable to these hazards. For all hazards, annualized loss estimates were determined using the best available data on historical losses from sources including NOAA's National Climatic Data Center records, county and municipal hazard mitigation plans, and local knowledge. Annualized loss estimates were generated by totaling the amount of property damage over the period of time for which records were available, and calculating the average annual loss. Given the standard weighting analysis, losses can be readily compared across hazards providing an objective approach for evaluating mitigation alternatives.

For the dam failure[1], erosion, and terror threat, no data with historical property damages was available. Therefore a detailed vulnerability assessment could not be completed for these hazards at this time.

The results for these hazards are found at the end of this section in **Table 6.16**.

[1] As noted in Section 5: *Hazard Profiles*, dam failure could be catastrophic to structures and populations in the inundation area. However, due to lack of data, no additional analysis was performed. Further, local USACE and NCDENR also complete separate dam failure plans to identify risk and response measures.

6.2.2 GIS-Based Analysis

Other hazards have specified geographic boundaries that permit additional analysis using Geographic Information Systems (GIS). These hazards include:

- Flood
- Hazardous Material Incident
- Landslide
- Nuclear Accident
- Wildfire

The objective of the GIS-based analysis was to determine the estimated vulnerability of critical facilities and populations for the identified hazards in Davidson County using best available geospatial data. Digital data was collected from local, regional, state, and national sources for hazards and buildings. This included local tax assessor records for individual parcels and buildings and geo-referenced point locations for identified assets (critical facilities and infrastructure, special populations, etc.) when available. ESRI® ArcGIS™ 10.0 was used to assess hazard vulnerability utilizing digital hazard data, as well as local building data. Using these data layers, hazard vulnerability can be quantified by estimating the assessed building value for parcels and/or buildings determined to be located in identified hazard areas. The results of the analysis provided an estimate of the number of parcels, buildings, and critical facilities, as well as the estimated value of those buildings determined to be potentially at risk to the hazards with delineable geographic hazard boundaries.

6.2.3 Risk Modeling Software Analysis

A risk modeling software was used for the following hazards:

- Earthquake
- Hurricane and Tropical Storm

There are several models that exist to model hazards. Hazus-MH was used in this vulnerability assessment to address the aforementioned hazards.

Hazus-MH

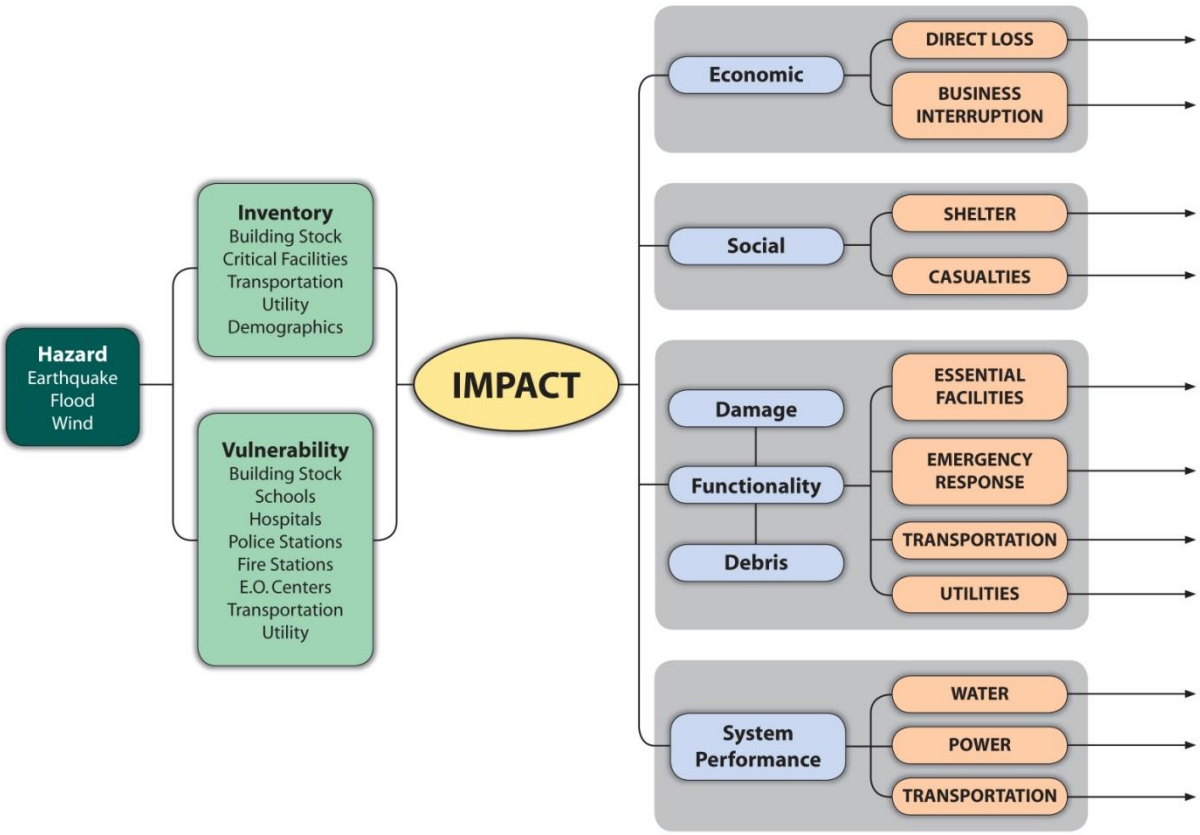
Hazus-MH ("Hazus") is a standardized loss estimation software program developed by FEMA. It is built upon an integrated GIS platform to conduct analysis at a regional level (i.e., not on a structure-by-structure basis). The Hazus risk assessment methodology is parametric, in that distinct hazard and inventory parameters (e.g., wind speed and building types) can be modeled using the software to determine the impact (i.e., damages and losses) on the built environment.

The Davidson County Risk Assessment utilized Hazus-MH to produce hazard damage loss estimations for hazards for the planning area. At the time this analysis

was completed, Hazus-MH 2.1 was used to estimate potential damages from hurricane winds earthquake hazards using Hazus-MH methodology. Although the program can also model losses for flood and storm surge, it was not used in this Risk Assessment.

Figure 6.1 illustrates the conceptual model of the Hazus-MH methodology.

FIGURE 6.1: CONCEPTUAL MODEL OF HAZUS-MH METHODOLOGY



Hazus-MH is capable of providing a variety of loss estimation results. In order to be consistent with other hazard assessments, annualized losses are presented when possible. Some additional results based on location-specific scenarios may also be presented to provide a complete picture of hazard vulnerability.

Loss estimates provided in this vulnerability assessment are based on best available data and methodologies. The results are an approximation of risk. These estimates should be used to understand relative risk from hazards and potential losses. Uncertainties are inherent in any loss estimation methodology, arising in part from incomplete scientific knowledge concerning natural hazards and their effects on the built environment. Uncertainties also result from approximations and simplifications that are necessary for a comprehensive analysis (e.g., incomplete inventories, non-specific locations, demographics, or economic parameters).

All conclusions are presented in “Conclusions on Hazard Vulnerability” at the end of this section.

6.3 EXPLANATION OF DATA SOURCES

Earthquake

Hazus-MH 2.1 (as described above) was used to assess earthquake vulnerability. A level 1, probabilistic scenario to estimate annualized loss was utilized. In this scenario, several return periods (events of varying intensities) are run to determine annualized loss. Default Hazus earthquake damage functions and methodology were used to determine the probability of damage. Results are calculated at the 2000 U.S. Census tract level in Hazus and presented at the county level.

Flood

FEMA Digital Flood Insurance Rate Maps (DFIRMs) were used to determine flood vulnerability. DFIRM data can be used in ArcGIS for mapping purposes and they identify several features including floodplain boundaries and base flood elevations. Identified areas on the DFIRM represent some features of Flood Insurance Rate Maps including the 100-year flood areas (1.0-percent annual chance flood), and the 500-year flood areas (0.2-percent annual chance flood). For the vulnerability assessment, local parcel data and critical facilities were overlaid on the 100-year floodplain areas and 500-year floodplain areas. It should be noted that such an analysis does not account for building elevation.

Hurricane and Tropical Storm Wind

Hazus-MH 2.1 (as described above) was used to assess wind vulnerability. For the hurricane wind analysis, a probabilistic scenario was created to estimate the annualized loss damage and probable peak wind speeds in Davidson County. Default Hazus wind speed data, damage functions, and methodology were used in to determine the probability of damage for 50-, 100-, 500-, and 1,000-year frequency events (also known as return periods) in the scenario. Results are calculated in Hazus at the 2000 U.S. Census tract level and presented at the county and municipal level.

Hazardous Materials Incident

For the fixed hazardous materials incident analysis, Toxic Release Inventory (TRI) data was used. The Toxics Release Inventory is a publicly available database from the federal Environmental Protection Agency (EPA) that contains information on toxic chemical releases and other waste management activities reported annually by certain covered industry groups as well as federal facilities. This inventory was established under the Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA) and expanded by the Pollution Prevention Act of 1990. Each year, facilities that meet certain activity thresholds must report their releases and other waste management activities for listed toxic chemicals to EPA and to their state or tribal entity. A facility must report if it meets the following three criteria:

- The facility falls within one of the following industrial categories: manufacturing; metal mining; coal mining; electric generating facilities that combust coal and/or oil; chemical wholesale distributors; petroleum terminals and bulk storage facilities; RCRA Subtitle C treatment, storage, and disposal (TSD) facilities; and solvent recovery services;
- Has 10 or more full-time employee equivalents; and
- Manufactures or processes more than 25,000 pounds or otherwise uses more than 10,000 pounds of any listed chemical during the calendar year. Persistent, bioaccumulative, and toxic (PBT) chemicals are subject to different thresholds of 10 pounds, 100 pounds, or 0.1 grams depending on the chemical.

For the mobile hazardous materials incident analysis, transportation data including major highways and railroads were obtained from the North Carolina Department of Transportation. This data is ArcGIS compatible, lending itself to buffer analysis to determine risk.

Landslide

The USGS Landslide Susceptibility Index was used to determine vulnerability to landslides. The risk levels of low, moderate, and high correspond to the Landslide Susceptibility Index where "Low" indicates a zone of Low Incident/High Susceptibility, "Mod" indicates a zone of Moderate Incident/High Susceptibility, and "High" indicates a zone of High Landslide Susceptibility. For the vulnerability assessment, local parcel data and critical facilities were overlaid on the moderate and high incidence areas.

Nuclear Accident

The data used to determine vulnerability to a nuclear accident in Davidson County is based on the location of the McGuire Nuclear Power Station and buffer radii recommended by the Nuclear Regulatory Commission for emergency management planning in the event of a nuclear accident.

Wildfire

The data used to determine vulnerability to wildfire in Davidson County is based on GIS data called the Southern Wildfire Risk Assessment (SWRA). This data is available on the Southern Wildfire Risk Assessment website and can be downloaded and imported into ArcGIS. A specific layer, known as "Wildland Urban Interface Risk Index" (WUIRI) was used to determine vulnerability of people and property. The WUIRI is presented on a scale of 0 to -9. It combines data on housing density with the data on the impact and likelihood of a wildfire occurring in a specific area. The primary purpose of the data is to highlight areas of concern that may be conducive to mitigation actions. Due to the assumptions made, it is not a true probability. However, it does provide a comparison of risk throughout the region.

6.4 ASSET INVENTORY

An inventory of geo-referenced assets within Davidson County and its jurisdictions was compiled in order to identify and characterize those properties potentially at risk to the identified hazards[2]. By understanding the type and number of assets that exist and where they are located in relation to known hazard areas, the relative risk and vulnerability for such assets can be assessed. Under this assessment, two categories of physical assets were created and then further assessed through GIS analysis. These are presented below in Section 6.4.1.

6.4.1 Physical and Improved Assets

The two categories of physical assets consist of:

1. Improved Property: Includes all improved properties in Davidson County according to local parcel data provided by the county. The information has been expressed in terms of the

[2] While potentially not all-inclusive for the jurisdictions in Davidson County, "georeferenced" assets include those assets for which specific location data is readily available for connecting the asset to a specific geographic location for purposes of GIS analysis.

number of parcels and total assessed value of improvements (buildings) that may be exposed to the identified hazards. In addition, building footprint data was available for all jurisdictions and it was used to improve the overall assessment by providing an accurate assessment of how many buildings are located in hazard areas. However, it should be noted that building footprint data from all jurisdictions except has not been updated since 2009, so it likely underestimates building counts.

2. Critical Facilities: Critical facilities vary by jurisdiction and the critical facilities provided by each jurisdiction are used in this section. It should be noted that this listing is not all-inclusive for assets located in the county, and it is anticipated that it may be expanded or adjusted during future plan updates as more geo-referenced data becomes available for use in GIS analysis.

The following tables provide a detailed listing of the geo-referenced assets that have been identified for inclusion in the vulnerability assessment Davidson County.

Table 6.1 lists the number of parcels, total value of parcels, total number of parcels with improvements, and the total assessed value of improvements for participating areas of Davidson County (study area of vulnerability assessment).[3]

TABLE 6.1: IMPROVED PROPERTY IN DAVIDSON COUNTY

Location	Number of Parcels	Total Assessed Value of Parcels	Estimated Number of Buildings	Total Estimated Value of Improvements[4]
Denton	985	$92,346,970	1,686	$70,248,830
Lexington	9,213	$1,242,198,370	13,099	$882,010,730
Midway	2,232	$309,140,740	4,104	$215,022,020
Thomasville	11,128	$1,470,949,820	17,806	$1,052,333,910
Wallburg	1,304	$196,086,180	2,545	$135,034,540
Unincorporated Area	65,688	$9,118,379,433	122,776	$5,622,583,883
DAVIDSON COUNTY TOTAL	**90,550**	**$12,429,101,513**	**162,016**	**$7,977,233,913**

Source: Davidson County GIS Department

Table 6.2 lists the fire stations, police stations, EMS/rescue stations, medical care facilities, schools, and other critical facilities located in Davidson County. These facilities were identified as primary critical facilities in that they are necessary to maintain government functions and protect the life, health, safety, and welfare of citizens. These facilities were geospatially mapped and used as the basis for further geographic analysis of the hazards that could potentially affect critical facilities. All critical facility information was provided by local governments and the Davidson County GIS department.

In addition, **Figure 6.2** shows the locations of the primary critical facilities in Davidson County. **Table 6.17**, near the end of this section, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. As noted previously, this list is not all-inclusive and only includes information provided by local governments.

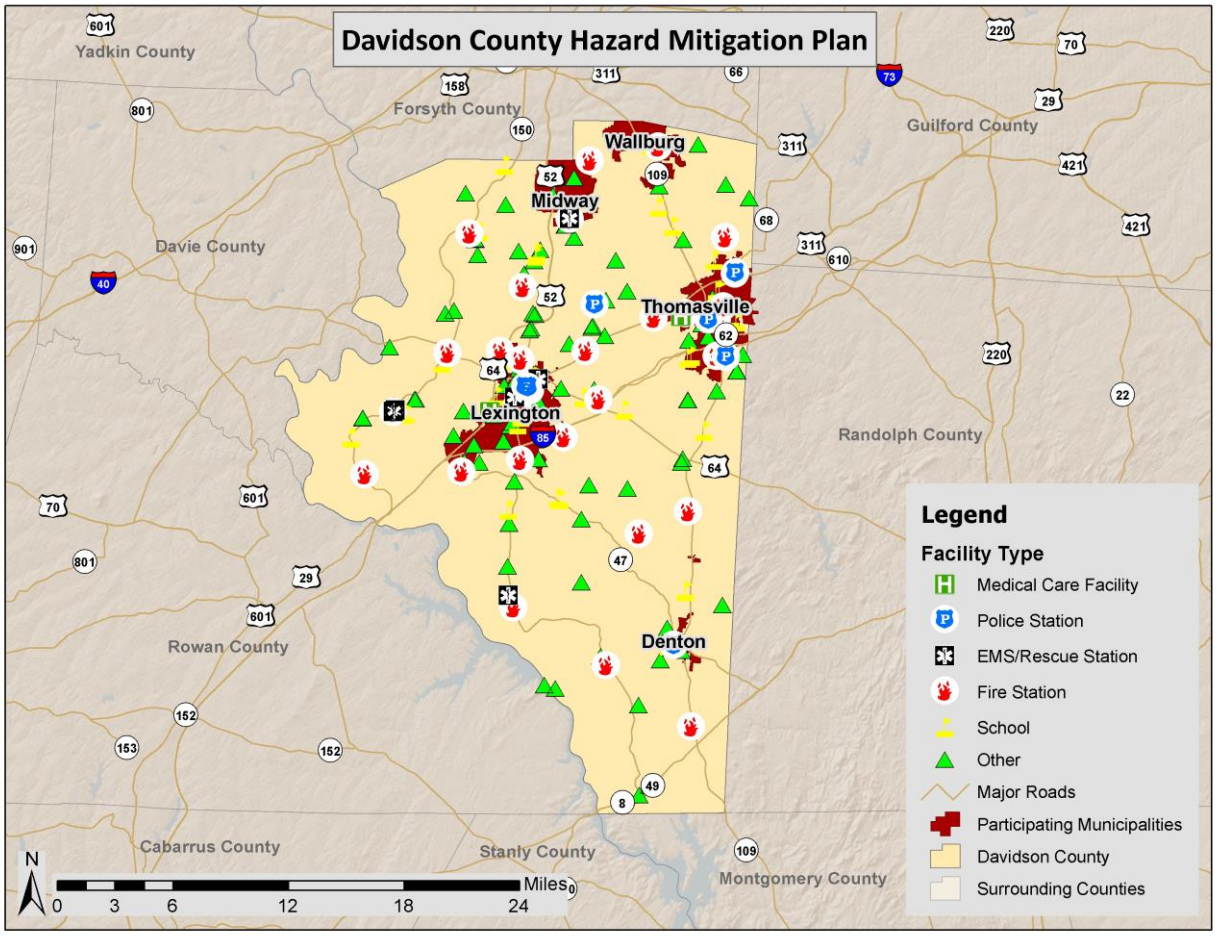
[3] Total assessed values for improvements is based on tax assessor records as joined to digital parcel data. This data does not include dollar figures for tax-exempt improvements such as publicly-owned buildings and facilities. It should also be noted that, due to record keeping, some duplication is possible thus potentially resulting in an inflated value exposure for an area.
[4] Building value for each jurisdiction is based on the dollar value of parcels with a building value greater than zero.

TABLE 6.2: CRITICAL FACILITY INVENTORY IN DAVIDSON COUNTY

Location	Fire Stations	Police Stations	EMS/Rescue Stations	Medical Care Facilities	Schools	Other
Denton	1	1	2	0	1	3
Lexington	4	2	2	1	6	27
Midway	1	0	1	0	1	2
Thomasville	5	2	2	1	8	12
Wallburg	1	0	0	0	1	1
Unincorporated Area	19	2	3	0	22	70
DAVIDSON COUNTY TOTAL	**31**	**7**	**10**	**2**	**39**	**115**

Source: Local Governments

FIGURE 6.2: CRITICAL FACILITY LOCATIONS IN DAVIDSON COUNTY



Source: Local Governments

6.4.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in Davidson County that are potentially at risk to these hazards.

Table 6.3 lists the population by jurisdiction according to U.S. Census 2010 population estimates. The total population in Davidson County according to Census data is 162,878 persons. Additional population estimates are presented in Section 3: *Community Profile*.

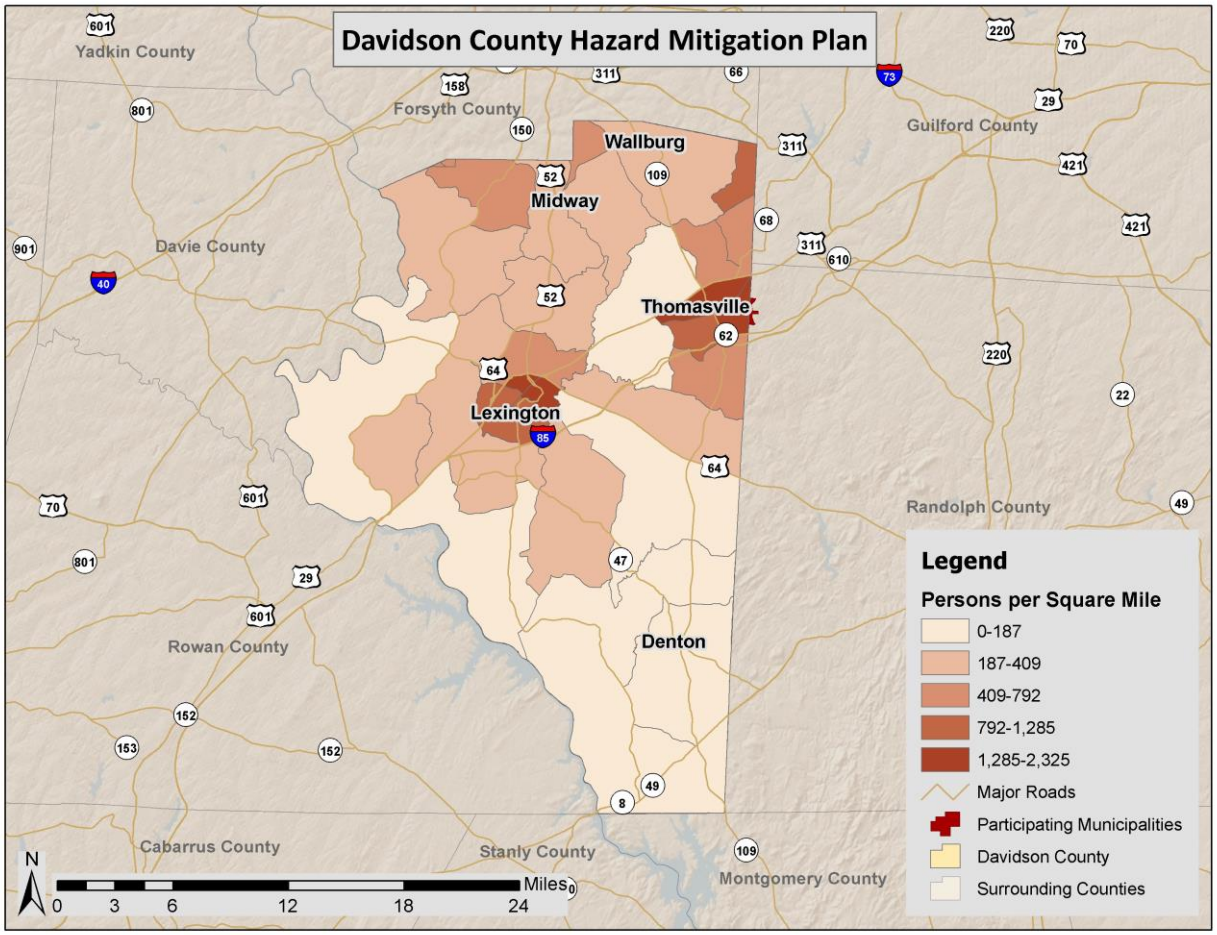
TABLE 6.3: TOTAL POPULATION IN DAVIDSON COUNTY

Location	Total 2010 Population
Denton	1,636
Lexington	18,931
Midway	4,679
Thomasville	26,757
Wallburg	3,047
Unincorporated Area	107,828
DAVIDSON COUNTY TOTAL	**162,878**

Note: The total population of Thomasville includes population residing in Randolph County.
Source: United States Census 2010

In addition, **Figure 6.3** illustrates the population density by census tract as it was reported by the U.S. Census Bureau in 2010.

FIGURE 6.3: POPULATION DENSITY IN DAVIDSON COUNTY



Source: U.S. Census Bureau, 2010

6.4.3 Development Trends and Changes in Vulnerability

Since the previous hazard mitigation plan was approved in 2010, Davidson County has experienced limited growth and development. **Table 6.4** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE 6.4: BUILDING COUNTS FOR DAVIDSON COUNTY

Jurisdiction	Total Housing Units (2013)	Units Built 2010 or later	% Building Stock Built Post-2010
Denton	808	0	0.0%
Lexington	8,711	0	0.0%
Midway	2,157	43	2.0%
Thomasville	11,887	19	0.2%
Wallburg	1,355	0	0.0%

Jurisdiction	Total Housing Units (2013)	Units Built 2010 or later	% Building Stock Built Post-2010
Unincorporated Area	47,638	352	0.2%
DAVIDSON COUNTY TOTAL	**72,556**	**414**	**0.6%**

Source: United States Census Bureau

Table 6.5 shows population growth estimates for the county and municipalities from 2010 to 2013 based on the U.S. Census Annual Estimates of Resident Population.

TABLE 6.5: POPULATION GROWTH FOR DAVIDSON COUNTY

Jurisdiction	Population Estimates (as of July 1)				% Change 2010-2013
	2010	2011	2012	2013	
Denton	1,661	1,603	1,713	1,640	-1.3%
Lexington	19,155	19,082	19,038	18,981	-0.9%
Midway	4,666	4,673	4,694	4,698	0.7%
Thomasville	26,319	26,507	26,760	26,983	2.5%
Wallburg	3,017	3,022	3,048	3,067	1.7%
Unincorporated Area	105,820	106,837	107,375	107,606	1.7%
DAVIDSON COUNTY TOTAL	**160,638**	**161,724**	**162,628**	**162,975**	**1.5%**

Note: July 1 population estimates were used in this table to allow comparison of annual population counts (April 1 Census estimates were used for all other population counts throughout the plan which is why the counts may differ).
Source: United States Census Bureau

Based on the data above, there has been a low rate of residential development in the county since 2010. However, Midway experienced a slightly higher rate of development compared to the rest of the county, resulting in an increased number of structures that are vulnerable to the potential impacts of the identified hazards. Additionally, there has been some population growth in several of the municipalities and the unincorporated area. Since the population has increased in these jurisdictions, there is now a greater number of people exposed to the identified hazards. Therefore, development and population growth have impacted the county's vulnerability since the previous local hazard mitigation plan was approved and there has been a slight increase in the overall vulnerability.

It is also important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains, moderate landside susceptibility areas, high wildfire risk areas, primary and secondary hazardous materials buffers, or McGuire Nuclear Power Plant's 50-mile buffer.

6.5 VULNERABILITY ASSESSMENT RESULTS

As noted earlier, only hazards with a specific geographic boundary, modeling tool, or sufficient historical data allow for further analysis. Those results are presented here. All other hazards are assumed to impact the entire planning region (drought, extreme heat, hailstorm, lightning, thunderstorm/high wind, tornado, and winter storm and freeze) or, due to lack of data, analysis would not lead to credible results (dam and levee failure, erosion, and terror threat). The total region exposure, and thus risk, was presented in **Table 6.1**.

The annualized loss estimate for all hazards is presented at the end of this section in **Table 6.16.**

The hazards presented in this subsection include: hurricane and tropical storm winds, earthquake, landslide, flood, hazardous materials incident, nuclear accident, and wildfire.

6.5.1 Hurricane and Tropical Storm

Historical evidence indicates that Davidson County has some risk to the hurricane and tropical storm hazard. There have been five disaster declarations due to hurricanes (Hurricane Hugo, Hurricane Fran, Hurricane Floyd, Hurricane Isabel, and Hurricane Ivan) in the county. Several tracks have come near or traversed through Davidson County, as shown and discussed in Section 5: *Hazard Profiles*.

Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, high winds, and precipitation, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore only hurricane winds are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to the hurricane and tropical storm hazard. Hazus-MH 2.1 was used to determine annualized losses for the county as shown below in **Table 6.6.** In the comparative annualized loss analysis at the end of this section, only losses to buildings are reported in order to best match annualized losses reported for other hazards. Hazus-MH reports losses at the U.S. Census tract level, so determining participating jurisdiction losses was not possible.

TABLE 6.6: ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$637,00	$148,000	$5,000	$790,000

Source: Hazus-MH 2.1

In addition, probable peak wind speeds were calculated in Hazus. These are shown below in **Table 6.7.**

TABLE 6.7: PROBABLE PEAK HURRICANE/TROPICAL STORM WIND SPEEDS (MPH)

Location	50-year event	100-year event	500-year event	1,000-year event
Denton	64.7	74.2	94.4	101.4
Lexington	63.8	73.3	92.6	99.7
Midway	62.1	71.7	91.2	98.0
Thomasville	63.6	72.9	92.9	99.3
Wallburg	62.5	71.9	91.3	98.0
Unincorporated Area	64.7	74.2	94.4	101.4
MAXIMUM WIND SPEED REPORTED	**64.7**	**74.2**	**94.4**	**101.4**

Source: Hazus-MH 2.1

Social Vulnerability

Given equal susceptibility across Davidson County, it is assumed that the total population is at risk to the hurricane and tropical storm hazard.

Critical Facilities

Given equal vulnerability across Davidson County, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among other factors. Determining individual building response is beyond the scope of this plan. However, this plan will consider mitigation actions for vulnerable structures, including critical facilities, to reduce the impacts of the hurricane wind hazard. A list of specific critical facilities and their associated risk can be found in **Table 6.17** at the end of this section.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in Davidson County. Hurricane events can cause substantial damage in their wake including fatalities, extensive debris clean-up, and extended power outages.

6.5.2 Earthquake

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the annualized loss for the county. The results of the analysis reported at the U.S. Census tract level do not make it feasible to estimate losses at the jurisdiction level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to building damage (structural and non-structural), contents, and inventory. However, like the analysis for hurricanes, the comparative annualized loss figures at the end of this section only utilize building losses in order to provide consistency with other hazards. **Table 6.8** summarizes the findings.

TABLE 6.8: ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Building Loss	Non-Structural Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$39,000	$96,000	$28,000	$2,000	$165,000

Source: Hazus-MH 2.1

Social Vulnerability

It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities

The Hazus probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. A list of individual critical facilities and their risk can be found in **Table 6.17**.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in Davidson County. Minor earthquakes may rattle dishes and cause minimal damage while stronger earthquakes will result in structural damage as indicated in the Hazus scenario above. Impacts of earthquakes include debris clean-up, service disruption and, in severe cases, fatalities due to building collapse. Specific vulnerabilities for assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available. Furthermore, mitigation actions to address earthquake vulnerability will be considered.

6.5.3 Landslide

In order to complete the vulnerability assessment for landslides in Davidson County, GIS analysis was used. The potential dollar value of exposed land and property total can be determined using the USGS Landslide Susceptibility Index (detailed in Section 5: *Hazard Profiles*), county-level tax parcel and building footprint data, and GIS analysis. **Table 6.9** presents the potential at-risk property where available. Almost the entire county is located outside of high and moderate incidence areas as determined by the USGS landslide data. However, there is a small area in the northern part of the county that is considered to have moderate landslide incidence. Additionally, all areas of the county have moderate landslide susceptibility. Typically, an analysis is run to determine which parcels/buildings are located within the high and moderate incidence areas, but since no high incidence areas exist in the county, only an analysis of moderate incidence areas was carried out.

TABLE 6.9: TOTAL POTENTIAL AT-RISK PARCELS/BUILDINGS FOR THE LANDSLIDE HAZARD

Location	Number of Parcels At Risk	Number of Improvements At Risk	Total Value of Improvements At Risk ($)
Incidence Level	**Moderate**		
Denton	0	0	$0
Lexington	0	0	$0
Midway	0	0	$0
Thomasville	0	0	$0
Wallburg	13	18	$1,792,950
Unincorporated Area	1,205	1,310	$147,609,110
DAVIDSON COUNTY TOTAL	**1,218**	**1,328**	**$149,402,060**

Source: United States Geological Survey

Social Vulnerability

Given low incidence and moderate susceptibility across most of Davidson County, it is assumed that much of the total population is at a low risk to landslides.

Critical Facilities

No critical facilities are located in a moderate incidence area. However, all critical facilities are located in a moderate susceptibility area. A list of specific critical facilities and their associated risk can be found in **Table 6.17** at the end of this section.

In conclusion, a landslide has the potential to impact some existing and future buildings, facilities, and populations in Davidson County, though most areas are at a very low risk. Due to a variety of factors such as steep slopes and modified slopes, hilly areas of the county bear a greater risk than flat areas. Specific vulnerabilities for Davidson County assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available.

6.5.4 Flood

Historical evidence indicates that Davidson County is susceptible to flood events. A total of 42 flood events have been reported by the National Climatic Data Center, resulting in $837,382 (2014 dollars) in property damage and 1 fatality. On an annualized level, these damages amounted to $46,533 for Davidson County.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with local tax assessor records for each of the Davidson County municipalities. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within an identified floodplain. **Table 6.10** presents the potential at-risk property. Both the number of parcels/buildings and the approximate value are presented.

TABLE 6.10: ESTIMATED EXPOSURE OF PARCELS/BUILDINGS TO THE FLOOD HAZARD

Location	1.0-percent ACF			0.2-percent ACF		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[5]	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[6]
Denton	0	0	$0	0	0	$0
Lexington	653	193	$119,474,140	335	100	$77,513,480
Midway	45	0	$0	3	140	$39,860
Thomasville	626	208	$134,172,600	493	0	$115,462,950
Wallburg	57	15	$5,806,140	34	9	$3,460,860
Unincorporated Area	7,424	1,695	$782,407,763	2,120	208	$326,661,660
DAVIDSON COUNTY TOTAL	**8,805**	**2,111**	**$1,041,860,643**	**2,985**	**457**	**$523,138,810**

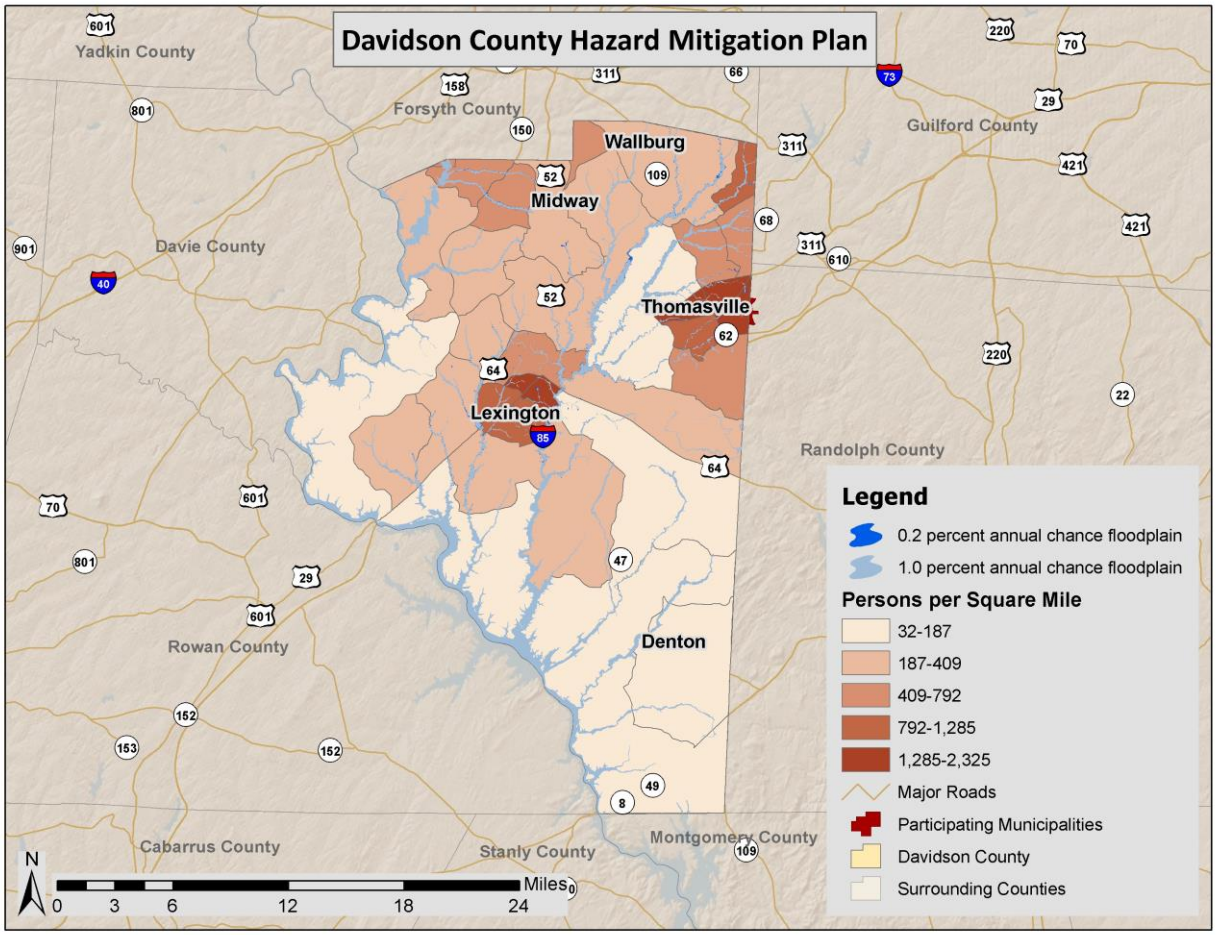
Source: Federal Emergency Management Agency DFIRM

Social Vulnerability

U.S. Census 2010 population at the tract level was used for analysis to determine where areas of high population concentration intersect with flood prone areas in the county. **Figure 6.4** is presented to gain a better understanding of the at-risk population.

[5] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-percent annual chance floodplain, since building footprints were not associated with dollar value data.
[6] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 0.2-percent annual chance floodplain, since building footprints were not associated with dollar value data.

FIGURE 6.4 : POPULATION DENSITY NEAR FLOODPLAINS



Source: FEMA DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are 6 critical facilities located in the 1.0-percent annual chance floodplain. Two of these facilities are dams and two are water intake facilities which in some cases are necessarily located within the floodplain. The remaining two facilities are a gas regulator and a power station. There are no critical facilities located in the 0.2-percent annual chance floodplain based on FEMA DFIRM boundaries and GIS analysis. (As previously noted, this analysis does not consider building elevation, which may negate risk.) A list of specific critical facilities and their associated risk can be found in **Table 6.17** at the end of this section.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in Davidson County, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. As noted, the floodplains used in this analysis include the 100-year and 500-year FEMA regulated floodplain boundaries. It is certainly possible that more severe events could occur beyond these boundaries or urban (flash) flooding could impact additional structures. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

6.5.5 Hazardous Materials Incident

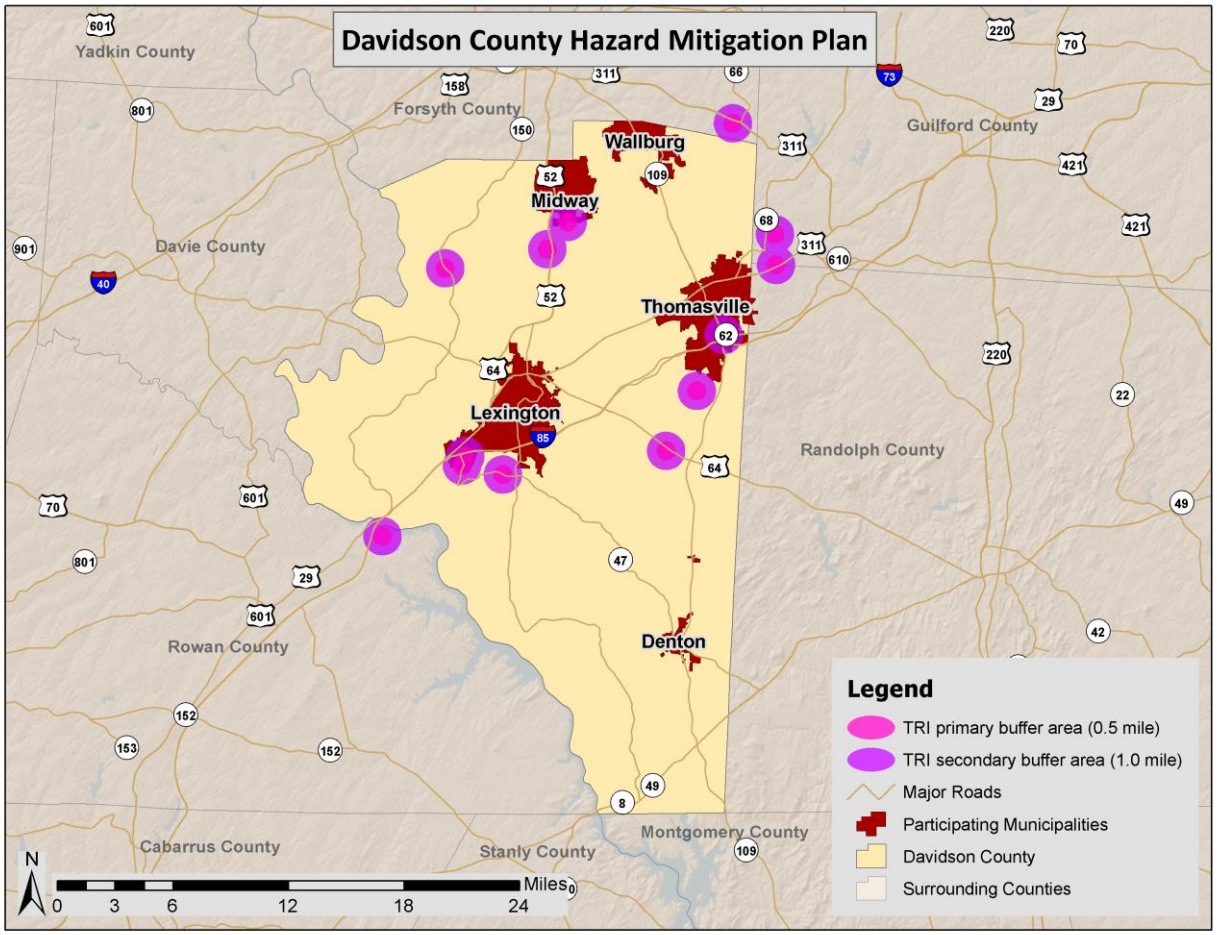
Historical evidence indicates that Davidson County is susceptible to hazardous materials events. A total of 182 HAZMAT incidents have been reported by the Pipeline and Hazardous Materials Safety Administration, resulting in $25,467 (2014 dollars) in property damage and 1 injury. On an annualized level, these damages amount to $7,083 for Davidson County.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and building footprints/parcels.[7] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to respect the different levels of effect: immediate (primary) and secondary. Primary and secondary impact sites were selected based on guidance from the PHMSA Emergency Response Guidebook. For the fixed site analysis, geo-referenced TRI listed toxic sites in Davidson County, along with buffers, were used for analysis as shown in **Figure 6.5.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure 6.6** shows the areas used for mobile toxic release buffer analysis. The results indicate the approximate number of parcels/buildings and improved value, as shown in **Table 6.11** (fixed sites), **Table 6.12** (mobile road sites) and **Table 6.13** (mobile railroad sites).[8]

[7] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an actual event).
[8] Note that parcels included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE 6.5: TRI SITES WITH BUFFERS IN DAVIDSON COUNTY



Source: Environmental Protection Agency

TABLE 6.11: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[9]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[10]
Denton	0	0	$0	0	0	$0
Lexington	175	338	$35,953,170	247	503	$82,162,950
Midway	140	301	$14,155,860	438	880	$38,090,150
Thomasville	378	595	$79,871,810	2,312	3,547	$235,456,690
Wallburg	0	0	$0	0	0	$0
Unincorporated Area	714	1,362	$162,274,890	3,245	6,083	$395,057,440
DAVIDSON COUNTY TOTAL	**1,407**	**2,596**	**$292,255,730**	**6,242**	**11,013**	**$750,767,230**

[9] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[10] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

FIGURE 6.6: MOBILE HAZMAT BUFFERS IN DAVIDSON COUNTY

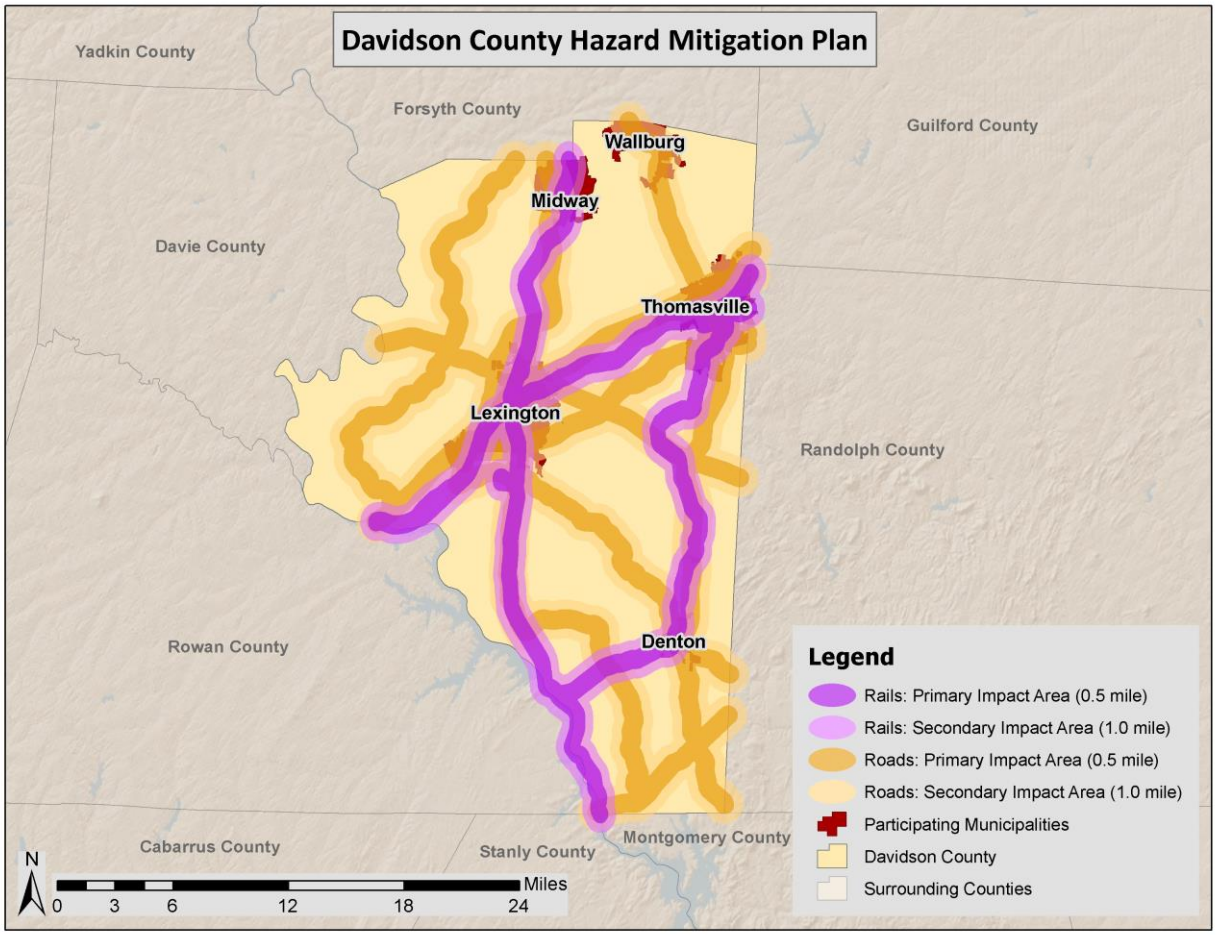


TABLE 6.12: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[11]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[12]
Denton	879	1,540	$64,294,700	985	1,686	$70,248,830
Lexington	7,833	10,715	$769,067,250	9,213	13,095	$882,010,730
Midway	836	1,375	$91,119,200	1,379	2,494	$144,152,990
Thomasville	6,298	9,628	$671,434,150	10,067	16,097	$963,669,280
Wallburg	664	1,220	$70,758,880	1,154	2,223	$113,986,750
Unincorporated Area	24,344	43,957	$2,123,689,940	39,739	73,616	$3,351,676,213
DAVIDSON COUNTY TOTAL	**40,854**	**68,435**	**$3,790,364,120**	**62,537**	**109,211**	**$5,525,744,793**

[11] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[12] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

TABLE 6.13: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[13]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[14]
Denton	830	1,260	$59,294,020	982	1,648	$70,006,870
Lexington	6,335	8,784	$560,058,830	8,397	12,198	$743,509,010
Midway	703	1,412	$71,582,930	1,302	2,516	$124,666,630
Thomasville	7,183	11,096	$653,836,580	9,659	15,425	$907,813,800
Wallburg	0	0	$0	0	0	$0
Unincorporated Area	7,578	14,080	$715,234,960	15,003	27,645	$1,251,843,690
DAVIDSON COUNTY TOTAL	**22,629**	**36,632**	**$2,060,007,320**	**35,343**	**59,432**	**$3,097,840,000**

Social Vulnerability

Given high susceptibility across Davidson County, it is assumed that the total population is at risk to hazardous materials incidents. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are 25 facilities located in a HAZMAT risk zone. The primary impact zone includes nine facilities: 1 dam, 3 power stations, 1 library, 1 EMS station, 2 fire stations, and 1 school. The remaining facilities are in the secondary, 1.0-mile, zone. This results in a total of 1, airport, 2 dams, 7 power stations, 1 library, 4 water tanks, 2 EMS stations, 3 fire stations, 5 schools in both zones. A list of specific critical facilities and their associated risk can be found in **Table 6.17** at the end of this section.

Mobile Analysis:

The critical facility analysis for road and railroad transportation corridors revealed that there are 172 critical facilities located in the primary and secondary mobile HAZMAT buffer areas for roads and 128 critical facilities located in the railroad HAZMAT buffer areas. The 1.0-mile road buffer area (worst case scenario modeled) includes the following critical facilities: 27 fire stations, 6 police stations, 10 EMS/Rescue stations, 2 medical care facilities, 36 schools, and 91 other facilities. The railroad buffer areas include the following: 19 fire stations, 6 police stations, 8 EMS/Rescue stations, 2 medical care facilities, 23 schools, and 71 other facilities. It should be noted that many of the facilities located in the buffer areas for railroad are also located in the buffer areas for road and/or the fixed site analysis. A list of specific critical facilities and their associated risk can be found in **Table 6.17** at the end of this section.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in Davidson County. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in conditions that could alter the impact area such direction and speed of wind, volume of release, etc.

[13] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[14] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

6.5.6 Nuclear Accident

The location of McGuire Nuclear Power Plant southwest of Davidson County demonstrates that the county is at some risk to the effects of a nuclear accident. Although there have not been any major events at this plant in the past, there have been major events at other nuclear stations around the country. Additionally, smaller scale incidents at McGuire Nuclear Power Plant have occurred.

In order to assess nuclear risk, a GIS-based analysis was used to estimate exposure during a nuclear event within each of the risk zones described in *Section 5: Hazard Profiles*. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within one of the risk zones. There are no properties in Davidson County located within the 10-mile risk zone, so **Table 6.14** only presents potential at-risk properties in the 50-mile buffer zone. Both the number of parcels/buildings and the approximate value are presented.

TABLE 6.14: ESTIMATED EXPOSURE OF PARCELS/BUILDINGS TO A NUCLEAR ACCIDENT

Location	50-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[15]
Denton	981	1,671	$70,192,710
Lexington	9,213	13,099	$882,010,730
Midway	0	0	$0
Thomasville	0	0	$0
Wallburg	0	0	$0
Unincorporated Area	33,236	62,018	$2,347,423,503
DAVIDSON COUNTY TOTAL	**43,430**	**76,788**	**$3,299,626,943**

Source: International Atomic Energy Agency

Social Vulnerability

Since areas in the southwest part of the county are within the 50-mile buffer area, this segment of the population is considered to be at highest risk to a nuclear accident. However, other populations in the county may also be at some risk.

Critical Facilities

The critical facility analysis revealed that there are a total of 104 critical facilities located in the 50-mile nuclear buffer area. A list of specific critical facilities and their associated risk can be found in **Table 6.17** at the end of this section.

In conclusion, a nuclear accident has the potential to impact many existing and future buildings, facilities, and populations in the Davidson County, though areas in the southwest of the county are at a higher risk than others.

[15] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 50-mile buffer, since building footprints were not associated with dollar value data.

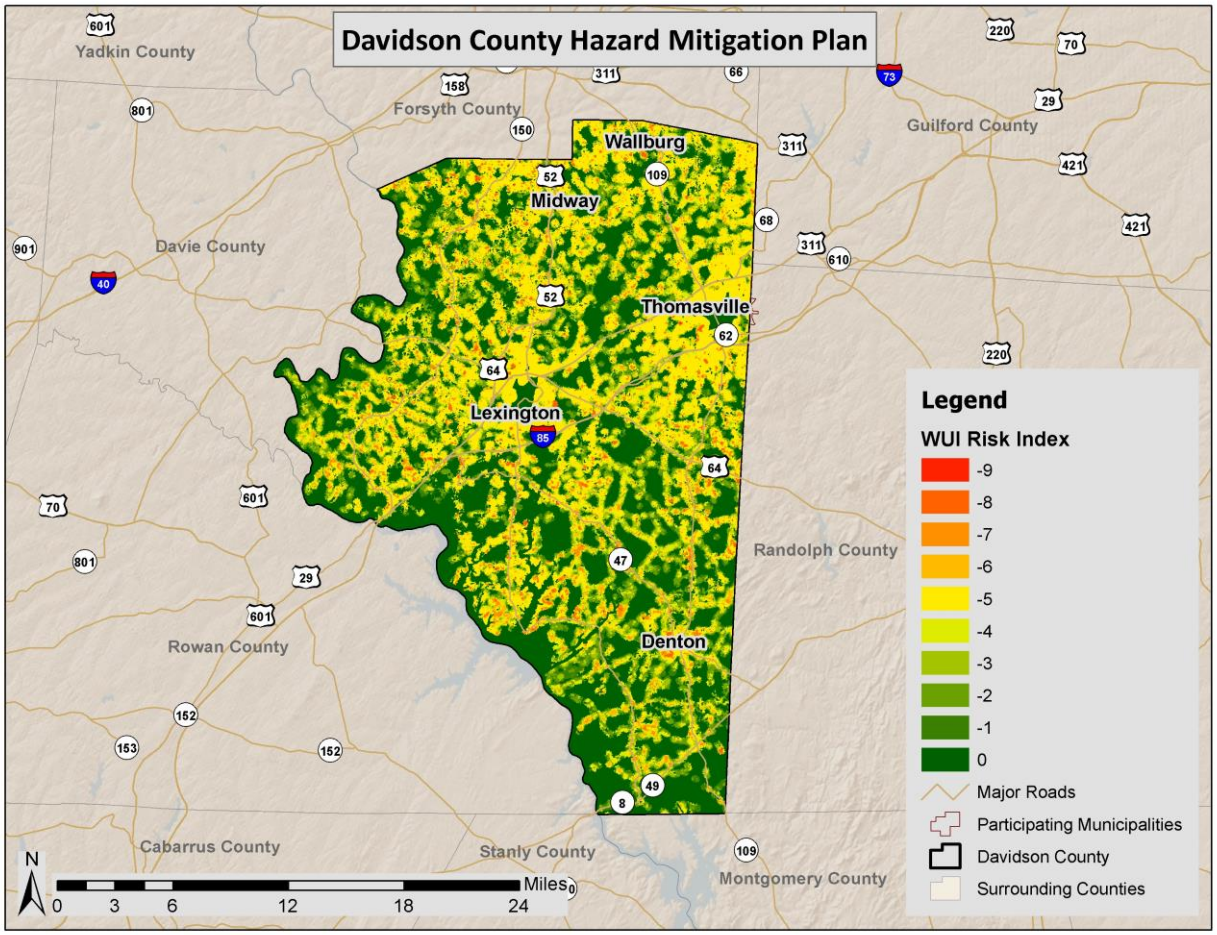
6.5.7 Wildfire

Historical evidence indicates that Davidson County is susceptible to wildfire events. A total of 227 wildfires were reported by the North Carolina Division of Forest Resources from 2009 to 2014 resulting in $58,000 in structure damage. On an annualized level, these damages amount to $11,600 for the county.

To estimate exposure to wildfire, the approximate number of parcels and their associated improved value was determined using GIS analysis. For the critical facility analysis, areas of risk were intersected with critical facility locations. **Figure 6.7** shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to -9 with lower values being most severe (as noted previously, this is only a measure of relative risk). **Figure 6.8** shows the areas of analysis where any grid cell is less than -5. Areas with a value below -5 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

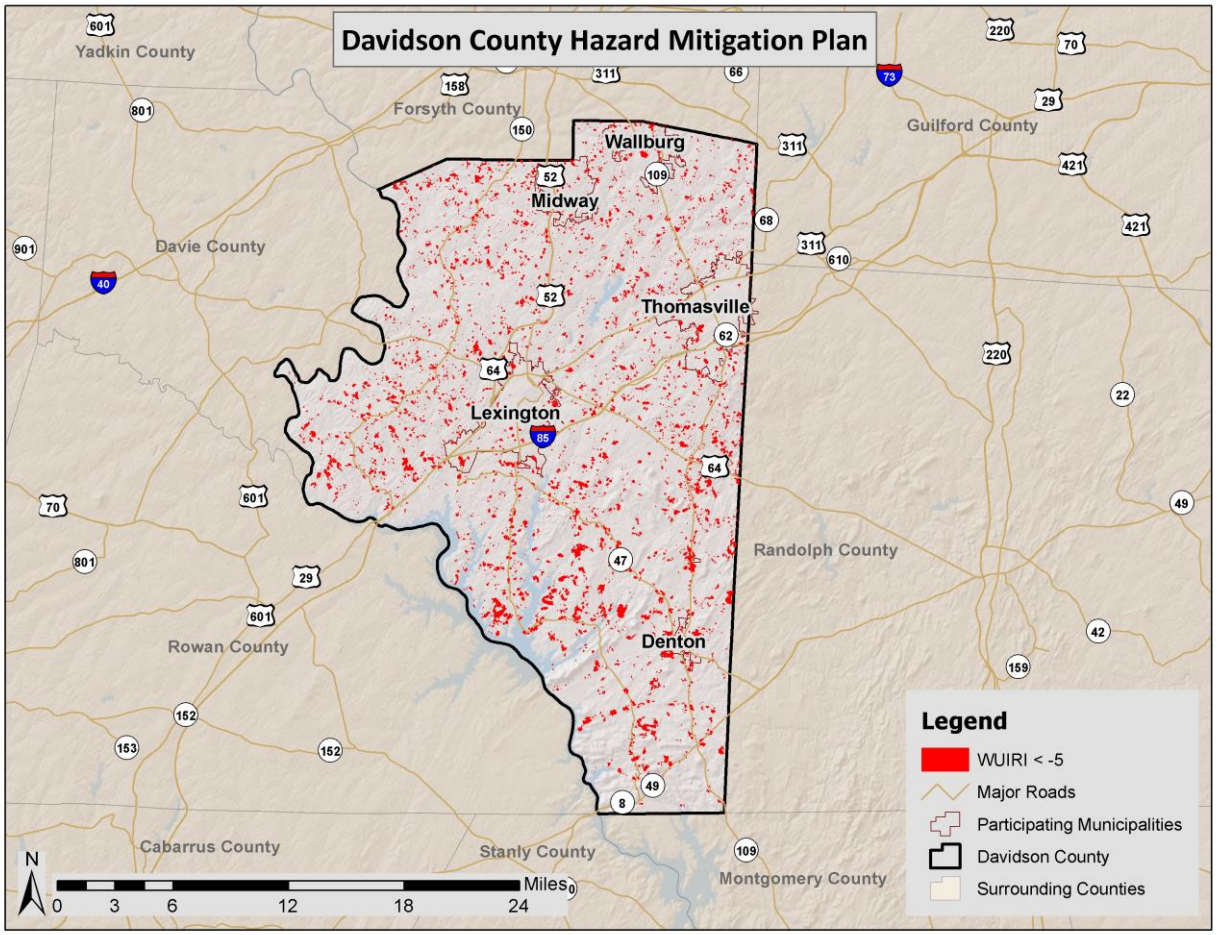
Table 6.15 shows the results of the analysis.

FIGURE 6.7: WUI RISK INDEX AREAS IN DAVIDSON COUNTY



Source: Southern Wildfire Risk Assessment Data

FIGURE 6.8: WILDFIRE RISK AREAS IN DAVIDSON COUNTY



Source: Southern Wildfire Risk Assessment Data

TABLE 6.15: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

	HIGH WILDFIRE RISK AREA		
Location	**Approx. Number of Parcels**	**Approx. Number of Buildings**	**Approx. Improved Value**
Denton	134	201	$12,743,380
Lexington	438	394	$101,908,740
Midway	399	299	$37,779,880
Thomasville	437	386	$76,966,140
Wallburg	305	313	$35,658,280
Unincorporated Area	18,352	14,693	$1,759,388,983
DAVIDSON COUNTY TOTAL	**20,065**	**16,286**	**$2,024,445,403**

Social Vulnerability

Although not all areas have equal vulnerability, there is some susceptibility across the entire county. It is assumed that the total population is at low risk to the wildfire hazard. Determining the exact number of people in wildfire risk areas is difficult with existing data and could be misleading.

Critical Facilities

The critical facility analysis revealed that there are 8 critical facilities located in the wildfire risk area (areas where the WUIRI is less than -5): 1 fire station, 2 gas regulators, 3 power stations, 1 water plant, and 1 water tank. However, it should also be noted, that several factors could impact the spread of a wildfire putting all facilities at some risk. A list of specific critical facilities and their associated risk can be found in **Table 6.17** at the end of this section.

In conclusion, a wildfire event has the potential to impact some existing and future buildings, critical facilities, and populations in Davidson County.

6.6 CONCLUSIONS ON HAZARD VULNERABILITY

The results of this vulnerability assessment are useful in at least three ways:

- Improving our understanding of the risk associated with the natural hazards in Davidson County through better understanding of the complexities and dynamics of risk, how levels of risk can be measured and compared, and the myriad of factors that influence risk. An understanding of these relationships is critical in making balanced and informed decisions on managing the risk.
- Providing a baseline for policy development and comparison of mitigation alternatives. The data used for this analysis presents a current picture of risk in Davidson County. Updating this risk "snapshot" with future data will enable comparison of the changes in risk with time. Baselines of this type can support the objective analysis of policy and program options for risk reduction in the region.
- Comparing the risk among the natural hazards addressed. The ability to quantify the risk to all these hazards relative to one another helps in a balanced, multi-hazard approach to risk management at each level of governing authority. This ranking provides a systematic framework to compare and prioritize the very disparate natural hazards that are present in Davidson County. This final step in the risk assessment provides the necessary information for local officials to craft a mitigation strategy to focus resources on only those hazards that pose the most threat to Davidson County and its municipalities.

Exposure to hazards can be an indicator of vulnerability. Economic exposure can be identified through locally assessed values for improvements (buildings), and social exposure can be identified by estimating the population exposed to each hazard. This information is especially important for decision-makers to use in planning for evacuation or other public safety related needs.

The types of assets included in these analyses include all building types in the participating jurisdictions. Specific information about the types of assets that are vulnerable to the identified hazards is included in each hazard subsection (for example all building types are considered at risk to the winter storm hazard and commercial, residential, and government owned facilities are at risk to repetitive flooding, etc).

Table 6.16 presents a summary of annualized loss for each hazard in Davidson County. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for each municipality. Therefore, an annualized loss was determined using the damage reported from historical occurrences at the county level. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the county.

TABLE 6.16: ANNUALIZED LOSS FOR DAVIDSON COUNTY*

Event	Davidson County
Atmospheric Hazards	
Drought	Negligible
Extreme Heat	Negligible
Hailstorm	$37,500
Hurricane & Tropical Storm	$790,000
Lightning	$45,325
Severe Thunderstorm / High Wind	$162,030
Tornado	$501,190
Winter Storm & Freeze	$344,444
Geologic Hazards	
Earthquake	$165,000
Landslide	Negligible
Hydrologic Hazards	
Dam Failure	Negligible
Erosion	Negligible
Flood	$46,533
Other Hazards	
HAZMAT Incident	$7,083
Nuclear Accident	Negligible
Terror Threat	Negligible
Wildfire	$11,600

*In this table, the term "Negligible" is used to indicate that no records for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not kept.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to atmospheric hazards including drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind, tornado, and winter storm and freeze. Some buildings may be more vulnerable to these hazards based on locations, construction, and building type. **Table 6.17** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

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TABLE 6.17: AT-RISK CRITICAL FACILITIES IN DAVIDSON COUNTY

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
DENTON																								
Denton - Base 4	EMS Base	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Station #39	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Denton Town Hall	Government Office	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Denton Library	Library	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Denton Police Dept	Police	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Station 10	Rescue Squad	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Denton Elementary	School	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Water Tank-Bryon St just E of NC 109 & Noell Av	Water Tank	X	X	X	X	X	X	X	X	X								X		X		X		
LEXINGTON																								
Lexington Municipal Airport	Airport	X	X	X	X	X	X	X	X	X						X	X	X	X	X		X		
Lexington - Base 1	EMS Base	X	X	X	X	X	X	X	X	X							X	X		X		X		
Station #46	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington FD	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington FD	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington FD	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Gas Regulator-Greensboro St, adj to gov center	Gas Regulator	X	X	X	X	X	X	X	X	X			X				X	X		X		X		
Gas Regulator-int of Hoover Dr & Oak Ave	Gas Regulator	X	X	X	X	X	X	X	X	X							X	X	X	X		X		

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Gas Regulator-Kirkwood Ave & Talbert Blvd	Gas Regulator	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Gas Regulator-Linwood Rd south of Brown St	Gas Regulator	X	X	X	X	X	X	X	X	X							X	X		X		X		
in NC DOT Right of Way	Gas Regulator	X	X	X	X	X	X	X	X	X							X	X		X		X		
Davidson County Governmental Center	Government Office	X	X	X	X	X	X	X	X	X							X	X		X		X		
Lexington City Hall	Government Office	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Davidson County 911 Center	Government Office	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Davidson County Courthouse	Government Office	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Davidson County Health Dept	Government Office	X	X	X	X	X	X	X	X	X							X	X		X		X		
Lexington Memorial Hospital	Hospital	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington Library	Library	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington National Guard Armory	National Guard Armory	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Davidson County Sheriff's Dept	Police	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington Police Dept	Police	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Carolina Avenue Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X		X		X		
Cotton Grove Rd Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Hickory Street Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Market Street Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
N Main Street Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X		X		X		
Sink Inn Road Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Power Station-Albemarle St	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Power Station-E 13th Ave	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Power Station-Hyde St & S Pennington Ave	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Power Station-off Old Linwood Rd	Power Station	X	X	X	X	X	X	X	X	X						X		X	X	X		X		
Station 6	Rescue Squad	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Charles England Intermmediate	School	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington High	School	X	X	X	X	X	X	X	X	X							X	X		X		X		
Lexington Middle	School	X	X	X	X	X	X	X	X	X							X	X		X		X		
Pickett Elementary	School	X	X	X	X	X	X	X	X	X								X	X	X		X		
South Lexington Elementary	School	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Southwest Elementary	School	X	X	X	X	X	X	X	X	X							X	X		X		X		
Lexington Sewage Treatment Plant	Sewage Treatment Plant	X	X	X	X	X	X	X	X	X								X				X		

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Water Tank-Lindsay St off of Swing Dairy Rd	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
S Salisbury St Storage Tank	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Stand Pipe Tank -- Abandoned	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
MIDWAY																								
North - Base 3	EMS Base	X	X	X	X	X	X	X	X	X					X	X		X	X	X				
Station #86	Fire Station	X	X	X	X	X	X	X	X	X					X	X		X	X	X				
Midway Elementary	School	X	X	X	X	X	X	X	X	X					X	X			X	X				
Water Tank-Gumtree Rd at Norman Shoaf Rd	Water Tank	X	X	X	X	X	X	X	X	X									X	X				
Water Tank-Pin Oak Dr along US 52	Water Tank	X	X	X	X	X	X	X	X	X							X	X		X				
THOMASVILLE																								
Freeman Lake Dam	Dam	X	X	X	X	X	X	X	X	X						X	X	X		X				
Liberty Drive Dam	Dam	X	X	X	X	X	X	X	X	X							X	X	X	X				
Thomasville - Base 2	EMS Base	X	X	X	X	X	X	X	X	X							X	X	X	X				
City of Thomasville FD	Fire Station	X	X	X	X	X	X	X	X	X							X	X		X				
City of thomasville FD	Fire Station	X	X	X	X	X	X	X	X	X							X	X		X				
Station #43	Fire Station	X	X	X	X	X	X	X	X	X							X	X		X				
Thomasville FD	Fire Station	X	X	X	X	X	X	X	X	X								X	X	X				
Thomasville FD	Fire Station	X	X	X	X	X	X	X	X	X						X	X	X	X	X				
Thomasville FD	Fire Station	X	X	X	X	X	X	X	X	X								X	X	X				
Thomasville City Hall	Government Office	X	X	X	X	X	X	X	X	X							X	X	X	X				

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Thomasville Medical Center	Hospital	X	X	X	X	X	X	X	X	X								X	X	X				
Thomasville Library	Library	X	X	X	X	X	X	X	X	X							X	X	X	X				
Thomasville National Guard Armory	National Guard Armory	X	X	X	X	X	X	X	X	X							X	X		X				
City of Thomasville Police	Police	X	X	X	X	X	X	X	X	X							X	X		X				
Davidson County Sheriff's Dept	Police	X	X	X	X	X	X	X	X	X							X	X	X	X				
Power Station-off Finch Ave	Power Station	X	X	X	X	X	X	X	X	X								X	X	X				
Power Station-off Unity St	Power Station	X	X	X	X	X	X	X	X	X									X	X				
Power Station-Taylor St	Power Station	X	X	X	X	X	X	X	X	X			X			X	X	X	X	X				
Station 5	Rescue Squad	X	X	X	X	X	X	X	X	X						X	X	X	X	X				
E Lawson Brown Middle	School	X	X	X	X	X	X	X	X	X							X	X		X				
East Davidson High	School	X	X	X	X	X	X	X	X	X							X	X		X				
Fair Grove Elementary	School	X	X	X	X	X	X	X	X	X							X	X		X				
Liberty Drive Elementary	School	X	X	X	X	X	X	X	X	X						X		X	X	X				
Pilot Elementary	School	X	X	X	X	X	X	X	X	X							X	X	X	X				
Thomasville High	School	X	X	X	X	X	X	X	X	X								X		X				
Thomasville Middle	School	X	X	X	X	X	X	X	X	X							X	X		X				
Thomasville Primary	School	X	X	X	X	X	X	X	X	X						X		X	X	X				

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Thomasville Sewage Treatment Plant	Sewage Treatment Plant	X	X	X	X	X	X	X	X	X								X						
Thomasville Water Works	Water Plant	X	X	X	X	X	X	X	X	X								X	X	X				
Water Tank-int of Commerce St & E Guilford St	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X				
Water Tank-Int of Hasty School Rd and Transit Ave	Water Tank	X	X	X	X	X	X	X	X	X							X	X		X				
WALLBURG																								
Station #61	Fire Station	X	X	X	X	X	X	X	X	X							X	X						X
NC Hwy 109 Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X						
Wallburg Elementary	School	X	X	X	X	X	X	X	X	X							X	X						
UNINCORPORATED AREA																								
Davidson County Community College	College	X	X	X	X	X	X	X	X	X							X	X						
Glosson's Lake Dam #2	Dam	X	X	X	X	X	X	X	X	X								X				X		
High Rock Dam	Dam	X	X	X	X	X	X	X	X	X									X	X		X		
Old City Lake Dam	Dam	X	X	X	X	X	X	X	X	X			X		X	X		X						
Sapona Country Club Dam	Dam	X	X	X	X	X	X	X	X	X												X		
Thom-a-lex Dam	Dam	X	X	X	X	X	X	X	X	X			X					X						
Tucker Dam	Dam	X	X	X	X	X	X	X	X	X							X	X						
West - Base 5	EMS Base	X	X	X	X	X	X	X	X	X							X	X				X		
Station #31	Fire Station	X	X	X	X	X	X	X	X	X							X	X				X		

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Station #33	Fire Station	X	X	X	X	X	X	X	X	X							X	X						
Station #35	Fire Station	X	X	X	X	X	X	X	X	X														
Station #37	Fire Station	X	X	X	X	X	X	X	X	X							X	X				X		
Station #41	Fire Station	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X		X		
Station #48	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Station #51	Fire Station	X	X	X	X	X	X	X	X	X							X	X				X		
Station #54	Fire Station	X	X	X	X	X	X	X	X	X							X	X		X				
Station #56	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Station #58	Fire Station	X	X	X	X	X	X	X	X	X							X	X				X		
Station #64	Fire Station	X	X	X	X	X	X	X	X	X							X	X		X				
Station #67	Fire Station	X	X	X	X	X	X	X	X	X							X	X				X		
Station #71	Fire Station	X	X	X	X	X	X	X	X	X							X	X				X		
Station #73	Fire Station	X	X	X	X	X	X	X	X	X									X	X				
Station #76	Fire Station	X	X	X	X	X	X	X	X	X							X	X						
Station #91	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X				
Station #92	Fire Station	X	X	X	X	X	X	X	X	X												X		
Station #96	Fire Station	X	X	X	X	X	X	X	X	X														
Pressure Regulation Facility	Gas Plant	X	X	X	X	X	X	X	X	X							X	X				X		
Gas Regulator-Biesecker Rd int w/Old Hwy 52	Gas Regulator	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Gas Regulator-int Old Hwy 52 & Bethesda Rd	Gas Regulator	X	X	X	X	X	X	X	X	X							X	X	X	X				

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Gas Regulator-N Leonard Rd south of Welcome Sch	Gas Regulator	X	X	X	X	X	X	X	X	X									X	X				X
Gas Regulator-N Second St - Welcome	Gas Regulator	X	X	X	X	X	X	X	X	X									X	X				
Peak Shaving Plant	Gas Regulator	X	X	X	X	X	X	X	X	X								X	X	X				X
North Davidson Library	Library	X	X	X	X	X	X	X	X	X					X	X		X	X	X				
West Davidson Library	Library	X	X	X	X	X	X	X	X	X							X	X				X		
Davidson County Sheriff's Dept	Police	X	X	X	X	X	X	X	X	X														
Thomasville Police Dept	Police	X	X	X	X	X	X	X	X	X							X	X		X				
Delivery Switching Station	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
NC Hwy 150 Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X				X		
Power Station-Canaan Church Rd at Johnson Rd	Power Station	X	X	X	X	X	X	X	X	X														
Power Station-Clarksbury Church Rd	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X				
Power Station-Clodfelter Rd just west of Hoy Long*	Power Station	X	X	X	X	X	X	X	X	X														
Power Station-Franklin Ln	Power Station	X	X	X	X	X	X	X	X	X								X						X
Power Station-Hege Rd	Power Station	X	X	X	X	X	X	X	X	X														
Power Station-Hugh Miller Rd	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Power Station-Hwy 64 East	Power Station	X	X	X	X	X	X	X	X	X						X	X	X	X	X				

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Power Station-Leonard Rd	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Power Station-N Old Greensboro Rd	Power Station	X	X	X	X	X	X	X	X	X														
Power Station-NC Hwy 109 just north of West St	Power Station	X	X	X	X	X	X	X	X	X							X	X						
Power Station-NC Hwy 47 just north of Bethany Rd	Power Station	X	X	X	X	X	X	X	X	X							X	X				X		
Power Station-NC Hwy 8 just north of NC Hwy 49	Power Station	X	X	X	X	X	X	X	X	X							X	X				X		
Power Station-NC Hwy 8 just north of Newsome Ln	Power Station	X	X	X	X	X	X	X	X	X							X	X		X		X		
Power Station-off Cody Dr	Power Station	X	X	X	X	X	X	X	X	X							X	X						
Power Station-off Craver Rd near int w/George Heg	Power Station	X	X	X	X	X	X	X	X	X														
Power Station-Old Hwy 52 - near Owens-Illinois	Power Station	X	X	X	X	X	X	X	X	X					X	X		X	X	X				
Power Station-Old Hwy 52 - near Owens-Illinois	Power Station	X	X	X	X	X	X	X	X	X					X	X		X	X	X				
Power Station-Old Linwood Rd	Power Station	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X		X		X
Power Station-Reedy Creek Rd just east of Link Rd	Power Station	X	X	X	X	X	X	X	X	X												X		
Power Station-S Main St Ext at Jackson Hill Rd	Power Station	X	X	X	X	X	X	X	X	X							X	X				X		X
Power Station-Sink Farm Rd (back)	Power Station	X	X	X	X	X	X	X	X	X							X	X				X		

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Power Station-Sink Farm Rd (front)	Power Station	X	X	X	X	X	X	X	X	X							X	X				X		
Power Station-Sturdivant Rd	Power Station	X	X	X	X	X	X	X	X	X							X	X		X		X		
Power Station-Welcome - Arcadia Rd	Power Station	X	X	X	X	X	X	X	X	X								X						
Power Station-Welcome - Arcadia Rd	Power Station	X	X	X	X	X	X	X	X	X								X						
Ridge Road Substation	Power Station	X	X	X	X	X	X	X	X	X						X				X				
Station 9	Rescue Squad	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Tyro Fire Dept. #67	Rescue Squad	X	X	X	X	X	X	X	X	X							X	X				X		
Brier Creek Elementary	School	X	X	X	X	X	X	X	X	X							X	X						
Central Davidson HIgh	School	X	X	X	X	X	X	X	X	X							X	X				X		
Central Davidson Middle	School	X	X	X	X	X	X	X	X	X							X	X				X		
Churchland Elementary	School	X	X	X	X	X	X	X	X	X							X	X				X		
Davis - Townsend Elementary	School	X	X	X	X	X	X	X	X	X							X	X						
Extended Day	School	X	X	X	X	X	X	X	X	X							X	X						
Friedburg Elementary	School	X	X	X	X	X	X	X	X	X							X	X						
Hasty Elementary	School	X	X	X	X	X	X	X	X	X														
Ledford High	School	X	X	X	X	X	X	X	X	X							X	X						
Ledford Middle	School	X	X	X	X	X	X	X	X	X							X	X						
North Davidson High	School	X	X	X	X	X	X	X	X	X						X		X	X	X				

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
North Davidson Middle	School	X	X	X	X	X	X	X	X	X						X		X	X	X				
Northwest Elementary	School	X	X	X	X	X	X	X	X	X								X						
Reeds Elementary	School	X	X	X	X	X	X	X	X	X							X	X				X		
Silver Valley Elementary	School	X	X	X	X	X	X	X	X	X							X	X	X	X				
South Davidson HIgh	School	X	X	X	X	X	X	X	X	X							X	X	X	X				
South Davidson Middle	School	X	X	X	X	X	X	X	X	X							X	X	X	X				
Southwood Elementary	School	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Stoner - Thomas School	School	X	X	X	X	X	X	X	X	X							X	X				X		
Tyro Middle	School	X	X	X	X	X	X	X	X	X								X				X		
Welcome Elementary	School	X	X	X	X	X	X	X	X	X									X	X		X		
West Davidson High	School	X	X	X	X	X	X	X	X	X								X				X		
Denton Sewage Treatment Plant	Sewage Treatment Plant	X	X	X	X	X	X	X	X	X										X				
High Point Sewage Treatment Plant	Sewage Treatment Plant	X	X	X	X	X	X	X	X	X							X	X						
Water Intake Facility	Water Intake	X	X	X	X	X	X	X	X	X			X					X						
Water Intake Facility	Water Intake	X	X	X	X	X	X	X	X	X			X											
Denton Water Plant	Water Plant	X	X	X	X	X	X	X	X	X									X	X		X		
Lexington Water Works	Water Plant	X	X	X	X	X	X	X	X	X							X	X		X				

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Water Plant-Off US 64 at Yadkin River	Water Plant	X	X	X	X	X	X	X	X	X							X	X				X		X
Water Tank-Abbotts Creek Church Rd	Water Tank	X	X	X	X	X	X	X	X	X														
Water Tank-Early Hedrick Rd off of Turner Rd	Water Tank	X	X	X	X	X	X	X	X	X								X						
Water Tank-Int of Allred Rd and Rhodes Rd	Water Tank	X	X	X	X	X	X	X	X	X												X		
Water Tank-Int of Tower Rd and Fuller Mill Rd (lg)	Water Tank	X	X	X	X	X	X	X	X	X								X						
Water Tank-Int of Tower Rd and Fuller Mill Rd (sm)	Water Tank	X	X	X	X	X	X	X	X	X								X						
Water Tank-Kilcrease Ln off of Light Rd (lg)	Water Tank	X	X	X	X	X	X	X	X	X						X			X	X				
Water Tank-Kilcrease Ln off of Light Rd (sm)	Water Tank	X	X	X	X	X	X	X	X	X						X			X	X				
Water Tank-NC 150 just S of US 64 intersection	Water Tank	X	X	X	X	X	X	X	X	X							X	X				X		X
Water Tank-NC 150 S near int w/Pete Barnes Rd (lg)	Water Tank	X	X	X	X	X	X	X	X	X							X	X				X		
Water Tank-NC 150 S near int w/Pete Barnes Rd (sm)	Water Tank	X	X	X	X	X	X	X	X	X							X	X				X		
Water Tank-NC 8 S, Southmont	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Water Tank-NC 8 S, Southmont	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Water Tank-Off of NC 49	Water Tank	X	X	X	X	X	X	X	X	X							X	X				X		
Water Tank-Off of Young Rd	Water Tank	X	X	X	X	X	X	X	X	X												X		
Water Tank-Old Greensboro Rd at Darr Rd int	Water Tank	X	X	X	X	X	X	X	X	X														

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Water Tank-Old US 52 just S of Hwy 52 & N of Arno	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Water Tank-Old US 52, S of N Davidson, Welcome	Water Tank	X	X	X	X	X	X	X	X	X						X		X	X	X				
Water Tank-Shirley Rd near int w/Floyd Church Rd	Water Tank	X	X	X	X	X	X	X	X	X												X		
Water Tank-Trantham Dr off of NC 8	Water Tank	X	X	X	X	X	X	X	X	X						X	X	X	X	X		X		
Water Tank-W. Lex. Ave near Wallburg-High Point Rd	Water Tank	X	X	X	X	X	X	X	X	X														

SECTION 7
CAPABILITY ASSESSMENT

This section of the Plan discusses the capability of the jurisdictions in Davidson County to implement hazard mitigation activities. It consists of the following four subsections:

- 7.1 What is a Capability Assessment?
- 7.2 Conducting the Capability Assessment
- 7.3 Capability Assessment Findings
- 7.4 Conclusions on Local Capability

7.1 WHAT IS A CAPABILITY ASSESSMENT

The purpose of conducting a capability assessment is to determine the ability of a local jurisdiction to implement a comprehensive mitigation strategy and to identify potential opportunities for establishing or enhancing specific mitigation policies, programs, or projects[1]. As in any planning process, it is important to try to establish which goals, objectives, and/or actions are feasible based on an understanding of the organizational capacity of those agencies or departments tasked with their implementation. A capability assessment helps to determine which mitigation actions are practical, and likely to be implemented over time, given a local government's planning and regulatory framework, level of administrative and technical support, amount of fiscal resources, and current political climate.

A capability assessment has two primary components: 1) an inventory of a local jurisdiction's relevant plans, ordinances, or programs already in place and 2) an analysis of its capacity to carry them out. Careful examination of local capabilities will detect any existing gaps, shortfalls, or weaknesses with ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. A capability assessment also highlights the positive mitigation measures already in place or being implemented at the local government level, which should continue to be supported and enhanced through future mitigation efforts.

The capability assessment completed for Davidson County and its municipalities serves as a critical planning step and an integral part of the foundation for designing an effective hazard mitigation strategy. Coupled with the Risk Assessment, the Capability Assessment helps identify and target meaningful mitigation actions for incorporation in the Mitigation Strategy portion of the Hazard Mitigation Plan. It not only helps establish the goals and objectives for the region to pursue under this Plan, but it also ensures that those goals and objectives are realistically achievable under given local conditions.

[1] While the Final Rule for implementing the Disaster Mitigation Act of 2000 does not require a local capability assessment to be completed for local hazard mitigation plans, it is a critical step in developing a mitigation strategy that meets the needs of the region while taking into account their own unique abilities. The Rule does state that a community's mitigation strategy should be "based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools" (44 CFR, Part 201.6(c)(3)).

7.2 CONDUCTING THE CAPABILITY ASSESSMENT

In order to facilitate the inventory and analysis of local government capabilities for Davidson County and its municipalities, a detailed Capability Assessment Survey was completed for each of the participating jurisdictions based on the information found in the existing hazard mitigation plan and local government websites. The survey questionnaire compiled information on a variety of "capability indicators" such as existing local plans, policies, programs, or ordinances that contribute to and/or hinder the jurisdictions' ability to implement hazard mitigation actions. Other indicators included information related to the communities' fiscal, administrative, and technical capabilities, such as access to local budgetary and personnel resources for mitigation purposes. The current political climate, an important consideration for any local planning or decision making process, was also evaluated with respect to hazard mitigation.

At a minimum, survey results provide an extensive inventory of existing local plans, ordinances, programs, and resources that are in place or under development in addition to their overall effect on hazard loss reduction. However, the survey instrument can also serve to identify gaps, weaknesses, or conflicts that the county and local jurisdictions can recast as opportunities for specific actions to be proposed as part of the hazard mitigation strategy.

The information collected in the survey questionnaire was incorporated into a database for further analysis. A general scoring methodology[2] was then applied to quantify each jurisdiction's overall capability. According to the scoring system, each capability indicator was assigned a point value based on its relevance to hazard mitigation

Using this scoring methodology, a total score and an overall capability rating of "high," "moderate," or "limited" could be determined according to the total number of points received. These classifications are designed to provide nothing more than a general assessment of local government capability. The results of this capability assessment provide critical information for developing an effective and meaningful mitigation strategy.

7.3 CAPABILITY ASSESSMENT FINDINGS

The findings of the capability assessment are summarized in this Plan to provide insight into the relevant capacity of the jurisdictions in Davidson County to implement hazard mitigation activities. All information is based upon the review of the existing hazard mitigation plan and local government websites through the Capability Assessment Survey and input provided by local government officials during meetings of the Davidson County Hazard Mitigation Planning Team.

7.3.1 Planning and Regulatory Capability

Planning and regulatory capability is based on the implementation of plans, ordinances, and programs that demonstrate a local jurisdiction's commitment to guiding and managing growth, development, and redevelopment in a responsible manner while maintaining the general welfare of the community. It includes emergency response and mitigation planning, comprehensive land use planning, and transportation planning; the enforcement of zoning or subdivision ordinances and building codes that regulate how land is developed and structures are built; as well as protecting environmental, historic,

[2] The scoring methodology used to quantify and rank the jurisdictions' capability can be found in Appendix B.

and cultural resources in the community. Although some conflicts can arise, these planning initiatives generally present significant opportunities to integrate hazard mitigation principles and practices into the local decision making process.

This assessment is designed to provide a general overview of the key planning and regulatory tools and programs that are in place or under development for the jurisdictions in Davidson County along with their potential effect on loss reduction. This information will help identify opportunities to address existing gaps, weaknesses, or conflicts with other initiatives in addition to integrating the implementation of this Plan with existing planning mechanisms where appropriate.

Table 7.1 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the jurisdictions in Davidson County. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Davidson County Hazard Mitigation Plan.

TABLE 7.1: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning / Regulatory Tool	DAVIDSON COUNTY	Denton	Lexington	Midway	Thomasville	Wallburg
Hazard Mitigation Plan	✓	✓	✓	✓	✓	✓
Comprehensive Land Use Plan	✓		✓	*	✓	
Floodplain Management Plan			✓			
Open Space Management Plan (Parks & Rec/Greenway Plan)	✓	✓	✓		✓	
Stormwater Management Plan/Ordinance			*		✓	
Natural Resource Protection Plan			✓			
Flood Response Plan						
Emergency Operations Plan	✓	✓	✓	✓	✓	✓
Continuity of Operations Plan	✓					
Evacuation Plan						
Disaster Recovery Plan						
Capital Improvements Plan	✓		✓		✓	
Economic Development Plan	✓		✓		✓	

Planning / Regulatory Tool	DAVIDSON COUNTY	Denton	Lexington	Midway	Thomasville	Wallburg
Historic Preservation Plan						
Flood Damage Prevention Ordinance	✓	✓	✓	✓	✓	✓
Zoning Ordinance	✓	✓	✓	✓	✓	✓
Subdivision Ordinance	✓	✓	✓	✓	✓	✓
Unified Development Ordinance			✓			
Post-Disaster Redevelopment Ordinance						
Building Code	✓	✓	✓	✓	✓	✓
Fire Code	✓	✓	✓	✓	✓	✓
National Flood Insurance Program (NFIP)	✓	✓	✓		✓	
NFIP Community Rating System			✓			

A more detailed discussion on the county's planning and regulatory capability follows.

7.3.2 Emergency Management

Hazard mitigation is widely recognized as one of the four primary phases of emergency management. The three other phases include preparedness, response, and recovery. In reality, each phase is interconnected with hazard mitigation, as **Figure 7.1** suggests. Opportunities to reduce potential losses through mitigation practices are most often implemented before disaster strikes, such as the elevation of flood prone structures or the continuous enforcement of policies that prevent and regulate development that is vulnerable to hazards due to its location, design, or other characteristics. Mitigation opportunities will also be presented during immediate preparedness or response activities, such as installing storm shutters in advance of a hurricane, and certainly during the long-term recovery and redevelopment process following a hazard event.

FIGURE 7.1: THE FOUR PHASES OF EMERGENCY MANAGEMENT

Planning for each phase is a critical part of a comprehensive emergency management program and a key to the successful implementation of hazard mitigation actions. As a result, the Capability Assessment Survey asked several questions across a range of emergency management plans in order to assess the participating jurisdictions' willingness to plan and their level of technical planning proficiency.

Hazard Mitigation Plan: A hazard mitigation plan represents a community's blueprint for how it intends to reduce the impact of natural and human-caused hazards on people and the built environment. The essential elements of a hazard mitigation plan include a risk assessment, capability assessment, and mitigation strategy.

- Davidson County has previously adopted a hazard mitigation plan. Each participating municipality was included in the county's plan.

Disaster Recovery Plan: A disaster recovery plan serves to guide the physical, social, environmental, and economic recovery and reconstruction process following a disaster. In many instances, hazard mitigation principles and practices are incorporated into local disaster recovery plans with the intent of capitalizing on opportunities to break the cycle of repetitive disaster losses. Disaster recovery plans can also lead to the preparation of disaster redevelopment policies and ordinances to be enacted following a hazard event.

- Neither the county nor any of the participating municipalities have adopted a disaster recovery plan. The jurisdictions should consider developing a plan to guide the recovery and reconstruction process following a disaster.

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

- Davidson County maintains an emergency operations plan through the County Emergency Management Department. All five participating municipalities have adopted the county plan.

Continuity of Operations Plan: A continuity of operations plan establishes a chain of command, line of succession, and plans for backup or alternate emergency facilities in case of an extreme emergency or disaster event.

- Davidson County has adopted a continuity of operations plan (COOP).

Flood Response Plan: A flood response plan establishes procedures for responding to a flood emergency including coordinating and facilitating resources to minimize the impacts of flood.

- Neither the county nor any of the participating municipalities have adopted a flood response plan.

7.3.3 General Planning

The implementation of hazard mitigation activities often involves agencies and individuals beyond the emergency management profession. Stakeholders may include local planners, public works officials, economic development specialists, and others. In many instances, concurrent local planning efforts will help to achieve or complement hazard mitigation goals, even though they are not designed as such. Therefore, the Capability Assessment Survey also asked questions regarding general planning capabilities and the degree to which hazard mitigation is integrated into other on-going planning efforts in Davidson County.

Comprehensive Land Use Plan: A comprehensive land use plan establishes the overall vision for what a community wants to be and serves as a guide for future governmental decision making. Typically a comprehensive plan contains sections on demographic conditions, land use, transportation elements, and community facilities. Given the broad nature of the plan and its regulatory standing in many communities, the integration of hazard mitigation measures into the comprehensive plan can enhance the likelihood of achieving risk reduction goals, objectives, and actions.

- Davidson County has adopted a county land development plan. Lexington and Thomasville have also each adopted a city land use plan.
- Midway is currently in the process of developing a town land use plan and a draft of the plan has been completed.

Capital Improvements Plan: A capital improvements plan guides the scheduling of spending on public improvements. A capital improvements plan can serve as an important mechanism for guiding future development away from identified hazard areas. Limiting public spending in hazardous areas is one of the most effective long-term mitigation actions available to local governments.

- Davidson County, Lexington, and Thomasville have capital improvement plans in place.

Historic Preservation Plan: A historic preservation plan is intended to preserve historic structures or districts within a community. An often overlooked aspect of the historic preservation plan is the assessment of buildings and sites located in areas subject to natural hazards and the identification of ways to reduce future damages. This may involve retrofitting or relocation techniques that account for the need to protect buildings that do not meet current building standards or are within a historic district that cannot easily be relocated out of harm's way.

- Neither the county nor any of the participating municipalities have adopted a historic preservation plan.

Zoning Ordinance: Zoning represents the primary means by which land use is controlled by local governments. As part of a community's police power, zoning is used to protect the public health, safety, and welfare of those in a given jurisdiction that maintains zoning authority. A zoning ordinance is the mechanism through which zoning is typically implemented. Since zoning regulations enable municipal governments to limit the type and density of development, a zoning ordinance can serve as a powerful tool when applied in identified hazard areas.

- Davidson County and all five participating municipalities have adopted zoning ordinances.
- Lexington includes zoning regulations as part of its local land use ordinance.
- The county, Denton, Midway, Thomasville, and Wallburg have adopted standalone zoning ordinances.

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

- Davidson County and all five participating municipalities have adopted subdivision ordinances.
- Lexington includes subdivision regulations as part of its local land use ordinance.
- The county, Denton, Midway, Thomasville, and Wallburg have adopted standalone subdivision ordinances.

Building Codes, Permitting, and Inspections: Building codes regulate construction standards. In many communities, permits and inspections are required for new construction. Decisions regarding the adoption of building codes (that account for hazard risk), the type of permitting process required both before and after a disaster, and the enforcement of inspection protocols all affect the level of hazard risk faced by a community.

- North Carolina has a state compulsory building code, which applies throughout the state; however, jurisdictions may adopt codes if approved as providing adequate minimum standards. The County and all five participating municipalities have adopted a building code.
- Davidson County provides building inspection services for all unincorporated areas of the County and through contractual agreements for the Towns of Midway and Wallburg.
- Denton, Lexington, and Thomasville are responsible for enforcement of the building codes within their planning jurisdiction.

The adoption and enforcement of building codes by local jurisdictions is routinely assessed through the Building Code Effectiveness Grading Schedule (BCEGS) program developed by the Insurance Services

Office, Inc. (ISO).[3] In North Carolina, the North Carolina Department of Insurance assesses the building codes in effect in a particular community and how the community enforces its building codes *with special emphasis on mitigation of losses from natural hazards*. The results of BCEGS assessments are routinely provided to ISO's member private insurance companies, which in turn may offer ratings credits for new buildings constructed in communities with strong BCEGS classifications. The concept is that communities with well-enforced, up-to-date codes should experience fewer disaster-related losses and, as a result, should have lower insurance rates.

In conducting the assessment, ISO collects information related to personnel qualification and continuing education as well as the number of inspections performed per day. This type of information combined with local building codes is used to determine a grade for that jurisdiction. The grades range from 1 to 10 with a BCEGS grade of 1 representing exemplary commitment to building code enforcement and a grade of 10 indicating less than minimum recognized protection.

Specific BCEGS rating for the participating jurisdictions can be obtained by contacting the department for building inspections within that jurisdiction.

7.3.4 Floodplain Management

Flooding represents the greatest natural hazard facing the nation. At the same time, the tools available to reduce the impacts associated with flooding are among the most developed when compared to other hazard-specific mitigation techniques. In addition to approaches that cut across hazards such as education, outreach, and the training of local officials, the *National Flood Insurance Program* (NFIP) contains specific regulatory measures that enable government officials to determine where and how growth occurs relative to flood hazards. Participation in the NFIP is voluntary for local governments; however, program participation is strongly encouraged by FEMA as a first step for implementing and sustaining an effective hazard mitigation program. It is therefore used as part of this assessment as a key indicator for measuring local capability.

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

A key service provided by the NFIP is the mapping of identified flood hazard areas. Once completed, the Flood Insurance Rate Maps (FIRMs) are used to assess flood hazard risk, regulate construction practices, and set flood insurance rates. FIRMs are an important source of information to educate residents, government officials, and the private sector about the likelihood of flooding in their community.

Table 7.2 provides NFIP policy and claim information for each participating jurisdiction in Davidson County.

[3] Participation in BCEGS is voluntary and may be declined by local governments if they do not wish to have their local building codes evaluated.

TABLE 7.2: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
DAVIDSON COUNTY†	05/01/80	06/16/09	187	$42,511,000	15	$229,408
Denton	05/10/12	03/16/09	0	$0	0	$0
Lexington	11/01/79	06/16/09	28	$7,227,900	5	$25,649
Midway*	--	--	--	--	--	--
Thomasville	09/28/79	06/16/09	58	$14,753,400	9	$82,810
Wallburg*	--	--	--	--	--	--

†Includes unincorporated areas of county only
* Community does not participate in the NFIP
Source: NFIP Community Status information as of 2/12/15; NFIP claims and policy information as of 11/30/14

Community Rating System: An additional indicator of floodplain management capability is the active participation of local jurisdictions in the Community Rating System (CRS). The CRS is an incentive-based program that encourages counties and municipalities to undertake defined flood mitigation activities that go beyond the minimum requirements of the NFIP by adding extra local measures to provide protection from flooding. All of the 18 creditable CRS mitigation activities are assigned a range of point values. As points are accumulated and reach identified thresholds, communities can apply for an improved CRS class rating. Class ratings, which range from 10 to 1, are tied to flood insurance premium reductions as shown in **Table 7.3**. As class rating improves (the lower the number the better), the percent reduction in flood insurance premiums for NFIP policyholders in that community increases.

TABLE 7.3: CRS PREMIUM DISCOUNTS, BY CLASS

CRS Class	Premium Reduction
1	45%
2	40%
3	35%
4	30%
5	25%
6	20%
7	15%
8	10%
9	5%
10	0

Source: *FEMA*

Community participation in the CRS is voluntary. Any community that is in full compliance with the rules and regulations of the NFIP may apply to FEMA for a CRS classification better than class 10. The CRS application process has been greatly simplified over the past several years based on community

comments. Changes were made with the intent to make the CRS more user-friendly and make extensive technical assistance available for communities who request it.

- The City of Lexington (Class 7) is the only jurisdiction that currently participates in the CRS. Participation in the CRS program should be considered as a mitigation action by the County and other participating municipalities. The program would be most beneficial to the Davidson County and the City of Thomasville, which have 187 and 58 NFIP policies, respectively.

Flood Damage Prevention Ordinance: A flood damage prevention ordinance establishes minimum building standards in the floodplain with the intent to minimize public and private losses due to flood conditions.

- All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. The county, Denton, Lexington, and Thomasville participate in the NFIP and they all have adopted flood damage prevention regulations.
- Although the Towns of Midway and Wallburg do not participate in the NFIP, they have adopted flood damage prevention ordinances.
- The Towns of Denton and Midway have adopted Davidson County's Flood Damage Prevention Ordinance.

Floodplain Management Plan: A floodplain management plan (or a flood mitigation plan) provides a framework for action regarding corrective and preventative measures to reduce flood-related impacts.

- Neither the county nor any of the participating municipalities have adopted floodplain management plans.
- The City of Lexington includes a floodplain management plan within its local land use ordinance.

Open Space Management Plan*:* An open space management plan is designed to preserve, protect, and restore largely undeveloped lands in their natural state and to expand or connect areas in the public domain such as parks, greenways, and other outdoor recreation areas. In many instances, open space management practices are consistent with the goals of reducing hazard losses, such as the preservation of wetlands or other flood-prone areas in their natural state in perpetuity.

- Davidson County has adopted a greenway master plan as well as a parks and recreation and tourism development master plan, which was also adopted by Denton, Lexington, and Thomasville.
- Davidson County also participated in the development of the Piedmont Triad Regional Open Space Strategy which identifies a wide variety of key conservation opportunities across the region as well as a strategy meant to serve as the foundation for future conservation planning efforts within the county.
- The City of Lexington has also adopted a city parks and recreation facility development master plan.

Stormwater Management Plan: A stormwater management plan is designed to address flooding associated with stormwater runoff. The stormwater management plan is typically focused on design

and construction measures that are intended to reduce the impact of more frequently occurring minor urban flooding.

- Neither the county nor any of the participating municipalities have adopted a stormwater master plan.
- The City of Thomasville has adopted a stormwater ordinance and several jurisdictions, including Davidson County and Lexington, include some stormwater regulations in other local ordinances. The City of Lexington is also in the process of implementing Phase II stormwater management requirements.

7.3.5 Administrative and Technical Capability

The ability of a local government to develop and implement mitigation projects, policies, and programs is directly tied to its ability to direct staff time and resources for that purpose. Administrative capability can be evaluated by determining how mitigation-related activities are assigned to local departments and if there are adequate personnel resources to complete these activities. The degree of intergovernmental coordination among departments will also affect administrative capability for the implementation and success of proposed mitigation activities.

Technical capability can generally be evaluated by assessing the level of knowledge and technical expertise of local government employees, such as personnel skilled in using Geographic Information Systems (GIS) to analyze and assess community hazard vulnerability. The Capability Assessment Survey was used to capture information on administrative and technical capability through the identification of available staff and personnel resources.

Table 7.4 provides a summary of the capability assessment results for Davidson County with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in that jurisdiction with the specified knowledge or skill.

TABLE 7.4: RELEVANT STAFF / PERSONNEL RESOURCES

Staff / Personnel Resource	DAVIDSON COUNTY	Denton	Lexington	Midway	Thomasville	Wallburg
Planners with knowledge of land development / land management practices	✓		✓	✓	✓	
Engineers or professionals trained in construction practices related to buildings and/or infrastructure	✓	✓	✓	✓	✓	✓
Planners or engineers with an understanding of natural and/or human-caused hazards	✓		✓		✓	

Staff / Personnel Resource	DAVIDSON COUNTY	Denton	Lexington	Midway	Thomasville	Wallburg
Emergency Manager	✓	✓	✓	✓	✓	✓
Floodplain Manager	✓	✓	✓	✓	✓	✓
Land Surveyors						
Scientists familiar with the hazards of the community	✓	✓	✓	✓	✓	✓
Staff with education or expertise to assess the community's vulnerability to hazards	✓	✓	✓	✓	✓	✓
Personnel skilled in GIS and/or Hazus	✓		✓		✓	
Resource development staff or grant writers			✓			

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

7.3.6 Fiscal Capability

The ability of a local government to take action is often closely associated with the amount of money available to implement policies and projects. This may take the form of outside grant funding awards or locally-based revenue and financing. The costs associated with mitigation policy and project implementation vary widely. In some cases, policies are tied primarily to staff time or administrative costs associated with the creation and monitoring of a given program. In other cases, direct expenses are linked to an actual project, such as the acquisition of flood-prone homes, which can require a substantial commitment from local, state, and federal funding sources.

The Capability Assessment Survey was used to capture information on the county's fiscal capability through the identification of locally available financial resources.

Table 7.5 provides a summary of the results for Davidson County with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds) according to the previous hazard mitigation plan.

TABLE 7.5: RELEVANT FISCAL RESOURCES

Fiscal Tool / Resource	DAVIDSON COUNTY	Denton	Lexington	Midway	Thomasville	Wallburg
Capital Improvement Programming	✓	✓	✓	✓	✓	✓
Community Development Block Grants (CDBG)	✓	✓	✓	✓	✓	✓
Special Purpose Taxes (or taxing districts)	✓	✓	✓	✓	✓	✓
Gas / Electric Utility Fees						
Water / Sewer Fees						
Stormwater Utility Fees						
Development Impact Fees						
General Obligation, Revenue, and/or Special Tax Bonds						
Partnering Arrangements or Intergovernmental Agreements	✓	✓	✓		✓	
Other: HMGP, PDM, FMA, SBA, other Federal, state, and non-governmental funding sources, etc.	✓	✓	✓	✓	✓	✓

7.3.7 Political Capability

One of the most difficult capabilities to evaluate involves the political will of a jurisdiction to enact meaningful policies and projects designed to reduce the impact of future hazard events. Hazard mitigation may not be a local priority or may conflict with or be seen as an impediment to other goals of the community, such as growth and economic development. Therefore, the local political climate must be considered in designing mitigation strategies as it could be the most difficult hurdle to overcome in accomplishing their adoption and implementation.

The Capability Assessment Survey was used to capture information on political capability of Davidson County. The previous hazard mitigation plan was reviewed for general examples of local political capability, such as guiding development away from identified hazard areas, restricting public investments or capital improvements within hazard areas, or enforcing local development standards that go beyond minimum state or federal requirements (i.e., building codes, floodplain management, etc.).

- The previous local hazard mitigation plan identified existing ordinances that address natural hazards or are related to hazard mitigation such as flood damage prevention, watershed protection, stream buffers, drought management, zoning, and subdivision.

- In Davidson County, many residents have not experienced significant natural hazard events and may be unaware of hazards that their community may face. Short-term solutions to natural hazard events are more acceptable than adopting hazard mitigation strategies in areas where the public does not perceive the threat of loss as great or imminent. It is expected that the current and future political climates will increasingly become more favorable with further education and awareness.

7.4 CONCLUSIONS ON LOCAL CAPABILITY

In order to form meaningful conclusions on the assessment of local capability, a quantitative scoring methodology was designed and applied to results of the Capability Assessment Survey. This methodology, further described in Appendix B, attempts to assess the overall level of capability of Davidson County to implement hazard mitigation actions.

The overall capability to implement hazard mitigation actions varies among the participating jurisdictions. For planning and regulatory capability, the majority of the jurisdictions are in the low to moderate range. There is also some variation in the administrative and technical capability among the jurisdictions with larger jurisdictions generally having greater staff and technical resources. All of jurisdictions are in the limited range for fiscal capability.

Table 7.6 shows the results of the capability assessment using the designed scoring methodology. The capability score is based solely on the information found in the existing hazard mitigation plan and readily available on the jurisdictions' government websites. According to the assessment, the average local capability score for all jurisdictions is 30.3, which falls into the moderate capability ranking.

TABLE 7.6: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
DAVIDSON COUNTY	41	High
Denton	22	Moderate
Lexington	46	High
Midway	19	Limited
Thomasville	36	Moderate
Wallburg	18	Limited

As previously discussed, one of the reasons for conducting a Capability Assessment is to examine local capabilities to detect any existing gaps or weaknesses within ongoing government activities that could hinder proposed mitigation activities and possibly exacerbate community hazard vulnerability. These gaps or weaknesses have been identified for each jurisdiction in the tables found throughout this section. The participating jurisdictions used the Capability Assessment as part of the basis for the

Mitigation Actions that are identified in Section 9; therefore, each jurisdiction addresses their ability to expand on and improve their existing capabilities through the identification of their Mitigation Actions.

7.4.1 Linking the Capability Assessment with the Risk Assessment and the Mitigation Strategy

The conclusions of the Risk Assessment and Capability Assessment serve as the foundation for the development of a meaningful hazard mitigation strategy. During the process of identifying specific mitigation actions to pursue, the Hazard Mitigation Planning Team considered not only each jurisdiction's level of hazard risk, but also their existing capability to minimize or eliminate that risk.

SECTION 8
MITIGATION STRATEGY

This section of the Plan provides the blueprint for the participating jurisdictions in Davidson County to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Davidson County Hazard Mitigation Planning Team and the findings and conclusions of the *Capability Assessment* and *Risk Assessment*. It consists of the following five subsections:

- 8.1 Introduction
- 8.2 Mitigation Goals
- 8.3 Identification and Analysis of Mitigation Techniques
- 8.4 Selection of Mitigation Techniques for Davidson County
- 8.5 Plan Update Requirement

8.1 INTRODUCTION

The intent of the Mitigation Strategy is to provide the Davidson County communities with the goals that will serve as guiding principles for future mitigation policy and project administration, along with an analysis of mitigation techniques available to meet those goals and reduce the impact of identified hazards. It is designed to be comprehensive, strategic, and functional in nature:

- In being *comprehensive*, the development of the strategy includes a thorough review of all hazards and identifies extensive mitigation measures intended to not only reduce the future impacts of high risk hazards, but also to help the region achieve compatible economic, environmental, and social goals.
- In being *strategic*, the development of the strategy ensures that all policies and projects proposed for implementation are consistent with pre-identified, long-term planning goals.
- In being *functional,* each proposed mitigation action is linked to established priorities and assigned to specific departments or individuals responsible for their implementation with target completion deadlines. When necessary, funding sources are identified that can be used to assist in project implementation.

The first step in designing the Mitigation Strategy includes the identification of mitigation goals. Mitigation goals represent broad statements that are achieved through the implementation of more specific mitigation actions. These actions include both hazard mitigation policies (such as the regulation of land in known hazard areas through a local ordinance) and hazard mitigation projects that seek to address specifically targeted hazard risks (such as the acquisition and relocation of a repetitive loss structure).

The second step involves the identification, consideration, and analysis of available mitigation measures to help achieve the identified mitigation goals. This is a long-term, continuous process sustained through the development and maintenance of this Plan. Alternative mitigation measures will continue to be considered as future mitigation opportunities are identified, as data and technology improve, as mitigation funding becomes available, and as this Plan is maintained over time.

The third and last step in designing the Mitigation Strategy is the selection and prioritization of specific mitigation actions for Davidson County and its municipalities (provided separately in Section 9: *Mitigation Action Plan*). The county and each participating jurisdiction has its own Mitigation Action Plan (MAP) that reflects the needs and concerns of that jurisdiction. The MAP represents an unambiguous and functional plan for action and is considered to be the most essential outcome of the mitigation planning process.

The MAP includes a prioritized listing of proposed hazard mitigation actions (policies and projects) for Davidson County and its municipalities to complete. Each action has accompanying information, such as those departments or individuals assigned responsibility for implementation, potential funding sources, and an estimated target date for completion. The MAP provides those departments or individuals responsible for implementing mitigation actions with a clear roadmap that also serves as an important tool for monitoring success or progress over time. The cohesive collection of actions listed in the MAP can also serve as an easily understood menu of mitigation policies and projects for those local decision makers who want to quickly review the recommendations and proposed actions of the Hazard Mitigation Plan.

In preparing each Mitigation Action Plan for Davidson County, officials considered the overall hazard risk and capability to mitigate the effects of hazards as recorded through the risk and capability assessment process, in addition to meeting the adopted mitigation goals and unique needs of the community.

8.1.1 Mitigation Action Prioritization

Prioritization of the proposed mitigation actions was based on the following six factors:

- Effect on overall risk to life and property
- Ease of implementation
- Political and community support
- A general economic cost/benefit review[1]
- Funding availability
- Continued compliance with the NFIP

The point of contact for each jurisdiction helped coordinate the prioritization process by reviewing each action and working with the lead agency/department responsible to determine a priority for each action using the six factors listed above.

Using these criteria, actions were classified as high, moderate, or low priority by the participating jurisdiction officials.

[1] Only a general economic cost/benefit review was considered by the Hazard Mitigation Planning Team through the process of selecting and prioritizing mitigation actions. Mitigation actions with "high" priority were determined to be the most cost effective and most compatible with the participating jurisdictions' unique needs. Actions with a "moderate" priority were determined to be cost-effective and compatible with jurisdictional needs, but may be more challenging to complete administratively or fiscally than "high" priority actions. Actions with a "low" priority were determined to be important community needs, but the community likely identified several potential challenges in terms of implementation (e.g. lack of funding, technical obstacles). A more detailed cost/benefit analysis will be applied to particular projects prior to the application for or obligation of funding, as appropriate.

8.2 MITIGATION GOALS

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

The primary goal of all local governments is to promote the public health, safety, and welfare of its citizens. In keeping with this standard, Davidson County and the participating municipalities have developed five goal statements for local hazard mitigation planning in the county. In developing these goals, the previous hazard mitigation plan was reviewed to determine if the goals remained applicable. The existing goals were presented, reviewed, voted on, and accepted by the Hazard Mitigation Planning Team (all of the goals remain unchanged). Each goal, purposefully broad in nature, serves to establish parameters that were used in developing mitigation actions. The Davidson County Mitigation Goals are presented in **Table 8.1**. Consistent implementation of actions over time will ensure that community goals are achieved.

TABLE 8.1: DAVIDSON COUNTY MITIGATION GOALS

	Goal
Goal #1	To enhance local government capability to lessen the impacts of all natural hazards.
Goal #2	To identify and protect critical facilities, services, and infrastructure from the impacts of natural disasters.
Goal #3	To develop an effective public awareness/education/outreach program for natural hazards impacts.
Goal #4	To protect persons and property from damage due to natural hazards.
Goal #5	To ensure disaster resistant future development.

8.3 IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES

44 CFR Requirement
44 CFR Part 201.6(c)(3)(ii): The mitigation strategy shall include a section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effect of each hazard, with particular emphasis on new and existing buildings and infrastructure.

In formulating the Mitigation Strategy for Davidson County, 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 Davidson County Hazard Mitigation Planning Team meetings. In general, all activities considered by the Hazard Mitigation Planning Team can be classified under one of the following six broad categories of mitigation techniques: Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, and Public Awareness and Education. These are discussed in detail below.

8.3.1 Prevention

Preventative activities are 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:

- Planning and zoning
- Building codes
- Open space preservation
- Floodplain regulations
- Stormwater management regulations
- Drainage system maintenance
- Capital improvements programming
- Riverine / fault zone setbacks

8.3.2 Property Protection

Property protection measures involve the modification of existing buildings and structures to help them better withstand the forces of a hazard, or removal of the structures from hazardous locations. Examples include:

- Acquisition
- Relocation
- Building elevation
- Critical facilities protection
- Retrofitting (e.g., windproofing, floodproofing, seismic design techniques, etc.)
- Safe rooms, shutters, shatter-resistant glass
- Insurance

8.3.3 Natural Resource Protection

Natural resource protection activities reduce the impact of natural hazards by preserving or restoring natural areas and their protective functions. Such areas include floodplains, wetlands, steep slopes, and sand dunes. Parks, recreation, or conservation agencies and organizations often implement these protective measures. 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
- Slope stabilization

8.3.4 Structural Projects

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:

- Reservoirs
- Dams / levees / dikes / floodwalls
- Diversions / detention / retention
- Channel modification
- Storm sewers

8.3.5 Emergency Services

Although not typically considered a "mitigation" technique, emergency service measures do minimize the impact of a hazard event on people and property. These commonly are actions taken immediately prior to, during, or in response to a hazard event. Examples include:

- Warning systems
- Evacuation planning and management
- Emergency response training and exercises
- Sandbagging for flood protection
- Installing temporary shutters for wind protection

8.3.6 Public Education and Awareness

Public education and awareness activities are used to advise residents, elected officials, business owners, potential property buyers, and visitors 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

- Hazard expositions

8.4 SELECTION OF MITIGATION TECHNIQUES FOR DAVIDSON COUNTY

In order to determine the most appropriate mitigation techniques for the communities in Davidson County, the Hazard Mitigation Planning Team thoroughly reviewed and considered the findings of the *Capability Assessment* and *Risk Assessment* to determine the best activities for their respective communities. 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).

8.5 PLAN UPDATE REQUIREMENT

In keeping with FEMA requirements for plan updates, the Mitigation Actions identified in the previous plans were evaluated to determine their 2015 implementation status. Updates on the implementation status of each action are provided. The mitigation actions provided in Section 9: *Mitigation Action Plan* include the mitigation actions from the previous plans as well as any new mitigation actions proposed through the 2015 planning process.

SECTION 9
MITIGATION ACTION PLAN

This section includes the listing of the mitigation actions proposed by the participating jurisdictions in Davidson County. It consists of the following two subsections:

- 9.1 Overview
- 9.2 Mitigation Action Plans

44 CFR Requirement
44 CFR Part 201.6(c)(3)(iii): The mitigation strategy shall include an action plan describing how the actions identified in paragraph (c)(2)(ii) of this section will be prioritized, implemented, and administered by the local jurisdiction.

9.1 OVERVIEW

As described in the previous section, the Mitigation Action Plan, or MAP, provides a functional plan of action for each jurisdiction. It is designed to achieve the mitigation goals established in Section 8: *Mitigation Strategy* and will be maintained on a regular basis according to the plan maintenance procedures established in Section 10: *Plan Maintenance*.

Each proposed mitigation action has been identified as an effective measure (policy or project) to reduce hazard risk for Davidson County. Each action is listed in the MAP in conjunction with background information such as hazard(s) addressed and relative priority. Other information provided in the MAP includes 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 Davidson County Multi-Jurisdictional 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 and in Section 8 (page 8.2).

The Mitigation Action Plan is organized by mitigation strategy category (Prevention, Property Protection, Natural Resource Protection, Structural Projects, Emergency Services, or Public Education and Awareness). The following are the key elements described in the Mitigation Action Plan:

- Hazard(s) Addressed—Hazard which the action addresses.
- Relative Priority—High, moderate, or low priority as assigned by the jurisdiction.
- Lead Agency/Department—Department responsible for undertaking the action.
- Potential Funding Sources—Local, State, or Federal sources of funds are noted here, where applicable.
- Implementation Schedule—Date by which the action the action should be completed. More information is provided when possible.

- Implementation Status (2015)—Indication of completion, progress, deferment, or no change since the previous plan. If the action is new, that will be noted here.

9.2 MITIGATION ACTION PLANS

The mitigation actions proposed by each of the participating jurisdictions are listed in 6 individual MAPs on the following pages. **Table 9.1** shows the location of each jurisdiction's MAP within this section as well as the number of mitigation actions proposed by each jurisdiction.

TABLE 9.1: INDIVIDUAL MAP LOCATIONS

Location	Page	Number of Mitigation Actions
Davidson County	**9:3**	**20**
Denton	9:9	12
Lexington	9:13	20
Midway	9:19	15
Thomasville	9:22	21
Wallburg	9:28	3

Davidson County Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Adopt stormwater management plan.	Flood	High	Davidson County Planning	Local	January 2018	Since the last plan update, the county has become a member of Stormwater Smart. However, stormwater management regulations require regular evaluation so the county will plan to carry this out going forward.
P-2	Coordinate the collection and storage of damage assessment information such as type of hazard, location of hazard occurrence, when it occurred, death or injury, property damaged, ***in digitized form*** for easy retrieval and for local use in hazard mitigation and land use planning.	All	High	Davidson County Planning/ Emergency Management	Local	July 2016	Data has already been collected for this task but a GIS layer still needs to be created to complete the action. This is in progress but the action is being deferred to 2016.
P-3	Develop storm water management programs to increase water quality and mitigate against storm water or urban flooding.	Flood	High	Davidson County Public Works	NC Division of Water Quality Loans	January 2018	Stormwater management programs have been established and will continue to be implemented. However, stormwater management regulations require regular evaluation so the county will plan to carry this out going forward.
P-4	Require developers demonstrate how the proposed development will have a sufficient emergency water supply that will be both available and accessible during a wildfire and/or structure fire.	Wildfire	High	Davidson County Planning	Local	Completed	Developers must demonstrate that proposed development will have sufficient emergency water supply so this action is complete.
P-5	Designate preferred growth areas and develop area plans for target locations.	All	Moderate	Davidson County Planning	Local	Completed	Preferred growth areas have been designed so this action is complete.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
P-6	Continued enforcement of all codes as they apply to protection from hazards. Especially for construction in flood prone areas. Ensure adequate follow up and compliance.	All	High	Davidson County Planning/ Inspections	Local	2020	A number of codes are in place to ensure protection from hazards, especially in flood areas. These codes require continual evaluation and assurance that structures are in compliance so this action is being deferred to the next cycle.
P-7	Finalize a COOP plan for the county and its departments	All	High	Davidson County Emergency Services	Local	2018	New action
P-8	Finalize a EOP plan for the county and its departments	All	High	Davidson County Emergency Services	Local	Summer 2016	New action
Property Protection							
PP-1	Retrofit critical facilities and county owned facilities for improved resilience to all hazards with the use new technology. This could include but is not limited to: wind retrofits, low water consumption fixtures, leak detectors, ignition-resistant building materials, 320 or 361 compliant safe rooms, lightning protection, hail resistant roofing and/or anchoring fixed building equipment	All	High	Davidson County Emergency Services	Local	2020	New action
PP-2	Install back-up generators on critical facilities and county owned facilities for improved resilience to all hazards.	All	High	Davidson County Emergency Services	Local	2020	New action
Natural Resource Protection							
NRP-1	Consider additional vegetative buffering requirements beyond 50 foot buffer for large developments with extensive impervious surfaces.	All	Low	Davidson County Planning	Local	January 2018	The county has not implemented additional vegetative buffer requirements. This will be something the county evaluates again going forward so this action is deferred.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
NRP-2	Adopt as countywide policy: Wherever possible preserve natural wetlands, designate conservation corridors, especially along streams through acquisition or conservation easements.	All	Moderate	Davidson County Planning	Local	Completed	The Davidson County Land Development Plan addresses the preservation of natural areas so this action is complete.
Emergency Services							
ES-1	Suggest locating a new fire department on High Rock Mountain.	Wildfire	Moderate	Davidson County Emergency Services Department/ County Fire Marshal	Funding unidentified	Deleted	The County approved the placement of three (3) 10,000 gallon storage tanks on a dry hydrant for fire protection on High Rock Mountain so this action is no longer necessary and will be deleted.
ES-2	Consider gravity fed system for water supply.	Wildfire	Low	Davidson County Planning	Funding unidentified	Completed	The County approved the placement of three (3) 10,000 gallon storage tanks on a dry hydrant for fire protection on High Rock Mountain so this action is complete.
ES-3	Improve countywide emergency notification system by integrating cell numbers and implementing other update features.	All	High	Davidson County Emergency Services Department	Local	2017	New action
Public Education and Awareness							
PEA-1	Educate and inform local government and elected officials (decision makers) of the need to consider hazard mitigation in policy and budgetary planning and decision making processes.	All	High	Davidson County Planning/ Emergency Services Department	Local	2020	The county ES department has taken many steps (such as presentations at county board meetings) to provide local government officials with necessary information on mitigation to plan the budget and policy-making accordingly. However, this action will need to be carried on and new information will need to be presented as it becomes available.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
PEA-2	Design a public information/education program targeted to mobile home/manufactured home residents explaining hazards such as high wind events, flooding and alternative shelters in a storm/high wind event/ flood.	Flood	High	Davidson County Emergency Services Department	Local	2020	Although some information on high wind events has been developed and made available to manufactured home residents, additional information and dissemination has been deemed necessary so the county will work on improving outreach going forward.
PEA-3	Disseminate information on the benefits of purchasing **flood insurance** to property owners in flood hazard areas.	Flood	Moderate	Davidson County Planning/ Inspections	Local	Completed	Educational information is displayed at the Central Permitting Office since 2013 so this action is complete.
PEA-4	Incorporate Flood hazard awareness materials into storm water outreach.	Flood	Low	Davidson County Planning	Local	2019	Stormwater Smart educates school children about flooding. This aspect of the program will continue to be re-evaluated and improvements will be implemented as necessary.
PEA-5	Educate High Rock Mountain residents as to risks of wildfire, lack of emergency water supply, and need for creating a defensible space around structures.	Wildfire	High	Davidson County Emergency Services Department, NC Forest Service	Local	Completed	Several actions have been taken to help reduce risk to High Rock Mountain residents including outreach materials so this action is complete.
Previously Completed Mitigation Actions							
	Address data limitations regarding lack of detailed information about individual structures located in floodplains and first floor elevations for priority areas.	Flood	Moderate	Davidson County Planning	Local	Completed	Completed in 2006. No further data limitations. This information is stored in County GIS.
	Protect government documents and critical information from flood damage by elevating all critical documents, records, files on upper floors of buildings or facilities in floodplains.	Flood	High	Davidson County Planning/ Administration/ Social Services	Local	Completed	Completed in 2006. This has been done for paper files. Back-up files for all digital information are stored off-site.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Evaluate current capacity of critical services to deal with power outages	Winter Storm, High Wind	High	Davidson County Emergency Services Department	Local	Completed	Completed in 2007. Evaluation verified needs and priorities for alternative power at governmental center and other key functions. Assurance that critical county services can continue in-place in case of natural disaster
	Procure generators and fuel for alternative sources of power for Governmental Center	Winter Storm, High Wind	Moderate	Davidson County Administration/ Emergency Management	Local	Completed	Completed in 2008. Generators and transfer switches purchased for all priority sites: -- all EMS bases, 911 Center, Health Department and Gov't. Center. This assures that critical countywide functions can continue in-place in case of natural disaster.
	Procure and install transfer switches	Winter Storm, High Wind	Low	Davidson County Emergency Management	Homeland Security Grants	Completed	Completed in 2008. Generators and transfer switches purchased for all priority sites: -- all EMS bases, 911 Center, Health Department and Gov't. Center. This assures that critical countywide functions can continue in-place in case of natural disaster.
	Consider sign ordinances limiting height or size of signs in certain corridors (i.e., US 64; Hwy 8; US 52; Bus 85).	High Wind	Low	Davidson County Planning	Local	Completed	Completed in 2007. Height limitations adopted. See "Signs" section of county Zoning Ordinance Reduce potential for property damage in high wind events.
	Identify, upgrade, map emergency shelters throughout county and municipalities.	All	High	Davidson County Emergency Services Department	Local	Completed	Completed in 2007. All shelters identified, classified according to uses & accessibility. Makes operating in case of disaster swift and reliable.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Identify and designate at least one emergency shelter in each municipality	All	High	Davidson County Emergency Services Department	Local	Completed	Completed in 2007. All shelters identified, classified according to uses & accessibility. Makes operating in case of disaster swift and reliable.
	Put in place a countywide 911 reverse call system for location specific warning to public of impending disaster	All	High	Davidson County Emergency Services Department	Homeland Security Funds	Completed	Completed in 2008. Makes possible targeted and advance warning of certain disasters.
	Locate and identify emergency water source for High Rock Mountain area in case of wildfire.	Wildfire	High	Davidson County Emergency Services Department, Handy Sanitary District	Local	Completed	Completed in 2006. Ponds have been located and installed that provide water source for firefighters. In addition roads are being widened to accommodate firefighting vehicles.
	Identify potential inundation areas downstream of high hazard dams.	Dam Failure	Moderate	Aluminum Corporation of America (dam owner)	Local	Completed	Completed in 2008. Pin-points most vulnerable properties for emergency response purposes. Also identifies target properties for mitigation actions including on-going education.
	Through subdivision regulations, encourage that power, cable and telephone lines be buried.	High Wind, Winter Storm	Moderate	Davidson County Planning	Local	Completed	Completed in 2006. Power and utility lines required to be underground for all new developments. Reduces power outages, threats to human health in high wind, ice and snow events.
	Strengthen floodplain regulation to current standards. (New model regulation).	Flood	High	Davidson County Planning/ Inspections	Local	Completed	Completed in 2009. New floodplain maps and ordinance adopted February 2009. Provides for accurate data, mapping and enforcement of regulations.

Town of Denton Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Establish hazard mitigation as a component of all planning activities.	All	Moderate	Denton Town Manager	n/a	2019	Although hazard mitigation has been integrated into many planning activities, the town will attempt to improve its integration into all planning activities going forward.
P-2	Develop a comprehensive land use plan.	All	Moderate	Denton Town Manager	n/a	2017	The town does not have a comprehensive plan but is requesting funding to begin comprehensive plan in FY2015-2016 and complete in 18 months.
P-3	Continue to clear debris from culverts and storm drains in flood prone areas.	Flood	High	Denton Public Works	Local	2020	In the past, the town has undertaken debris removal to reduce localized flooding in areas around culverts and storm drains. The town will continue to implement this program and will work to identify any new areas that require maintenance and check-ins.
P-4	Consider tree ordinances or programs to encourage planting trees less susceptible to damage from ice and wind.	Winter Storm, High Wind	Low	Denton Town Manager	Urban and Community Forestry Grant	2018	The town has not established an ordinance or program related to tree planting, but it will continue to look into doing so, most likely as part of developing a comprehensive plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
P-5	Through subdivision regulations, encourage that power, cable and telephone lines be buried.	Winter Storm, High Wind	Low	Denton Town Manager	Local	2018	The town has not required that utility lines be buried, but it will continue to encourage this practice and will look into establishing subdivision regulations to this effect, most likely as part of developing a comprehensive plan.
P-6	Through development of land use plan, designate preferred growth areas and develop area plans for target locations.	All	Low	Denton Town Manager	Local	2017	The town has not established a comprehensive land use plan, but funding is requested for FY 2015-2016 with completion in 18 months.
P-7	Through development of land use plan, Wherever possible preserve natural wetlands, designate conservation corridors, especially along streams through acquisition or conservation easements.	All	Low	Denton Town Manager	Local	2017	The town has not established a comprehensive land use plan, but funding is requested in FY 2015-2016.
P-8	Consider amending subdivision ordinance to allow clustering to maximize density while preserving high hazard areas (areas prone to flood, landslide, erosion)	All	Low	Denton Town Manager	Local	2017	The town has not amended its subdivision ordinance to allow clustering, but it most likely will come as part of developing a comprehensive land use plan, scheduled to begin in FY 2015-2016 & take 18 months to complete.
Property Protection							
PP-1	Evaluate current capacity of critical services to deal with power outages.	All	High	Denton Town Manager/Fire Service	Local	2020	The town has evaluated the current capacity of critical services and generally found that it has the capacity to deal with power outages. Continued evaluation will be necessary and increases in supply will be implemented when required.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Emergency Services							
ES-1	Develop emergency water supply capability.	All	High	Denton Town Manager	n/a	Completed	The town has established an emergency water supply capability so this action is completed.
Public Education and Awareness							
PEA-1	Educate and inform local government and elected officials (decision makers) of the need to consider hazard mitigation in policy and budgetary planning and decision making processes.	All	High	Denton Town Manager	Local	2016, Annually	Many efforts have been taken to inform local government and elected officials about the need to consider hazard mitigation in planning and policy-making decisions, however, this effort will need to be continued due to turnover of officials and to keep this on the radar of those officials
PEA-2	Water conservation message to be place on water bills during drought.	Drought	Low	Denton Town Water Resources	Local	2016, Annually	The town has included water conservation messages in water bills, but this will practice will need to be continued to keep it in the minds of citizens.
Previously Completed Mitigation Actions							
	Obtain generator for emergency shelter (civic center) and fire station.	All	High	Denton Town Manager/Fire Service	Local	Completed	Completed in 2007. Generators purchased for both facilities. Assurance that critical municipal functions can continue in-place in case of natural disaster.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Develop a policy regarding drought management and response.	Drought	Low	Denton Town Manager	n/a	Completed	Completed in 2004. Denton is a part of the comprehensive countywide water conservation and interconnect plan which establishes uniform water control measures among jurisdictions and Davidson Water, Inc. and provides for interconnections in case of severe drought.
	Countywide 911 reverse call system.	All	High	Davidson County	n/a	Completed	Completed in 2008. Makes possible targeted and advance warning of certain disasters.
	Identify and designate at least one emergency shelter in Denton.	All	High	Denton Town Manager	n/a	Completed	Completed in 2007. Shelters are designated, and according to the County plan, are being "typed" according to use by general and special populations. This assures that safe and secure shelter is ready and available in multi-hazard situations.

City of Lexington Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Establish hazard mitigation as a component of all planning activities.	All	High	Lexington Planning	Local	Accomplished	The Land Use Plan is the primary plan that incorporates hazard mitigation into planning. But all new development is approved only after a multi-department plan review process which takes into consideration hazards and risks identified in the City's Hazard Mitigation Plan.
P-2	Adopt local storm water regulations to reduce urban and small stream flooding and reduce the impact of urban runoff on downstream rivers.	Flood	High	Lexington Planning	Local	2 years (2017)	Lexington is a member of Stormwater SMART, the regional program that provides stormwater and flood control public education in the county. Also, the Zoning Ordinance incorporates many provisions to reduce stormwater runoff in new development. The City has now been designated urban and will soon be under Phase II rules.
P-3	Develop in-house GIS capabilities to track the value of properties within planning areas; and easily identify land in non-buildable areas.	All	High	Lexington Engineering Department	Local	Accomplished	Currently available on Davidson County GIS.
P-4	Coordinate collection and storage of damage assessment information such as type of hazard, location of hazard occurrence, when it occurred, death or injury, property damaged, ***in digitized form*** for easy retrieval and local use in hazard mitigation and land use planning.	All	High	Davidson County Emergency Services, City and County GIS	Local	Accomplished	GIS has this capability. The City has not collected any data on events.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
P-5	Develop program to clear debris from culverts and storm drains in flood prone areas.	Flood	Moderate	Lexington Public Works/Streets Department	Homeland Security Funds	Accomplished	Part of current maintenance program.
P-6	Develop storm water programs to increase water quality and mitigate against storm water or urban flooding.	Flood	High	Lexington Public Works/Planning	Local	Deleted	This action was combined with P-2.
P-7	Through subdivision regulations, encourage that power, cable and telephone lines be buried.	Winter Storm, High Wind	Moderate	Lexington Planning	Local	Accomplished	Regulations require all new subdivision utilities to be underground.
P-8	Establish natural hazard vulnerability assessment as a component of the plans-review –approval process.	All	High	Lexington Planning	Local	Accomplished	The Land Use Plan is the primary plan that incorporates hazard mitigation into planning. But all new development is approved only after a multi-department plan review process which takes into consideration hazards and risks identified in the City's Hazard Mitigation Plan.
P-9	Devise local policy precluding the placement public facilities within a floodplain unless the facility provides an overriding public benefit, will not worsen hazard risk, will not promote further floodplain development, and will be constructed to withstand flood damage.	Flood	High	Lexington Planning	Local	Accomplished	Zoning regulations addresses this issue
P-10	Set up centralized, coordinated permitting process.	All	Low	Lexington Planning	Local	Accomplished	Consolidated through Business and Community Development
P-11	Designate preferred growth areas and develop area plans for target locations.	All	Moderate	Lexington Planning	Local	Accomplished	Land Use Plan Ordinance 2004, updated 2010
P-12	Encourage street interconnectivity in all new subdivisions to allow multiple access points for emergency vehicles.	All	Moderate	Lexington Planning	Local	Accomplished	Land Use Plan Ordinance 2004, updated 2010

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Property Protection							
PP-1	Evaluate current capacity of critical services to deal with power outages.	Winter Storm, High Wind	High	Lexington Information and Technology/ Electric Department	Local	Accomplished	Every building with data network switch has at least a UPS. Also have redundant fiber paths in most buildings. All electric substations are on wireless network.
PP-2	All new critical public structures will be designed and constructed to withstand winds of at least 100 mph.	High Wind	Moderate	Lexington Building Inspections/ Planning	Local	Deleted	Davidson County and City of Lexington refer to NC State Building Code which is 90 mph.
Natural Resource Protection							
NRP-1	Wherever possible preserve natural wetlands, designate conservation corridors, especially along streams through acquisition or conservation easements.	All	High	Lexington Planning	Local	Accomplished	Land Use Ordinance adopted 2004, updated 2010
Emergency Services							
ES-1	Pursue and achieve the designation of Lexington as a "Storm Ready Community" by the National Weather Service to assure timely public warning of impending natural disaster events.	All	Moderate	Lexington Fire Department	Local	2 years (2017)	Work has been started to achieve the designation as a Storm Ready community and should be completed in next 2 years.
ES-2	Develop plans for the notification and evacuation of populations downstream of the Thom-A-Lex dam.	Dam Failure	High	Lexington Water Department, Davidson County Emergency Services	Local	Accomplished	These plans were approved on March 1, 2015
Public Education and Awareness							
PEA-1	Educate and inform local government and elected officials (decision makers) of the need to consider hazard mitigation in policy and budgetary planning and decision making processes.	All	High	Lexington Fire Department	Local	6 months – 3 years (2018)	City employees and elected officials training on NIMS has started and is being updated.
PEA-2	Periodically write a letter to flood plain property owners reminding them of their status and need to purchase flood insurance.	Flood	Moderate	Lexington Engineering Department	Local	Accomplished	Letters sent to repetitive loss property owners annually by Lexington Engineering Department.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
PEA-3	Use available communications resources for outreach and education to promote awareness of natural hazards and mitigation options.	All	Moderate	Lexington Fire Department, Davidson County Emergency Services	Local	Accomplished	Public Awareness Campaign has been developed and implemented
Previously Completed Mitigation Actions							
	Adopt a Unified Development Ordinance regulating the uses of buildings, structures and open land to support mitigation activities.	All	High	Lexington Planning	Local	Completed	Completed in 2004. The Zoning and Flood Plain ordinances are part of the Unified Development Ordinance and regulate building and land use in support of mitigation activities.
	Develop a comprehensive policy regarding drought management and response.	Drought	High	Lexington Public Works/Water Division	Local	Completed	Completed in 2004. Lexington City Council and all governing boards responsible for providing water throughout the County adopted comprehensive water conservation and interconnect plan in 2004 to assure that public water is available for human health and safety even in periods of severe drought.
	Define and identify all “critical facilities.”	All	Moderate	Lexington GIS/Information Technology	Local	Completed	Completed in 2008. These facilities were identified and mapped for the 2004 Plan and have been updated for 2009. The outcome is that all such facilities have either back-up power and/or advanced plans for evacuation.
	Fully assess the vulnerability of each identified critical facility to natural hazards.	All	Moderate	Lexington Engineering Department	Local	Completed	Completed in 2007. These sites have been mapped and inspected for vulnerability to minimize multi-hazard risks.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Modify, relocate, retrofit, or protect to the extent practical, any critical facility vulnerable to natural hazards.	All	Moderate	Lexington Public Buildings	Local	Completed	Completed in 2007. All critical facilities have been evaluated. Facilities that are vulnerable (e.g. County Administration Building and Health Department [within City of Lexington] and City Water Department have been equipped with generators and transfer switches. Records are digitally stored and backed up.
	Identify alternative water supplies.	All	Moderate	Lexington Public Works/Water Division	Local	Completed	Completed in 2004. Lexington has signed the countywide water conservation and interconnect plan which establishes uniform water control measures among jurisdictions and Davidson Water, Inc. and provides for interconnections in case of severe drought.
	Supply critical facilities with back-up power source. Priority needs: • generator for Fire stations • generator for utilities complex	Winter Storm, High Wind	Low	Lexington Finance/Electric Department	Local	Completed	Completed. Generators and transfer switches purchased for all priority sites including all city fire stations and the hospital. City Hall, garage, and a portion of the utilities complex are equipped with emergency generators and automatic transfer switches. This assures that critical municipal functions can continue in-place in case of natural disaster.
	Look for sources of funding to procure and install transfer switches.	Winter Storm, High Wind	Low	Lexington Electric Department/ Information Technology	Homeland Security	Completed	Completed in 2008. Transfer switches purchased for all crucial public facilities.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Identify and designate at least one emergency shelter in Lexington.	All	High	Davidson County Emergency Services	Local	Completed	Completed in 2007. A countywide plan has been developed and enhanced that is applicable in Lexington. Emergency shelters (schools, YMCA, large churches, etc.) are classified and mapped according to the general and special needs they will provide.
	Strengthen floodplain regulation to current standards. (New model regulation).	Flood	High	Lexington Planning	Local	Completed	Completed in 2009. Updated ordinance and new maps have been adopted by the City Council. The number of flood prone properties is reduced from previous maps. This is integrated into the City's GIS mapping system.

Town of Midway Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Establish hazard mitigation as a component of all planning activities.	All	Moderate	Midway Town Manager	n/a	2019	Although hazard mitigation has been integrated into many planning activities, the town will attempt to improve its integration into all planning activities going forward.
P-2	Currently developing a comprehensive land use plan that will be implemented in phases.	All	Moderate	Midway Town Manager/Planning Zoning Board	n/a	Completed	The town has developed a comprehensive land use plan.
P-3	Adopted Davidson County's policy regarding drought management and response.	Drought	Low	Midway Town Manager	n/a	Completed	The town has adopted Davidson County's policy regarding drought management and response.
P-4	Clear debris from culverts and storm drains in flood prone areas.	Flood	High	NC DOT	n/a	Deleted	NC Department of Transportation clears debris from culverts and storm drains in flood prone areas.
P-5	Consider tree ordinances or programs to encourage planting trees less susceptible to damage from ice and wind.	Winter Storm, High Wind	Low	Midway Town Manager	n/a	2015-2016	The town has not established an ordinance or program related to tree planting, but it will do so in the next two years.
P-6	Through a subdivision regulation plan, encourage that power, cable and telephone lines be buried. This will be implemented in phases.	Winter Storm, High Wind	Low	Midway Town Manager/Planning Zoning Board	Local	2016	The town will be requiring that utility lines be buried in all new subdivisions
P-7	Through development of land use plan, designate preferred growth areas and develop area plans for target locations. This will be implemented in phases.	All	Low	Midway Town Manager/Planning Zoning Board	Local	2015-2016	The town is working to develop a land use plan and currently has a draft plan developed. It will be finalized no later than December 2016.
P-8	Consider a subdivision ordinance to allow clustering to maximize density while preserving high hazard areas (areas prone to flood, landslide, erosion).	All	Low	Midway Town Manager/Planning Zoning Board	Local	2015/16	The town will be adopting a subdivision ordinance to be finalize no later than December 2016

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Property Protection							
PP-1	Evaluate capacity of critical services to deal with power outages.	All	High	Midway Town Manager/Duke Power	n/a	Deleted	Duke Power currently evaluates capacity of critical services to deal with power outages.
Natural Resource Protection							
NRP-1	Through development of land use plan, Wherever possible preserve natural wetlands, designate conservation corridors, especially along streams through acquisition or conservation easements.	All	Low	Midway Town Manager/Planning Zoning Board	Local	2018	The town has been working to develop a land use plan and currently has a draft plan developed. It will look to finalize this plan before the next HMP update.
Emergency Services							
ES-1	Emergency water supply capability is handled through Davidson Water Inc.	All	High	Midway Town Manager, Davidson Water Inc.	n/a	Deleted	Emergency water supply capability is handled through Davidson Water Inc
ES-2	Generators for emergency shelter (Midway Elementary School) and fire station.	All	High	Midway Fire and Rescue	Local	2020	The town is looking into investing in generators for the emergency shelter and fire station but has not purchased these yet.
ES-3	Countywide 911 reverse call system.	All	High	Davidson County	n/a	2017	A countywide reverse 911 system is in place, but the county is looking to improve and upgrade this system in the next few years.
ES-4	Identify and designate at least one emergency shelter in Midway (Midway Elementary School).	All	High	Midway Fire Services/Town Manager	n/a	Completed	The county has designated Midway Elementary School as an emergency shelter.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Public Education and Awareness							
PEA-1	Educate and inform local government and elected officials (decision makers) of the need to consider hazard mitigation in policy and budgetary planning and decision-making processes. Will be attending **National Incident Management System course.**	All	High	Midway Town Manager	Local	2016, Annually	Many efforts have been taken to inform local government and elected officials about the need to consider hazard mitigation in planning and policy-making decisions, however, this effort will need to be continued due to turnover of officials and to keep this on the radar of those officials

City of Thomasville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Establish hazard mitigation as a component of all planning activities.	All	High	Thomasville Planning	Local	2018	Comprehensive land use plan implemented in December 2008. The city will need to evaluate and update the plan in the future so this action is deferred.
P-2	Implement storm water management program.	Flood	High	Thomasville Water Resources/Public Works	Local	Completed	Thomasville is a Phase II Stormwater city and adopted a Stormwater Management Ordinance in 2006.
P-3	Continue to clear debris from culverts and storm drains in flood prone areas.	Flood	Moderate	Thomasville Public Works	Local	Completed	Thomasville is a Phase II Stormwater city and adopted a Stormwater Management Ordinance in 2006. Thomasville joined the Stormwater SMART. Implemented program to clear drains and install stormwater devices.
P-4	Consider tree ordinances or programs to encourage planting trees less susceptible to damage from ice and wind.	Winter Storm, High Wind	Low	Thomasville Planning	Urban and Community Forestry Grant	Completed	Thomasville has adopted a utility guideline that meets these requirements.
P-5	Through subdivision regulations, encourage that power, cable and telephone lines be buried.	Winter Storm, High Wind	High	Thomasville Planning	Local	Completed	Subdivision regulations are included in the zoning ordinance.
P-6	Set up Centralized, coordinated permitting process.	All	Low	Thomasville Planning	Local	Completed	Thomasville has implemented a coordinated permitted process.
P-7	Designate preferred growth areas and develop area plans for target locations	All	Low	Thomasville Planning	Local	2018	Thomasville implemented a new Land Development plan in 2008. This steers growth and development away from flood prone areas. The city will need to evaluate and update the plan in the future so this action is deferred.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
P-8	Consider amending subdivision ordinance to allow clustering to maximize density while preserving high hazard areas (areas prone to flood, landslide, erosion).	All	Moderate	Thomasville Planning	Local	3-5 years (2020)	The option of cluster development would be an amendment to the Zoning ordinance. Future considerations for this type of development will be considered among local officials and developers.
Property Protection							
PP-1	Evaluate current capacity of critical services to deal with power outages.	Winter Storm, High Wind	High	Thomasville Public Services Department	Local	3-5years (2020)	Thomasville periodically evaluates status and need of its critical facilities to deal with power outages- with first time generators, transfer switches or possible upgrades. The city will continue to evaluate critical services capacity and make improvements as necessary.
PP-2	Supply critical facilities with back up power source. Priority needs • 1 generator for City Hall • 2 generators for Fire Service • 2 generators for water/wastewater plants • 1 generator for Public Works Building (ADDED 2009)	Winter Storm, High Wind	Low	Thomasville Finance Department/ Public Services Department	Local	3-5years (2020)	Thomasville periodically evaluates status and need of its critical facilities to deal with power outages- with first time generators, transfer switches or possible upgrades. All four fire stations are powered with generator backups.
PP-3	Look for sources of funding to procure and install transfer switches	Winter Storm, High Wind	Low	Thomasville Public Services Department	Hazard Mitigation Funding	3-5 years (2020)	The city has not installed any new transfer switches but ill implement as funding becomes available

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Natural Resource Protection							
NRP-1	Wherever possible preserve natural wetlands, designate conservation corridors, especially along streams through acquisition or conservation easements.	All	High	Thomasville Planning	Local	2019	Thomasville is doing some local watershed planning which will be the basis for future preservation, buffer protection and easement. This work is incomplete and will need to be continued going forward.
Structural Projects							
SP-1	Build and develop property to house a new Police Department	All	High	Thomasville Police and City Manager	Local	2-4 years (2019)	This has not been completed, but Thomasville is working through a design process to establish structural needs for the Thomasville Police Department.
Emergency Services							
ES-1	Identify and designate at least one emergency shelter in Thomasville.	All	Moderate	Davidson County Emergency Management, Thomasville City Manager	Local	Completed	Thomasville has several locations designated for sheltering.
ES-2	Seek funding to support of the implementation of an emergency operating center to fund - four phone lines, four portable radios Bluetooth printer, two projectors, two laptop computers, two HD televisions, and two whiteboards. The equipment will support the EOC and serve as a reserve EOC for Davidson County Emergency Management	All	High	Davidson Co EM and Thomasville Fire Department	Local	6-12 Months (2016)	Thomasville is working on implementing an emergency operating center that will serve as a primary EOC for Thomasville and reserve EOC for Davidson County EM.
ES-3	Design and implement an emergency operating center for the entire city; EOC will be available as an alternate location for Davidson County	All	High	Thomasville Fire Department	Local	3-6 months (2016)	Thomasville is working on implementing an emergency operating center that will serve as a primary EOC for Thomasville and reserve EOC for Davidson County EM.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
ES-4	Pursue and participate in the Community Rating System (CRS) through the National Flood Insurance Program (NFIP)	Flood	High	Thomasville Fire Department, Public Works, Planning and Zoning	Local	2-4 Years (2019)	The city is not in the CRS, but is currently in the planning phase of participation in the program.
ES-5	Pursue and achieve the designation of Thomasville as a "Storm Ready Community" by the National Weather Service to assure timely public warning of impending natural disaster events.	All	Moderate	Thomasville Fire Department	Local	2-4 years (2019)	The city is not a StormReady community but is currently in the planning phase of participation in the program.
ES-6	Use available communications resources for outreach and education to promote awareness of natural hazards and mitigation options	All	Moderate	Davidson Co EM and Thomasville Fire Department	N/A	3-6 months (2016)	Thomasville has developed an "Elected Officials Guidebook to Emergency Response". The implementation has begun as outreach has started.
ES-7	Put in place a countywide emergency notification call system for location specific warning to public of impending disaster (i.e. NIXLE)	All	High	Davidson Co EM and Thomasville Fire Department	Local	3-6 months (2016)	Thomasville Fire is looking to participate with Davidson County EM in this program.
Public Education and Awareness							
PEA-1	Educate and inform local government and elected officials (decision makers) of the need to consider hazard mitigation in policy and budgetary planning and decision making processes.	All	High	Thomasville Fire Department	Local	3-6 months	Expected completion date of July 2015. Elected officials guides will be distributed April 2015
Previously Completed Mitigation Actions							
	Adopt and implement local storm water management plan to reduce urban and small stream flooding and reduce the impact of urban run off on downstream rivers.	Flood	High	Thomasville Public Services Department	Local	Completed	Completed in 2006 and implementation is ongoing. Thomasville is a Phase II Stormwater city and is required to adopt a Stormwater Management Plan which it did in 2006. Implementation of the plan is ongoing. It is enforced for all development review. Features of the plan will continue to be implemented and strengthened.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Consider expanding partnership with Davidson County for increased access to GIS capabilities to track the location and value of properties within planning areas.	All	Low	Thomasville Planning	Local	Completed	Completed in 2006 and implementation is ongoing. Thomasville has expended its contract with Davidson County for comprehensive GIS services. As the already strong capacity of the GIS office grows, Thomasville will receive the same enhanced services as the County. Information on location and value of properties is readily available through County GIS and the County Tax Department.
	Develop emergency water supply capability.	All	High	Thomasville Assistant City Manager	Local	Completed	Completed in 2004 and implementation is ongoing. Thomasville is a part of the comprehensive countywide water conservation and interconnect plan which was developed in 2004. It establishes uniform water control measures among jurisdictions and Davidson Water, Inc. and provides for interconnections in case of severe drought.
	Identify alternative water supplies.	All	Moderate	Thomasville Assistant City Manager/Public Works	Local	Completed	Completed in 2006 and implementation is ongoing. Thomasville has two alternative water supplies and one under construction. The City has 1 interconnect with Davidson Water, Inc., a private water supplier, and a 2nd interconnect with the City of High Point. Another interconnect is being constructed with Davidson Water, Inc.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Strengthen floodplain regulation to current standards. (New model regulation).	Flood	High	Thomasville Planning	Local	Completed	Completed in 2009. City Council adopted new FIRM maps and the new floodplain ordinance, February 2009.

Town of Wallburg Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Establish hazard mitigation as a component of all planning activities.	All	High	Wallburg Town Manager	n/a	2019	Although hazard mitigation has been integrated into many planning activities, the town will attempt to improve its integration into all planning activities going forward.
Emergency Services							
ES-1	Work with county to improve countywide emergency notification system by integrating cell numbers and implementing other update features.	All	High	Davidson County Emergency Services Department	Local	2017	New action
Public Education and Awareness							
PEA-1	Establish and inform local government and elected officials of the need to consider hazard mitigation in policy and budgetary planning and decision making processes.	All	High	Wallburg Town Manager, Davidson County Planning	Local	2016, Annually	Many efforts have been taken to inform local government and elected officials about the need to consider hazard mitigation in planning and policy-making decisions, however, this effort will need to be continued due to turnover of officials and to keep this on the radar of those officials
Previously Completed Mitigation Actions							
	To identify critical facilities within the town limits of Wallburg.	All	Moderate	Wallburg Town Manager, Davidson County Planning	Local	Completed	Completed in 2007. Critical facilities have been identified and mapped thus making possible advance mitigation planning to protect these facilities and maintain power.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Identify and designate at least one emergency shelter in Wallburg.	All	Moderate	Wallburg Town Manager	n/a	Completed	Completed in 2008. Shelters have been identified and designated according to the County plan. They are being "typed" according to use by general and special populations. This assures that safe and secure shelter is ready and available in multi-hazard situations.

SECTION 10
PLAN MAINTENANCE

This section discusses how the Davidson County Mitigation Strategy and Mitigation Action Plan will be implemented and how the Multi-jurisdictional Hazard Mitigation Plan will be evaluated and enhanced over time. This section also discusses how the public will continue to be involved in a sustained hazard mitigation planning process. It consists of the following three subsections:

- 10.1 Implementation and Integration
- 10.2 Monitoring, Evaluation, and Enhancement
- 10.3 Continued Public Involvement

44 CFR Requirement
44 CFR Part201.6(c)(4)(i): The plan shall include a plan maintenance process that includes a section describing the method and schedule of monitoring, evaluating and updating the mitigation plan within a five-year cycle. ***44 CFR Part 201.6(c)(4)(ii):*** The plan maintenance process shall include a process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

10.1 MONITORING AND EVALUATING THE PREVIOUS PLAN

Since the previous plan was adopted, each jurisdiction has worked to ensure that mitigation was integrated into local activities and that the mitigation plan was appropriately implemented. Each of the jurisdictions outlined a process in the previous mitigation plan for monitoring and evaluating the plan throughout the interim period between plan updates.

Each jurisdiction was ultimately successful in implementing the monitoring and evaluation process that was outlined in previous plan as annual meetings were held to discuss the mitigation plan and the priorities that were outlined in it. The specific process is outlined below with an explanation of how the monitoring and evaluating process was carried out as well as any changes that were identified that would be useful to implement during the next update.

Monitoring and Evaluation Process
The Davidson County Hazard Mitigation Plan included an annual review process and, if requested by any jurisdiction, a progress report on the plan. This review process was carried out by the Emergency Services Director every year since the previous plan was approved. During this annual review process, the Emergency Services Director solicited comments from affected county departments, each municipality, and other stakeholders via the hazard mitigation planning team. The plan was also open to comments from the general public during this timeframe.

Moreover, when reports were requested on the implementation status of the plan, these included a review of mitigation actions in the plan and progress that had been made towards completing those

actions. Additionally, any newly identified funding opportunities or changes to planning requirements were reviewed.

Although there were some minor revisions made to the plan during interim update period, there were few major revisions identified during these annual reviews and the Hazard Mitigation Planning Team generally agreed that the plan was on course and that the monitoring and evaluating process itself was sufficient to ensure implementation of the plan.

10.2 IMPLEMENTATION AND INTEGRATION

Each agency, department, or other partner participating under the Davidson County Multi-jurisdictional Hazard Mitigation Plan 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. When applicable, potential funding sources have been identified for proposed actions listed in the Mitigation Action Plan.

The participating jurisdictions will integrate this Hazard Mitigation Plan into relevant city and county government decision-making processes or mechanisms, where feasible. This includes integrating the requirements of the Hazard Mitigation Plan into other local planning documents, processes, or mechanisms, such as comprehensive or capital improvement plans, when appropriate. The members of the Davidson County Hazard Mitigation Planning Team will remain charged with ensuring that the goals and mitigation actions of new and updated local planning documents for their agencies or departments are consistent, or do not conflict with, the goals and actions of the Hazard Mitigation Plan, and will not contribute to increased hazard vulnerability in Davidson County.

Since the previous plan was adopted, each jurisdiction has worked to integrate the hazard mitigation plan into other planning mechanisms where applicable/feasible. Examples of how this integration has occurred have been documented in the Implementation Status discussion provided for each of the mitigation actions found in Section 9. Specific examples of how integration has occurred include:

- Integrating the mitigation plan into reviews and updates of floodplain management ordinances;
- Integrating the mitigation plan into reviews and updates of emergency operations plans;
- Integrating the mitigation plan into review and updates of building codes; and
- Integrating the mitigation plan into the capital improvements plan through identification of mitigation actions that require local funding

Opportunities to further integrate the requirements of this Plan into other local planning mechanisms shall continue to be identified through future meetings of the Hazard Mitigation Planning Team (also known as the Mitigation Advisory Team) and the annual review process described herein. Although it is recognized that there are many possible benefits to integrating components of this Plan into other local

planning mechanisms, the development and maintenance of this Multi-jurisdictional Hazard Mitigation Plan is deemed by the Hazard Mitigation Planning Team to be the most effective and appropriate method to implement local hazard mitigation actions at this time.

10.3 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 Hazard Mitigation Planning Team shall meet in March of every year to evaluate the progress attained and to revise, where needed, the activities set forth in the Plan. The findings and recommendations of the Hazard Mitigation Planning Team shall be documented in the form of a report that can be shared with interested municipal, county, and other stakeholder representatives. The Hazard Mitigation Planning Team will also meet following any disaster events warranting a reexamination 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 Davidson County. The Davidson County Emergency Services Director will be responsible for reconvening the Hazard Mitigation Planning Team for these reviews.

Five Year Plan Review

The Plan will be thoroughly reviewed by the Hazard Mitigation Planning Team every five years to determine whether there have been any significant changes in Davidson County 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 Davidson County/municipal 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 Davidson County Emergency Services Director will be responsible for reconvening the Hazard Mitigation Planning Team 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 County 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 Davidson County Multi-jurisdictional Hazard Mitigation Plan will be submitted to the State Hazard Mitigation Officer at the North Carolina Division of Emergency Management (NCEM) for final review and approval in coordination with the Federal Emergency Management Agency (FEMA).

Because the plan update process can take several months to complete, and because Federal funding may be needed to update the plan, it is recommended that the five-year review process begin at the beginning of the third year after the plan was last approved. This will allow the participants in the Davidson County Multi-jurisdictional Hazard Mitigation Plan to organize in order to seek Federal funding if necessary and complete required plan update documentation before the plan expires at the end of the fifth year.

Disaster Declaration

Following a disaster declaration, the Davidson County Multi-jurisdictional 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 Davidson County Emergency Management Coordinator to reconvene the Hazard Mitigation Planning Team and ensure the appropriate stakeholders are invited to participate in the plan revision and update process following declared disaster events.

Reporting Procedures

The results of the five-year review will be summarized by the Hazard Mitigation Planning Team 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

Upon the initiation of the amendment process, representatives from Davidson County and the participating municipalities will forward information on the proposed change(s) to all interested parties including, but not limited to, all directly affected County/municipal departments, residents, and businesses. Information will also be forwarded to the North Carolina Division of Emergency Management. This information will be disseminated in order to seek input on the proposed amendment(s) for no less than a 45-day review and comment period.

At the end of the 45-day review and comment period, the proposed amendment(s) and all comments will be forwarded to the Hazard Mitigation Planning Team for final consideration. The Hazard Mitigation Planning Team will review the proposed amendment along with the comments received from other parties, and if acceptable, the committee will submit a recommendation for the approval and adoption of changes to the Plan.

In determining whether to recommend approval or denial of a Plan amendment request, the following factors will be considered by the Hazard Mitigation Planning Team:

- There are errors, inaccuracies, or omissions made in the identification of issues or needs in the Plan.
- New issues or needs have been identified which are not adequately addressed in the Plan.
- There has been a change in information, data, or assumptions from those on which the Plan is based.

Upon receiving the recommendation from the Hazard Mitigation Planning Team, and prior to adoption of the Plan, the participating jurisdictions will hold a public hearing, if deemed necessary. The governing bodies of each participating jurisdiction will review the recommendation from the Hazard Mitigation Planning Team (including the factors listed above) and any oral or written comments received at the public hearing. Following that review, the governing bodies will take one of the following actions:

- Adopt the proposed amendments as presented;
- Adopt the proposed amendments with modifications;
- Refer the amendments request back to the Hazard Mitigation Planning Team for further revision; or
- Defer the amendment request back to the Hazard Mitigation Planning Team for further consideration and/or additional hearings.

10.4 CONTINUED PUBLIC INVOLVEMENT

44 CFR Requirement
44 CFR Part 201.6(c)(4)(iii): The plan maintenance process shall include a discussion on how the community will continue public participation in the plan maintenance process.

Public participation is an integral component to the mitigation planning process and will continue to be essential as this Plan evolves over time. As described above, significant changes or amendments to the Plan shall require a public hearing prior to any adoption procedures.

Other efforts to involve the public in the maintenance, evaluation, and revision process will be made as necessary. These efforts may include:

- Advertising meetings of the Hazard Mitigation Planning Team in local newspapers, public bulletin boards and/or County and municipal office buildings;
- Designating willing and voluntary citizens and private sector representatives as official members of the Hazard Mitigation Planning Team;
- Utilizing local media to update the public on any maintenance and/or periodic review activities taking place;
- Utilizing the websites of participating jurisdictions to advertise any maintenance and/or periodic review activities taking place; and
- Keeping copies of the Plan in public libraries.

Annex A
Town of Denton

This annex includes jurisdiction-specific information for the Town of Denton. It consists of the following five subsections:

- A.1 Town of Denton Community Profile
- A.2 Town of Denton Risk Assessment
- A.3 Town of Denton Vulnerability Assessment
- A.4 Town of Denton Capability Assessment
- A.5 Town of Denton Mitigation Strategy

A.1 TOWN OF DENTON COMMUNITY PROFILE

A.1.1 Geography and the Environment

The Town of Denton is located in the southern portion of Davidson County. An orientation map is provided as **Figure A.1**.

The Town of Denton was incorporated in 1907. It is the highest elevation in Davidson County and has a total area of 2.0 square miles, less than 0.01 of which is water area.

According to the State Climate Office of North Carolina, Davidson County, and the Town of Denton, enjoys a moderate climate that is characterized by mild winters and hot, humid summers. In general, the spring months are marked by unpredictable weather and changes can occur rapidly with sunny skies yielding to severe thunderstorms in just a few hours. Precipitation is generally well distributed throughout the year and annual totals average 45 inches.

From December to February, the average high temperature ranges from the lower to mid 50s and low temperatures average around 30°F. However, the temperature drops to 10°F or 12°F about once during an average winter over central North Carolina. The mountains also act as a barrier preventing most wintery precipitation from entering the region, and snow and sleet is usually light and occurs on average once or twice per year.

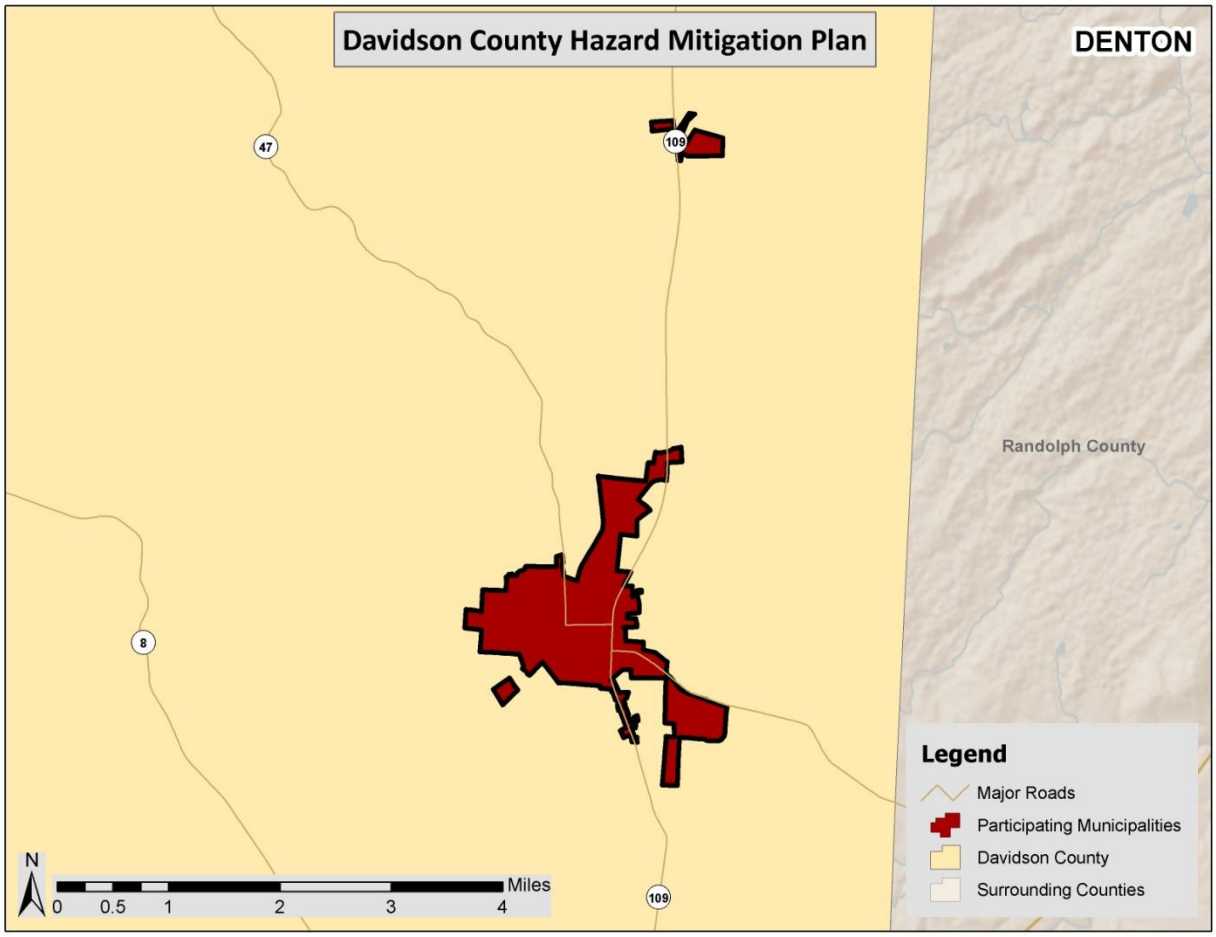
In spring, temperatures begin to rise and the increase in average temperature is greater in April than in any other month. In general, the days are warm and the nights are cool during the spring months. Average high temperatures increase from 63°F in March to 79°F in May. There is a similar increase in average low temperatures, which are in the upper 30s in March and climb to the mid 50s in May. Additionally, tornadoes are most likely early in the spring; however, North Carolina is outside the principal tornado area of the United States.

Tropical air over central North Carolina brings warm temperatures and rather high humidity during the summer. Average high temperatures range from the mid to upper 80s and low temperatures average in

the 60s. Summer rainfall is the most variable, and daily showers as well as periods of one to two weeks without rain are both common. Thunderstorms are also common events during the summer months.

Autumn is the season typified by the most rapidly changing temperature. The drop-off is greatest in October and continues through November. Average high temperatures begin in the lower 80s in September and fall to the low 60s by November. Average lows also drop significantly from the 59°F to about 38°F from September to November.

FIGURE A.1: TOWN OF DENTON ORIENTATION MAP



A.1.2 Population and Demographics

According to the 2010 Census, the Town of Denton has a population of 1,636 people. The town has seen an almost 13 percent growth between 2000 and 2010, and the average population density is 827 people per square mile. Population counts from the U.S. Census Bureau for 1990, 2000, and 2010 for the town are presented in **Table A.1**.

TABLE A.1: POPULATION COUNTS FOR DENTON

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Denton	1,292	1,450	1,636	12.8%

Source: United States Census Bureau

Based on the 2010 Census, the median age of residents of the Town of Denton is 39.8 years. The racial characteristics of the town are presented in **Table A.2**. Whites make up the majority of the population in the town, accounting for over 98 percent of the population.

TABLE A.2: DEMOGRAPHICS OF DENTON

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Denton	98.4%	0.1%	0.1%	0.0%	0.0%	0.3%	1.0%	1.0%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau

A.1.3 Housing

According to the 2010 U.S. Census, there are 766 housing units in the Town of Denton, the majority of which are single family homes. Housing information for the town is presented in **Table A.3**. As shown in the table, the town has a very low percentage of seasonal housing units.

TABLE A.3: HOUSING CHARACTERISTICS OF DENTON

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Vacant Units, Percent (2010)	Median Home Value (2009-2013)
Denton	651	766	0.7%	$102,500

Source: United States Census Bureau

A.1.4 Infrastructure

Transportation

The Town of Denton has two primary state highways for transportation uses. NC Route 109 runs north-south connecting the town to Thomasville and neighboring Montgomery County. NC Route 47 is another primary state high that travels east-west and links Denton to Lexington and Randolph County.

Currently, there is no passenger rail service offered in Denton; however, freight carriers such as Norfolk Southern and CSX serve the town.

The Piedmont Triad International Airport is the largest airport closest to Denton. It offers 10 daily non-stop commercial flights on 8 airlines and it is the third busiest airport in North Carolina. It is approximately 48 miles from the center of the town. Davidson County Airport, located in Lexington,

also provides public air service as well as one other privately-owned airport, Hiatt Airport, located just outside of Thomasville. The Charlotte Douglas International Airport and Raleigh-Durham International Airport are two additional large airports that are also in fairly close proximity to the town.

Utilities

Electrical power in the Town of Denton is provided by Duke Energy Progress and EnergyUnited. Duke Energy Progress, the largest electric power holding company in the US, provides service across Davidson County. EnergyUnited is an electricity cooperative that also services the majority of the county.

Sewer and water service are both provided by the Town of Denton. The town operates one wastewater treatment plant and one water treatment plant.

Community Facilities

There are a number of buildings and community facilities located throughout the Town of Denton. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 1 fire station, 1 police station, 2 EMS/rescue stations, and 1 public school located within the town.

There are no hospitals located in Denton; however, there are two nearby in Thomasville and Lexington. Novant Health Thomasville Medical Center is a general acute center with 146 beds and Wake Forest Baptist Health – Lexington Medical Center is also a general acute center with 94 beds.

There are also a number of county and municipal parks located in and near the Town of Denton, including Denton FarmPark and many community and neighborhood parks. High Rock Lake, Tuckertown Lake, and the Yadkin River also offer additional recreational opportunities nearby.

A.1.5 Land Use

Much of Davidson County is developed and relatively urbanized. However, there are some areas that are more sparsely developed. The incorporated municipalities, including the Town of Denton, are where the county's population is generally concentrated. The incorporated areas are also where many businesses, commercial uses, and institutional uses are located. Land uses in the balance of the study area consist of a variety of types of residential, commercial, industrial, government, and recreational uses. Davidson County's land use pattern can be described as suburban sprawl. Population density is greater in the northern portion of the county while the southern portion is largely rural with primarily residential development. Local land use and associated regulations are further discussed in *Section 7: Capability Assessment*

A.1.6 Employment and Industry

The early modern economy in Davidson County was based on agriculture but it later transitioned to one based on textile and furniture manufacturing in the twentieth century up until the late 1990s. Today, Davidson County, like many communities, is grappling with the evolution of a manufacturing economy shifting to an economy based on the service industry.

According to the North Carolina Employment Security Commission (NCESC), in 2013 (the last full year with data available), Davidson County had an average annual employment of 71,433 workers and an average unemployment rate of 8.4 percent (compared to 8.0 percent for the state). The Manufacturing

industry employed 21.9 percent of the county's workforce followed by Retail Trade (12.1%); Health Care and Social Assistance (11.2%); and Educational Services (10.4%). The American Community Survey (ACS) found the average annual median household income in Davidson County was $43,083 from 2009 to 2013 compared to $46,334 for the state of North Carolina.

A.2 TOWN OF DENTON RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to the Town of Denton. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

A.2.1 Drought

Location and Spatial Extent

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that the town would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment.

Historical Occurrences

According to the North Carolina State Office, the Central Piedmont Region, which includes the Town of Denton, experienced moderate to extreme drought occurrences in 11 of the last 14 years (2000-2013). **Table A.4** shows the most severe drought condition reported for each year in the Central Piedmont Region, according to PDSI classifications. However, it should be noted that the most severe classification reported is based on monthly regional averages, and conditions in the Town of Denton may actually have been less or more severe than what is reported.

TABLE A. 4: HISTORICAL DROUGHT OCCURRENCES IN DENTON

extreme drought	severe drought	moderate drought	mid-range	moderately moist	very moist	extremely moist
−4.00 and below	−3.00 to −3.99	−2.00 to −2.99	−1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

	Denton	
2000	-2.83	Moderate Drought
2001	-3.43	Severe Drought
2002	-4.98	Extreme Drought
2003	-0.38	Mid-range
2004	-2.04	Moderate Drought
2005	-2.37	Moderate Drought
2006	-2.62	Moderate Drought
2007	-4.16	Extreme Drought
2008	-4.37	Extreme Drought
2009	-1.08	Mid-range
2010	-2.53	Moderate Drought
2011	-3.44	Severe Drought
2012	-2.84	Moderate Drought

	Denton	
2013	**-0.37**	Mid-range

Source: North Carolina State Climate Office

Data from the National Climatic Data Center (NCDC) was also reviewed to obtain additional information on historical drought events in the town, but no events were reported in the Town of Denton.

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the Town of Denton has a probability level of likely (10 to 100 percent annual probability) for future drought events. This hazard may vary slightly by location but each area has an equal probability of experiencing a drought. However, historical information also indicates that there is a much lower probability for extreme, long-lasting drought conditions.

A.2.2 Extreme Heat

Location and Spatial Extent

Excessive heat typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire town is susceptible to extreme heat conditions.

Historical Occurrences

Data from the National Climatic Data Center was used to determine historical extreme heat and heat wave events in the Town of Denton, however events are only reported at the county level. One event was reported in Davidson County:

July 22, 1998 – *Excessive Heat* – Excessive heat plagued central North Carolina during July 22 through July 23. Maximum temperatures reached the 98 to 103 degree range combined with dew points in the 78 to 80 degree range with little wind to give heat index values of around 110 degrees for several hours each afternoon. To make matters worse, the minimum temperatures did not fall below 80 at several locations and those that did achieved that feat for only an hour or two. Strong thunderstorms ended the 2 day excessive heat ordeal on the evening of the 23 when rain cooled the environment enough to send temperatures into the lower 70s at most locations.

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been reported at an observation station in Lexington since 1902. The recorded maximum for the county can be found below in **Table A.5**.

TABLE A.5: HIGHEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	07/29/1952	107

Source: State Climate Office of North Carolina

The State Climate Office also reports average maximum temperatures at various stations across the state. There is one station located in Davidson County in Lexington. **Table A.6** shows the average maximum temperatures from 1971 to 2000 at the Lexington observation station which can be used as a general comparison for the town.

TABLE A.6: AVERAGE MAXIMUM TEMPERATURE IN DAVIDSON COUNTY

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. Max (°F)	49.6 °F	54.4 °F	63.3 °F	72.5 °F	79.3 °F	85.5 °F	89.1 °F	87.4 °F	81.6 °F	71.9 °F	61.7 °F	52.6 °F

Source: State Climate Office of North Carolina

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of the Town of Denton has a probability level of possible (1 to 10 percent annual probability) for future extreme heat events to impact the town.

A.2.3 Hailstorm

Location and Spatial Extent

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that the Town of Denton is uniformly exposed to severe thunderstorms; therefore, all areas of the town are equally exposed to hail which may be produced by such storms.

Historical Occurrences

According to the National Climatic Data Center, six recorded hailstorm events have affected the Town of Denton since 1997.[1] **Table A.7** is a summary of the hail events in the Town of Denton. **Table A.8** provides detailed information about each event that occurred in the town. In all, hail occurrences did not result in any reported property damages.[2] Hail ranged in diameter from 0.75 inches to 1.75 inches. It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

TABLE A.7: SUMMARY OF HAIL OCCURRENCES IN DENTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	6	0/0	$0

Source: National Climatic Data Center

TABLE A.8: HISTORICAL HAIL OCCURRENCES IN DENTON

	Date	Magnitude	Deaths / Injuries	Property Damage*
Denton				
DENTON	7/28/1997	0.75 in.	0/0	$0
DENTON	3/20/1998	0.75 in.	0/0	$0
DENTON	5/13/1999	0.75 in.	0/0	$0
DENTON	4/26/2003	0.75 in.	0/0	$0

[1] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through October 2014. It is likely that additional hail events have affected the Town of Denton. In addition to NCDC, the North Carolina Department of Insurance office was contacted for information. As additional local data becomes available, this hazard profile will be amended.

[2] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

	Date	Magnitude	Deaths / Injuries	Property Damage*
DENTON	5/3/2003	1.75 in.	0/0	$0
DENTON	5/3/2003	1.50 in.	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard (coinciding with thunderstorms), it is assumed that the entire town has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the town.

A.2.4 Hurricane and Tropical Storm

Location and Spatial Extent

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States. While coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland and they can affect the Town of Denton. All areas in the Town of Denton are equally susceptible to hurricane and tropical storms.

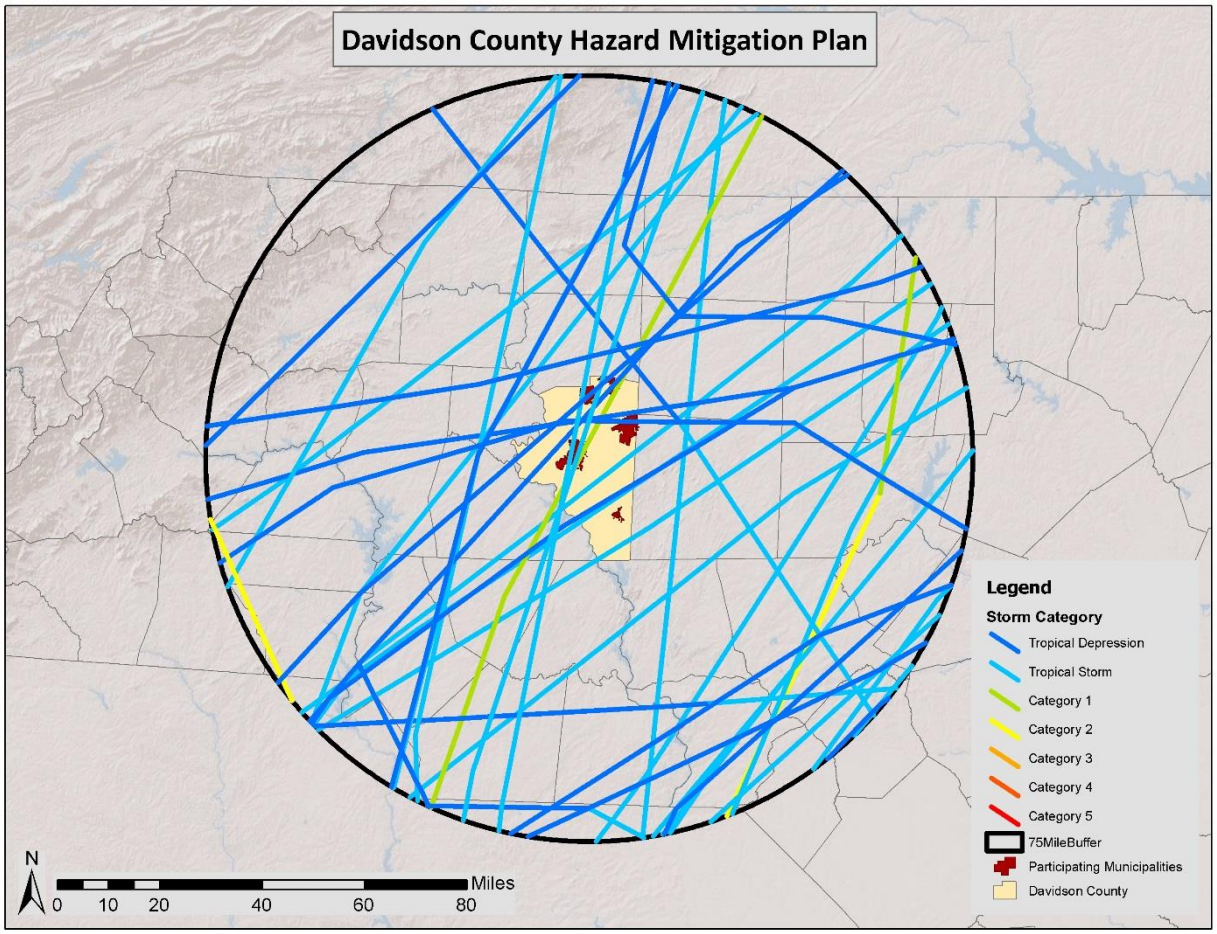
Historical Occurrences

According to the National Hurricane Center's historical storm track records, 45 hurricane/tropical storm tracks have passed within 75 miles of Davidson County since 1859.[3] This includes 6 hurricanes, 23 tropical storms and 16 tropical depressions.

Of the recorded storm events, 11 have traversed directly through Davidson County as shown in **Figure A.2**. **Table A.9** provides the date of occurrence, name (if applicable), maximum wind speed (as recorded within 75 miles of Davidson County), and Category of the storm based on the Saffir-Simpson Scale for each event.

[3] These storm track statistics do not include extra-tropical storms. Though these related hazard events are less severe in intensity, they may cause significant local impact in terms of rainfall and high winds.

FIGURE A.2: HISTORICAL HURRICANE STORM TRACKS WITHIN 75 MILES OF DAVIDSON COUNTY



Source: National Oceanic and Atmospheric Administration; National Hurricane Center

TABLE A.9: HISTORICAL STORM TRACKS WITHIN 75 MILES OF DAVIDSON COUNTY (1850–2014)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/17/1859	UNNAMED	40	Tropical Storm
10/4/1877	UNNAMED	50	Tropical Storm
9/12/1878	UNNAMED	60	Tropical Storm
9/11/1882	UNNAMED	40	Tropical Storm
10/12/1885	UNNAMED	40	Tropical Storm
6/22/1886	UNNAMED	40	Tropical Storm
9/10/1888	UNNAMED	35	Tropical Storm
9/24/1889	UNNAMED	45	Tropical Storm
8/28/1893	UNNAMED	75	Category 1
9/29/1896	UNNAMED	85	Category 2
7/13/1901	UNNAMED	35	Tropical Storm
6/16/1902	UNNAMED	35	Tropical Storm
9/23/1907	UNNAMED	35	Tropical Storm
8/31/1911	UNNAMED	25	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/3/1913	UNNAMED	40	Tropical Storm
8/3/1915	UNNAMED	35	Tropical Storm
9/23/1920	UNNAMED	35	Tropical Storm
10/3/1927	UNNAMED	40	Tropical Storm
8/11/1928	UNNAMED	30	Tropical Depression
10/2/1929	UNNAMED	50	Tropical Storm
9/6/1935	UNNAMED	45	Tropical Storm
10/20/1944	UNNAMED	50	Tropical Storm
9/18/1945	UNNAMED	50	Tropical Storm
10/9/1946	UNNAMED	30	Tropical Depression
8/28/1949	UNNAMED	40	Tropical Storm
8/31/1952	ABLE	45	Tropical Storm
7/10/1959	CINDY	30	Tropical Depression
8/30/1964	CLEO	25	Tropical Depression
6/9/1968	ABBY	25	Tropical Depression
5/26/1970	ALMA	25	Tropical Depression
9/8/1977	BABE	25	Tropical Depression
9/5/1979	DAVID	55	Tropical Storm
7/25/1985	BOB	55	Tropical Storm
8/18/1985	DANNY	25	Tropical Depression
8/29/1988	CHRIS	25	Tropical Depression
9/22/1989	HUGO	85	Category 2
7/21/1994	UNNAMED	20	Tropical Depression
9/6/1996	FRAN*	65	Category 1
7/24/1997	DANNY	30	Tropical Depression
9/5/1999	DENNIS	30	Tropical Depression
9/16/1999	FLOYD*	90	Category 2
9/18/2003	ISABEL*	85	Category 2
9/17/2004	IVAN*	20	Tropical Depression
9/28/2004	JEANNE	20	Tropical Depression
7/7/2005	CINDY	20	Tropical Depression

*Although the track of these storms traversed just outside of the 75 mile buffer area, they were included in the hazard history since a federal disaster area was declared for Davidson County as a result of the storm's impact.
Source: National Hurricane Center

The National Climatic Data Center reported four events associated with a hurricane or tropical storm in Davidson County since 1996. Additionally, Federal records indicate that five disaster declarations were made in 1989 (Hurricane Hugo), 1996 (Hurricane Fran), 1999 (Hurricane Floyd), 2003 (Hurricane Isabel), and 2004 (Hurricane Ivan) for the county.[4]

Flooding is often the greatest hazard of concern with hurricane and tropical storm events in Davidson County. Most events do not carry winds that are above that of the winter storms and straight line winds received by the county. Some anecdotal information is available for the major storms that have impacted that area as found below:

[4] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

Hurricane Hugo – September 22-24, 1989
Hurricane Hugo was one of the largest storms on record in the Atlantic Basin that produced high winds and dumped heavy rains over much of North Carolina and South Carolina. Hugo reached a peak level of Category 5 on the Saffir-Simpson scale and made landfall near Isle of Palms in South Carolina as a Category 4, eventually passing over Charlotte and much of the surrounding area as a Category 1 storm. Although the storm caused its greatest damage in South Carolina, over 1,000 structures were destroyed or severely damaged in North Carolina, causing over $1 billion dollars in damages. Wind gusts reached over 40 mph and numerous trees were downed throughout much of south and western North Carolina.

Hurricane Fran – September 5-6, 1996
After being hit just a few weeks earlier by Hurricane Bertha, North Carolina was impacted by the one of the most devastating storms to ever make landfall along the Atlantic Coast. Fran dropped more than 10 inches of rain in many areas and had sustained winds of around 115 miles per hour as it hit the coast and began its path along the I-40 corridor central North Carolina. In the end, over 3 billion dollars in damages were reported in the state. Damages to infrastructure and agriculture added to the overall toll and more than 1.7 million people in the state were left without power.

Hurricane Floyd – September 16, 1999
Hurricane Floyd, combined with the weather conditions before and immediately after this hurricane, resulted in the most severe flooding and devastation in North Carolina history. In North Carolina, the storm resulted in 35 fatalities, over $3 billion in damages, 7,000 destroyed homes, 56,000 damaged homes, 1,500 people rescued from flooded areas, and more than 500,000 customers without electricity. Additionally, the flooding caused an estimated $813 million in agricultural losses affecting 32,000 farmers. There was also significant loss of livestock including 2,860,827 poultry, 28,000 swine, and 619 cattle.

Hurricane Isabel – September 18, 2003
Hurricane Isabel's worst impacts were along the cost of North Carolina where storm surge in Dare County in particular were extremely strong, damaging thousands of homes. The storm surge created a large inlet on Hatteras Island which left the community isolated for months. Further inland and across the state, trees were downed and power was lost by hundreds of thousands of residents. In most of the state, power was restored within a few days, but the effects to the economy and daily lives of citizens were significant.

Hurricane Ivan – September 16-17, 2004
Just a week and a half following Tropical Storm Frances, the remnants of Hurricane Ivan hit western North Carolina when many streams and rivers were already well above flood stage. The widespread flooding forced many roads to be closed and landslides were common across the mountain region. Wind gusts reached between 40 and 60 mph across the higher elevations of the Appalachian Mountains resulting in numerous downed trees. More than $13.8 million of federal aid was dispersed across North Carolina following Ivan.

Probability of Future Occurrences

Given the inland location of the town, it is more likely to be affected by remnants of hurricane and tropical storm systems (as opposed to a major hurricane) which may result in flooding or high winds. The probability of being impacted is less than coastal areas, but still remains a real threat to the Town of Denton due to induced events like flooding and erosion. Based on historical evidence, the probability level of future occurrence is likely (between 10 and 100 percent annual probability). Given the regional

nature of the hazard, all areas in the town are equally exposed to this hazard. However, when the town is impacted, the damage could be catastrophic, threatening lives and property throughout the planning area.

A.2.5 Lightning

Location and Spatial Extent

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of the Town of Denton is uniformly exposed to lightning.

Historical Occurrences

According to the National Climatic Data Center, there have been no recorded lightning events in the Town of Denton since 1996 (**Table A.10** and **Table A.11**).[5]

It is certain that lightning events have impacted the town. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE A.10: SUMMARY OF LIGHTNING OCCURRENCES IN DENTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	0	0/0	$0

Source: National Climatic Data Center

TABLE A.11: HISTORIC LIGHTNING OCCURRENCES IN DENTON

	Date	Deaths / Injuries	Property Damage*	Details
Denton				
None Reported	--	--	--	--

*Property Damage is reported in 2014 dollars; all damage may not have been reported.
Source: National Climatic Data Center

Probability of Future Occurrences

Although there were not any historical lightning events reported in the Town of Denton via NCDC data, it is considered a regular occurrence, especially accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN®), the Town of Denton is located in an area of the country that experienced an average of 3 to 5 lightning flashes per square kilometer per year between 1997 and 2010. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the town.

[5] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is certain that additional lightning events have occurred in the Town of Denton. The State Fire Marshall's office was also contacted for additional information but none could be provided. As additional local data becomes available, this hazard profile will be amended.

A.2.6 Thunderstorm Wind / High Wind

Location and Spatial Extent

A wind event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. Also, the Town of Denton typically experiences several straight-line wind events each year. These wind events can and have caused significant damage. It is assumed that the Town of Denton has uniform exposure to an event and the spatial extent of an impact could be large.

Historical Occurrences

According to NCDC, there have been six reported thunderstorm wind and high wind events since 1997 in the Town of Denton.[6] These events caused over $22,000 (2014 dollars) in damages.[7] **Table A.12** summarizes this information. **Table A.13** provides detailed thunderstorm wind and high wind event reports including date, magnitude, and associated damages for each event.

TABLE A.12: SUMMARY OF THUNDERSTORM / HIGH WIND OCCURRENCES IN DENTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	6	0/0	$22,125

Source: National Climatic Data Center

TABLE A.13: HISTORICAL THUNDERSTORM / HIGH WIND OCCURRENCES IN DENTON

	Date	Type	Magnitude†	Deaths / Injuries	Property Damage*
Denton					
DENTON	7/16/1997	Thunderstorm Wind	50 kts.	0/0	$22,125
DENTON	7/21/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
DENTON	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
DENTON	6/10/2009	Thunderstorm Wind	50 kts. EG	0/0	$0
DENTON	7/27/2013	Thunderstorm Wind	50 kts. EG	0/0	$0
DENTON	4/25/2014	Thunderstorm Wind	50 kts. EG	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained ;MG = measured gust ;MS = measured sustained
Source: National Climatic Data Center

Probability of Future Occurrences

It is certain that wind events, including straight-line wind and thunderstorm wind, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for future wind events for the entire town.

[6] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through October 2014 and these high wind events are only inclusive of those reported by NCDC from 1996 through October 2014. It is likely that additional thunderstorm and high wind events have occurred in the Town of Denton. As additional local data becomes available, this hazard profile will be amended.

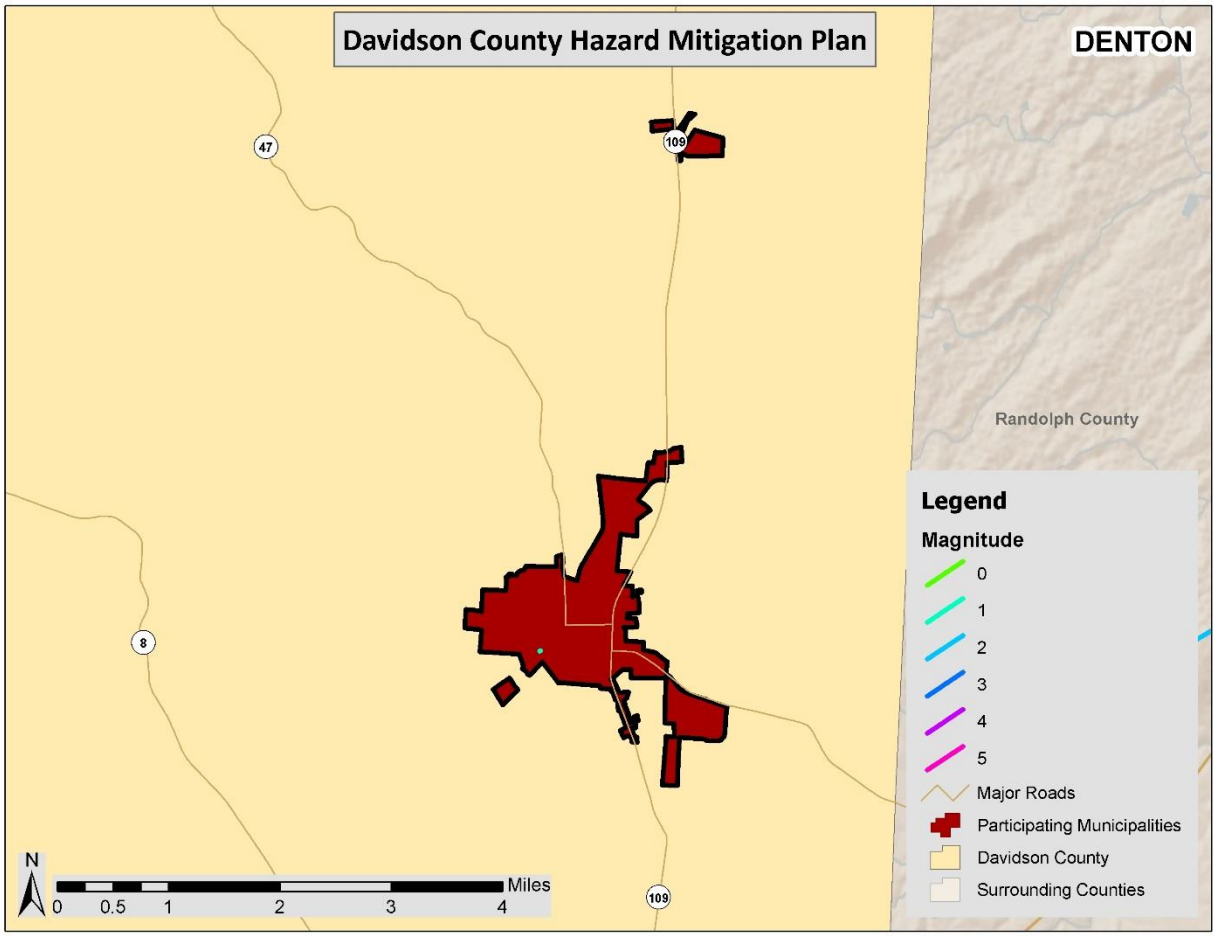
[7] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

A.2.7 Tornado

Location and Spatial Extent

Tornadoes occur throughout the state of North Carolina, and thus in the Town of Denton. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that the Town of Denton is uniformly exposed to this hazard. With that in mind, **Figure A.3** shows tornado track data for many of the major tornado events that have impacted the town. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE A.3: HISTORICAL TORNADO TRACKS IN DENTON



Source: National Weather Service Storm Prediction Center

Historical Occurrences

Tornadoes were responsible for one disaster declaration in Davidson County in 1989.[8] According to the National Climatic Data Center, there have been no recorded tornado events in the Town of Denton since

[8] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.

1950 (**Table A.14** and **Table A.15**).[9] However an EF1 through EF5 event is possible. It is important to note that only tornadoes that have been reported are factored into this risk assessment. It is likely that a high number of occurrences have gone unreported over the past 64 years.

TABLE A.14: SUMMARY OF TORNADO OCCURRENCES IN DENTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	0	0/0	$0

Source: National Climatic Data Center

TABLE A.15: HISTORICAL TORNADO IMPACTS IN DENTON

	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Denton					
None Reported	--	--	--	--	--

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Probability of Future Occurrences

According to historical information, tornado events have not occurred in the town. However, given the town's location in the southeastern United States and history of tornadoes, an occurrence is possible every few years. While the majority of the reported tornado events in Davidson County are small in terms of size, intensity, and duration, they do pose a significant threat should the Town of Denton experience a direct tornado strike. The probability of future tornado occurrences affecting the Town of Denton is likely (10 to 100 percent annual probability).

A.2.8 Winter Storm and Freeze

Location and Spatial Extent

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The Town of Denton is accustomed to severe winter weather conditions and often receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire town has uniform exposure to a winter storm.

Historical Occurrences

Winter weather has resulted in five disaster declarations in Davidson County. This includes the Blizzard of 1996, one subsequent 1996 winter storm, a severe winter storm in 2000, an ice storm in 2002 and a severe winter storm in 2014.[10] The National Climatic Data Center does not report winter storm events at the municipal level, however, there have been a total of 55 recorded winter storm events and 1

[9] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through October 2014. It is likely that additional tornadoes have occurred in the Town of Denton. As additional local data becomes available, this hazard profile will be amended.
[10] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.

extreme cold event in Davidson County since 1996 (**Table A.16**).[11] These events resulted in nearly $6.2 million (2014 dollars) in damages.[12] Detailed information on the recorded winter storm events can be found in **Table A.17**.

TABLE A.16: SUMMARY OF WINTER STORM EVENTS IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Davidson County	55	0/0	$6,200,000

Source: National Climatic Data Center

TABLE A.17: HISTORICAL WINTER STORM IMPACTS IN DAVIDSON COUNTY

	Date	Type of Storm	Deaths / Injuries	Property Damage*
Davidson County				
DAVIDSON (ZONE)	1/6/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/11/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/2/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/16/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/8/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/13/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/29/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/23/1998	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/2/1999	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/20/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/22/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/24/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/28/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/19/2000	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	2/12/2001	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/3/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/23/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/16/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/27/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/13/2003	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/15/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/30/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/15/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2007	Winter Weather	0/0	$0

[11] These winter storm and extreme cold events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is certain that additional winter storm conditions have affected the Town of Denton and Davidson County.
[12] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

	Date	Type of Storm	Deaths / Injuries	Property Damage*
DAVIDSON (ZONE)	2/1/2007	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/7/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/17/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/19/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/13/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/22/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/4/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/1/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/18/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/30/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/29/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/5/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/2/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/16/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/25/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/10/2011	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/26/2013	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/28/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/11/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2014	Winter Storm	0/0	$0
DAVIDSON (ZONE)	3/3/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/6/2014	Ice Storm	0/0	$6,200,000
DAVIDSON (ZONE)	3/17/2014	Winter Weather	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been recorded in Lexington since 1902. The recorded minimum for the county can be found below in **Table A.18**.

TABLE A.18: LOWEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	01/21/1985	-6

Source: State Climate Office of North Carolina

There have been several severe winter weather events in Davidson County. The text below describes two of the major events (one snow and one ice event) and associated impacts on the county. Similar impacts can be expected with most severe winter weather.

1996 Winter Storm – January 6-8, 1996
This storm left two feet of snow in some areas and several thousand citizens without power for up to nine days. Although shelters were opened, some roads were impassible for many days. This event caused considerable disruption to business, industry, schools, and government services.

2002 Ice Storm – December 4-5, 2002
An ice storm produced up to an inch of freezing rain in central North Carolina impacting 40 counties. A total of 24 people were killed, and as many as 1.8 million people were left without electricity. Additionally, property damage was estimated at almost $100 million. New records were also set for traffic accidents and school closing durations. The scale of destruction was comparable to that of hurricanes that have impacted the state, such as Hurricane Fran in 1996. The storm cost the state $97.2 million in response and recovery.

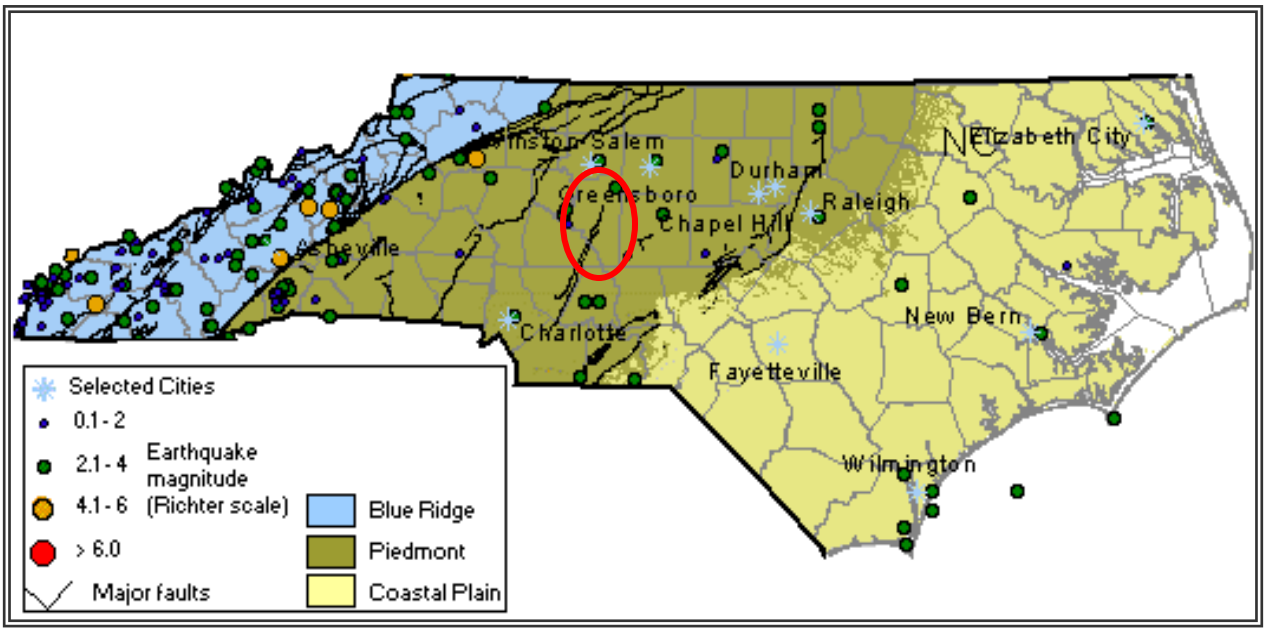
Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

Probability of Future Occurrences
Winter storm events will remain a regular occurrence in the Town of Denton due to its location in the western half of the state. According to historical information, the Town of Denton generally experiences several winter storm events each year. Therefore, the annual probability is highly likely (10 to 100 percent).

A.2.9 Earthquake

Location and Spatial Extent
Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout North Carolina. **Figure A.4** is a map showing geological and seismic information for North Carolina.

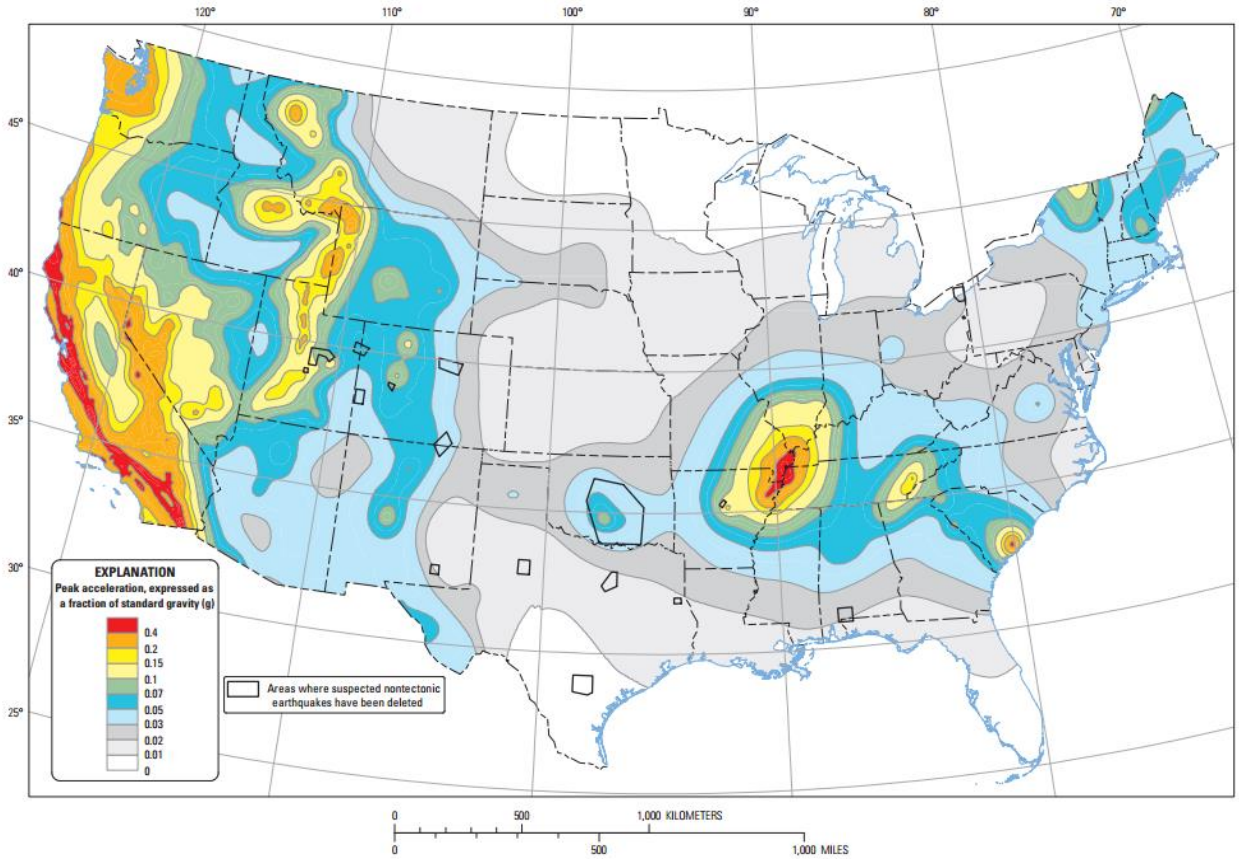
FIGURE A.4: GEOLOGICAL AND SEISMIC INFORMATION FOR NORTH CAROLINA



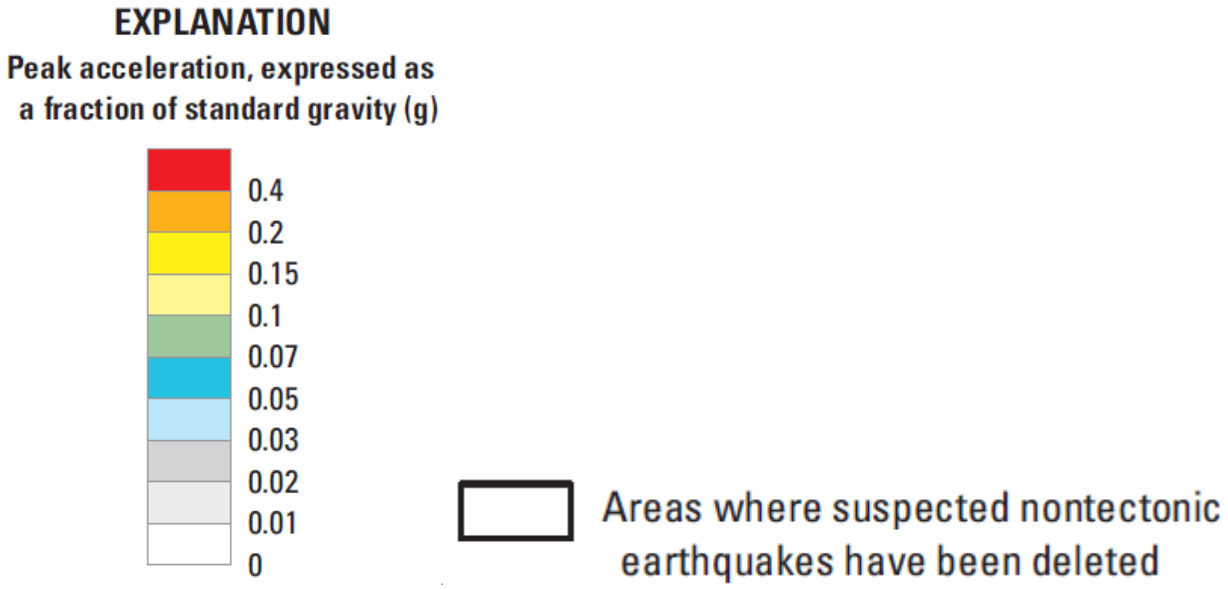
Source: North Carolina Geological Survey

Figure A.5 shows the intensity level associated with the Town of Denton, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, the Town of Denton lies within an approximate zone of 0.03 to 0.05 ground acceleration. This indicates that the town exists within an area of low to moderate seismic risk.

FIGURE A.5: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

Historical Occurrences

At least one earthquake is known to have affected the Town of Denton since 1976. This event measured a III on the Modified Mercalli Intensity (MMI) scale. **Table A.19** provides a summary of earthquake events reported by the National Geophysical Data Center between 1638 and 1985. **Table A.20** presents a detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known). [13]

TABLE A.19: SUMMARY OF SEISMIC ACTIVITY IN DENTON

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Denton	1	III	3.3

Source: National Geophysical Data Center

TABLE A.20: SIGNIFICANT SEISMIC EVENTS IN DENTON (1638 -1985)

Location	Date	Epicentral Distance	Magnitude	MMI
Denton				
Denton	9/13/1976	124.0 km	3.3	III

Source: National Geophysical Data Center

Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting the Town of Denton is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the town. The annual probability level for the town is estimated between 1 and 10 percent (possible).

A.2.10 Landslide

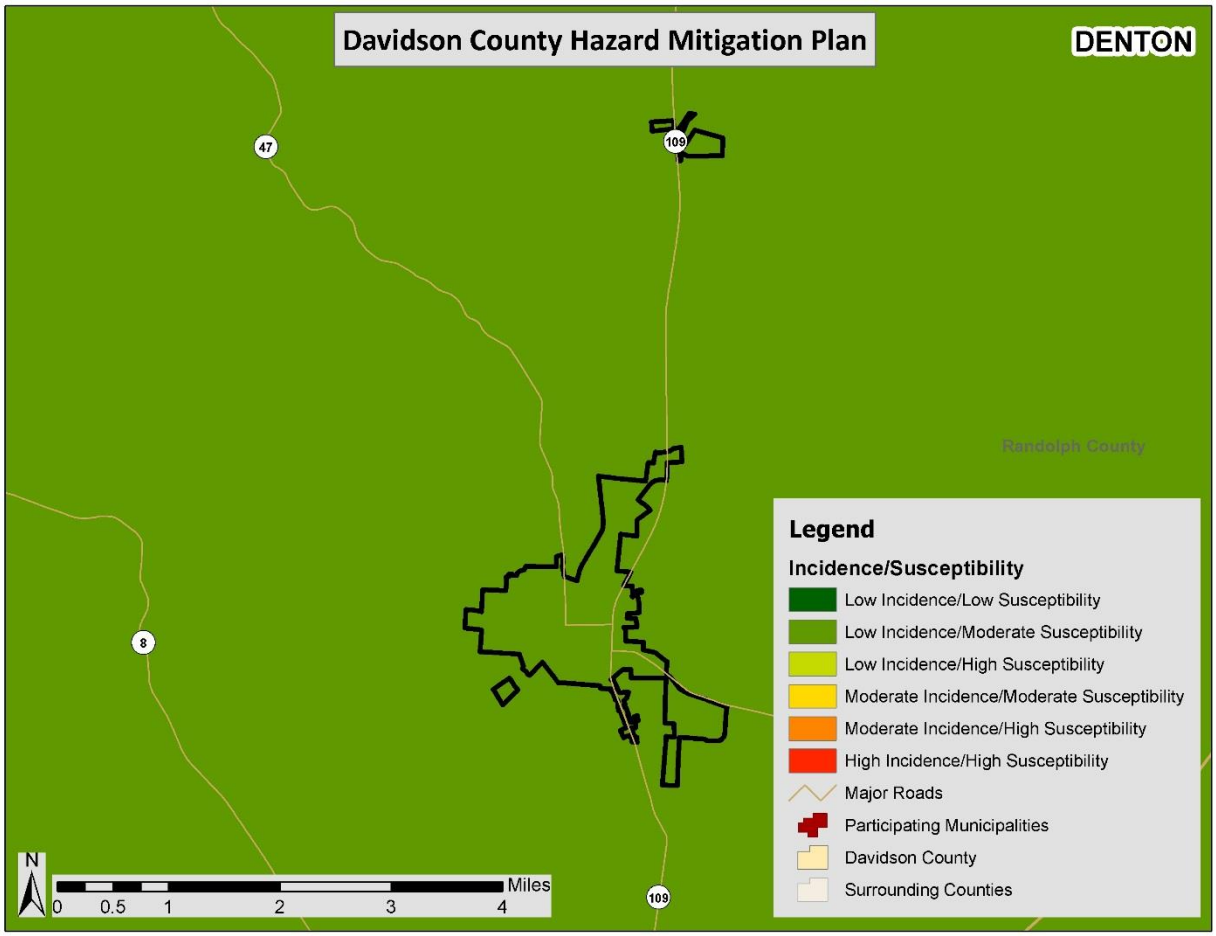
Location and Spatial Extent

Landslides occur along steep slopes when the pull of gravity can no longer be resisted (often due to heavy rain). Human development can also exacerbate risk by building on previously undevelopable steep slopes and constructing roads by cutting through hills or mountains. Landslides are possible throughout the Town of Denton, though the risk is relatively low.

According to **Figure A.6** below, the town has low landslide activity. However, there is moderate susceptibility to landslides throughout the town.

[13] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

FIGURE A.6: LANDSLIDE SUSCEPTIBILITY AND INCIDENCE MAP OF DENTON



Source: United States Geological Survey

Historical Occurrences

Relatively flat topography throughout the Town of Denton makes the planning area less susceptible to landslides. Most landslides are caused by heavy rainfall in the area. Building on steep slopes that was not previously possible also contributes to risk. Although no landslide incidents have been reported in the town, it should be noted that the North Carolina Geological Survey emphasized the dataset provided was incomplete. Therefore, there may be additional historical landslide occurrences that were not reported. Some incidence mapping has also been completed throughout the western portion of North Carolina though it is not complete either. Again, it should be noted that it is possible more incidents have occurred than what is mapped. Since no incidents were reported, a map was not produced to show the location of previous events.

Probability of Future Occurrences

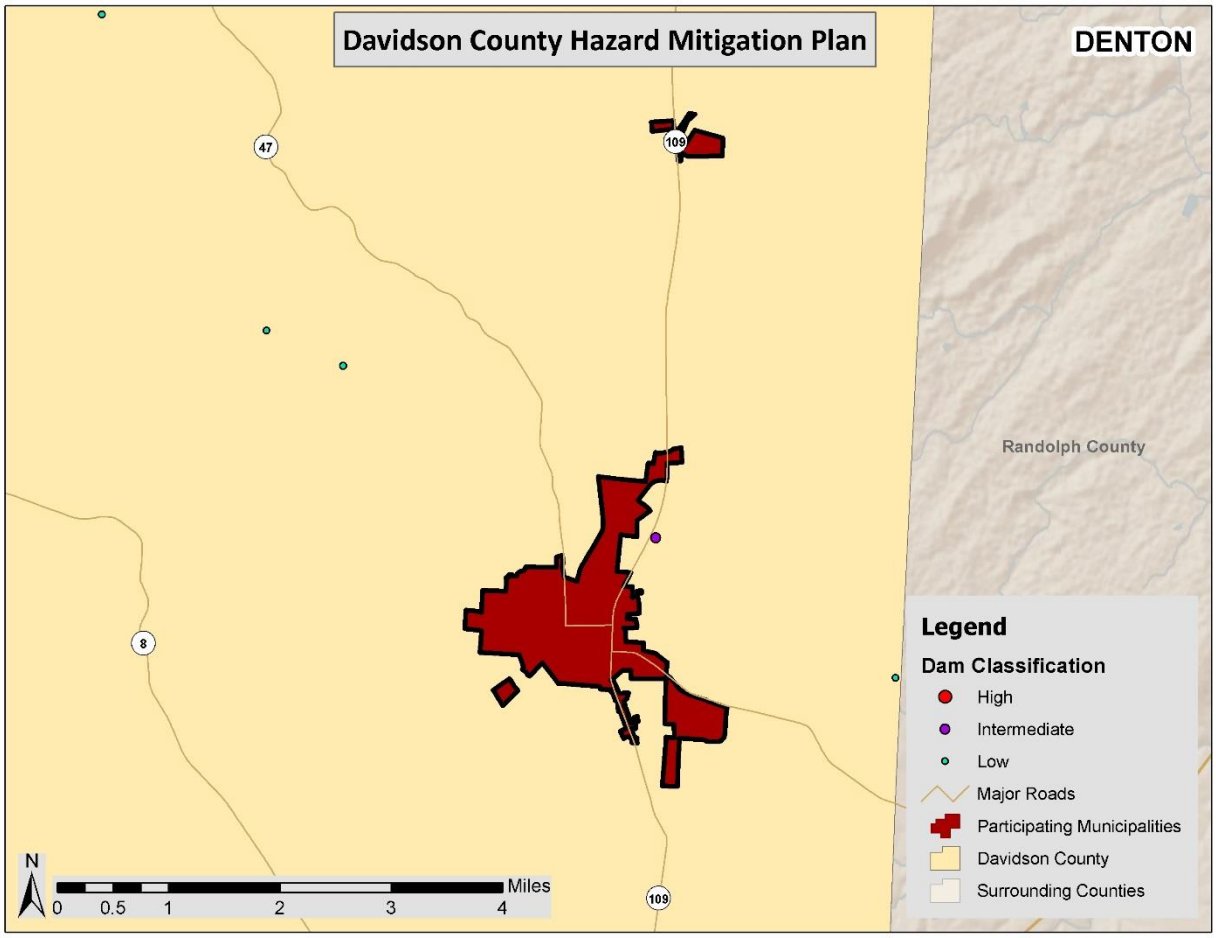
Based on historical information and the USGS susceptibility index, the probability of future landslide events is unlikely (less than 1 percent probability). Local conditions may become more favorable for landslides due to heavy rain, for example. This would increase the likelihood of occurrence. It should also be noted that some areas in the Town of Denton have greater risk than others given factors such as steepness on slope and modification of slopes.

A.2.11 Dam and Levee Failure

Location and Spatial Extent

According to the North Carolina Division of Energy, Mineral, and Land Resources, there are no dams in the Town of Denton.[14] **Figure A.7** shows the dam location and the corresponding hazard ranking for dams located nearby the town. Of these dams, none are classified as high hazard potential (**Table A.21**).

FIGURE A.7: DENTON DAM LOCATION AND HAZARD RANKING



Source: North Carolina Division of Energy, Mineral, and Land Resources, 2014

TABLE A.21: DENTON HIGH HAZARD DAMS

Dam Name	Hazard Potential	Surface Area (acres)	Max Capacity (Ac-ft)	Owner Type
Denton				
None Reported	--	--	--	--

Source: North Carolina Division of Energy, Mineral, and Land Resources, 2014

[14] The December 2, 2014 list of high hazard dams obtained from the North Carolina Division of Energy, Mineral, and Land Resources (http://portal.ncdenr.org/web/lr/dams) was reviewed and amended by local officials to the best of their knowledge.

Historical Occurrences

According to local sources and a review of the past hazard mitigation plan, there has been no history of dam breach in the Town of Denton.

Probability of Future Occurrences

Given the current dam inventory and historic data, a dam breach is unlikely (less than 1 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

A.2.12 Erosion

Location and Spatial Extent

Erosion in the Town of Denton is typically caused by flash flooding events. Unlike coastal areas, where the soil is mainly composed of fine grained particles such as sand, soils in the Town of Denton have much greater organic matter content. Furthermore, vegetation also helps to prevent erosion in the area. Erosion occurs in the town, particularly along the banks of rivers and streams, but it is not an extreme threat. No areas of concern were reported by the planning team.

Historical Occurrences

Several sources were vetted to identify areas of erosion in the Town of Denton. This includes searching local newspapers, interviewing local officials, and reviewing the previous hazard mitigation plan. Little information could be found beyond the hazard mitigation plan; however, the last update of the county hazard mitigation plan classified erosion as a relatively low concern as the magnitude was determined to be mild.

Probability of Future Occurrences

Erosion remains a natural, dynamic, and continuous process for the Town of Denton, and it will continue to occur. The annual probability level assigned for erosion is possible (between 1 and 10 percent).

A.2.13 Flood

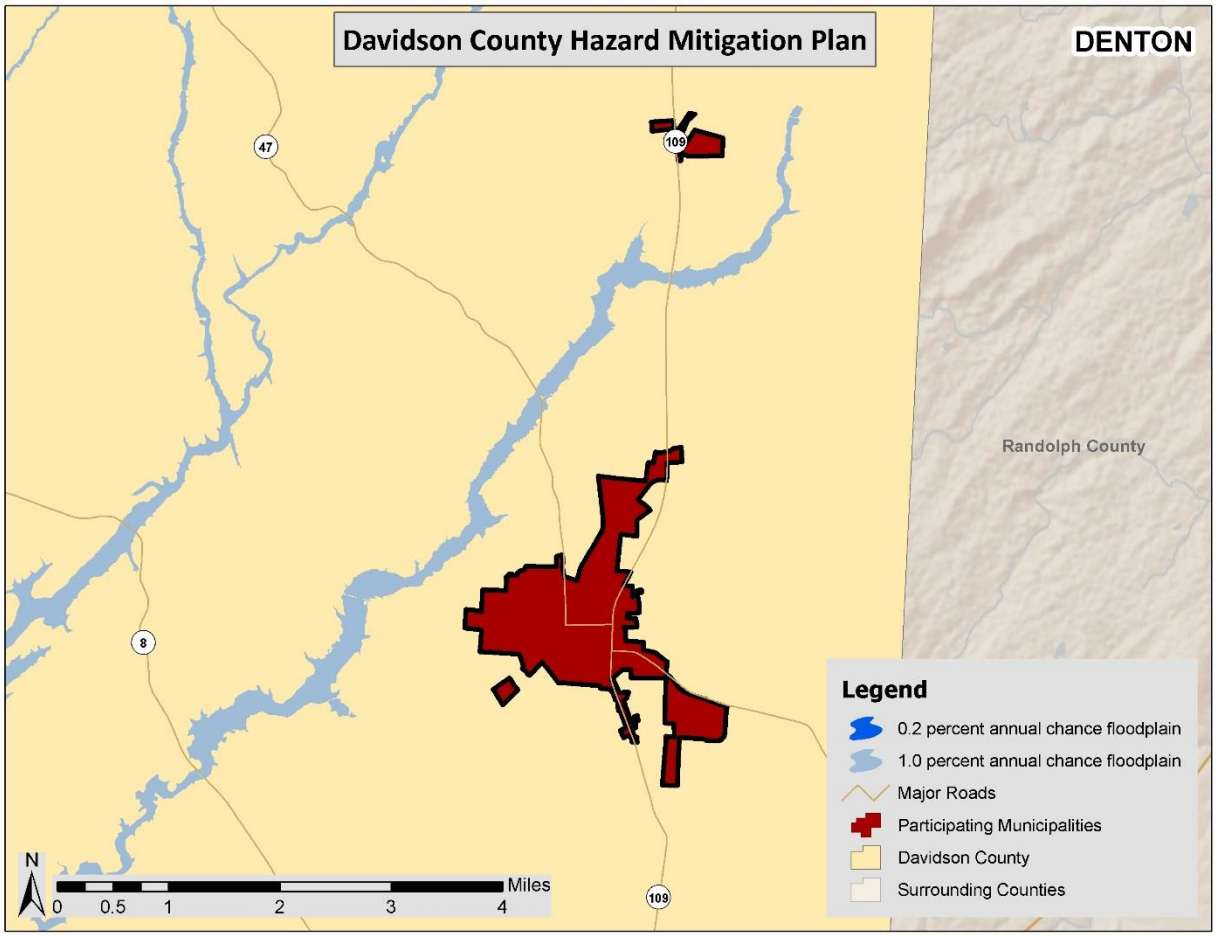
Location and Spatial Extent

There are areas near the Town of Denton that are susceptible to flood events. Special flood hazard areas near the town were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM).[15] This includes Zone AE (1-percent annual chance floodplain with elevation) and Zone X500 (0.2-percent annual chance floodplain). According to GIS analysis, of the 2.0 square miles of land that make up the Town of Denton, there are 0.0 square miles of land in zone AE (1-percent annual chance floodplain/100-year floodplain) and 0.0 square miles of land in zone X500 (0.2-percent annual chance floodplain/500-year floodplain).

These flood zone values account for 0.0 percent of the total land area in the Town of Denton. It is important to note that while FEMA digital flood data is recognized as best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Flooding and flood-related losses often do occur outside of delineated special flood hazard areas. **Figure A.8** illustrates the location and extent of currently mapped special flood hazard areas for the Town of Denton and the surrounding area based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

[15] The county-level DFIRM data used for Davidson County was updated in 2009.

FIGURE A.8: SPECIAL FLOOD HAZARD AREAS IN DENTON



Source: Federal Emergency Management Agency

Historical Occurrences

Information from the National Climatic Data Center was used to ascertain historical flood events. The National Climatic Data Center reported a total of 1 event in the Town of Denton since 2002.[16] A summary of these events is presented in **Table A.22**. This event did not account for any property damage in the town.[17] Specific information on flood events, including date, type of flooding, and deaths and injuries, can be found in **Table A.23**.

TABLE A.22: SUMMARY OF FLOOD OCCURRENCES IN DENTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	1	0/0	$0

Source: National Climatic Data Center

[16] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is likely that additional occurrences have occurred and have gone unreported in the Town of Denton.
[17] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE A.23: HISTORICAL FLOOD EVENTS IN DENTON

	Date	Type	Deaths / Injuries	Property Damage*
Denton				
DENTON	9/18/2002	Flash Flood	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of November 2014, there have been no flood losses reported in the Town of Denton through the National Flood Insurance Program (NFIP) since 1978. A summary of these figures for the town is provided in **Table A.24**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in the Town of Denton were either uninsured, denied claims payment, or not reported.

TABLE A.24: SUMMARY OF INSURED FLOOD LOSSES IN DENTON

Location	Number of Policies	Flood Losses	Claims Payments
Denton	0	0	$0

Source: Federal Emergency Management Agency, National Flood Insurance Program

Repetitive Loss Properties

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 140,000 repetitive loss properties nationwide.

As of August 2014, there are no non-mitigated repetitive loss properties located in the Town of Denton. **Table A.25** presents detailed information on repetitive loss properties and NFIP claims and policies for the town.

TABLE A.25: REPETITIVE LOSS PROPERTIES IN DENTON

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Denton	0	--	0	$0	$0	$0	$0

Source: National Flood Insurance Program

Probability of Future Occurrences

Flood events will remain a threat in the Town of Denton, and the probability of future occurrences will remain possible (between 1 and 10 percent annual probability). The town has risk to flooding, though not all areas will experience floods. The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above, which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain).

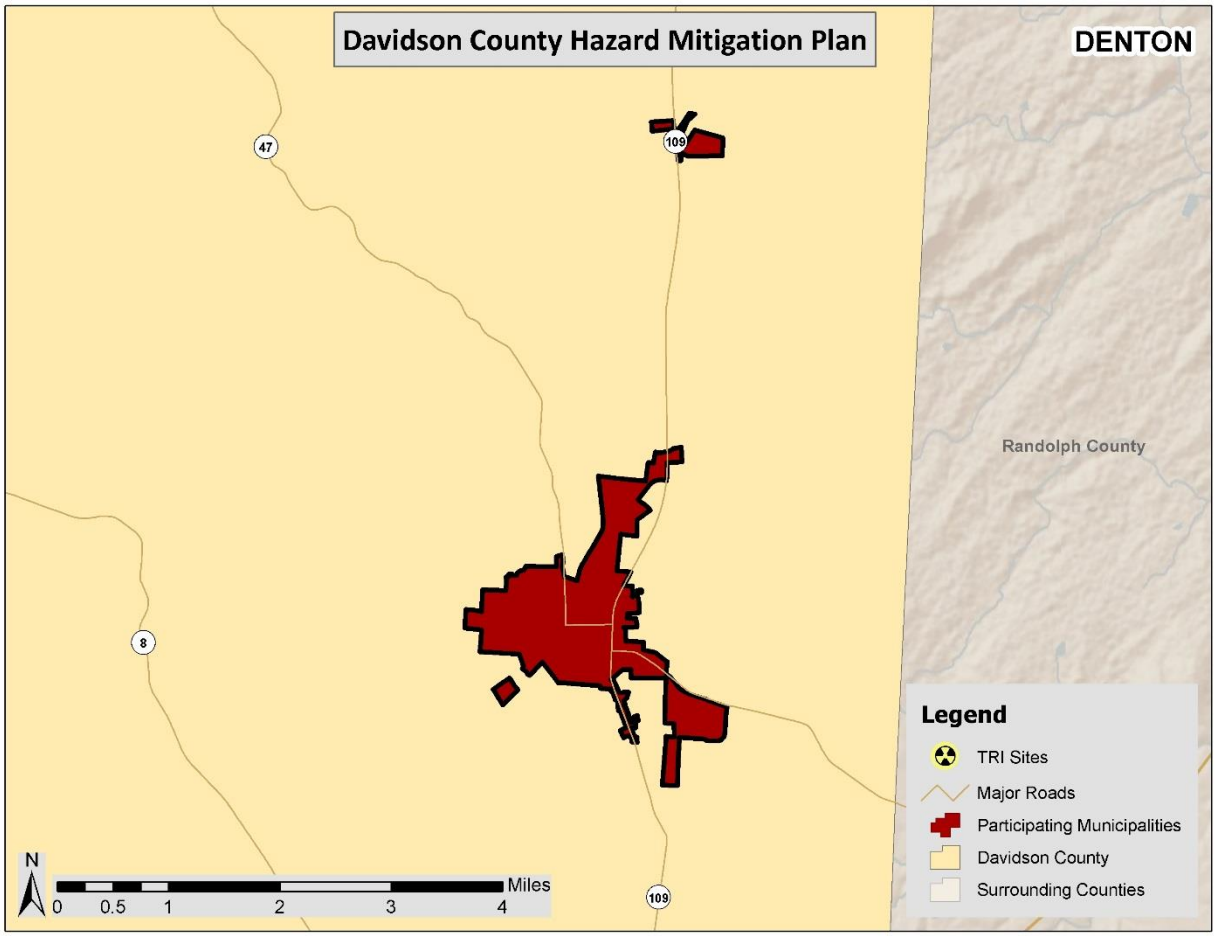
It can be inferred from the floodplain location map, previous occurrences, and repetitive loss properties that risk varies throughout Davidson County. For example, areas northwest of the Town of Denton have more floodplain and thus a higher risk of flood than within the town itself. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

A.2.14 Hazardous Materials Incidents

Location and Spatial Extent

The Town of Denton does not have any TRI sites shown in **Figure A.9.**

FIGURE A.9: TOXIC RELEASE INVENTORY (TRI) SITES IN DENTON



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the town via roadways and rail. Many roads in the town are subject to hazardous materials transport and all roads that permit hazardous material transport are considered potentially at risk to an incident.

Historical Occurrences

There have been a total of two recorded HAZMAT incidents in the Town of Denton since 1978 (**Table A.26**). These events resulted in about $500 (2014 dollars) in property damages.[18] **Table A.27** presents detailed information on historical HAZMAT incidents in the Town of Denton as reported by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA).

TABLE A.26: SUMMARY OF HAZMAT INCIDENTS IN DENTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Denton	2	0/0	$543

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE A.27: HAZMAT INCIDENTS IN DENTON

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
Denton							
I-1978060572	5/27/1978	DENTON	Highway	No	0/0	$0	0
I-2010070585	4/21/2010	DENTON	Highway	Yes	0/0	$543	6,497.7 LGA

*Property damage is reported in 2014 dollars.

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

Probability of Future Occurrences

Given prior roadway incidents in the Town of Denton and, it is possible that a hazardous material incident may occur in the town (between 1 and 10 percent annual probability). However, town officials are mindful of this possibility and take precautions to prevent such an event from occurring. Additionally, there are detailed plans in place to respond to an occurrence.

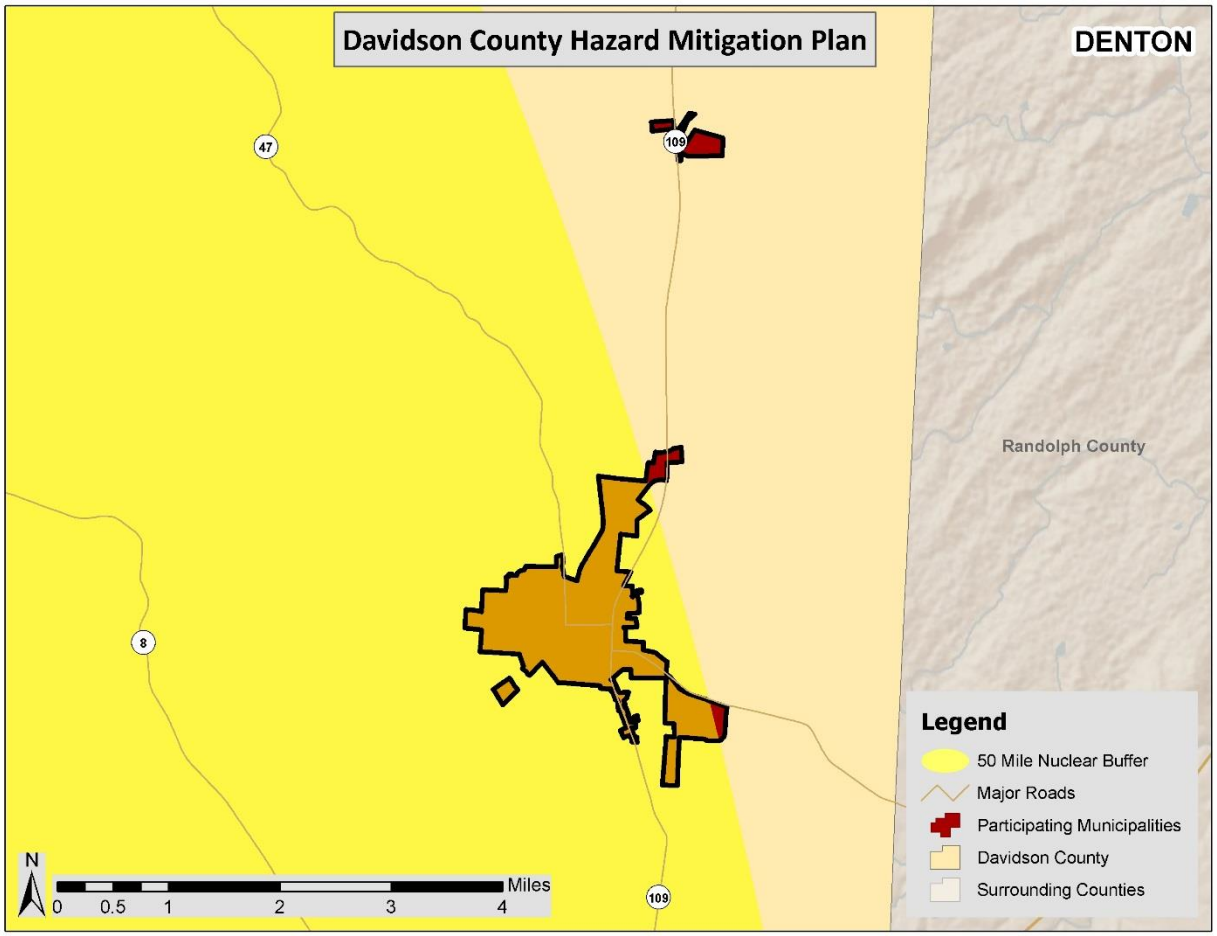
A.2.15 Nuclear Accident

Location and Spatial Extent

Nearly all of the Town of Denton is susceptible to a nuclear incident due to its proximity to the McGuire Nuclear Power Plant. Areas located within 10 miles of the station are considered to be within the zone of highest risk to a nuclear incident and is the designated evacuation radius recommended by the Nuclear Regulatory Commission. Although none of the town is within the 10-mile zone, most of the town is located within the 50-mile radius which is still considered to be at risk from a nuclear incident (**Figure A.10**).

[18] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

FIGURE A.10: NUCLEAR POWER PLANT INCIDENT HAZARD ZONES IN DENTON



Source: International Atomic Energy Agency

Historical Occurrences

Although there have been no major nuclear events at the McGuire Nuclear Power Plant, there is some possibility that one could occur as there have been incidents in the past in the United States at other facilities and at facilities around the world.

Probability of Future Occurrences

A nuclear event is a very rare occurrence in the United States due to the intense regulation of the industry. There have been incidents in the past, but it is considered unlikely (less than 1 percent annual probability).

A.2.16 Terror Threat

Location and Spatial Extent

A terror threat could potentially occur at any location in the town. However, the very definition of a terrorist event indicates that it is most likely to be targeted at a critical or symbolic resource/location. Ensuring and protecting the continuity of critical infrastructure and key resources (CIKR) of the United States is essential to the Nation's security, public health and safety, economic vitality, and way of life. CIKR includes physical and/or virtual systems or assets that, if damaged, would have a detrimental

impact on national security, including large-scale human casualties, property destruction, economic disruption, and significant damage to morale and public confidence. **Table A.28** lists the U.S. Department of Homeland Security's (DHS) identified main critical infrastructure sectors.

TABLE A.28 U.S. DEPARTMENT OF HOMELAND SECURITY CRITICAL INFRASTRUCTURE SECTORS

- Agriculture and Food
- Banking and Finance
- Chemical
- Commercial Facilities
- Communications
- Critical Manufacturing
- Dams
- Defense Industrial Base
- Emergency Services
- Energy
- Government Facilities
- Healthcare and Public Health
- Information Technology
- National Monuments and Icons
- Nuclear Reactors, Materials, and Waste
- Postal and Shipping
- Transportation Systems
- Water

All critical facilities (see Section A.3.1) are at a heightened level of risk in the Town of Denton. However, there are no facilities in the town that have been identified as the likely primary targets (**Table A.29**).

TABLE A.29: FACILITIES/EVENTS AT ELEVATED RISK OF TERROR THREAT IN DENTON

Critical Facility
Denton
None Identified

Source: Local Government

Historical Occurrences

Although there have been no major terror events in the Town of Denton, there is some possibility that one could occur in the future as there have been incidents in the United States in the past and there are several facilities that could be potential targets.

Probability of Future Occurrences

The Town of Denton has no recorded terrorist events. Due to no recorded incidents against the town, the probability of future occurrences of a terrorist attack is unlikely (less than 1 percent annual probability).

A.2.17 Wildfire

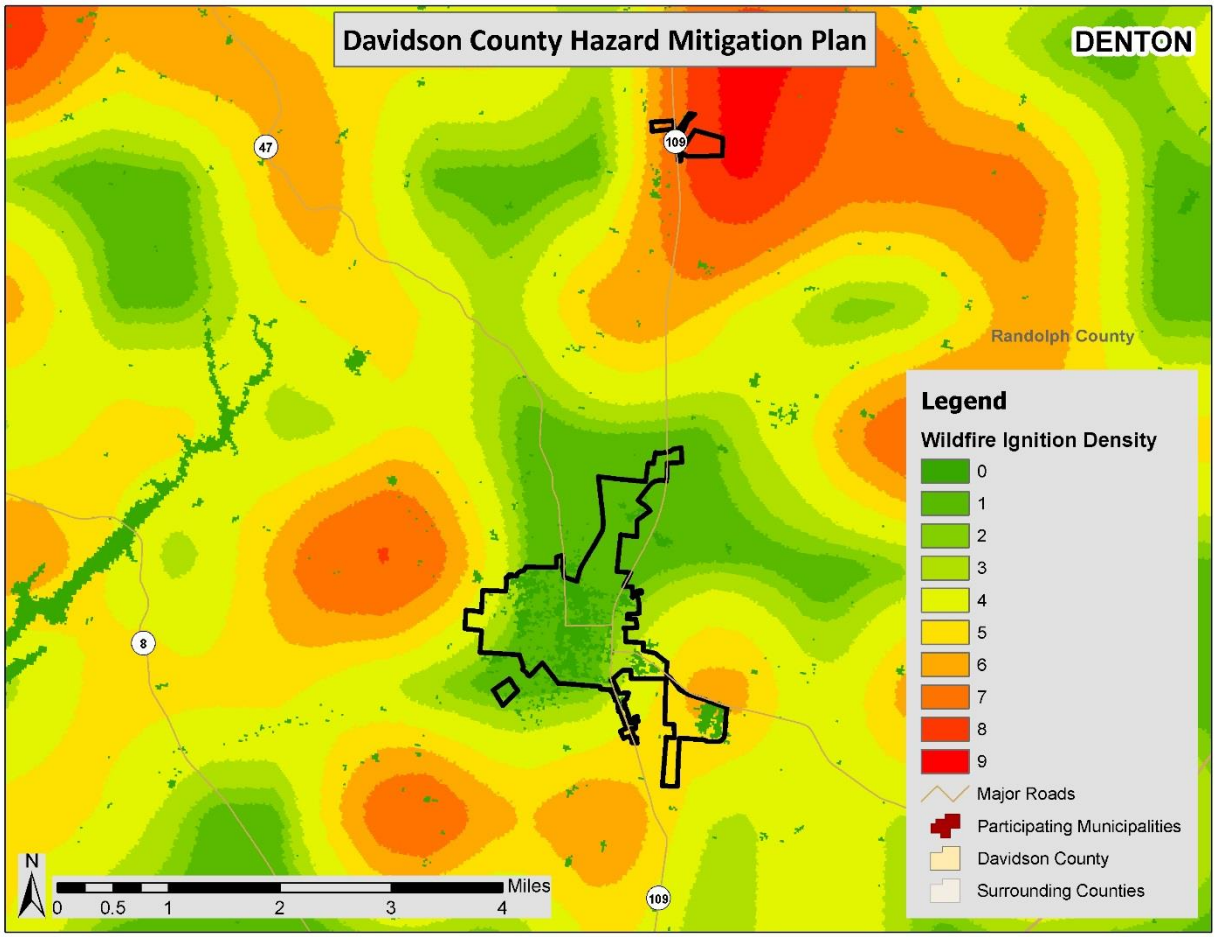
Location and Spatial Extent

The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below gives an indication of historic location in the Town of Denton.

Historical Occurrences

Figure A.11 shows the Wildfire Ignition Density in the Town of Denton based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[19]

FIGURE A.11: WILDFIRE IGNITION DENSITY IN DENTON



Source: Southern Wildfire Risk Assessment

Based on data from the North Carolina Division of Forest Resources from 2005 to 2014, Davidson County experienced an average of 39 wildfires annually which burn a combined average of 53.6 acres per year. The data indicates that most of these fires are small, averaging 1.4 acre per fire. **Table A.30** lists the number of reported wildfire occurrences in the county between the years 2005 and 2014.

[19] Southern Wildfire Risk Assessment, 2014.

TABLE A.30: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	27	53	47	36	16	40	48	30	47	46
Number of Acres	55.3	56.5	84.5	39.7	19	40.6	46.5	146.3	26.3	21.7

Source: North Carolina Division of Forest Resources

Since 2009, the NCDFR has also kept data on the number of structures damaged/destroyed. This information is presented in **Table A.31**.

TABLE A.31: STRUCTURES DAMAGED/DESTROYED BY WILDFIRE IN DAVIDSON COUNTY

Year	2009	2010	2011	2012	2013	2014
Davidson County						
Number of Structures	0	2	11	6	8	9
Cost of Damages to Structures	$0	$1,500	$13,600	$10,500	$14,600	$17,800

Source: North Carolina Division of Forest Resources

In addition, the North Carolina Department of Insurance collects fire data and reports it on an annual basis. This data is included in **Table A.32** to supplement the NCDFR data.

TABLE A.32: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

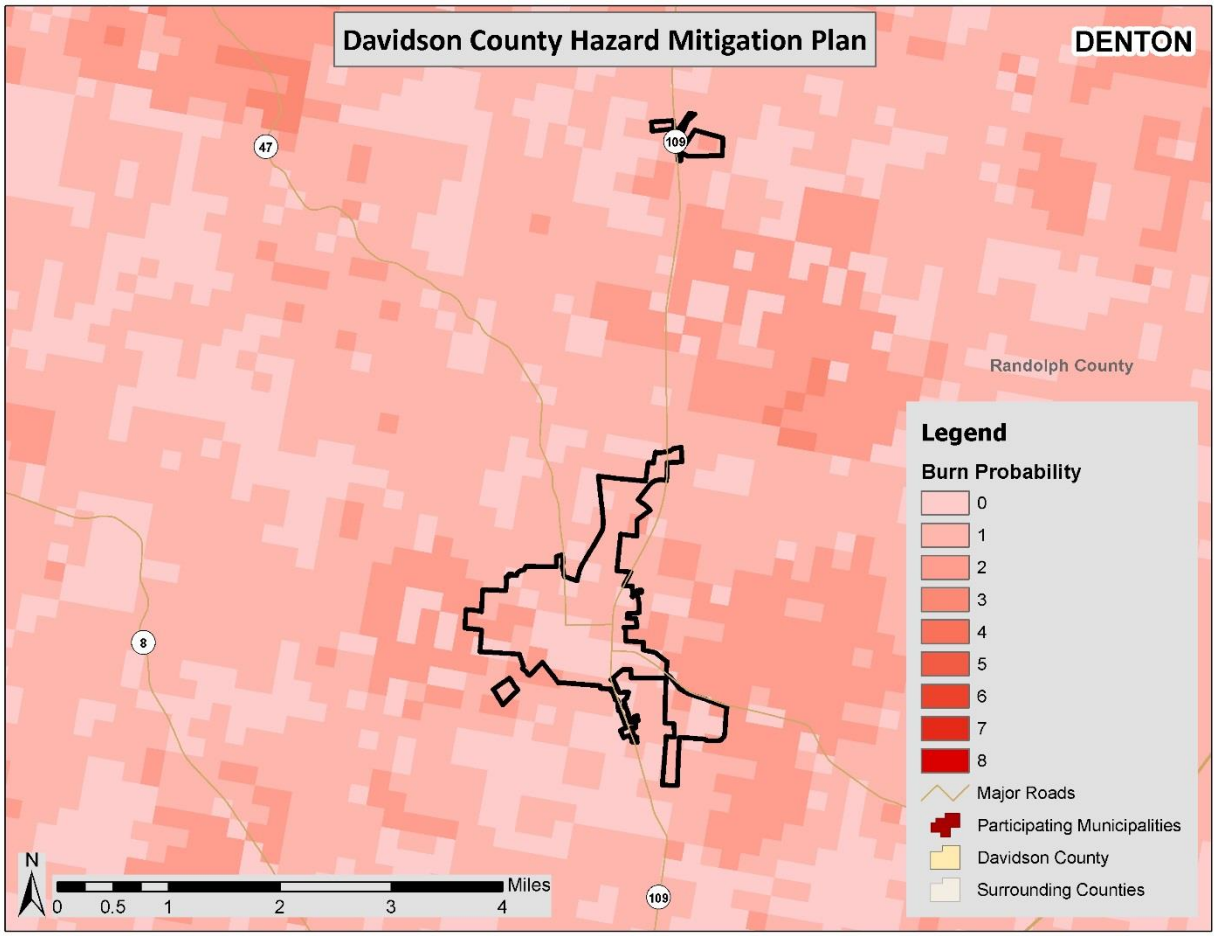
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	28	74	195	187	120	167	176	116	141	242
Property Loss	$0	$5,300	$650	$1,050	$1,550	$230	$1,940	$1,202	$10,700	$8,380

Source: North Carolina Department of Insurance

Probability of Future Occurrences

Wildfire events will be an ongoing occurrence around the Town of Denton. **Figure A.12** shows that there is some probability a wildfire will occur near the town. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to the Town of Denton for future wildfire events is likely (10 to 100 percent annual probability).

FIGURE A.12: BURN PROBABILITY IN DENTON



Source: Southern Wildfire Risk Assessment

A.2.18 Conclusions on Hazard Risk

The hazard profiles presented above were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

Hazard Extent

Table A.33 describes the extent of each natural hazard identified for the Town of Denton. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE A.33 EXTENT OF DENTON HAZARDS

Atmospheric Hazards	
Drought	Drought extent is defined by PDSI classifications which include Extremely Moist, Very Moist, Mid-Range, Moderate Drought, Severe Drought, and Extreme Drought classifications (pages 5:5-5:6). According to the PDSI classifications, the most severe drought condition is Extreme. Davidson County has received this ranking 3 times over the 14-year reporting period.
Extreme Heat	The extent of extreme heat can be defined by the maximum temperature reached. The highest temperature recorded in Davidson County is 107 degrees Fahrenheit (reported on July 29, 1952).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in the Town of Denton was 1.75 inches (reported on May 3, 2003). It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5 (Table 5.11). The greatest classification of hurricanes to traverse directly through Davidson County was an unnamed storm in 1893 which reached a maximum wind speed of 65 knots in the county. Although the county is much more likely to be impacted by the remnants of a hurricane or tropical storm, it is possible that a storm can impact the county directly.
Lightning	According to the Vaisala flash density map (Figure 5.5), the Town of Denton is located in an area that experiences 3 to 5 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Thunderstorm Wind / High Wind	Thunderstorm extent is defined by the number of thunder events and wind speeds reported. The strongest recorded wind event in the Town of Denton was last reported on April 25, 2014 at 50 knots (approximately 58 mph). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by tornado occurrences in the US provided by FEMA (Figure 5.6) as well as the Fujita/Enhanced Fujita Scale (Tables 5.18 and 5.19). According to NCDC data, no tornadoes have impacted the town. However, the greatest magnitude reported in the county was an EF2 (last reported on November 16, 2011). It should be noted that an EF5 tornado is possible.
Winter Storm and Freeze	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest 24-hour snowfall reported in the county was 20.3 inches on February 12, 1905. Due to unpredictable variations in snowfall throughout the county, extent totals will vary for each participating jurisdiction and reliable data on snowfall totals is not abundantly available. In addition, the lowest temperature reached in the county was -6 degrees Fahrenheit (January 21, 1985).
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale (Table 5.25) and the Modified Mercalli Intensity (MMI) scale (Table 5.26) and the distance of the epicenter from the Town of Denton. According to data provided by the National Geophysical Data Center, the greatest MMI to impact the town was III (slight) with a Richter Scale measurement of 3.3 (reported on September 13, 1976). The epicenter of this earthquake was located 124.0 km away.

Landslide	As noted above in the landslide profile, the landslide data provided by the North Carolina Geological survey is incomplete. This provides a challenge when trying to determine an accurate extent for the landslide hazard. However, when using the USGS landslide susceptibility index, extent can be measured with incidence, which is low throughout the town. Additionally, there is moderate susceptibility throughout the Town of Denton.
Hydrologic Hazards	
Dam Failure	Dam failure extent is defined using the North Carolina Division of Energy, Mineral, and Land Resources criteria (Table 5.30). There are no dams in the Town of Denton.
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records available for the Town of Denton.
Flood	Flood extent can be measured by the amount of land and property in the floodplain as well as flood height and velocity. The amount of land in the floodplain accounts for 0.0 percent of the total land area in the Town of Denton. Flood depth and velocity are recorded via United States Geological Survey stream gages throughout Davidson County. While a gage does not exist within the Town of Denton, there is one located near the town. The greatest peak discharge recorded near the town was reported on December 4, 1962. Water reached a discharge of 1,800 cubic feet per second. However the stream gage height was not available for this event.
Other Hazards	
Hazardous Materials Incident	According to USDOT PHMSA, the largest hazardous materials incident reported in the town was 6,497.5 LGA released on the highway on April 21, 2010. It should be noted that larger events are possible.
Nuclear Accident	Although there is no history of a nuclear accident at the McGuire Power Plant, other events across the globe and in the United States in particular indicate that an event is possible. Since several national and international events were Level 7 events on the INES, the potential for a Level 7 event at McGuire is possible.
Terror Threat	There is no history of terror threats in the Town of Denton; however; it is possible that one of these events could occur. If this were to take place, the magnitude of the event could range on the scale of critical damage with many fatalities and injuries to the population.
Wildfire	Wildfire data was provided by the North Carolina Division of Forest Resources and is reported annually by county from 2005-2014. The greatest number of fires to occur in Davidson County in any year was 53 in 2006. The greatest number of acres to burn in the county in a single year occurred in 2012 when 146.3 acres were burned. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.

Priority Risk Index Results

In order to draw some meaningful planning conclusions on hazard risk for the Town of Denton, the results of the hazard profiling process were used to generate town-wide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.20.2.

Table A.34 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles

developed for this section, as well as input from the Hazard Mitigation Planning Team. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE A.34: SUMMARY OF PRI RESULTS FOR DENTON

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Atmospheric Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Extreme Heat	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Hailstorm	Highly Likely	Minor	Moderate	6 to 12 hours	Less than 6 hours	**2.5**
Hurricane and Tropical Storm	Likely	Limited	Large	More than 24 hours	Less than 24 hours	**2.6**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Thunderstorm / High Wind	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Tornado	Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.7**
Winter Storm and Freeze	Highly Likely	Limited	Moderate	More than 24 hours	Less than 1 week	**2.8**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Landslide	Unlikely	Minor	Small	Less than 6 hours	Less than 6 hours	**1.5**
Hydrologic Hazards						
Dam and Levee Failure	Unlikely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.1**
Erosion	Possible	Minor	Small	More than 24 hours	More than 1 week	**1.8**
Flood	Possible	Minor	Negligible	6 to 12 hours	Less than 1 week	**1.7**
Other Hazards						
Hazardous Materials Incident	Possible	Limited	Small	Less than 6 hours	Less than 24 hours	**2.2**
Nuclear Accident	Unlikely	Limited	Large	6 to 12 hours	Less than 1 week	**2.3**
Terror Threat	Unlikely	Critical	Small	Less than 6 hours	Less than 24 hours	**2.2**
Wildfire	Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.3**

A.2.19 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for the Town of Denton, including the PRI results and input from the Hazard Mitigation Planning Team, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table A.35**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of the Town of Denton. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section A.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

TABLE A.35: CONCLUSIONS ON HAZARD RISK FOR DENTON

HIGH RISK	Thunderstorm / High Wind Winter Storm and Freeze Hazardous Materials Incident Tornado
MODERATE RISK	Hurricane and Tropical Storm Drought Hailstorm Lightning Wildfire
LOW RISK	Terror Threat Extreme Heat Dam and Levee Failure Nuclear Accident Earthquake Erosion Flood Landslide

A.3 TOWN OF DENTON VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of the Town of Denton to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the town and assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

A.3.1 Asset Inventory

Table A.36 lists the number of parcels, total value of parcels, total number of parcels with improvements, and the total assessed value of improvements for the Town of Denton (study area of vulnerability assessment).[20]

[20] Total assessed values for improvements is based on tax assessor records as joined to digital parcel data. This data does not include dollar figures for tax-exempt improvements such as publicly-owned buildings and facilities. It should also be noted that, due to record keeping, some duplication is possible thus potentially resulting in an inflated value exposure for an area.

TABLE A.36: IMPROVED PROPERTY IN DENTON

Location	Number of Parcels	Total Assessed Value of Parcels	Estimated Number of Buildings	Total Estimated Value of Improvements[21]
Denton	985	$92,346,970	1,686	$70,248,830

Source: Davidson County GIS Department

Table A.37 lists the fire stations, police stations, EMS/rescue stations, medical care facilities, schools, and other critical facilities located in the Town of Denton. These facilities were identified as primary critical facilities in that they are necessary to maintain government functions and protect the life, health, safety, and welfare of citizens. These facilities were geospatially mapped and used as the basis for further geographic analysis of the hazards that could potentially affect critical facilities. All critical facility information was provided by the local government and the Davidson County GIS department.

In addition, **Figure A.13** shows the locations of primary critical facilities in the Town of Denton. **Table A.52**, near the end of this section, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. As noted previously, this list is not all-inclusive and only includes information provided by the local government.

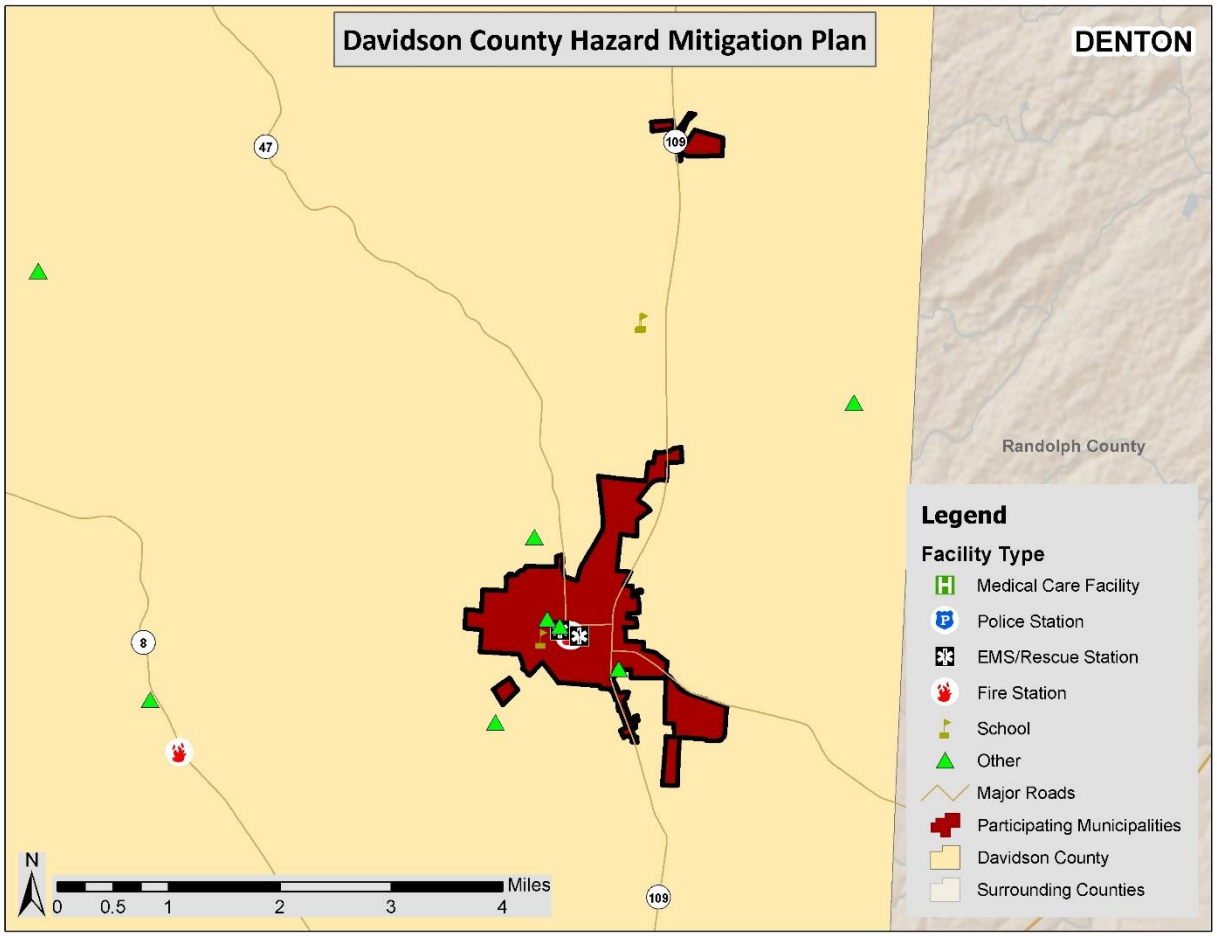
TABLE A.37: CRITICAL FACILITY INVENTORY IN DENTON

Location	Fire Stations	Police Stations	EMS/Rescue Stations	Medical Care Facilities	Schools	Other
Denton	1	1	2	0	1	3

Source: Local Government

[21] Building value for each jurisdiction is based on the dollar value of parcels with a building value greater than zero.

FIGURE A.13: CRITICAL FACILITY LOCATIONS IN DENTON



Source: Local Government

A.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in the Town of Denton that are potentially at risk to these hazards.

Table A.38 lists the population according to U.S. Census 2010 population estimates. The total population in the Town of Denton according to Census data is 1,636 persons. Additional population estimates are presented above in Section A.1.

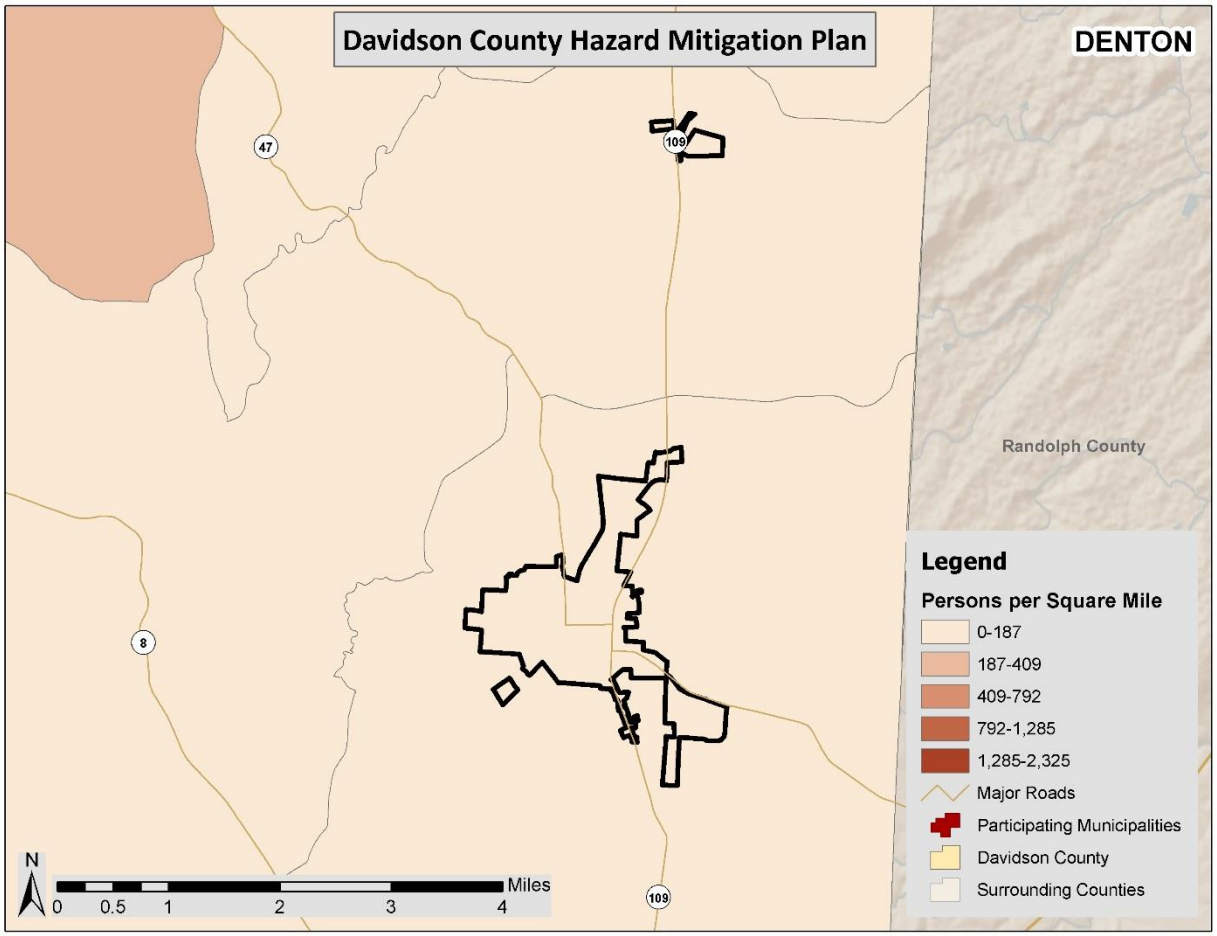
TABLE A.38: TOTAL POPULATION IN DENTON

Location	Total 2010 Population
Denton	1,636

Source: United States Census 2010

In addition, **Figure A.14** illustrates the population density by census tract as it was reported by the U.S. Census Bureau in 2010.

FIGURE A.14: POPULATION DENSITY IN DENTON



Source: United States Census Bureau, 2010

A.3.3 Development Trends and Changes in Vulnerability

Since the previous hazard mitigation plan was approved in 2010, the Town of Denton has experienced limited growth and development. **Table A.39** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE A.39: BUILDING COUNTS FOR DENTON

Jurisdiction	Total Housing Units (2013)	Units Built 2010 or later	% Building Stock Built Post-2010
Denton	808	0	0.0%

Source: United States Census Bureau

Table A.40 shows population growth estimates for the town from 2010 to 2013 based on the U.S. Census Annual Estimates of Resident Population.

TABLE A.40: POPULATION GROWTH FOR DENTON

Jurisdiction	Population Estimates (as of July 1)				% Change 2010-2013
	2010	2011	2012	2013	
Denton	1,661	1,603	1,713	1,640	-1.3%

Note: July 1 population estimates were used in this table to allow comparison of annual population counts (April 1 Census estimates were used for all other population counts throughout the plan which is why the counts may differ).
Source: United States Census Bureau

Based on the data above, there has been no residential development or population growth in the town since 2010, and the town has actually experienced a slight population decline. Therefore, development and population growth have not impacted the town's vulnerability since the previous local hazard mitigation plan was approved and there has been no change in the overall vulnerability.

However, it is important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains, moderate landside susceptibility areas, high wildfire risk areas, primary and secondary hazardous materials buffers, or McGuire Nuclear Power Plant's 50-mile buffer.

A.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, modeling tool, or sufficient historical data allow for further analysis. Those results, specific to the Town of Denton, are presented here. All other hazards are assumed to impact the entire planning region (drought, extreme heat, hailstorm, lightning, thunderstorm/high wind, tornado, and winter storm and freeze) or, due to lack of data, analysis would not lead to credible results (dam and levee failure, erosion, and terror threat). The total town exposure, and thus risk, was presented in **Table A.36**.

The annualized loss estimate for all hazards is presented at the end of this section in **Table A.51.**

The hazards presented in this section include: hurricane and tropical storm winds, earthquake, landslide, flood, hazardous materials incident, nuclear accident, and wildfire.

Hurricane and Tropical Storm

Historical evidence indicates that the Town of Denton has some risk to the hurricane and tropical storm hazard. There have been five disaster declarations due to hurricanes (Hurricane Hugo, Hurricane Fran, Hurricane Floyd, Hurricane Isabel, and Hurricane Ivan) in Davidson County. Several tracks have come near or traversed through Davidson County, as shown and discussed in Section A.2.4.

Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, high winds, and precipitation, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore only hurricane winds are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to the hurricane and tropical storm hazard. Hazus-MH 2.1 was used to determine annualized losses for the county as shown below in **Table A.41**. Only losses to buildings, contents, and inventory are reported, in order to best match annualized losses

reported for other hazards. Hazus-MH reports losses at the U.S. Census tract level, so determining participating jurisdiction losses was not possible.

TABLE A.41: ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$637,00	$148,000	$5,000	$790,000

Source: Hazus-MH 2.1

In addition, probable peak wind speeds were calculated in Hazus. These are shown below in **Table A.42.**

TABLE A.42: PROBABLE PEAK HURRICANE / TROPICAL STORM WIND SPEEDS (MPH)

Location	50-year event	100-year event	500-year event	1,000-year event
Denton	64.7	74.2	94.4	101.4

Source: Hazus-MH 2.1

Social Vulnerability

Given equal susceptibility across the Town of Denton, it is assumed that the total population is at risk to the hurricane and tropical storm hazard.

Critical Facilities

Given equal vulnerability across the Town of Denton, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among other factors. Determining individual building response is beyond the scope of this plan. However, this plan will consider mitigation actions for vulnerable structures, including critical facilities, to reduce the impacts of the hurricane wind hazard. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this section.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in the Town of Denton. Hurricane events can cause substantial damage in their wake including fatalities, extensive debris clean-up, and extended power outages.

Earthquake

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the annualized loss for Davidson County. The results of the analysis reported at the U.S. Census tract level do not make it feasible to estimate losses at the jurisdiction level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to building damage (structural and non-structural), contents, and inventory. However, like the analysis for hurricanes, the comparative annualized loss figures at the end of this section only utilize building losses in order to provide consistency with other hazards. **Table A.43** summarizes the findings.

TABLE A.43: ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Building Loss	Non-Structural Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$39,000	$96,000	$28,000	$2,000	$165,000

Source: Hazus-MH 2.1

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. A list of individual critical facilities and their risk can be found in **Table A.52**.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in the Town of Denton. Minor earthquakes may rattle dishes and cause minimal damage while stronger earthquakes will result in structural damage as indicated in the Hazus scenario above. Impacts of earthquakes include debris clean-up, service disruption and, in severe cases, fatalities due to building collapse. Specific vulnerabilities for assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available. Furthermore, mitigation actions to address earthquake vulnerability will be considered.

Landslide
In order to complete the vulnerability assessment for landslides in the Town of Denton, GIS analysis was used. The potential dollar value of exposed land and property total can be determined using the USGS Landslide Susceptibility Index (detailed in Section A.2.10), county-level tax parcel and building footprint data, and GIS analysis. **Table A.44** presents the potential at-risk property where available. No areas of the Town of Denton are identified as moderate or high incidence areas as determined by the USGS landslide data. However, all areas of the town have moderate landslide susceptibility. Typically, an analysis is run to determine which parcels/buildings are located within the high and moderate incidence areas, but since no high incidence areas exist in the county, only an analysis of moderate incidence areas was carried out.

TABLE A.44: TOTAL POTENTIAL AT-RISK PARCELS FOR THE LANDSLIDE HAZARD

Location	Number of Parcels At Risk	Number of Improvements At Risk	Total Value of Improvements At Risk ($)
Incidence Level	**Moderate**		
Denton	0	0	$0

Source: United States Geological Survey

Social Vulnerability
Given low incidence and moderate susceptibility across the entire town, it is assumed that the total population is at a low risk to landslides.

Critical Facilities
No critical facilities are located in a moderate incidence area. However, all critical facilities are located in a moderate susceptibility area. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this section.

In conclusion, a landslide has the potential to impact all existing and future buildings, facilities, and populations in the Town of Denton, though most areas are at a very low risk. Due to a variety of factors

such as steep slopes and modified slopes, hilly areas of the town bear a greater risk than flat areas. Specific vulnerabilities for the Town of Denton assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available.

Flood

Historical evidence indicates that the Town of Denton is susceptible to flood events. A total of 1 flood event has been reported by the National Climatic Data Center, resulting in no property damage. On an annualized level, damages are negligible for the Town of Denton.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with local tax assessor records for the town. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within an identified floodplain. **Table A.45** presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

TABLE A.45: ESTIMATED EXPOSURE OF PARCELS TO THE FLOOD HAZARD

Location	1.0-percent ACF			0.2-percent ACF		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[22]	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[23]
Denton	0	0	$0	0	0	$0

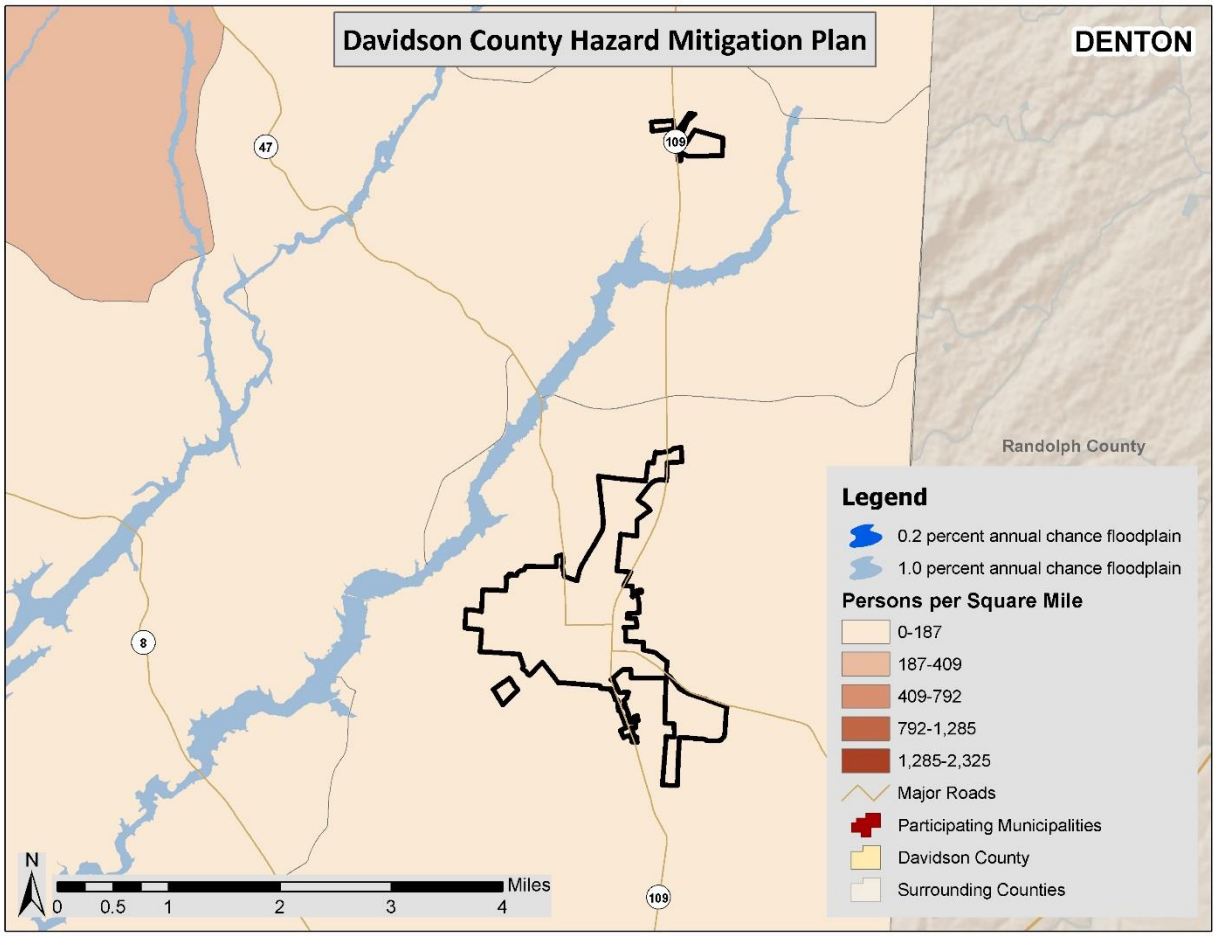
Source: Federal Emergency Management Agency DFIRM

Social Vulnerability

U.S. Census 2010 population at the tract level was used for analysis to determine where areas of high population concentration intersect with flood prone areas in the town. **Figure A.15** is presented to gain a better understanding of the at-risk population.

[22] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-percent annual chance floodplain, since building footprints were not associated with dollar value data.
[23] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 0.2-percent annual chance floodplain, since building footprints were not associated with dollar value data.

FIGURE A.15 : POPULATION DENSITY NEAR FLOODPLAINS



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no critical facilities in the Town of Denton located in the 1.0-percent annual chance floodplain and 0.2-percent annual chance floodplain based on FEMA DFIRM boundaries and GIS analysis. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this section.

In conclusion, a flood has the potential to impact existing and future buildings, facilities, and populations in the Town of Denton, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. As noted, the floodplains used in this analysis include the 100-year and 500-year FEMA regulated floodplain boundaries. It is certainly possible that more severe events could occur beyond these boundaries or urban (flash) flooding could impact additional structures. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

Hazardous Materials Incident

Historical evidence indicates that the Town of Denton is susceptible to hazardous materials events. A total of two HAZMAT incidents have been reported by the Pipeline and Hazardous Materials

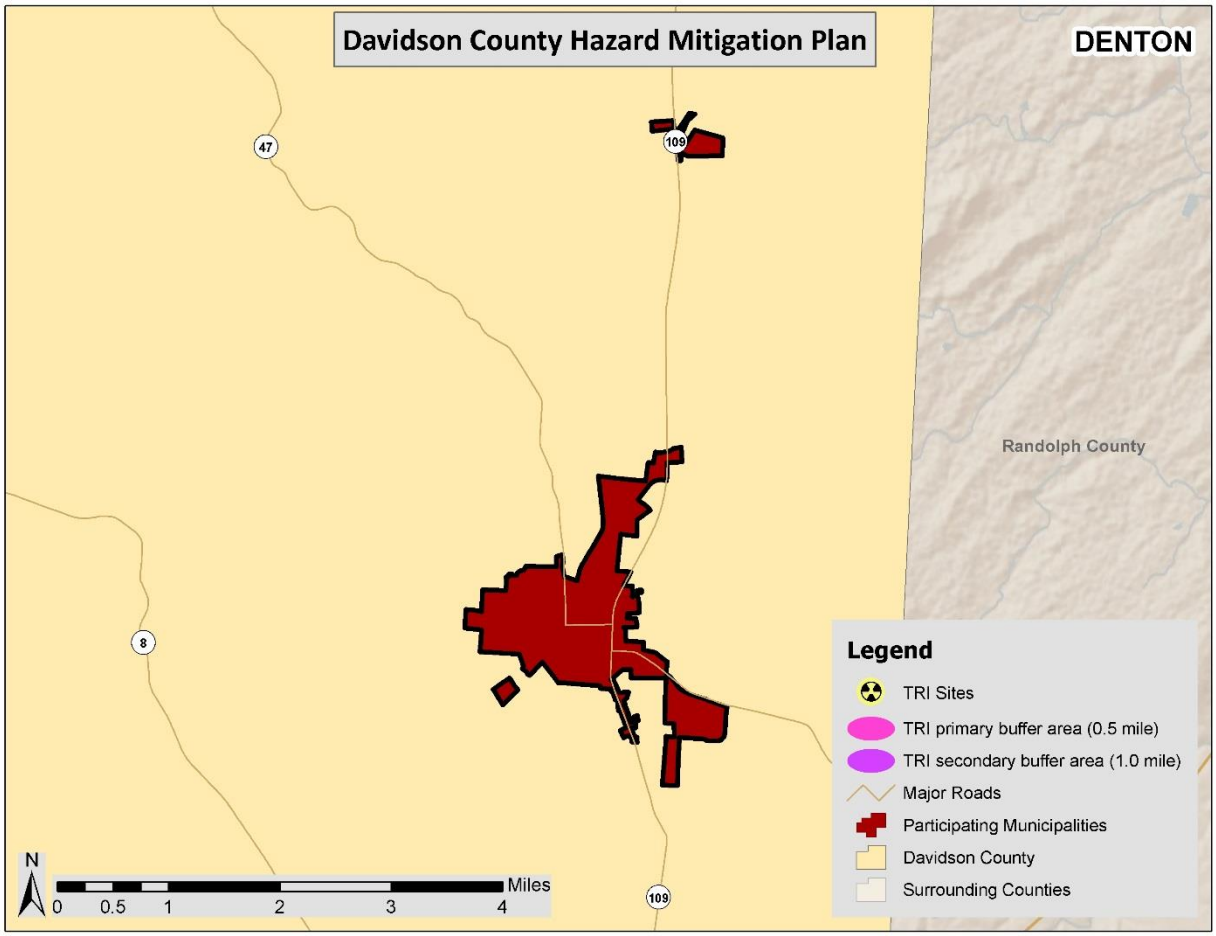
Safety Administration, resulting in $543 (2014 dollars) in property damage. On an annualized level, these damages amount to $136 for the Town of Denton.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and parcels.[24] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to respect the different levels of effect: immediate (primary) and secondary. Primary and secondary impact sites were selected based on guidance from FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks against Buildings and engineering judgment. For the fixed site analysis, geo-referenced TRI listed toxic sites in the Town of Denton, along with buffers, were used for analysis as shown in **Figure A.16.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure A.17** shows the areas used for mobile toxic release buffer analysis. The results indicate the approximate number of parcels/buildings and improved value, as shown in **Table A.46** (fixed sites), **Table A.47** (mobile road sites) and **Table A.48** (mobile railroad sites).[25]

[24] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an event).
[25] Note that parcels included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE A.16 : TRI SITES WITH BUFFERS IN DENTON



Source: Environmental Protection Agency

TABLE A.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[26]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[27]
Denton	0	0	$0	0	0	$0

[26] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[27] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

FIGURE A.17 : MOBILE HAZMAT BUFFERS IN DENTON

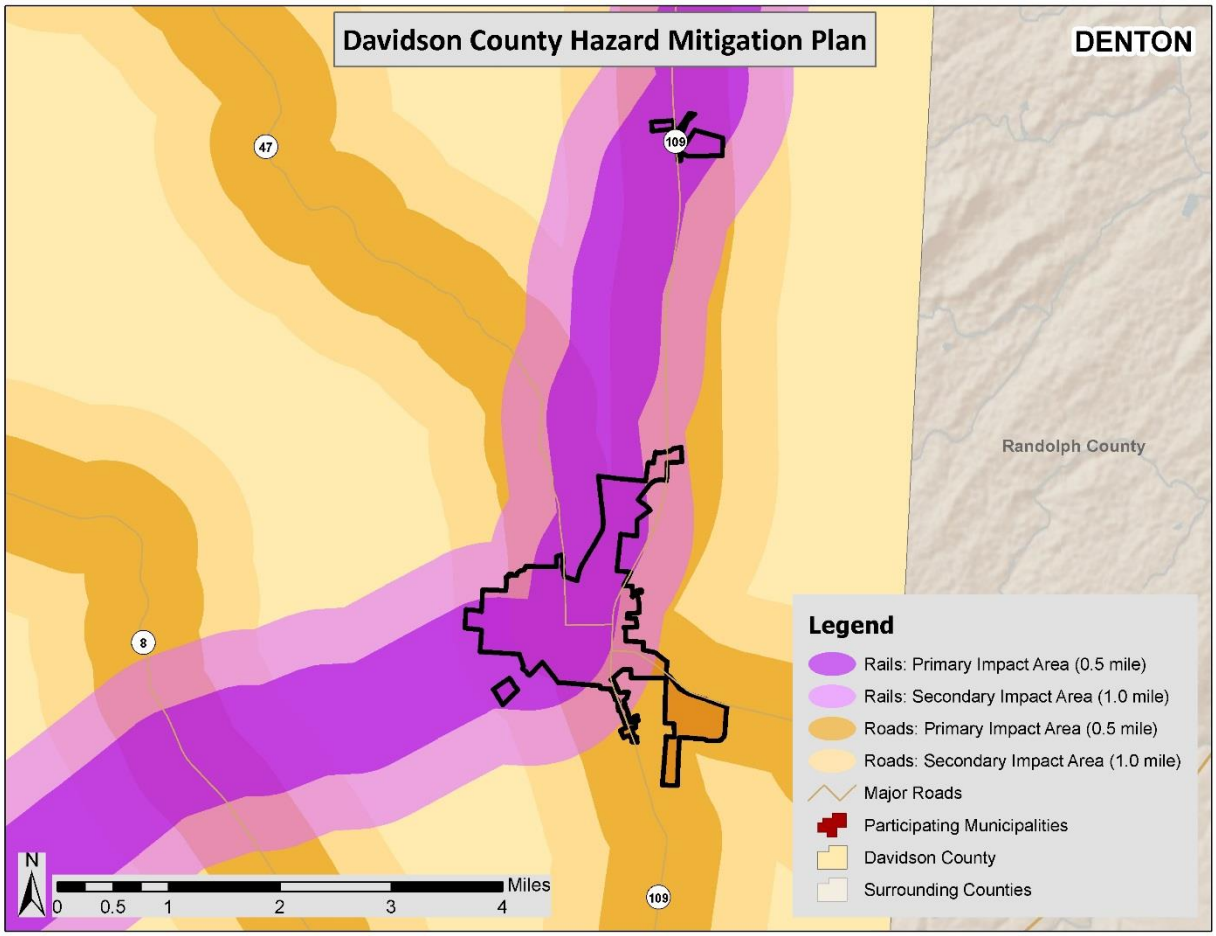


TABLE A.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[28]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[29]
Denton	879	1,540	$64,294,700	985	1,686	$70,248,830

[28] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[29] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

TABLE A.48: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[30]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[31]
Denton	830	1,260	$59,294,020	982	1,648	$70,006,870

Social Vulnerability

Given high susceptibility across the entire town, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are no Town of Denton facilities located in a HAZMAT risk zone. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this section.

Mobile Analysis:

The critical facility analysis for road and railroad transportation corridors in the Town of Denton revealed that there are 8 critical facilities located in the primary and secondary mobile HAZMAT buffer areas for roads and 8 critical facilities located in the railroad HAZMAT buffer areas. The 1.0-mile road buffer area (worst case scenario model) includes the following critical facilities: 1 fire station, 1 police station, 2 EMS/rescue stations, 1 school, and 3 other facilities. The railroad buffer areas include the following: 1 fire station, 1 police station, 2 EMS/rescue stations, 1 school, and 3 other facilities. It should be noted that all of the facilities located in the buffer areas for road are also located in the buffer areas for railroad. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this section.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in the Town of Denton. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in conditions that could alter the impact area such direction and speed of wind, volume of release, etc. Further, incidents from neighboring counties could also impact the town.

Nuclear Accident

The location of McGuire Nuclear Power Plant southwest of the Town of Denton demonstrates that the town is at risk to the effects of a nuclear accident. Although there have not been any major events at this plant in the past, there have been major events at other nuclear stations around the country. Additionally, smaller scale incidents at McGuire Nuclear Power Plant have occurred.

In order to assess nuclear risk, a GIS-based analysis was used to estimate exposure during a nuclear event within each of the risk zones described in Section 5: *Hazard Profiles*. The determination of

[30] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.

[31] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within one of the risk zones. There are no properties in Davidson County located within the 10-mile risk zone, so **Table A.49** only presents the potential at-risk property in the 50-mile buffer zone for the Town of Denton. Both the number of parcels/buildings and the approximate value are presented.

TABLE A.49: ESTIMATED EXPOSURE OF PARCELS/BUILDINGS TO A NUCLEAR ACCIDENT

Location	50-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[32]
Denton	981	1,671	$70,192,710

Source: International Atomic Energy Agency

Social Vulnerability

Since nearly the entire area of the town is within the 50-mile buffer area, the total population is considered to be at risk to a nuclear accident. However, populations within the 50-mile buffer zone are considered to be at an elevated risk.

Critical Facilities

The critical facility analysis revealed that there are 8 critical facilities located in the 50-mile nuclear buffer area in the Town of Denton. This includes the following: 1 fire station, 1 police station, 2 EMS/rescue stations, 1 school, and 3 other facilities. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this section.

In conclusion, a nuclear accident has the potential to impact many existing and future buildings, facilities, and populations in the Town of Denton.

Wildfire

Historical evidence indicates that the Town of Denton is susceptible to wildfire events. A total of 227 wildfires were reported by the North Carolina Division of Forest Resources in Davidson County from 2009 to 2014 resulting in $58,000 in structure damage. On an annualized level, these damages amount to $11,600 for the county (data is only reported at the county level, so it is not possible to calculate damages specific to the town).

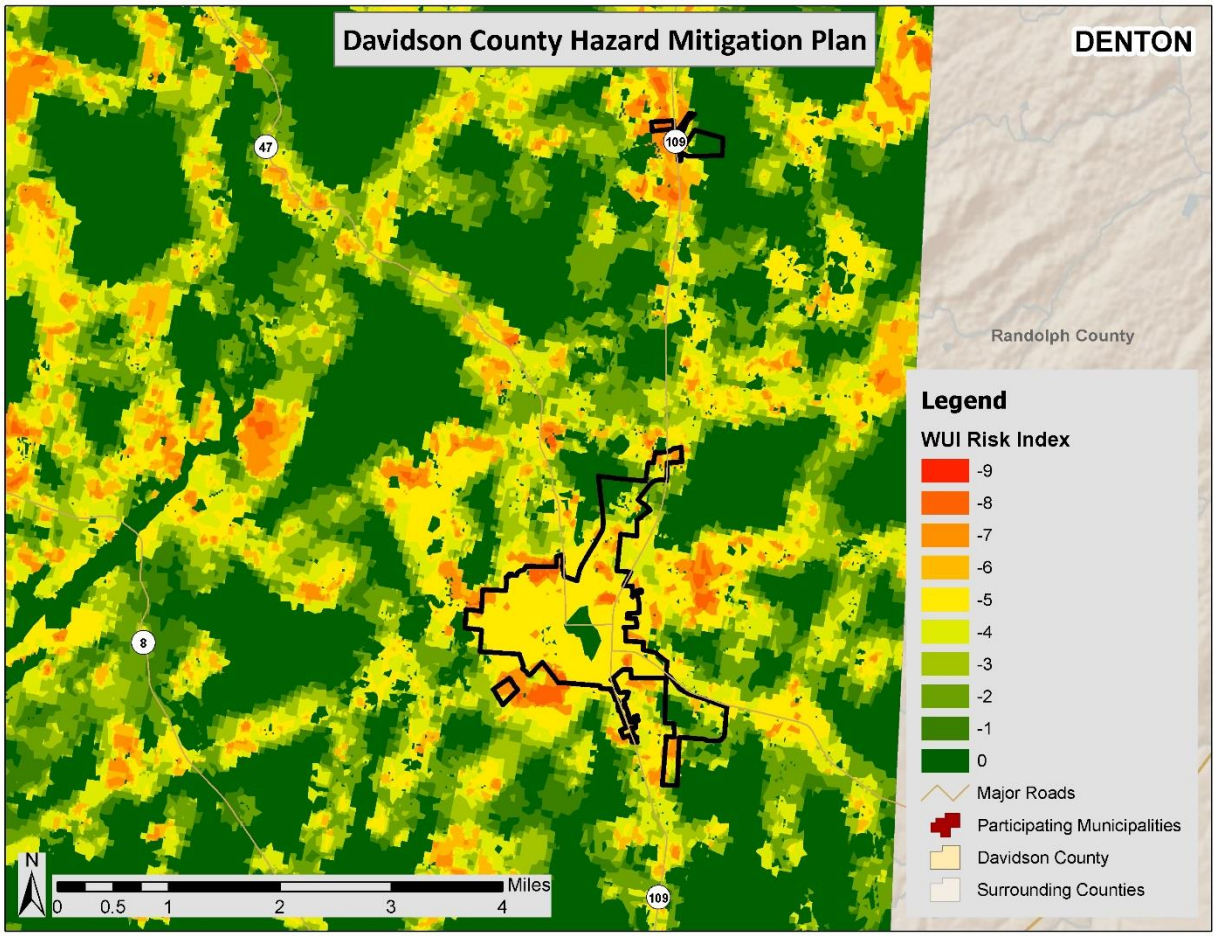
To estimate exposure to wildfire, the approximate number of parcels and their associated improved value was determined using GIS analysis. For the critical facility analysis, areas of risk were intersected with critical facility locations. **Figure A.18**, shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to -9 with lower values being most severe (as noted previously, this is only a measure of

[32] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 50-mile buffer, since building footprints were not associated with dollar value data.

relative risk). **Figure A.19** shows the areas of analysis where any grid cell is than -5. Areas with a value below -5 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

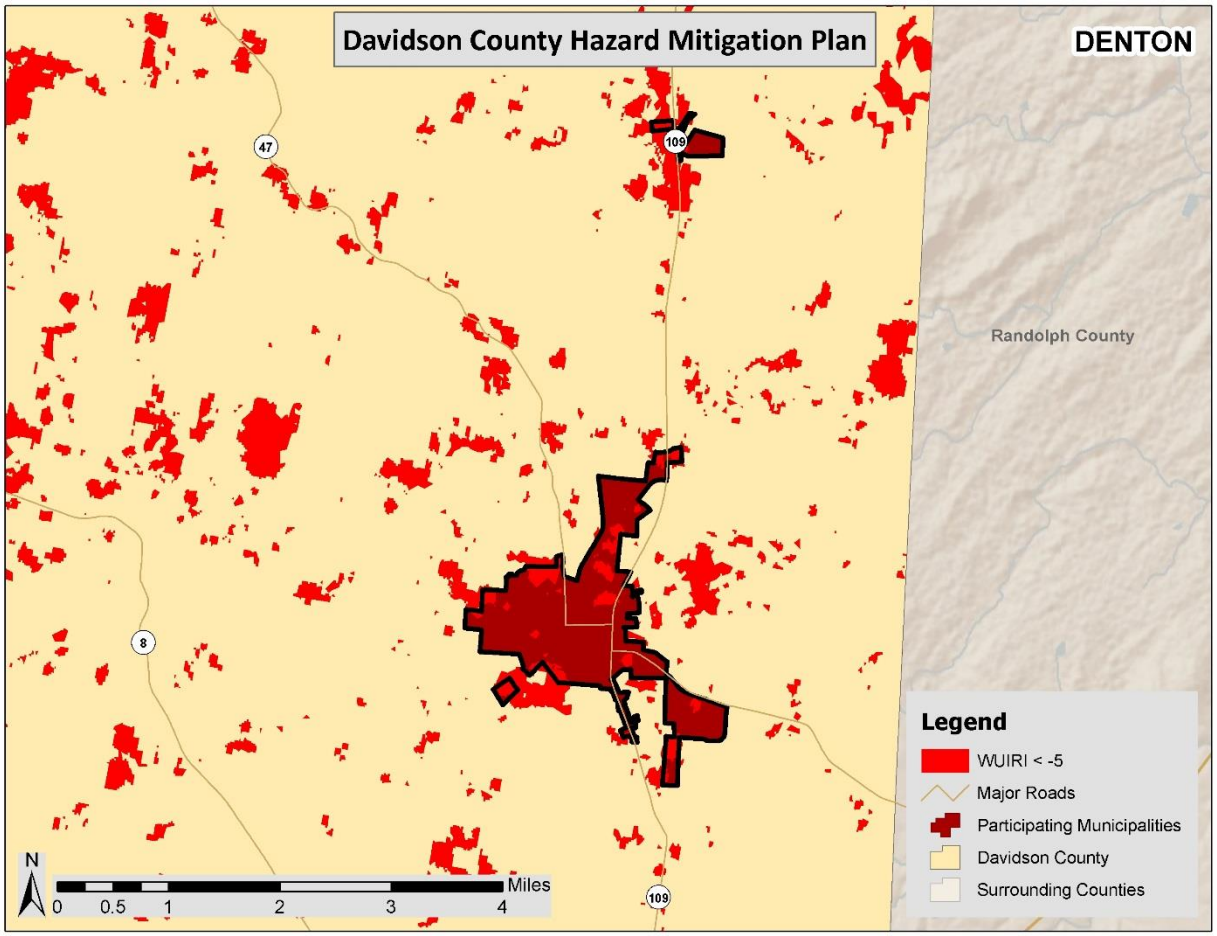
Table A.50 shows the results of the analysis.

FIGURE A.18: WUI RISK INDEX AREAS IN DENTON



Source: Southern Wildfire Risk Assessment Data

FIGURE A.19: HIGH WILDFIRE RISK AREAS IN DENTON



Source: Southern Wildfire Risk Assessment Data

TABLE A.50: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

Location	HIGH WILDFIRE RISK AREA		
	Approx. Number of Parcels	Approx. Number of Buildings	Approx. Improved Value
Denton	134	201	$12,743,380

Social Vulnerability

Although not all areas have equal vulnerability, there is some susceptibility across the entire town. It is assumed that the total population is at low risk to the wildfire hazard. Determining the exact number of people in wildfire risk areas is difficult with existing data and could be misleading.

Critical Facilities

The critical facility analysis revealed that there are no critical facilities located in the in the wildfire risk area (areas where the WUIRI is less than -5). However, it should also be noted, that several factors could impact the spread of a wildfire putting all facilities at some risk. A list of specific critical facilities and their associated risk can be found in **Table A.52** at the end of this section.

In conclusion, a wildfire event has the potential to impact some existing and future buildings, critical facilities, and populations in the Town of Denton.

Conclusions on Hazard Vulnerability

Table A.51 presents a summary of annualized loss for each hazard in the Town of Denton. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for the town. Therefore, although an annualized loss was determined using the damage reported from historical occurrences at the municipal level (where available), it is likely that the county-wide estimate (found in Section 6: *Vulnerability Assessment*) is a better estimate. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the town.

TABLE A.51: ANNUALIZED LOSS FOR DENTON*

Event	Denton
Atmospheric Hazards	
Drought	Negligible
Extreme Heat	Negligible
Hailstorm	Negligible
Hurricane & Tropical Storm†	$790,000
Lightning	Negligible
Severe Thunderstorm / High Wind	$1,301
Tornado	Negligible
Winter Storm & Freeze†	$344,444
Geologic Hazards	
Earthquake†	$165,000
Landslide	Negligible
Hydrologic Hazards	
Dam Failure	Negligible
Erosion	Negligible
Flood	Negligible
Other Hazards	
HAZMAT Incident	$136
Nuclear Accident	Negligible
Terror Threat	Negligible
Wildfire†	$11,600

*In this table, the term "Negligible" is used to indicate that no records for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not kept.
†Only county-wide damage estimates were reported for this hazard.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to atmospheric hazards including drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind, tornado, and winter storm and freeze. Some buildings may be more vulnerable to these hazards based on locations, construction, and building type. **Table A.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

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TABLE A.52: AT-RISK CRITICAL FACILITIES IN DENTON

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
DENTON																								
Denton - Base 4	EMS Base	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Station #39	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Denton Town Hall	Government Office	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Denton Library	Library	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Denton Police Dept	Police	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Station 10	Rescue Squad	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Denton Elementary	School	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Water Tank-Bryon St just E of NC 109 & Noell Av	Water Tank	X	X	X	X	X	X	X	X	X								X		X		X		

A.4 TOWN OF DENTON CAPABILITY ASSESSMENT

This subsection discusses the capability of the Town of Denton to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

A.4.1 Planning and Regulatory Capability

Table A.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the Town of Denton. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Davidson County Hazard Mitigation Plan.

TABLE A.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System
Denton	✓			✓				✓							✓	✓	✓			✓	✓	✓	

A more detailed discussion on the town's planning and regulatory capabilities follows.

Emergency Management

Hazard Mitigation Plan
The Town of Denton was included in the county's previous hazard mitigation plan.

Emergency Operations Plan
The Town of Denton is included in the county's emergency operations plan.

General Planning

Zoning Ordinance
The Town of Denton has adopted a standalone zoning ordinance.

Subdivision Ordinance
The Town of Denton has adopted a standalone subdivision ordinance.

Building Codes, Permitting, and Inspections
North Carolina has a state compulsory building code which applies throughout the state. The Town of Denton Building Inspections provides building code enforcement within the town's planning jurisdiction.

Floodplain Management

Table A.54 provides NFIP policy and claim information for the Town of Denton.

TABLE A.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
Denton	05/10/12	03/16/09	0	$0	0	$0

Source: NFIP Community Status information as of 2/12/15; NFIP claims and policy information as of 11/30/14

Flood Damage Prevention Ordinance
All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. The Town of Denton participates in the NFIP and has adopted flood damage prevention regulations.

Open Space Management Plan
The Town of Denton has adopted the county's parks and recreation tourism development master plan.

A.4.2 Administrative and Technical Capability

Table A.55 provides a summary of the capability assessment results for the Town of Denton with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in the town with the specified knowledge or skill.

TABLE A.55: RELEVANT STAFF / PERSONNEL RESOURCES

Staff / Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
Denton		✓		✓	✓		✓	✓		

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

A.4.3 Fiscal Capability

Table A.56 provides a summary of the results for the Town of Denton with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds) according to the previous county hazard mitigation plan.

TABLE A.56: RELEVANT FISCAL RESOURCES

Fiscal Tool / Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP, PDM, FMA, SBA, other Federal, state, and non-governmental funding sources, etc.
Denton	✓	✓	✓						✓	✓

A.4.4 Political Capability

The previous hazard mitigation plan indicates that the Town of Denton supports hazard mitigation practices and strategies to the extent that it is able to pursue development of strategies. Public awareness has increased through the planning process. Political willpower has yet to be developed through education and awareness programs.

A.4.5 Conclusions on Local Capability

Table A.57 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in the existing hazard mitigation plan and readily available on the town's government website. According to the assessment, the local capability score for the town is 22, which falls into the moderate capability ranking.

TABLE A.57: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
Denton	22	Moderate

A.5 TOWN OF DENTON MITIGATION STRATEGY

This subsection provides the blueprint for the Town of Denton to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Hazard Mitigation Planning Team and the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

A.5.1 Mitigation Goals

The Town of Denton developed five mitigation goals in coordination with the other participating Davidson County jurisdictions. The county mitigation goals are presented in **Table A.58**.

TABLE A.58: DAVIDSON COUNTY MITIGATION GOALS

	Goal
Goal #1	To enhance local government capability to lessen the impacts of all natural hazards.
Goal #2	To identify and protect critical facilities, services, and infrastructure from the impacts of natural disasters.
Goal #3	To develop an effective public awareness/education/outreach program for natural hazards impacts.
Goal #4	To protect persons and property from damage due to natural hazards.
Goal #5	To ensure disaster resistant future development.

A.5.2 Mitigation Action Plan

The mitigation actions proposed by the Town of Denton are listed in the following individual Mitigation Action Plan.

Denton Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Establish hazard mitigation as a component of all planning activities.	All	Moderate	Denton Town Manager	n/a	2019	Although hazard mitigation has been integrated into many planning activities, the town will attempt to improve its integration into all planning activities going forward.
P-2	Develop a comprehensive land use plan.	All	Moderate	Denton Town Manager	n/a	2017	The town does not have a comprehensive plan but is requesting funding to begin comprehensive plan in FY2015-2016 and complete in 18 months.
P-3	Continue to clear debris from culverts and storm drains in flood prone areas.	Flood	High	Denton Public Works	Local	2020	In the past, the town has undertaken debris removal to reduce localized flooding in areas around culverts and storm drains. The town will continue to implement this program and will work to identify any new areas that require maintenance and check-ins.
P-4	Consider tree ordinances or programs to encourage planting trees less susceptible to damage from ice and wind.	Winter Storm, High Wind	Low	Denton Town Manager	Urban and Community Forestry Grant	2018	The town has not established an ordinance or program related to tree planting, but it will continue to look into doing so, most likely as part of developing a comprehensive plan.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
P-5	Through subdivision regulations, encourage that power, cable and telephone lines be buried.	Winter Storm, High Wind	Low	Denton Town Manager	Local	2018	The town has not required that utility lines be buried, but it will continue to encourage this practice and will look into establishing subdivision regulations to this effect, most likely as part of developing a comprehensive plan.
P-6	Through development of land use plan, designate preferred growth areas and develop area plans for target locations.	All	Low	Denton Town Manager	Local	2017	The town has not established a comprehensive land use plan, but funding is requested for FY 2015-2016 with completion in 18 months.
P-7	Through development of land use plan, Wherever possible preserve natural wetlands, designate conservation corridors, especially along streams through acquisition or conservation easements.	All	Low	Denton Town Manager	Local	2017	The town has not established a comprehensive land use plan, but funding is requested in FY 2015-2016.
P-8	Consider amending subdivision ordinance to allow clustering to maximize density while preserving high hazard areas (areas prone to flood, landslide, erosion)	All	Low	Denton Town Manager	Local	2017	The town has not amended its subdivision ordinance to allow clustering, but it most likely will come as part of developing a comprehensive land use plan, scheduled to begin in FY 2015-2016 & take 18 months to complete.
Property Protection							
PP-1	Evaluate current capacity of critical services to deal with power outages.	All	High	Denton Town Manager/Fire Service	Local	2020	The town has evaluated the current capacity of critical services and generally found that it has the capacity to deal with power outages. Continued evaluation will be necessary and increases in supply will be implemented when required.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Emergency Services							
ES-1	Develop emergency water supply capability.	All	High	Denton Town Manager	n/a	Completed	The town has established an emergency water supply capability so this action is completed.
Public Education and Awareness							
PEA-1	Educate and inform local government and elected officials (decision makers) of the need to consider hazard mitigation in policy and budgetary planning and decision making processes.	All	High	Denton Town Manager	Local	2016, Annually	Many efforts have been taken to inform local government and elected officials about the need to consider hazard mitigation in planning and policy-making decisions, however, this effort will need to be continued due to turnover of officials and to keep this on the radar of those officials
PEA-2	Water conservation message to be place on water bills during drought.	Drought	Low	Denton Town Water Resources	Local	2016, Annually	The town has included water conservation messages in water bills, but this will practice will need to be continued to keep it in the minds of citizens.
Previously Completed Mitigation Actions							
	Obtain generator for emergency shelter (civic center) and fire station.	All	High	Denton Town Manager/Fire Service	Local	Completed	Completed in 2007. Generators purchased for both facilities. Assurance that critical municipal functions can continue in-place in case of natural disaster.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Develop a policy regarding drought management and response.	Drought	Low	Denton Town Manager	n/a	Completed	Completed in 2004. Denton is a part of the comprehensive countywide water conservation and interconnect plan which establishes uniform water control measures among jurisdictions and Davidson Water, Inc. and provides for interconnections in case of severe drought.
	Countywide 911 reverse call system.	All	High	Davidson County	n/a	Completed	Completed in 2008. Makes possible targeted and advance warning of certain disasters.
	Identify and designate at least one emergency shelter in Denton.	All	High	Denton Town Manager	n/a	Completed	Completed in 2007. Shelters are designated, and according to the County plan, are being "typed" according to use by general and special populations. This assures that safe and secure shelter is ready and available in multi-hazard situations.

Annex B
City of Lexington

This annex includes jurisdiction-specific information for the City of Lexington. It consists of the following five subsections:

- B.1 City of Lexington Community Profile
- B.2 City of Lexington Risk Assessment
- B.3 City of Lexington Vulnerability Assessment
- B.4 City of Lexington Capability Assessment
- B.5 City of Lexington Mitigation Strategy

B.1 CITY OF LEXINGTON COMMUNITY PROFILE

B.1.1 Geography and the Environment

The City of Lexington is located in the central portion of Davidson County. An orientation map is provided as **Figure B.1**.

The City of Lexington was incorporated in 1828 but it was a least sparsely settled by Europeans by 1775. The settlers named their community in honor of Lexington, Massachusetts, the site of the first skirmish in the American Revolutionary War. The total area of the city is 18.0 square miles, none of which is water area.

According to the State Climate Office of North Carolina, Davidson County, and the City of Lexington, enjoys a moderate climate that is characterized by mild winters and hot, humid summers. In general, the spring months are marked by unpredictable weather and changes can occur rapidly with sunny skies yielding to severe thunderstorms in just a few hours. Precipitation is generally well distributed throughout the year and annual totals average 45 inches.

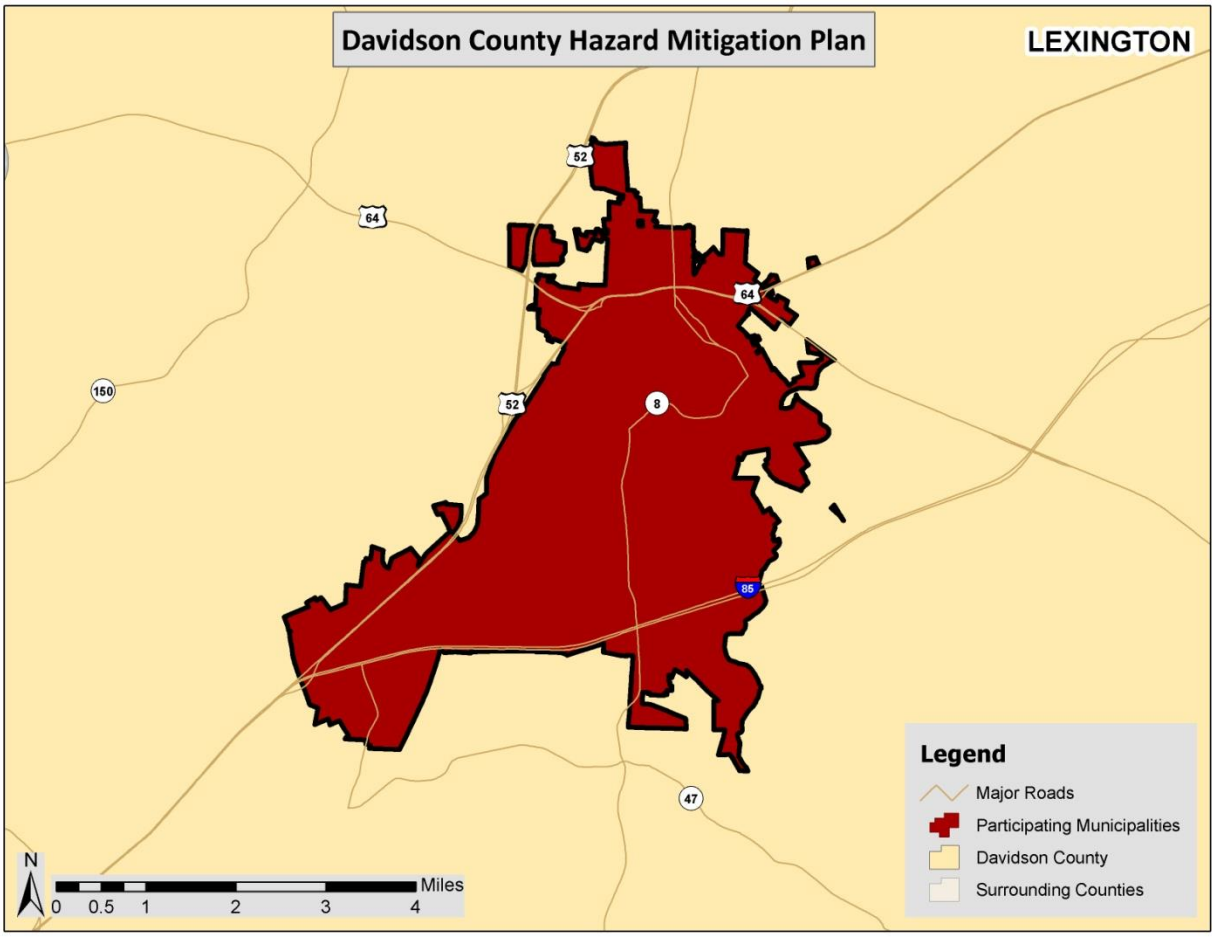
From December to February, the average high temperature ranges from the lower to mid 50s and low temperatures average around 30°F. However, the temperature drops to 10°F or 12°F about once during an average winter over central North Carolina. The mountains also act as a barrier preventing most wintery precipitation from entering the region, and snow and sleet is usually light and occurs on average once or twice per year.

In spring, temperatures begin to rise and the increase in average temperature is greater in April than in any other month. In general, the days are warm and the nights are cool during the spring months. Average high temperatures increase from 63°F in March to 79°F in May. There is a similar increase in average low temperatures, which are in the upper 30s in March and climb to the mid 50s in May. Additionally, tornadoes are most likely early in the spring; however, North Carolina is outside the principal tornado area of the United States.

Tropical air over central North Carolina brings warm temperatures and rather high humidity during the summer. Average high temperatures range from the mid to upper 80s and low temperatures average in the 60s. Summer rainfall is the most variable, and daily showers as well as periods of one to two weeks without rain are both common. Thunderstorms are also common events during the summer months.

Autumn is the season typified by the most rapidly changing temperature. The drop-off is greatest in October and continues through November. Average high temperatures begin in the lower 80s in September and fall to the low 60s by November. Average lows also drop significantly from the 59°F to about 38°F from September to November.

FIGURE B.1: CITY OF LEXINGTON ORIENTATION MAP



B.1.2 Population and Demographics

According to the 2010 Census, the City of Lexington has a population of 18,931 people. The city has seen a 5 percent decline in population between 2000 and 2010, and the average population density is 1,053 people per square mile. Population counts from the U.S. Census Bureau for 1990, 2000, and 2010 for the city are presented in **Table B.1**.

TABLE B.1: POPULATION COUNTS FOR LEXINGTON

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Lexington	16,581	19,953	18,931	-5.1%

Source: United States Census Bureau

Based on the 2010 Census, the median age of residents of the City of Lexington is 37.4 years. The racial characteristics of the city are presented in **Table B.2**. Whites make up the majority of the population in the city, accounting for almost 55 percent of the population, but there is a substantial minority population as well.

TABLE B.2: DEMOGRAPHICS OF LEXINGTON

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Lexington	54.7%	28.4%	0.7%	2.9%	0.0%	10.7%	2.6%	16.3%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau

B.1.3 Housing

According to the 2010 U.S. Census, there are 8,938 housing units in the City of Lexington, the majority of which are single family homes. Housing information for the city is presented in **Table B.3**. As shown in the table, the city has a very low percentage of seasonal housing units.

TABLE B.3: HOUSING CHARACTERISTICS OF LEXINGTON

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2009-2013)
Lexington	8,510	8,938	0.3%	$105,100

Source: United States Census Bureau

B.1.4 Infrastructure

Transportation

There is one interstate that crosses the City of Lexington. Interstate 85 is the major east-west thoroughfare that runs through Lexington connecting the county to Rowan and Randolph. There are also several US highways that cross the city. US Routes 64 is an additional east-west thoroughfare that links the county to its neighboring counties (Randolph, Davie, and Rowan) and passes through Lexington. The major north-south highway, US Route 52, which links Davidson County to Forsyth and Rowan Counties also traverses Lexington.

Within the City of Lexington, a public transportation system operated by Davidson County serves participating local human service agencies as well as the general public.

Currently, there is no passenger rail service offered in the city; however, Lexington is scheduled to receive passenger rail service by 2015. Both the Piedmont and Carolinian Amtrak trains do make special once-a-year stops in Lexington for the Barbecue Festival. Additionally, freight carriers such as Winston-Salem Southbound and Norfolk Southern serve the city.

The Piedmont Triad International Airport is the largest airport closest to Lexington. It offers 10 daily non-stop commercial flights on 8 airlines and it is the third busiest airport in North Carolina. It is approximately 40 miles from the center of the city. Davidson County Airport, located in Lexington, also provides public air service to the city as well as one other privately-owned airport, Hiatt Airport, located just outside of Thomasville. The Charlotte Douglas International Airport and Raleigh-Durham International Airport are two additional large airports that are also in fairly close proximity to the city.

Utilities

The City of Lexington provides municipally-owned and operate electric service to its residents as well as other customers across much of Davidson County.

Sewer and water service are both provided by the City of Lexington. The city operates one wastewater treatment plant and one water treatment plant.

Community Facilities

There are a number of buildings and community facilities located throughout the City of Lexington. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 4 fire stations, 2 police stations, 2 EMS/rescue stations, and 6 public schools located within the city.

One major hospital is located in the City of Lexington: Wake Forest Baptist Health – Lexington Medical Center. Wake Forest Baptist Health – Lexington Medical Center is also a general acute center with 94 beds.

There are also a number of county and municipal parks located in and near the City of Lexington, including Boone's Cave Park and many community and neighborhood parks. High Rock Lake, Tuckertown Lake, and the Yadkin River also offer additional recreational opportunities nearby.

B.1.5 Land Use

Much of Davidson County is developed and relatively urbanized. However, there are some areas that are more sparsely developed. The incorporated municipalities, including the City of Lexington, are where the county's population is generally concentrated. The incorporated areas are also where many businesses, commercial uses, and institutional uses are located. Land uses in the balance of the study area consist of a variety of types of residential, commercial, industrial, government, and recreational uses. Davidson County's land use pattern can be described as suburban sprawl. Population density is greater in the northern portion of the county while the southern portion is largely rural with primarily residential development. Local land use and associated regulations are further discussed in *Section 7: Capability Assessment*

B.1.6 Employment and Industry

The early modern economy in Davidson County was based on agriculture but it later transitioned to one based on textile and furniture manufacturing in the twentieth century up until the late 1990s. Today, Davidson County, like many communities, is grappling with the evolution of a manufacturing economy shifting to an economy based on the service industry.

According to the North Carolina Employment Security Commission (NCESC), in 2013 (the last full year with data available), Davidson County had an average annual employment of 71,433 workers and an average unemployment rate of 8.4 percent (compared to 8.0 percent for the state). The Manufacturing industry employed 21.9 percent of the county's workforce followed by Retail Trade (12.1%); Health Care and Social Assistance (11.2%); and Educational Services (10.4%). The American Community Survey (ACS) found the average annual median household income in Davidson County was $43,083 from 2009 to 2013 compared to $46,334 for the state of North Carolina.

B.2 CITY OF LEXINGTON RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to the City of Lexington. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

B.2.1 Drought

Location and Spatial Extent

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that the city would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment.

Historical Occurrences

According to the North Carolina Drought Monitor, the Central Piedmont Region, which includes the City of Lexington, experienced moderate to extreme drought occurrences in 11 of the last 14 years (2000-2013). **Table B.4** shows the most severe drought condition reported for each year in the Central Piedmont Region, according to PDSI classifications. However, it should be noted that the most severe classification reported is based on monthly regional averages, and conditions in the City of Lexington may actually have been less or more severe than what is reported.

TABLE B. 4: HISTORICAL DROUGHT OCCURRENCES IN LEXINGTON

extreme drought	severe drought	moderate drought	mid-range	moderately moist	very moist	extremely moist
-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

	Lexington	
2000	-2.83	Moderate Drought
2001	-3.43	Severe Drought
2002	-4.98	Extreme Drought

	Lexington	
2003	-0.38	Mid-range
2004	-2.04	Moderate Drought
2005	-2.37	Moderate Drought
2006	-2.62	Moderate Drought
2007	-4.16	Extreme Drought
2008	-4.37	Extreme Drought
2009	-1.08	Mid-range
2010	-2.53	Moderate Drought
2011	-3.44	Severe Drought
2012	-2.84	Moderate Drought
2013	-0.37	Mid-range

Source: North Carolina State Climate Office

Data from the National Climatic Data Center (NCDC) was also reviewed to obtain additional information on historical drought events in the town, but no events were reported in the City of Lexington.

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the City of Lexington has a probability level of likely (10 to 100 percent annual probability) for future drought events. This hazard may vary slightly by location but each area has an equal probability of experiencing a drought. However, historical information also indicates that there is a much lower probability for extreme, long-lasting drought conditions.

B.2.2 Extreme Heat

Location and Spatial Extent

Excessive heat typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire city is susceptible to extreme heat conditions.

Historical Occurrences

Data from the National Climatic Data Center was used to determine historical extreme heat and heat wave events in the City of Lexington, however events are only reported at the county level. One event was reported in Davidson County:

July 22, 1998 – *Excessive Heat* – Excessive heat plagued central North Carolina during July 22 through July 23. Maximum temperatures reached the 98 to 103 degree range combined with dew points in the 78 to 80 degree range with little wind to give heat index values of around 110 degrees for several hours each afternoon. To make matters worse, the minimum temperatures did not fall below 80 at several locations and those that did achieved that feat for only an hour or two. Strong thunderstorms ended the 2 day excessive heat ordeal on the evening of the 23 when rain cooled the environment enough to send temperatures into the lower 70s at most locations

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been reported at an observation station in Lexington since 1902. The recorded maximum for the county can be found below in **Table B.5**.

TABLE B.5: HIGHEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	07/29/1952	107

Source: State Climate Office of North Carolina

The State Climate Office also reports average maximum temperatures at various stations across the state. There is one station located in Davidson County in Lexington. **Table B.6** shows the average maximum temperatures from 1971 to 2000 at the Lexington observation station which can be used as a general comparison for the city.

TABLE B.6: AVERAGE MAXIMUM TEMPERATURE IN DAVIDSON COUNTY

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. Max (°F)	49.6 °F	54.4 °F	63.3 °F	72.5 °F	79.3 °F	85.5 °F	89.1 °F	87.4 °F	81.6 °F	71.9 °F	61.7 °F	52.6 °F

Source: State Climate Office of North Carolina

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of the City of Lexington has a probability level of possible (1 to 10 percent annual probability) for future extreme heat events to impact the city.

B.2.3 Hailstorm

Location and Spatial Extent

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that the City of Lexington is uniformly exposed to severe thunderstorms; therefore, all areas of the city are equally exposed to hail which may be produced by such storms.

Historical Occurrences

According to the National Climatic Data Center, 24 recorded hailstorm events have affected the City of Lexington since 1993.[1] **Table B.7** is a summary of the hail events in the City of Lexington. **Table B.8** provides detailed information about each event that occurred in the city. In all, hail occurrences resulted in almost $322,000 (2014 dollars) in property damages.[2] Hail ranged in diameter from 0.75 inches to 1.75 inches. It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

[1] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through October 2014. It is likely that additional hail events have affected the City of Lexington. In addition to NCDC, the North Carolina Department of Insurance office was contacted for information. As additional local data becomes available, this hazard profile will be amended.

[2] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE B.7: SUMMARY OF HAIL OCCURRENCES IN LEXINGTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Lexington	24	0/0	$321,652

Source: National Climatic Data Center

TABLE B.8: HISTORICAL HAIL OCCURRENCES IN LEXINGTON

	Date	Magnitude	Deaths / Injuries	Property Damage*
Lexington				
Lexington	4/1/1993	1.00 in.	0/0	$0
LEXINGTON	5/11/1996	1.25 in.	0/0	$0
LEXINGTON	6/19/1996	1.75 in.	0/0	$0
LEXINGTON	6/2/1997	0.75 in.	0/0	$0
LEXINGTON	5/1/1998	0.75 in.	0/0	$0
LEXINGTON	8/18/2000	0.75 in.	0/0	$0
LEXINGTON	3/9/2002	0.88 in.	0/0	$0
LEXINGTON	5/2/2003	1.00 in.	0/0	$0
LEXINGTON	5/3/2003	1.75 in.	0/0	$321,652
LEXINGTON	6/19/2005	0.75 in.	0/0	$0
LEXINGTON	4/25/2006	0.88 in.	0/0	$0
LEXINGTON	5/14/2006	0.88 in.	0/0	$0
LEXINGTON	5/18/2006	0.88 in.	0/0	$0
LEXINGTON	5/18/2006	1.00 in.	0/0	$0
LEXINGTON	5/20/2006	0.75 in.	0/0	$0
LEXINGTON	5/26/2006	0.75 in.	0/0	$0
LEXINGTON	6/11/2007	0.75 in.	0/0	$0
LEXINGTON	6/11/2007	0.88 in.	0/0	$0
LEXINGTON ARPT	5/20/2008	0.88 in.	0/0	$0
LEXINGTON ARPT	9/30/2008	0.75 in.	0/0	$0
LEXINGTON ARPT	9/30/2008	0.75 in.	0/0	$0
LEXINGTON	2/28/2011	1.00 in.	0/0	$0
LEXINGTON	4/27/2011	1.00 in.	0/0	$0
LEXINGTON	3/24/2012	1.00 in.	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard (coinciding with thunderstorms), it is assumed that the City of Lexington has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the city.

B.2.4 Hurricane and Tropical Storm

Location and Spatial Extent

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States. While coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland and they can affect the City of Lexington. All areas in the City of Lexington are equally susceptible to hurricane and tropical storms.

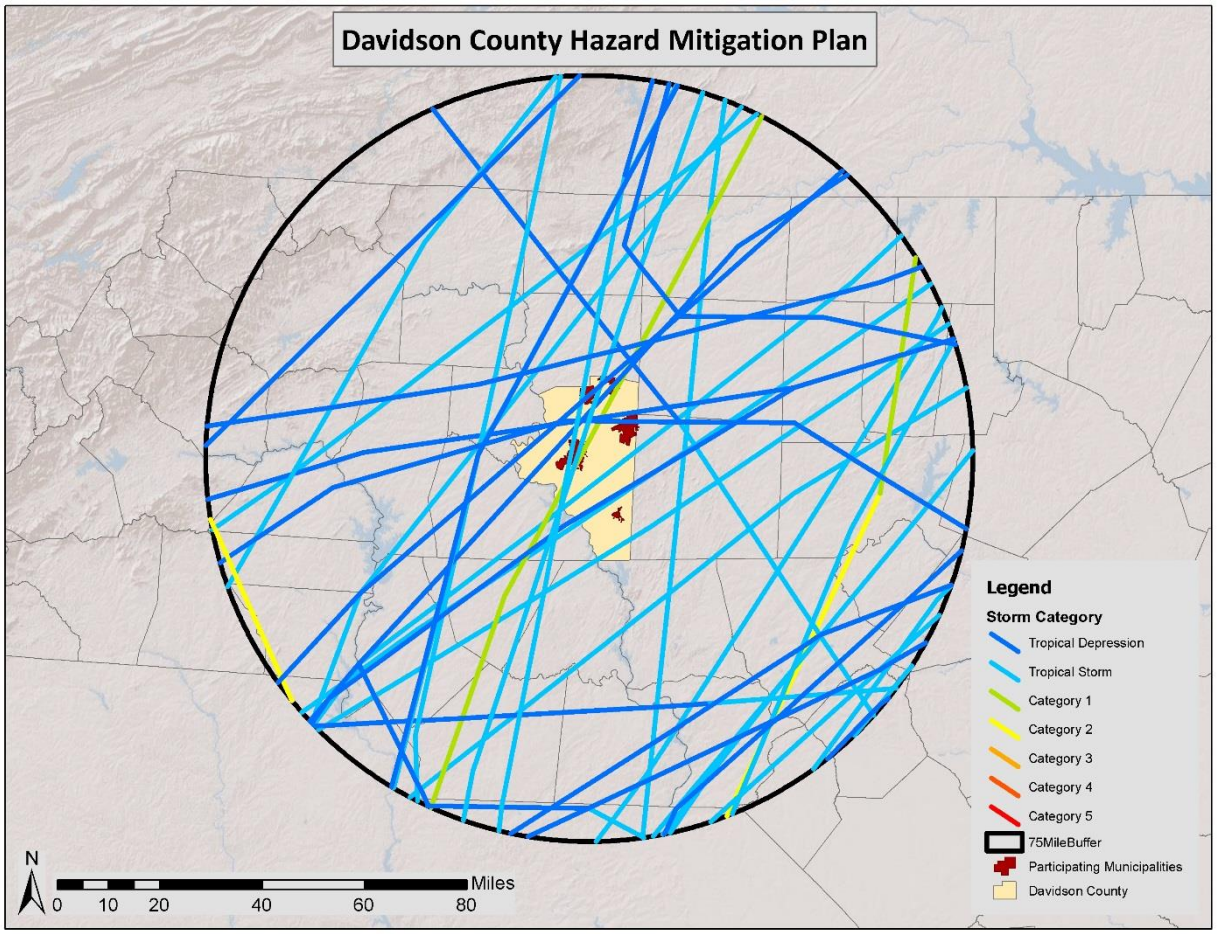
Historical Occurrences

According to the National Hurricane Center's historical storm track records, 45 hurricane/tropical storm tracks have passed within 75 miles of Davidson County since 1859.[3] This includes 6 hurricanes, 23 tropical storms and 16 tropical depressions.

Of the recorded storm events, 11 have traversed directly through Davidson County as shown in **Figure B.2**. **Table B.9** provides the date of occurrence, name (if applicable), maximum wind speed (as recorded within 75 miles of Davidson County), and Category of the storm based on the Saffir-Simpson Scale for each event.

[3] These storm track statistics do not include extra-tropical storms. Though these related hazard events are less severe in intensity, they may cause significant local impact in terms of rainfall and high winds.

FIGURE B.2: HISTORICAL HURRICANE STORM TRACKS WITHIN 75 MILES OF DAVIDSON COUNTY



Source: National Oceanic and Atmospheric Administration; National Hurricane Center

TABLE B.9: HISTORICAL STORM TRACKS WITHIN 75 MILES OF DAVISON COUNTY (1850–2014)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/17/1859	UNNAMED	40	Tropical Storm
10/4/1877	UNNAMED	50	Tropical Storm
9/12/1878	UNNAMED	60	Tropical Storm
9/11/1882	UNNAMED	40	Tropical Storm
10/12/1885	UNNAMED	40	Tropical Storm
6/22/1886	UNNAMED	40	Tropical Storm
9/10/1888	UNNAMED	35	Tropical Storm
9/24/1889	UNNAMED	45	Tropical Storm
8/28/1893	UNNAMED	75	Category 1
9/29/1896	UNNAMED	85	Category 2
7/13/1901	UNNAMED	35	Tropical Storm
6/16/1902	UNNAMED	35	Tropical Storm
9/23/1907	UNNAMED	35	Tropical Storm
8/31/1911	UNNAMED	25	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/3/1913	UNNAMED	40	Tropical Storm
8/3/1915	UNNAMED	35	Tropical Storm
9/23/1920	UNNAMED	35	Tropical Storm
10/3/1927	UNNAMED	40	Tropical Storm
8/11/1928	UNNAMED	30	Tropical Depression
10/2/1929	UNNAMED	50	Tropical Storm
9/6/1935	UNNAMED	45	Tropical Storm
10/20/1944	UNNAMED	50	Tropical Storm
9/18/1945	UNNAMED	50	Tropical Storm
10/9/1946	UNNAMED	30	Tropical Depression
8/28/1949	UNNAMED	40	Tropical Storm
8/31/1952	ABLE	45	Tropical Storm
7/10/1959	CINDY	30	Tropical Depression
8/30/1964	CLEO	25	Tropical Depression
6/9/1968	ABBY	25	Tropical Depression
5/26/1970	ALMA	25	Tropical Depression
9/8/1977	BABE	25	Tropical Depression
9/5/1979	DAVID	55	Tropical Storm
7/25/1985	BOB	55	Tropical Storm
8/18/1985	DANNY	25	Tropical Depression
8/29/1988	CHRIS	25	Tropical Depression
9/22/1989	HUGO	85	Category 2
7/21/1994	UNNAMED	20	Tropical Depression
9/6/1996	FRAN*	65	Category 1
7/24/1997	DANNY	30	Tropical Depression
9/5/1999	DENNIS	30	Tropical Depression
9/16/1999	FLOYD*	90	Category 2
9/18/2003	ISABEL*	85	Category 2
9/17/2004	IVAN*	20	Tropical Depression
9/28/2004	JEANNE	20	Tropical Depression
7/7/2005	CINDY	20	Tropical Depression

*Although the track of these storms traversed just outside of the 75 mile buffer area, they were included in the hazard history since a federal disaster area was declared for Davidson County as a result of the storm's impact.
Source: National Hurricane Center

The National Climatic Data Center reported four events associated with a hurricane or tropical storm in Davidson County since 1996. Additionally, Federal records indicate that five disaster declarations were made in 1989 (Hurricane Hugo), 1996 (Hurricane Fran), 1999 (Hurricane Floyd), 2003 (Hurricane Isabel), and 2004 (Hurricane Ivan) for the county.[4]

Flooding is often the greatest hazard of concern with hurricane and tropical storm events in Davidson County. Most events do not carry winds that are above that of the winter storms and straight line winds received by the county. Some anecdotal information is available for the major storms that have impacted that area as found below:

[4] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

Hurricane Hugo – September 22-24, 1989
Hurricane Hugo was one of the largest storms on record in the Atlantic Basin that produced high winds and dumped heavy rains over much of North Carolina and South Carolina. Hugo reached a peak level of Category 5 on the Saffir-Simpson scale and made landfall near Isle of Palms in South Carolina as a Category 4, eventually passing over Charlotte and much of the surrounding area as a Category 1 storm. Although the storm caused its greatest damage in South Carolina, over 1,000 structures were destroyed or severely damaged in North Carolina, causing over $1 billion dollars in damages. Wind gusts reached over 40 mph and numerous trees were downed throughout much of south and western North Carolina.

Hurricane Fran – September 5-6, 1996
After being hit just a few weeks earlier by Hurricane Bertha, North Carolina was impacted by the one of the most devastating storms to ever make landfall along the Atlantic Coast. Fran dropped more than 10 inches of rain in many areas and had sustained winds of around 115 miles per hour as it hit the coast and began its path along the I-40 corridor central North Carolina. In the end, over 3 billion dollars in damages were reported in the state. Damages to infrastructure and agriculture added to the overall toll and more than 1.7 million people in the state were left without power.

Hurricane Floyd – September 16, 1999
Hurricane Floyd, combined with the weather conditions before and immediately after this hurricane, resulted in the most severe flooding and devastation in North Carolina history. In North Carolina, the storm resulted in 35 fatalities, over $3 billion in damages, 7,000 destroyed homes, 56,000 damaged homes, 1,500 people rescued from flooded areas, and more than 500,000 customers without electricity. Additionally, the flooding caused an estimated $813 million in agricultural losses affecting 32,000 farmers. There was also significant loss of livestock including 2,860,827 poultry, 28,000 swine, and 619 cattle.

Hurricane Isabel – September 18, 2003
Hurricane Isabel's worst impacts were along the cost of North Carolina where storm surge in Dare County in particular were extremely strong, damaging thousands of homes. The storm surge created a large inlet on Hatteras Island which left the community isolated for months. Further inland and across the state, trees were downed and power was lost by hundreds of thousands of residents. In most of the state, power was restored within a few days, but the effects to the economy and daily lives of citizens were significant.

Hurricane Ivan – September 16-17, 2004
Just a week and a half following Tropical Storm Frances, the remnants of Hurricane Ivan hit western North Carolina when many streams and rivers were already well above flood stage. The widespread flooding forced many roads to be closed and landslides were common across the mountain region. Wind gusts reached between 40 and 60 mph across the higher elevations of the Appalachian Mountains resulting in numerous downed trees. More than $13.8 million of federal aid was dispersed across North Carolina following Ivan.

Probability of Future Occurrences

Given the inland location of the city, it is more likely to be affected by remnants of hurricane and tropical storm systems (as opposed to a major hurricane) which may result in flooding or high winds. The probability of being impacted is less than coastal areas, but still remains a real threat to the City of Lexington due to induced events like flooding and landsliding. Based on historical evidence, the probability level of future occurrence is likely (between 10 and 100 percent annual probability). Given

the regional nature of the hazard, all areas in the city are equally exposed to this hazard. However, when the city is impacted, the damage could be catastrophic, threatening lives and property throughout the planning area.

B.2.5 Lightning

Location and Spatial Extent

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of the City of Lexington is uniformly exposed to lightning.

Historical Occurrences

According to the National Climatic Data Center, there have been four recorded lightning events in the City of Lexington since 1998, as listed in summary **Table B.10**.[5] These events resulted in almost $350,000 (2014 dollars) in damages and caused one injury.[6] A complete listing of those events can be found in **Table B.11**.

It is certain that more than four lightning events have impacted the city. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE B.10: SUMMARY OF LIGHTNING OCCURRENCES IN LEXINGTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Lexington	4	0/1	$349,771

Source: National Climatic Data Center

TABLE B.11: HISTORIC LIGHTNING OCCURRENCES IN LEXINGTON

	Date	Deaths / Injuries	Property Damage*	Details
Lexington				
LEXINGTON	7/20/1998	0/1	$0	One man was struck by lightning. He was treated at the scene by local EMS.
LEXINGTON	8/31/2003	0/0	$64,330	A lightning strike set fire to an apartment building.
LEXINGTON	7/28/2005	0/0	$0	A house was struck by lightning in Holly Grove. Damage unknown.
LEXINGTON	6/25/2007	0/0	$285,441	Lightning struck the Southern Lunch restaurant on South Railroad Street burning the building down resulting in a

[5] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is certain that additional lightning events have occurred in the City of Lexington. The State Fire Marshall's office was also contacted for additional information but none could be provided. As additional local data becomes available, this hazard profile will be amended.

[6] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

	Date	Deaths / Injuries	Property Damage*	Details
				total loss.

*Property Damage is reported in 2014 dollars; all damage may not have been reported.
Source: National Climatic Data Center

Probability of Future Occurrences

Although there was not a high number of historical lightning events reported in the City of Lexington via NCDC data, it is considered a regular occurrence, especially accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN®), the City of Lexington is located in an area of the country that experienced an average of 3 to 5 lightning flashes per square kilometer per year between 1997 and 2010. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the city.

B.2.6 Thunderstorm Wind / High Wind

Location and Spatial Extent

A wind event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. Also, the City of Lexington typically experiences several straight-line wind events each year. These wind events can and have caused significant damage. It is assumed that the City of Lexington has uniform exposure to an event and the spatial extent of an impact could be large.

Historical Occurrences

According to NCDC, there have been 31 reported thunderstorm wind and high wind events since 1998 in the City of Lexington.[7] These events caused nearly $111,000 (2014 dollars) in damages.[8] **Table B.12** summarizes this information. **Table B.13** presents detailed thunderstorm wind and high wind event reports including date, magnitude, and associated damages for each event.

TABLE B.12: SUMMARY OF THUNDERSTORM / HIGH WIND OCCURRENCES IN LEXINGTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Lexington	31	0/0	$110,977

Source: National Climatic Data Center

[7] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through October 2014 and these high wind events are only inclusive of those reported by NCDC from 1996 through October 2014. It is likely that additional thunderstorm and high wind events have occurred in the City of Lexington. As additional local data becomes available, this hazard profile will be amended.

[8] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE B.13: HISTORICAL THUNDERSTORM / HIGH WIND OCCURRENCES IN LEXINGTON

	Date	Type	Magnitude†	Deaths / Injuries	Property Damage*
Lexington					
LEXINGTON	5/26/1998	Thunderstorm Wind	50 kts.	0/0	$0
LEXINGTON	7/1/1999	Thunderstorm Wind	50 kts.	0/0	$0
LEXINGTON	5/20/2000	Thunderstorm Wind	60 kts. E	0/0	$0
LEXINGTON	6/15/2000	Thunderstorm Wind	50 kts. E	0/0	$0
LEXINGTON	8/10/2000	Thunderstorm Wind	50 kts. E	0/0	$0
LEXINGTON	4/1/2001	Thunderstorm Wind	60 kts. E	0/0	$0
LEXINGTON	6/1/2002	Thunderstorm Wind	50 kts. E	0/0	$0
LEXINGTON	7/22/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	9/23/2003	Thunderstorm Wind	65 kts. EG	0/0	$0
LEXINGTON	5/26/2004	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	11/24/2004	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	6/7/2005	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	7/28/2005	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	4/3/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	4/17/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	4/17/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	5/26/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	6/23/2006	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	6/11/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	6/25/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	8/21/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	3/4/2008	Thunderstorm Wind	52 kts. EG	0/0	$0
LEXINGTON	6/29/2008	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	5/9/2009	Thunderstorm Wind	52 kts. EG	0/0	$0
LEXINGTON	8/20/2009	Thunderstorm Wind	50 kts. EG	0/0	$2,207
LEXINGTON	6/14/2010	Thunderstorm Wind	50 kts. EG	0/0	$108,567
LEXINGTON	6/18/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	7/4/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
LEXINGTON	1/30/2013	Thunderstorm Wind	50 kts. EG	0/0	$203
LEXINGTON ARPT	6/13/2013	Thunderstorm Wind	56 kts. MG	0/0	$0
LEXINGTON	4/25/2014	Thunderstorm Wind	50 kts. EG	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained ;MG = measured gust ;MS = measured sustained
Source: National Climatic Data Center

Probability of Future Occurrences

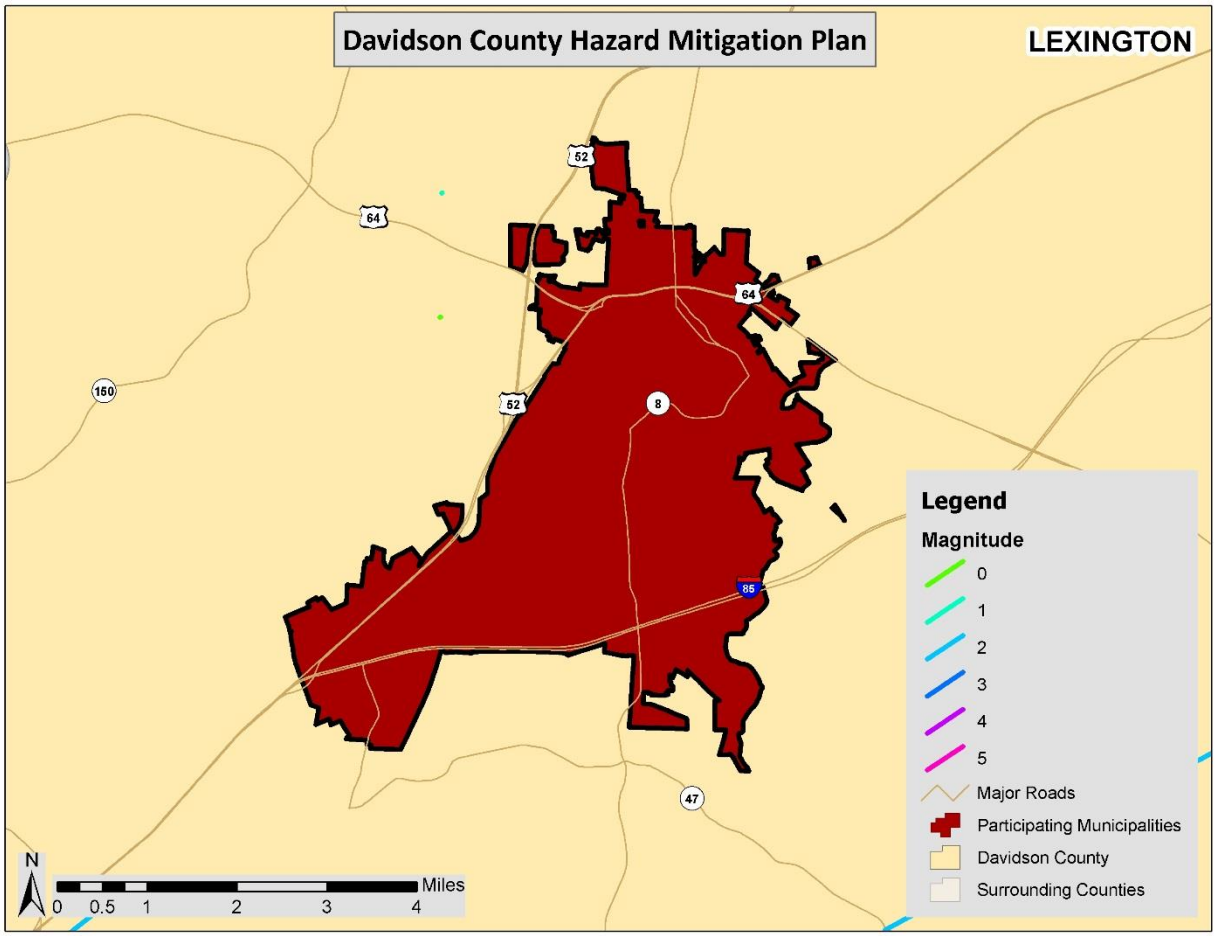
It is certain that wind events, including straight-line wind and thunderstorm wind, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for future wind events for the entire city.

B.2.7 Tornado

Location and Spatial Extent

Tornadoes occur throughout the state of North Carolina, and thus in the City of Lexington. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that the City of Lexington is uniformly exposed to this hazard. With that in mind, **Figure B.3** shows tornado track data for many of the major tornado events that have impacted the city. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE B.3: HISTORICAL TORNADO TRACKS IN LEXINGTON



Source: National Weather Service Storm Prediction Center

Historical Occurrences

Tornadoes were responsible for one disaster declaration in Davidson County in 1989.[9] According to the National Climatic Data Center, there have been no recorded tornado events in the City of Lexington

[9] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.

since 1950 (**Table B.14** and **Table B.15**).[10] However an EF1 through EF5 event is possible. It is important to note that only tornadoes that have been reported are factored into this risk assessment. It is likely that a high number of occurrences have gone unreported over the past 64 years.

TABLE B.14: SUMMARY OF TORNADO OCCURRENCES IN LEXINGTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Lexington	0	0/0	$0

Source: National Climatic Data Center

TABLE B.15: HISTORICAL TORNADO IMPACTS IN LEXINGTON

	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Lexington					
None Reported	--	--	--	--	--

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Probability of Future Occurrences

According to historical information, tornado events are not an annual occurrence for the city. However, given the city's location in the southeastern United States and history of tornadoes, an occurrence is possible every few years. While the majority of the reported tornado events in Davidson County are small in terms of size, intensity, and duration, they do pose a significant threat should the City of Lexington experience a direct tornado strike. The probability of future tornado occurrences affecting the City of Lexington is likely (10 to 100 percent annual probability).

B.2.8 Winter Storm and Freeze

Location and Spatial Extent

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The City of Lexington is accustomed to severe winter weather conditions and often receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire city has uniform exposure to a winter storm.

Historical Occurrences

Winter weather has resulted in five disaster declarations in Davidson County. This includes the Blizzard of 1996, one subsequent 1996 winter storm, a severe winter storm in 2000, an ice storm in 2002 and a severe winter storm in 2014.[11] The National Climatic Data Center does not report winter storm events at the municipal level, however, there have been a total of 55 recorded winter storm events and 1

[10] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through October 2014. It is likely that additional tornadoes have occurred in the City of Lexington. As additional local data becomes available, this hazard profile will be amended.
[11] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.

extreme cold event in Davidson County since 1996 (**Table B.16**).[12] These events resulted in nearly $6.2 million (2014 dollars) in damages.[13] Detailed information on the recorded winter storm events can be found in **Table B.17**.

TABLE B.16: SUMMARY OF WINTER STORM EVENTS IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Davidson County	55	0/0	$6,200,000

Source: National Climatic Data Center

TABLE B.17: HISTORICAL WINTER STORM IMPACTS IN DAVIDSON COUNTY

	Date	Type of Storm	Deaths / Injuries	Property Damage*
Davidson County				
DAVIDSON (ZONE)	1/6/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/11/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/2/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/16/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/8/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/13/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/29/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/23/1998	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/2/1999	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/20/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/22/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/24/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/28/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/19/2000	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	2/12/2001	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/3/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/23/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/16/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/27/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/13/2003	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/15/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/30/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/15/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2007	Winter Weather	0/0	$0

[12] These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is certain that additional winter storm conditions have affected the City of Lexington and Davidson County.
[13] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

	Date	Type of Storm	Deaths / Injuries	Property Damage*
DAVIDSON (ZONE)	2/1/2007	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/7/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/17/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/19/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/13/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/22/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/4/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/1/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/18/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/30/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/29/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/5/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/2/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/16/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/25/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/10/2011	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/26/2013	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/28/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/11/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2014	Winter Storm	0/0	$0
DAVIDSON (ZONE)	3/3/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/6/2014	Ice Storm	0/0	$6,200,000
DAVIDSON (ZONE)	3/17/2014	Winter Weather	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been recorded in Lexington since 1902. The recorded minimum for the county can be found below in **Table B.18**.

TABLE B.18: LOWEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	01/21/1985	-6

Source: State Climate Office of North Carolina

There have been several severe winter weather events in Davidson County. The text below describes two of the major events (one snow and one ice event) and associated impacts on the county. Similar impacts can be expected with most severe winter weather.

1996 Winter Storm – January 6-8, 1996
This storm left two feet of snow in some areas and several thousand citizens without power for up to nine days. Although shelters were opened, some roads were impassible for many days. This event caused considerable disruption to business, industry, schools, and government services.

2002 Ice Storm – December 4-5, 2002
An ice storm produced up to an inch of freezing rain in central North Carolina impacting 40 counties. A total of 24 people were killed, and as many as 1.8 million people were left without electricity. Additionally, property damage was estimated at almost $100 million. New records were also set for traffic accidents and school closing durations. The scale of destruction was comparable to that of hurricanes that have impacted the state, such as Hurricane Fran in 1996. The storm cost the state $97.2 million in response and recovery.

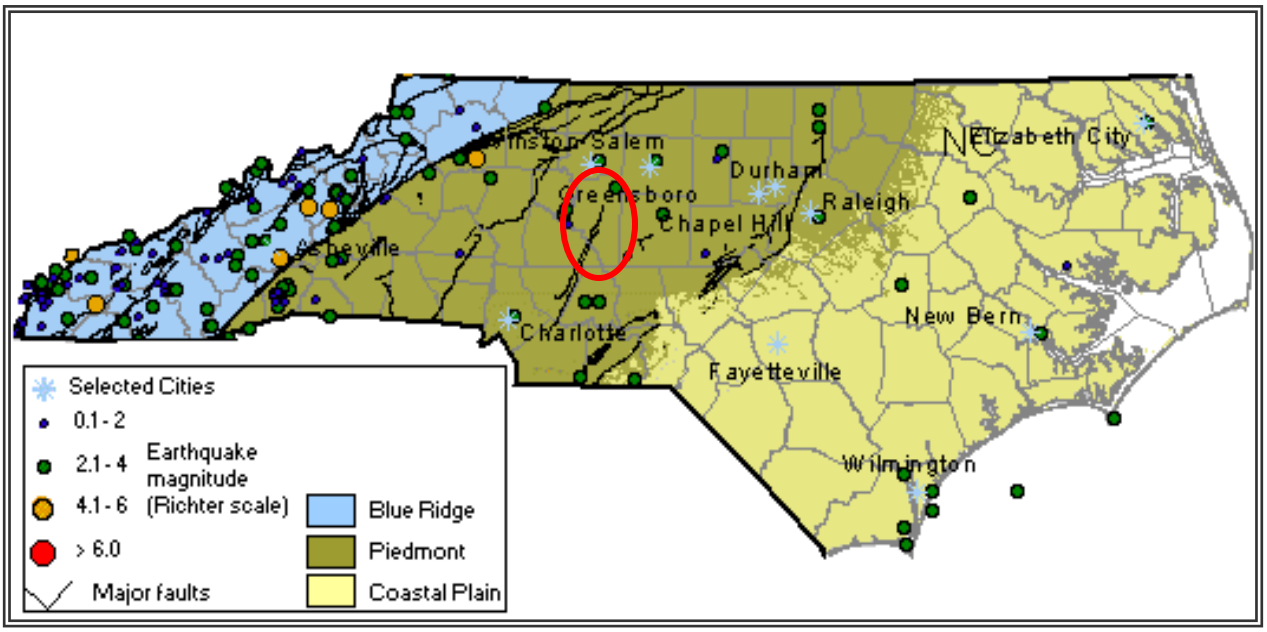
Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

Probability of Future Occurrences
Winter storm events will remain a regular occurrence in the City of Lexington due to its location in the western half of the state. According to historical information, the City of Lexington generally experiences several winter storm events each year. Therefore, the annual probability is highly likely (10 to 100 percent).

B.2.9 Earthquake

Location and Spatial Extent
Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout North Carolina. **Figure B.4** is a map showing geological and seismic information for North Carolina.

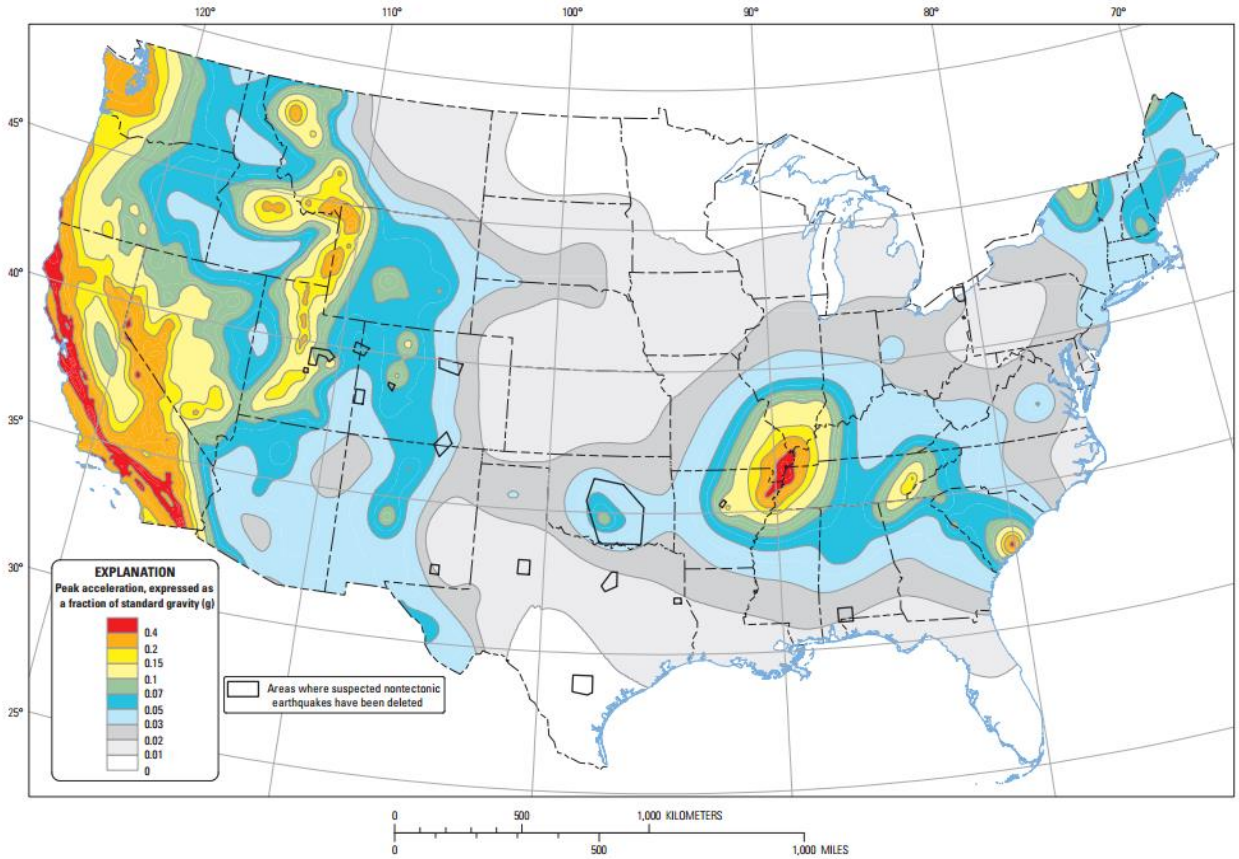
FIGURE B.4: GEOLOGICAL AND SEISMIC INFORMATION FOR NORTH CAROLINA



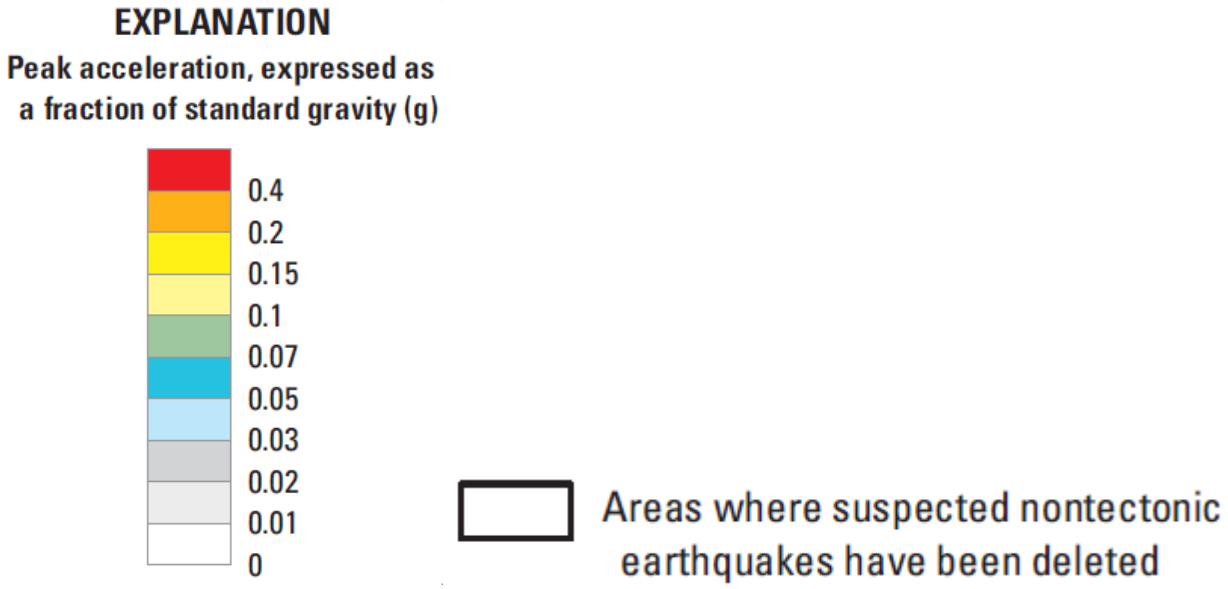
Source: North Carolina Geological Survey

Figure B.5 shows the intensity level associated with the City of Lexington, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, The City of Lexington lies within an approximate zone of level 0.03 to 0.05 ground acceleration. This indicates that the city exists within an area of low to moderate seismic risk.

FIGURE B.5: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

Historical Occurrences

At least one earthquake is known to have affected the City of Lexington since 1973. This event measured a 4.7 on the Richter Scale. **Table B.19** provides a summary of earthquake events reported by the National Geophysical Data Center between 1638 and 1985. **Table B.20** presents a detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known). [14]

TABLE B.19: SUMMARY OF SEISMIC ACTIVITY IN LEXINGTON

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Lexington	1	--	4.7

Source: National Geophysical Data Center

TABLE B.20: SIGNIFICANT SEISMIC EVENTS IN LEXINGTON (1638 -1985)

Location	Date	Epicentral Distance	Magnitude	MMI
Lexington				
Lexington	11/30/1973	334.0 km	4.7	--

Source: National Geophysical Data Center

Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting the City of Lexington is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the city. The annual probability level for the city is estimated between 1 and 10 percent (possible).

B.2.10 Landslide

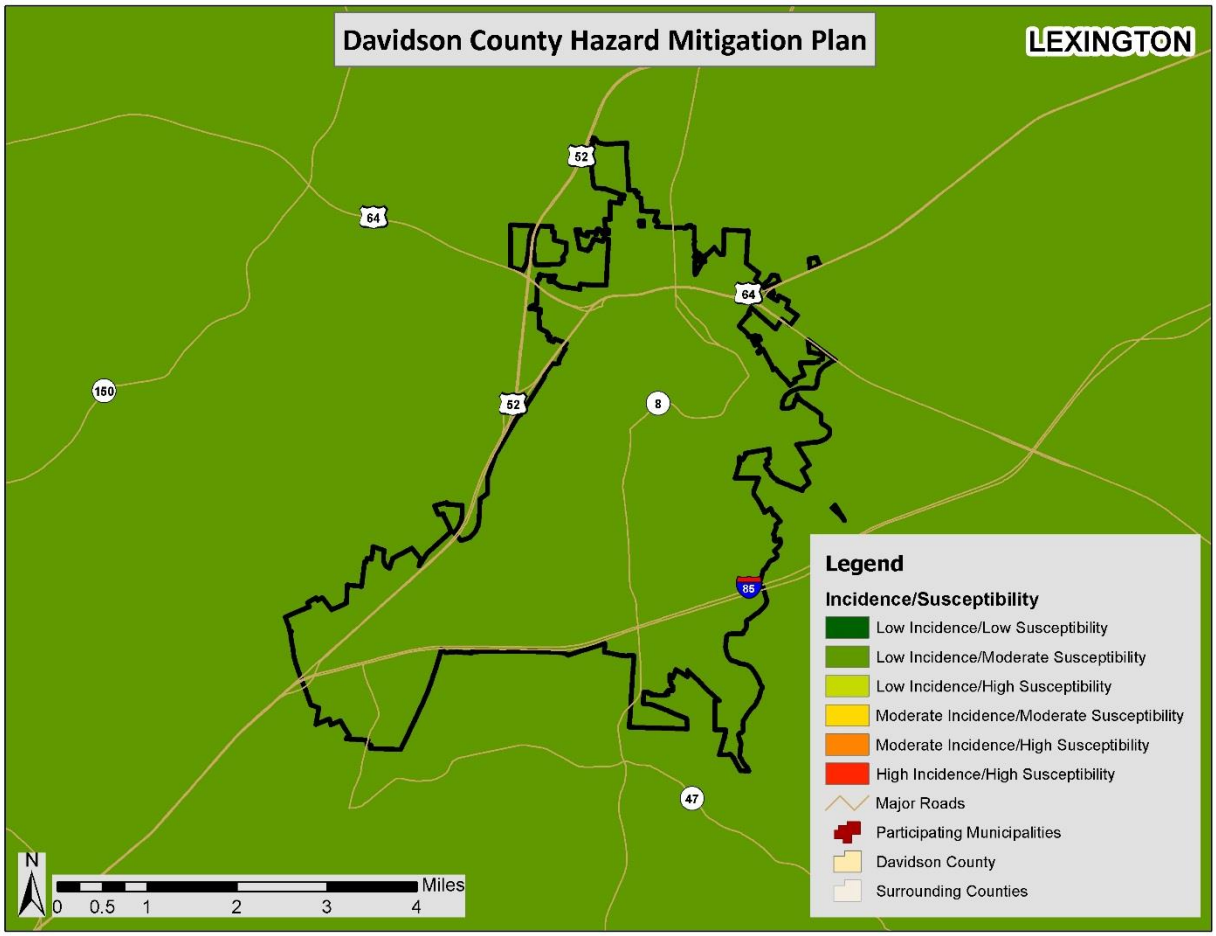
Location and Spatial Extent

Landslides occur along steep slopes when the pull of gravity can no longer be resisted (often due to heavy rain). Human development can also exacerbate risk by building on previously undevelopable steep slopes and constructing roads by cutting through hills or mountains. Landslides are possible throughout the City of Lexington, though the risk is relatively low.

According to **Figure B.6** below, the city has low landslide activity. However, there is moderate susceptibility throughout the city.

[14] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

FIGURE B.6: LANDSLIDE SUSCEPTIBILITY AND INCIDENCE MAP OF LEXINGTON



Source: United States Geological Survey

Historical Occurrences

Relatively flat topography throughout the City of Lexington makes the planning area less susceptible to landslides. Most landslides are caused by heavy rainfall in the area. Building on steep slopes that was not previously possible also contributes to risk. Although no landslide incidents have been reported in the city, it should be noted that the North Carolina Geological Survey emphasized the dataset provided was incomplete. Therefore, there may be additional historical landslide occurrences that were not reported. Some incidence mapping has also been completed throughout the western portion of North Carolina though it is not complete either. Again, it should be noted that it is possible more incidents have occurred than what is mapped. Since no incidents were reported, a map was not produced to show the location of previous events.

Probability of Future Occurrences

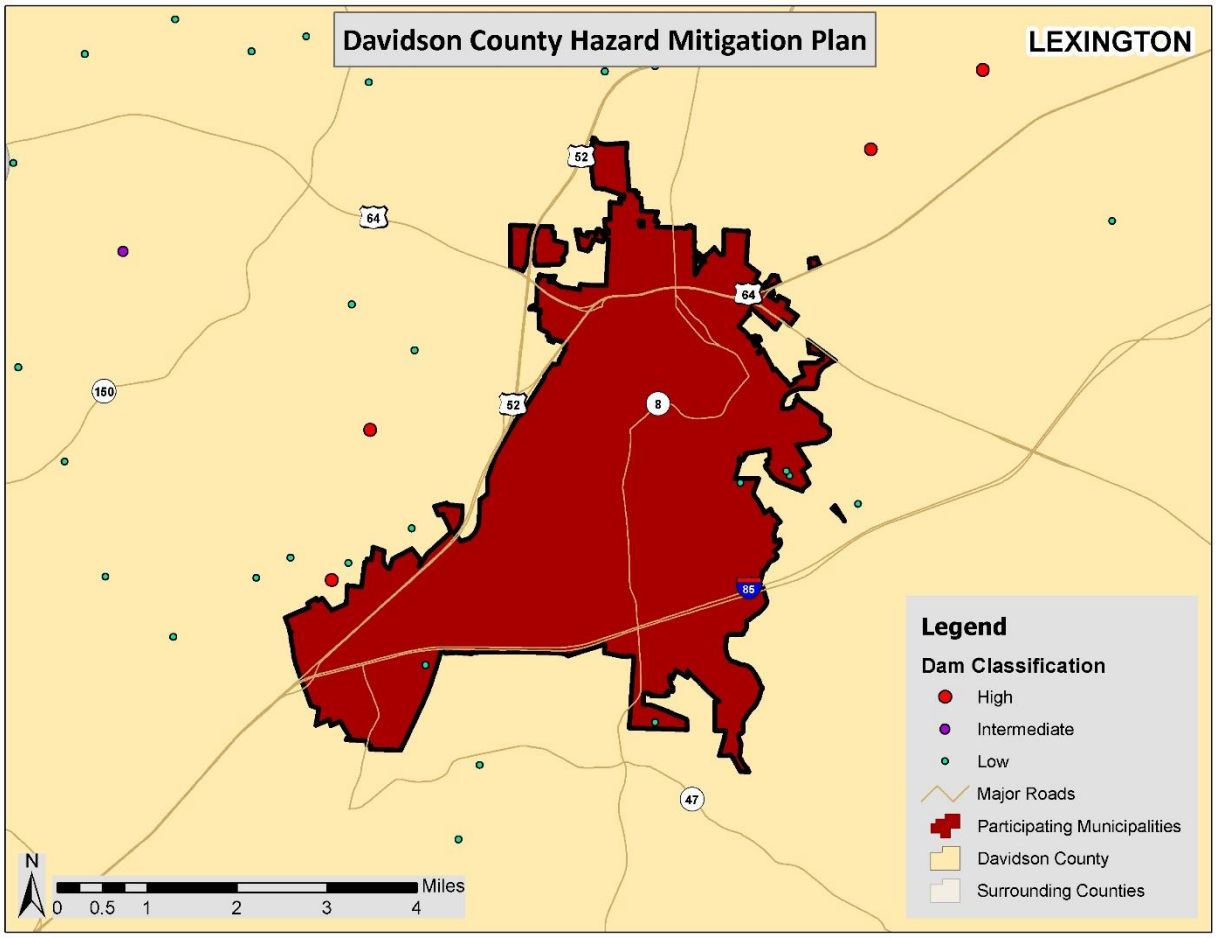
Based on historical information and the USGS susceptibility index, the probability of future landslide events is unlikely (less than 1 percent probability). Local conditions may become more favorable for landslides due to heavy rain, for example. This would increase the likelihood of occurrence. It should also be noted that some areas in the City of Lexington have greater risk than others given factors such as steepness on slope and modification of slopes.

B.2.11 Dam and Levee Failure

Location and Spatial Extent

According to the North Carolina Division of Energy, Mineral, and Land Resources, there are five dams in the City of Lexington.[15] **Figure B.7** shows the dam location and the corresponding hazard ranking for each. Of these dams, none are classified as high hazard potential (**Table B.21**).

FIGURE B.7: LEXINGTON DAM LOCATION AND HAZARD RANKING



Source: North Carolina Division of Energy, Mineral, and Land Resources, 2014

TABLE B.21: LEXINGTON HIGH HAZARD DAMS

Dam Name	Hazard Potential	Surface Area (acres)	Max Capacity (Ac-ft)	Owner Type
Lexington				
None Reported	--	--	--	--

Source: North Carolina Division of Energy, Mineral, and Land Resources, 2014

[15] The December 2, 2014 list of high hazard dams obtained from the North Carolina Division of Energy, Mineral, and Land Resources (http://portal.ncdenr.org/web/lr/dams) was reviewed and amended by local officials to the best of their knowledge.

Historical Occurrences

According to local sources and a review of the past hazard mitigation plan, there has been no history of dam breach in the City of Lexington.

Probability of Future Occurrences

Given the current dam inventory and historic data, a dam breach is unlikely (less than 1 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

B.2.12 Erosion

Location and Spatial Extent

Erosion in the City of Lexington is typically caused by flash flooding events. Unlike coastal areas, where the soil is mainly composed of fine grained particles such as sand, soils in the City of Lexington have much greater organic matter content. Furthermore, vegetation also helps to prevent erosion in the area. Erosion occurs in the city, particularly along the banks of rivers and streams, but it is not an extreme threat. No areas of concern were reported by the planning team.

Historical Occurrences

Several sources were vetted to identify areas of erosion in the City of Lexington. This includes searching local newspapers, interviewing local officials, and reviewing the previous hazard mitigation plan. Little information could be found beyond the hazard mitigation plan; however, the last update of the county hazard mitigation plan classified erosion as a relatively low concern as the magnitude was determined to be mild.

Probability of Future Occurrences

Erosion remains a natural, dynamic, and continuous process for the City of Lexington, and it will continue to occur. The annual probability level assigned for erosion is possible (between 1 and 10 percent).

B.2.13 Flood

Location and Spatial Extent

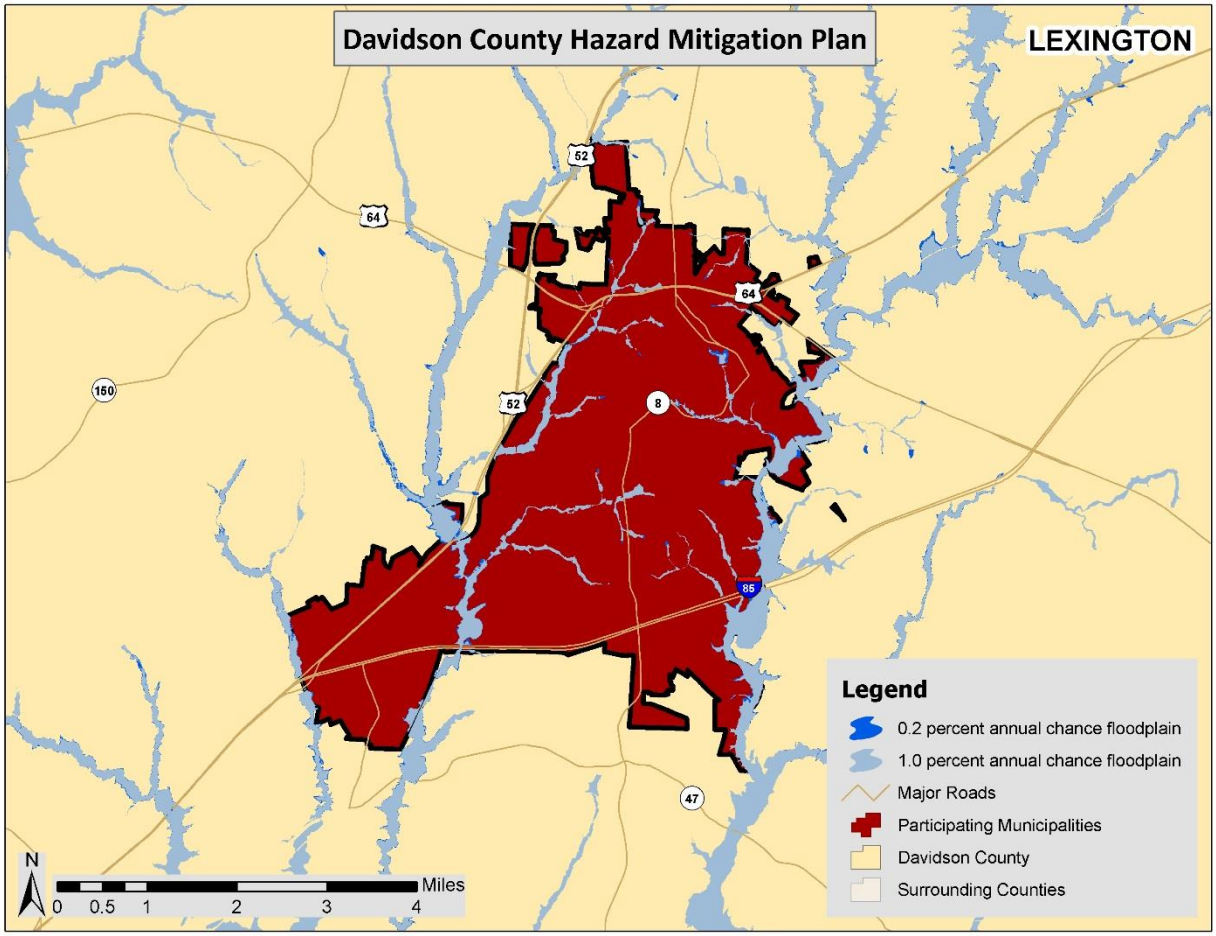
There are areas in the City of Lexington that are susceptible to flood events. Special flood hazard areas in the city were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM).[16] This includes Zone AE (1-percent annual chance floodplain with elevation) and Zone X500 (0.2-percent annual chance floodplain). According to GIS analysis, of the 18.0 square miles of land that make up the City of Lexington, there are 2.8 square miles of land in zone AE (1-percent annual chance floodplain/100-year floodplain) and 0.2 square miles of land in zone X500 (0.2-percent annual chance floodplain/500-year floodplain).

These flood zone values account for 16.7 percent of the total land area in the City of Lexington. It is important to note that while FEMA digital flood data is recognized as best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Flooding and flood-related losses often do occur outside of delineated special flood hazard areas. **Figure B.8** illustrates the

[16] The county-level DFIRM data used for Davidson County were updated in 2009.

location and extent of currently mapped special flood hazard areas for the City of Lexington based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE B.8: SPECIAL FLOOD HAZARD AREAS IN LEXINGTON



Source: Federal Emergency Management Agency

Historical Occurrences

Information from the National Climatic Data Center was used to ascertain historical flood events. The National Climatic Data Center reported a total of 11 events in the City of Lexington since 1999.[17] A summary of these events is presented in **Table B.22**. These events accounted for just over $1,000 (2014 dollars) in property damage in the city.[18] Specific information on flood events, including date, type of flooding, and deaths and injuries, can be found in **Table B.23**.

[17] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is likely that additional occurrences have occurred and have gone unreported in the City of Lexington.
[18] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE B.22: SUMMARY OF FLOOD OCCURRENCES IN LEXINGTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Lexington	11	0/0	$1,086

Source: National Climatic Data Center

TABLE B.23: HISTORICAL FLOOD EVENTS IN LEXINGTON

	Date	Type	Deaths / Injuries	Property Damage*
Lexington				
LEXINGTON	7/1/1999	Flash Flood	0/0	$0
LEXINGTON	7/4/2001	Flash Flood	0/0	$0
LEXINGTON	2/22/2003	Flash Flood	0/0	$0
LEXINGTON	6/8/2003	Flash Flood	0/0	$0
LEXINGTON	7/29/2003	Flash Flood	0/0	$0
LEXINGTON	7/17/2004	Flash Flood	0/0	$0
LEXINGTON	6/14/2006	Flash Flood	0/0	$0
LEXINGTON	6/23/2006	Flash Flood	0/0	$0
LEXINGTON	6/27/2006	Flash Flood	0/0	$0
LEXINGTON	7/13/2010	Flash Flood	1/0	$1,086
LEXINGTON	7/8/2011	Flash Flood	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of November 2014, there have been five flood losses reported in the City of Lexington through the National Flood Insurance Program (NFIP) since 1978. A summary of these figures for the city is provided in **Table B.24**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in the City of Lexington were either uninsured, denied claims payment, or not reported.

TABLE B.24: SUMMARY OF INSURED FLOOD LOSSES IN LEXINGTON

Location	Number of Policies	Flood Losses	Claims Payments
Lexington	28	5	$25,649

Source: Federal Emergency Management Agency, National Flood Insurance Program

Repetitive Loss Properties

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 140,000 repetitive loss properties nationwide.

As of August 2014, there are two non-mitigated repetitive loss properties located in the City of Lexington, which accounted for four losses and almost $25,000 in claims payments under the NFIP. The average claim payment for these properties is $6,222. One of the properties is single-family residential

and the other property is non-residential (commercial). **Table B.25** presents detailed information on repetitive loss properties and NFIP claims and policies for the City of Lexington.

TABLE B.25: REPETITIVE LOSS PROPERTIES IN LEXINGTON

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Lexington	2	1 single-family; 1 non-residential	4	$24,888	$0	$24,888	$6,222

Source: National Flood Insurance Program

Probability of Future Occurrences

Flood events will remain a threat in the City of Lexington, and the probability of future occurrences will remain highly likely (100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figures above, which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain).

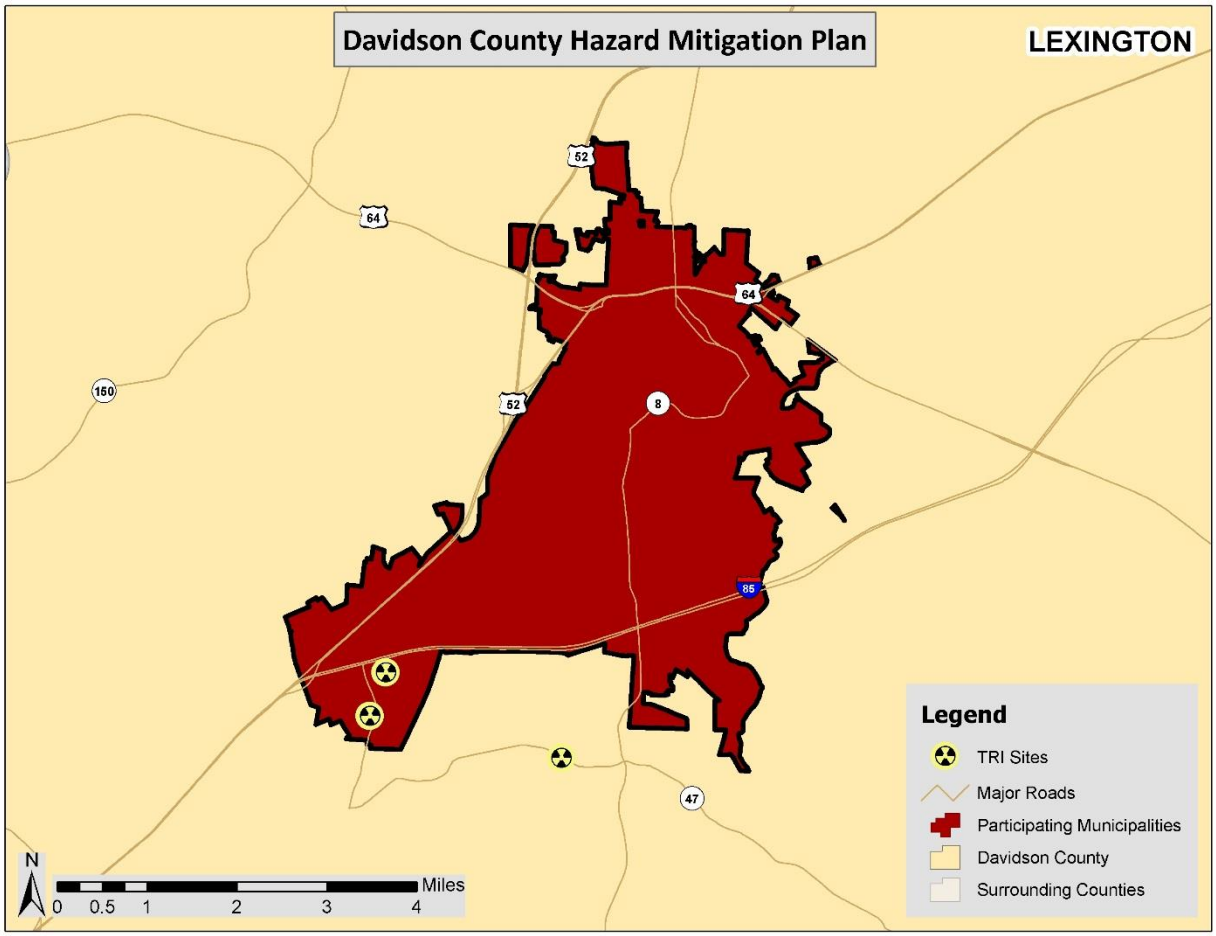
It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout the City of Lexington. For example, areas along the eastern and western town boundaries have more floodplain and thus a higher risk of flood than the rest of the town. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

B.2.14 Hazardous Materials Incidents

Location and Spatial Extent

The City of Lexington has two TRI sites. These sites are shown in **Figure B.9.**

FIGURE B.9: TOXIC RELEASE INVENTORY (TRI) SITES IN LEXINGTON



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the city via roadways and rail. Many roads in the city are subject to hazardous materials transport and all roads that permit hazardous material transport are considered potentially at risk to an incident.

Historical Occurrences

There have been a total of 35 recorded HAZMAT incidents in the City of Lexington since 1975 (**Table B.26**). These events resulted in almost $15,000 (2014 dollars) in property damages.[19] **Table B.27** presents detailed information on historical HAZMAT incidents in the City of Lexington as reported by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA).

TABLE B.26: SUMMARY OF HAZMAT INCIDENTS IN LEXINGTON

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Lexington	35	0/0	$14,613

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

[19] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE B.27: HAZMAT INCIDENTS IN LEXINGTON

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
Lexington							
I-1975080152	6/28/1975	LEXINGTON	Highway	No	0/0	$0	0
I-1976090957	9/22/1976	LEXINGTON	Highway	No	0/0	$0	15 LGA
I-1977010370	1/5/1977	LEXINGTON	Highway	No	0/0	$0	0
I-1977050284	4/26/1977	LEXINGTON	Highway	Yes	0/0	$0	600 LGA
I-1978070519	7/11/1978	LEXINGTON	Highway	No	0/0	$0	4 LGA
I-1978081661	8/14/1978	LEXINGTON	Highway	No	0/0	$0	0
I-1979010700	12/1/1978	LEXINGTON	Rail	Yes	0/0	$0	36,000 LGA
I-1979050940	5/4/1979	LEXINGTON	Highway	No	0/0	$0	25 LGA
I-1979110717	10/18/1979	LEXINGTON	Highway	No	0/0	$0	0
I-1979120077	11/28/1979	LEXINGTON	Highway	No	0/0	$0	45 LGA
I-1980060806	4/26/1980	LEXINGTON	Highway	No	0/0	$0	1 LGA
I-1988030384	2/9/1988	LEXINGTON	Highway	No	0/0	$0	15 LGA
I-1989010281	12/10/1988	LEXINGTON	Highway	No	0/0	$0	5 LGA
I-1989010277	12/20/1988	LEXINGTON	Highway	No	0/0	$0	5 LGA
I-1989050421	4/19/1989	LEXINGTON	Highway	No	0/0	$0	20 LGA
I-1989100027	9/15/1989	LEXINGTON	Rail	No	0/0	$0	0
I-1990030651	11/14/1989	LEXINGTON	Rail	Yes	0/0	$0	6,000 LGA
I-1990080504	8/7/1990	LEXINGTON	Highway	No	0/0	$0	5 LGA
I-1992080731	6/8/1992	LEXINGTON	Highway	No	0/0	$0	0.5 LGA
I-1993090749	8/24/1993	LEXINGTON	Highway	No	0/0	$0	0.25 LGA
I-1994050427	4/27/1994	LEXINGTON	Highway	Yes	0/0	$3,195	316 LGA
I-1996030432	2/16/1996	LEXINGTON	Highway	Yes	0/0	$0	5,247.5 LGA
I-1998050019	4/7/1998	LEXINGTON	Highway	No	0/0	$0	5 LGA
I-1998081325	7/29/1998	LEXINGTON	Highway	No	0/0	$0	1 LGA
I-2000060674	6/2/2000	LEXINGTON	Highway	No	0/0	$0	0.125 LGA
I-2001060065	5/5/2001	LEXINGTON	Highway	No	0/0	$0	10 LGA
I-2003020935	5/31/2002	LEXINGTON	Highway	Yes	0/0	$0	8,400 LGA
I-2004091116	9/10/2004	LEXINGTON	Highway	No	0/0	$0	25 LGA
E-2007050072	4/19/2007	LEXINGTON	Highway	Yes	0/0	$11,418	80 SLB
I-2010030475	3/9/2010	LEXINGTON	Highway	Yes	0/0	$0	1,255 LGA
I-2010030475	3/9/2010	LEXINGTON	Highway	Yes	0/0	$0	189 LGA
I-2010030475	3/9/2010	LEXINGTON	Highway	Yes	0/0	$0	417 LGA
I-2010030475	3/9/2010	LEXINGTON	Highway	Yes	0/0	$0	735 LGA
I-2010030475	3/9/2010	LEXINGTON	Highway	Yes	0/0	$0	189 LGA
E-2011090505	9/28/2011	LEXINGTON	Highway	No	0/0	$0	0.015625 LGA

*Property damage is reported in 2014 dollars.

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

Probability of Future Occurrences

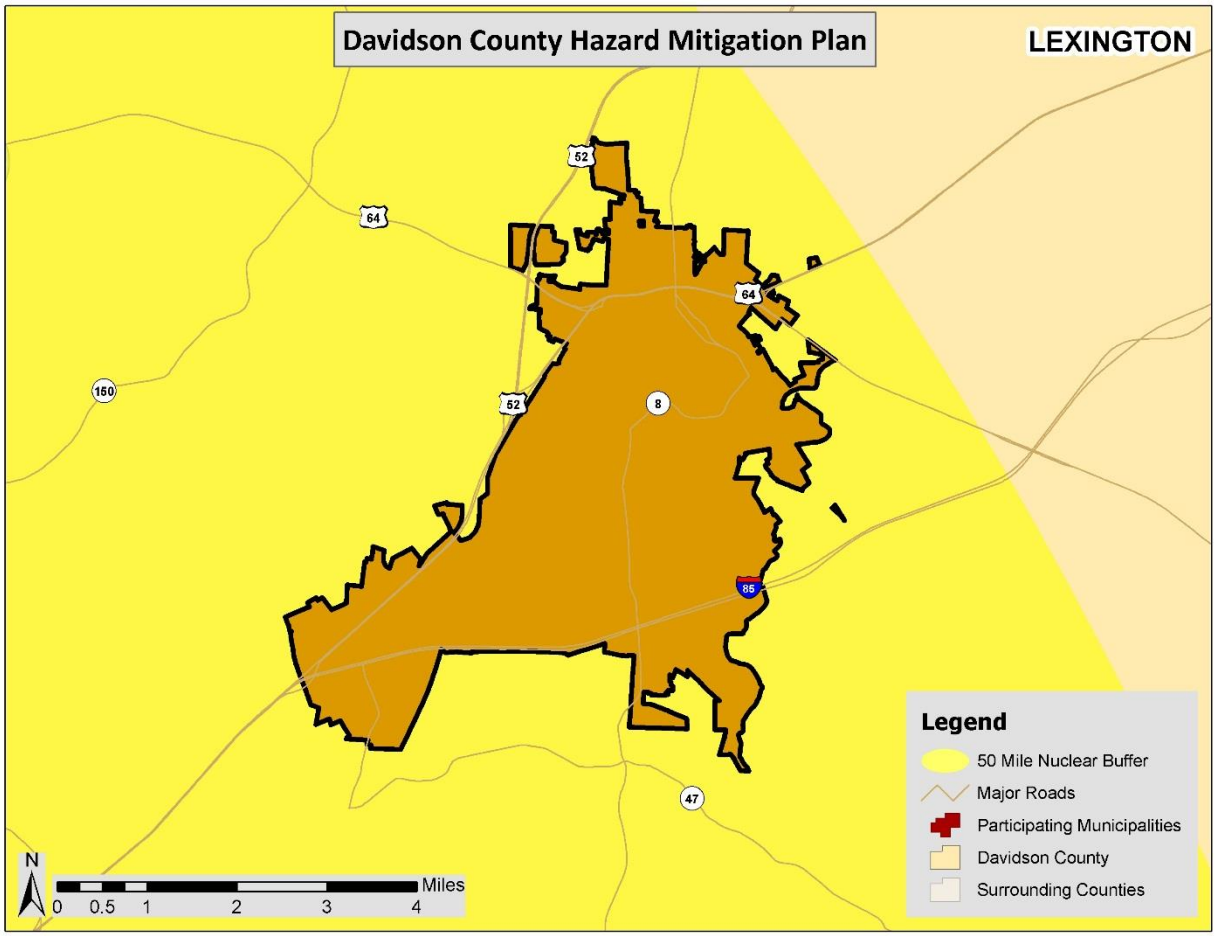
Given the location of two toxic release inventory sites in the City of Lexington and prior roadway and railway incidents, it is likely that a hazardous material incident may occur in the city (between 10 and 100 percent annual probability). However, city officials are mindful of this possibility and take precautions to prevent such an event from occurring. Additionally, there are detailed plans in place to respond to an occurrence.

B.2.15 Nuclear Accident

Location and Spatial Extent

The City of Lexington is susceptible to a nuclear incident due to its proximity to the McGuire Nuclear Power Plant. Areas located within 10 miles of the station are considered to be within the zone of highest risk to a nuclear incident and is the designated evacuation radius recommended by the Nuclear Regulatory Commission. Although none of the city is within the 10-mile zone, the entire city is located within the 50-mile radius which is still considered to be at risk from a nuclear incident (**Figure B.10**).

FIGURE B.10: NUCLEAR POWER PLANT INCIDENT HAZARD ZONES IN LEXINGTON



Source: International Atomic Energy Agency

Historical Occurrences

Although there have been no major nuclear events at the McGuire Nuclear Power Plant, there is some possibility that one could occur as there have been incidents in the past in the United States at other facilities and at facilities around the world.

Probability of Future Occurrences

A nuclear event is a very rare occurrence in the United States due to the intense regulation of the industry. There have been incidents in the past, but it is considered unlikely (less than 1 percent annual probability).

B.2.16 Terror Threat

Location and Spatial Extent

A terror threat could potentially occur at any location in the city. However, the very definition of a terrorist event indicates that it is most likely to be targeted at a critical or symbolic resource/location. Ensuring and protecting the continuity of critical infrastructure and key resources (CIKR) of the United States is essential to the Nation's security, public health and safety, economic vitality, and way of life. CIKR includes physical and/or virtual systems or assets that, if damaged, would have a detrimental impact on national security, including large-scale human casualties, property destruction, economic disruption, and significant damage to morale and public confidence. **Table B.28** lists the U.S. Department of Homeland Security's (DHS) identified main critical infrastructure sectors.

TABLE B.28 U.S. DEPARTMENT OF HOMELAND SECURITY CRITICAL INFRASTRUCTURE SECTORS

- Agriculture and Food
- Banking and Finance
- Chemical
- Commercial Facilities
- Communications
- Critical Manufacturing
- Dams
- Defense Industrial Base
- Emergency Services
- Energy
- Government Facilities
- Healthcare and Public Health
- Information Technology
- National Monuments and Icons
- Nuclear Reactors, Materials, and Waste
- Postal and Shipping
- Transportation Systems
- Water

All critical facilities (see Section B.3.3) are at a heightened level of risk in the City of Lexington. However, there are several facilities and events in the city that have been identified as the likely primary targets. These are listed in **Table B.29**.

TABLE B.29: FACILITIES/EVENTS AT ELEVATED RISK OF TERROR THREAT IN LEXINGTON

Critical Facility
Lexington
Barbecue Festival (held annually, late October)
Davidson County Airport
Lexington Memorial Hospital

Source: Local Government

Historical Occurrences

Although there have been no major terror events in the City of Lexington, there is some possibility that one could occur in the future as there have been incidents in the United States in the past and there are several facilities that could be potential targets.

Probability of Future Occurrences

The City of Lexington has no recorded terrorist events. Due to no recorded incidents against the city, the probability of future occurrences of a terrorist attack is unlikely (less than 1 percent annual probability).

B.2.17 Wildfire

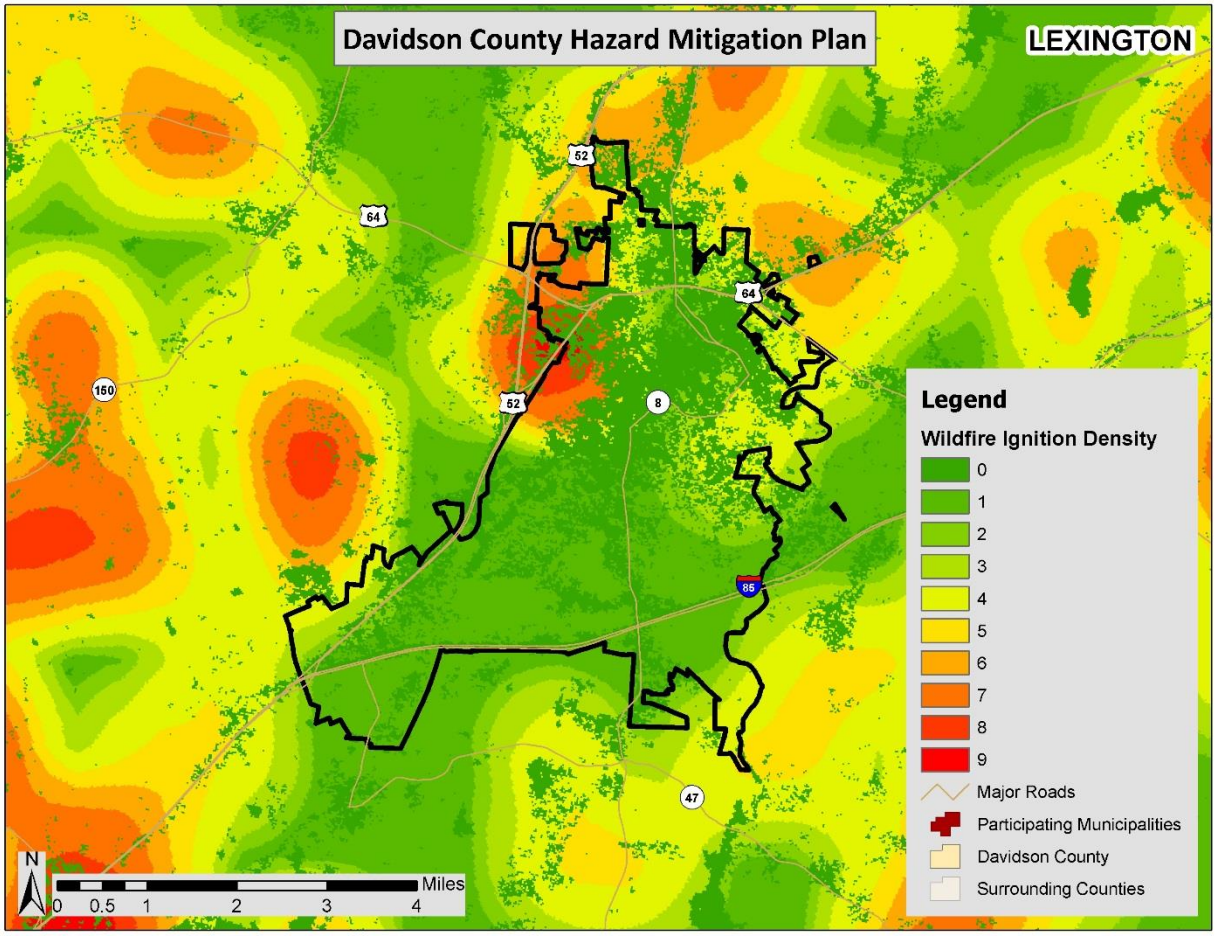
Location and Spatial Extent

The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data in the figure below give an indication of historic location in the City of Lexington.

Historical Occurrences

Figure B.11 shows the Wildfire Ignition Density in the City of Lexington based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[20]

FIGURE B.11: WILDFIRE IGNITION DENSITY IN LEXINGTON



Source: Southern Wildfire Risk Assessment

[20] Southern Wildfire Risk Assessment, 2014.

Based on data from the North Carolina Division of Forest Resources from 2005 to 2014, Davidson County experienced an average of 39 wildfires annually which burn a combined average of 53.6 acres per year. The data indicates that most of these fires are small, averaging 1.4 acre per fire. **Table B.30** lists the number of reported wildfire occurrences in the county between the years 2005 and 2014.

TABLE B.30: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	27	53	47	36	16	40	48	30	47	46
Number of Acres	55.3	56.5	84.5	39.7	19	40.6	46.5	146.3	26.3	21.7

Source: North Carolina Division of Forest Resources

Since 2009, the NCDFR has also kept data on the number of structures damaged/destroyed. This information is presented in **Table B.31**.

TABLE B.31: STRUCTURES DAMAGED/DESTROYED BY WILDFIRE IN DAVIDSON COUNTY

Year	2009	2010	2011	2012	2013	2014
Davidson County						
Number of Structures	0	2	11	6	8	9
Cost of Damages to Structures	$0	$1,500	$13,600	$10,500	$14,600	$17,800

Source: North Carolina Division of Forest Resources

In addition, the North Carolina Department of Insurance collects fire data and reports it on an annual basis. This data is included in **Table B.32** to supplement the NCDFR data.

TABLE B.32: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	28	74	195	187	120	167	176	116	141	242
Property Loss	$0	$5,300	$650	$1,050	$1,550	$230	$1,940	$1,202	$10,700	$8,380

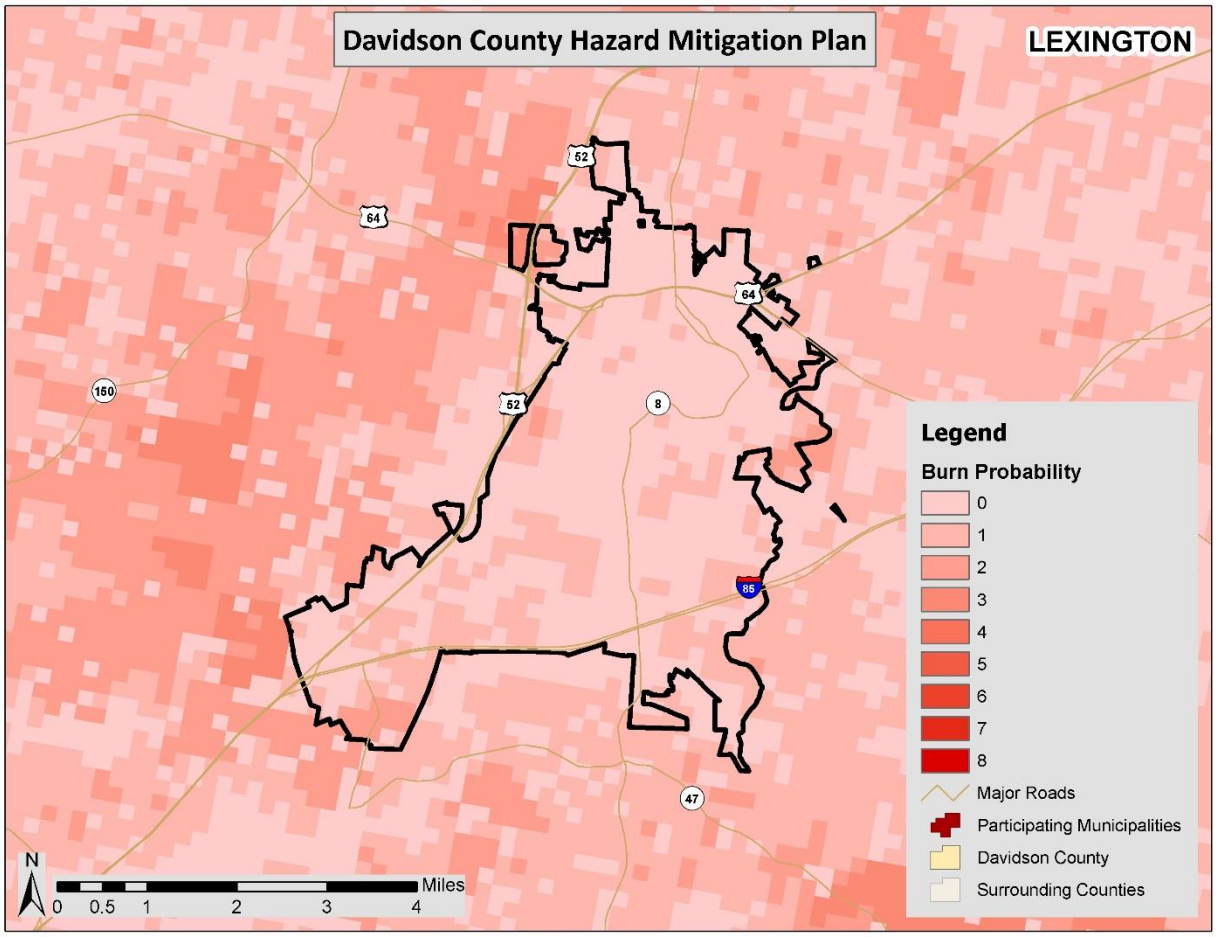
Source: North Carolina Department of Insurance

Probability of Future Occurrences

Wildfire events will be an ongoing occurrence around the City of Lexington. **Figure B.12** shows that there is some probability a wildfire will occur near the city. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk,

resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to the City of Lexington for future wildfire events is likely (10 to 100 percent annual probability).

FIGURE B.12: BURN PROBABILITY IN LEXINGTON



Source: Southern Wildfire Risk Assessment

B.2.18 Conclusions on Hazard Risk

The hazard profiles presented above were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

Hazard Extent

Table B.33 describes the extent of each natural hazard identified for the City of Lexington. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE B.33 EXTENT OF LEXINGTON HAZARDS

Atmospheric Hazards	
Drought	Drought extent is defined by PDSI classifications which include Extremely Moist, Very Moist, Mid-Range, Moderate Drought, Severe Drought, and Extreme Drought classifications (pages 5:5-5:6). According to the PDSI classifications, the most severe drought condition is Extreme. Davidson County has received this ranking 3 times over the 14-year reporting period.
Extreme Heat	The extent of extreme heat can be defined by the maximum temperature reached. The highest temperature recorded in Davidson County is 107 degrees Fahrenheit (reported on July 29, 1952).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in the City of Lexington was 1.75 inches (last reported on May 3, 2003). It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5 (Table 5.11). The greatest classification of hurricanes to traverse directly through Davidson County was an unnamed storm in 1893 which reached a maximum wind speed of 65 knots in the county. Although the county is much more likely to be impacted by the remnants of a hurricane or tropical storm, it is possible that a storm can impact the county directly.
Lightning	According to the Vaisala flash density map (Figure 5.5), the City of Lexington is located in an area that experiences 3 to 5 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Thunderstorm Wind / High Wind	Thunderstorm extent is defined by the number of thunder events and wind speeds reported. The strongest recorded wind event in City of Lexington was reported on September 23, 2003 at 65 knots (approximately 75 mph). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by tornado occurrences in the US provided by FEMA (Figure 5.6) as well as the Fujita/Enhanced Fujita Scale (Tables 5.18 and 5.19). According to NCDC data, no tornadoes have impacted the city. However, the greatest magnitude reported in the county was an EF2 (last reported on November 16, 2011). It should be noted that an EF5 tornado is possible.
Winter Storm and Freeze	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest 24-hour snowfall reported in the county was 20.3 inches on February 12, 1905. Due to unpredictable variations in snowfall throughout the county, extent totals will vary for each participating jurisdiction and reliable data on snowfall totals is not abundantly available. In addition, the lowest temperature reached in the county was -6 degrees Fahrenheit (January 21, 1985).
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale (Table 5.25) and the Modified Mercalli Intensity (MMI) scale (Table 5.26) and the distance of the epicenter from the City of Lexington. According to data provided by the National Geophysical Data Center, the greatest magnitude earthquake to impact the county was 4.7 on the Richter Scale (reported on November 30, 1973). The epicenter of this earthquake was located 334.0 km away.

Landslide	As noted above in the landslide profile, the landslide data provided by the North Carolina Geological survey is incomplete. This provides a challenge when trying to determine an accurate extent for the landslide hazard. However, when using the USGS landslide susceptibility index, extent can be measured with incidence, which is low throughout the city. Additionally, there is moderate susceptibility throughout the City of Lexington.
Hydrologic Hazards	
Dam Failure	Dam failure extent is defined using the North Carolina Division of Energy, Mineral, and Land Resources criteria (Table 5.30). Of the 5 dams in City of Lexington, 0 are classified as high-hazard.
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records available for the City of Lexington.
Flood	Flood extent can be measured by the amount of land and property in the floodplain as well as flood height and velocity. The amount of land in the floodplain accounts for 16.7 percent of the total land area in the City of Lexington. Flood depth and velocity are recorded via United States Geological Survey stream gages throughout Davidson County. A gage exists within the City of Lexington. The greatest peak discharge recorded at the city was reported on September 25, 1947. Water reached a discharge of 14,800 cubic feet per second and the stream gage height was 22.12 feet.
Other Hazards	
Hazardous Materials Incident	According to USDOT PHMSA, the largest hazardous materials incident reported in the city was 36,000 LGA released on the railway on December 1, 1978. It should be noted that larger events are possible.
Nuclear Accident	Although there is no history of a nuclear accident at the McGuire Power Plant, other events across the globe and in the United States in particular indicate that an event is possible. Since several national and international events were Level 7 events on the INES, the potential for a Level 7 event at McGuire is possible.
Terror Threat	There is no history of terror threats in the City of Lexington; however; it is possible that one of these events could occur. If this were to take place, the magnitude of the event could range on the scale of critical damage with many fatalities and injuries to the population.
Wildfire	Wildfire data was provided by the North Carolina Division of Forest Resources and is reported annually by county from 2005-2014. The greatest number of fires to occur in Davidson County in any year was 53 in 2006. The greatest number of acres to burn in the county in a single year occurred in 2012 when 146.3 acres were burned. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.

Priority Risk Index Results

In order to draw some meaningful planning conclusions on hazard risk for the City of Lexington, the results of the hazard profiling process were used to generate city-wide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.20.2.

Table B.34 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles

developed for this section, as well as input from the Hazard Mitigation Planning Team. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE B.34: SUMMARY OF PRI RESULTS FOR LEXINGTON

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Atmospheric Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Extreme Heat	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Hailstorm	Highly Likely	Minor	Moderate	6 to 12 hours	Less than 6 hours	**2.5**
Hurricane and Tropical Storm	Likely	Limited	Large	More than 24 hours	Less than 24 hours	**2.6**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Thunderstorm / High Wind	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Tornado	Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.7**
Winter Storm and Freeze	Highly Likely	Limited	Moderate	More than 24 hours	Less than 1 week	**2.8**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Landslide	Unlikely	Minor	Small	Less than 6 hours	Less than 6 hours	**1.5**
Hydrologic Hazards						
Dam and Levee Failure	Unlikely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.1**
Erosion	Possible	Minor	Small	More than 24 hours	More than 1 week	**1.8**
Flood	Highly Likely	Minor	Moderate	6 to 12 hours	Less than 1 week	**2.7**
Other Hazards						
Hazardous Materials Incident	Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.5**
Nuclear Accident	Unlikely	Limited	Large	6 to 12 hours	Less than 1 week	**2.3**
Terror Threat	Unlikely	Critical	Small	Less than 6 hours	Less than 24 hours	**2.2**
Wildfire	Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.3**

B.2.19 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for the City of Lexington, including the PRI results and input from the Hazard Mitigation Planning Team, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table B.35**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of the City of Lexington. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section B.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

TABLE B.35: CONCLUSIONS ON HAZARD RISK FOR LEXINGTON

HIGH RISK	Thunderstorm / High Wind Winter Storm and Freeze Tornado Flood
MODERATE RISK	Hurricane and Tropical Storm Drought Hailstorm Hazardous Materials Incident Lightning Nuclear Accident Wildfire
LOW RISK	Terror Threat Extreme Heat Dam and Levee Failure Earthquake Erosion Landslide

B.3 LEXINGTON VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of the City of Lexington to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the city and assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

B.3.1 Asset Inventory

Table B.36 lists the number of parcels, total value of parcels, total number of parcels with improvements, and the total assessed value of improvements for the City of Lexington (study area of vulnerability assessment).[21]

[21] Total assessed values for improvements is based on tax assessor records as joined to digital parcel data. This data does not include dollar figures for tax-exempt improvements such as publicly-owned buildings and facilities. It should also be noted that, due to record keeping, some duplication is possible thus potentially resulting in an inflated value exposure for an area.

TABLE B.36: IMPROVED PROPERTY IN LEXINGTON

Location	Number of Parcels	Total Assessed Value of Parcels	Estimated Number of Buildings	Total Estimated Value of Improvements[22]
Lexington	9,213	$1,242,198,370	13,099	$882,010,730

Source: Davidson County GIS Department

Table B.37 lists the fire stations, police stations, EMS/rescue stations, medical care facilities, schools, and other critical facilities located in the City of Lexington. These facilities were identified as primary critical facilities in that they are necessary to maintain government functions and protect the life, health, safety, and welfare of citizens. These facilities were geospatially mapped and used as the basis for further geographic analysis of the hazards that could potentially affect critical facilities. All critical facility information was provided by the local government and the Davidson County GIS department.

In addition, **Figure B.13** shows the locations of essential facilities in the City of Lexington. **Table B.52**, near the end of this section, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. As noted previously, this list is not all-inclusive and only includes information provided by the local government.

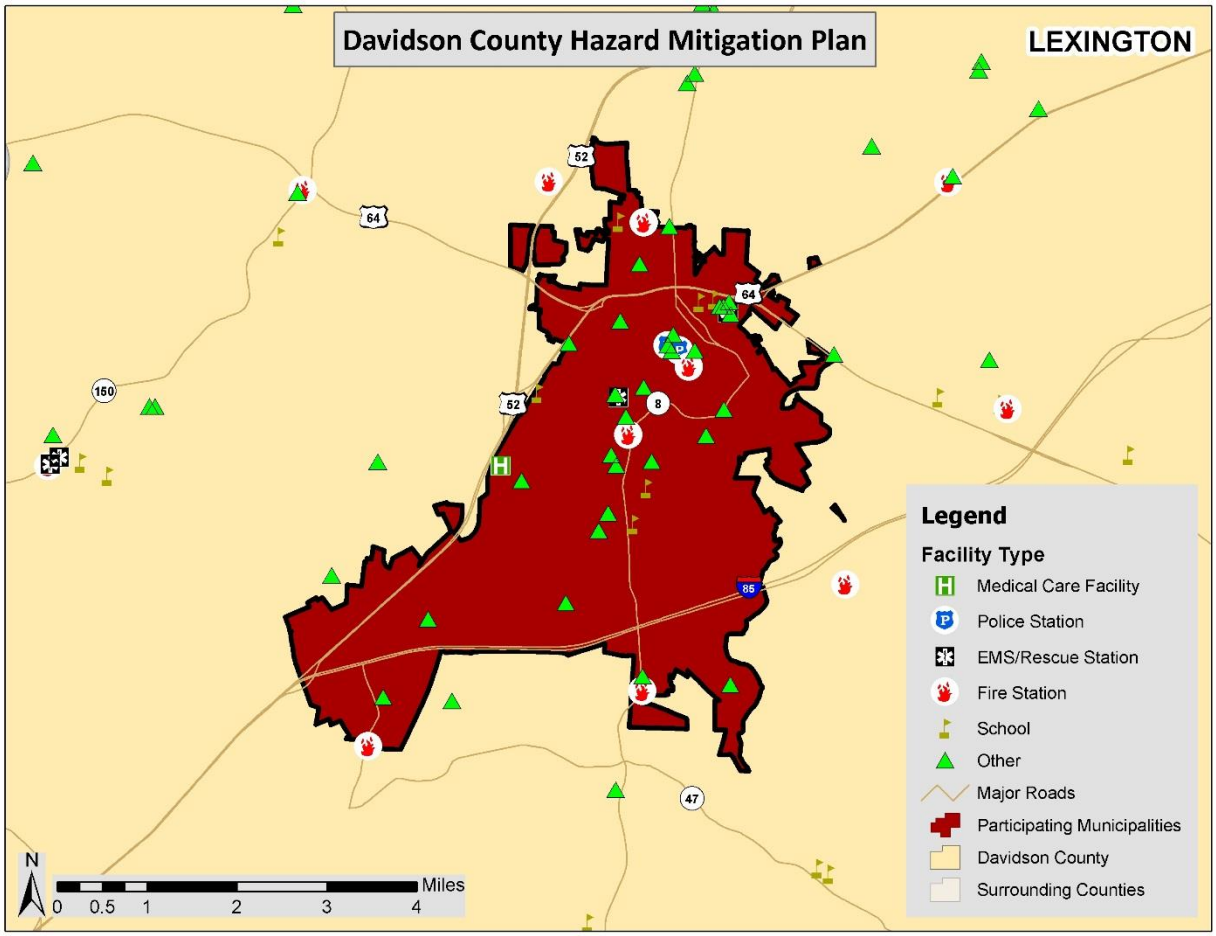
TABLE B.37: CRITICAL FACILITY INVENTORY IN LEXINGTON

Location	Fire Stations	Police Stations	EMS/Rescue Stations	Medical Care Facilities	Schools	Other
Lexington	4	2	2	1	6	27

Source: Local Government

[22] Building value for each jurisdiction is based on the dollar value of parcels with a building value greater than zero.

FIGURE B.13: CRITICAL FACILITY LOCATIONS IN LEXINGTON



Source: Local Government

B.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in the City of Lexington that are potentially at risk to these hazards.

Table B.38 lists the population according to U.S. Census 2010 population estimates. The total population in the City of Lexington according to Census data is 18,636 persons. Additional population estimates are presented above in Section B.1.

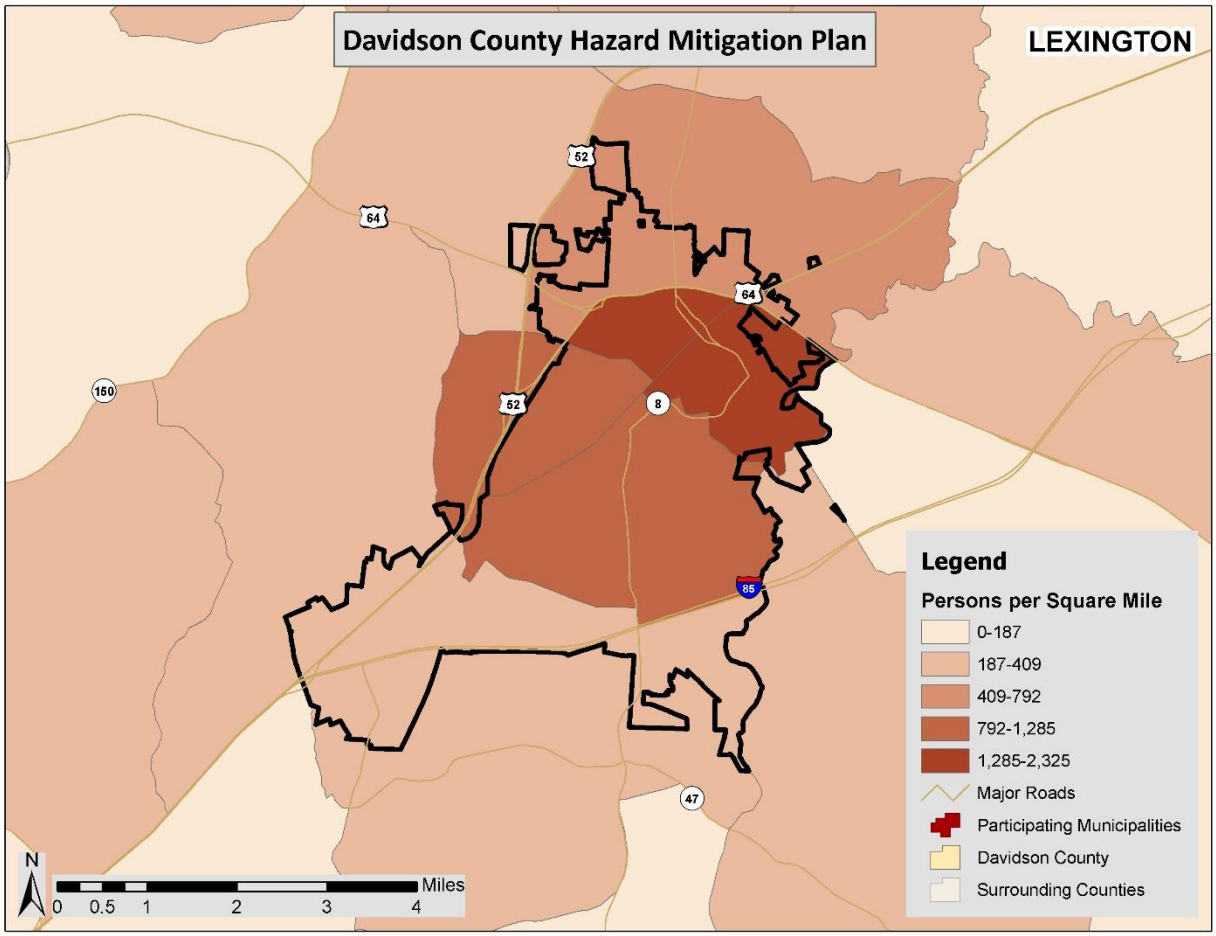
TABLE B.38: TOTAL POPULATION IN LEXINGTON

Jurisdiction	2010 Census Population
Lexington	18,931

Source: United States Census 2010

In addition, **Figure B.14** illustrates the population density by census tract as it was reported by the U.S. Census Bureau in 2010.

FIGURE B.14: POPULATION DENSITY IN LEXINGTON



Source: United States Census Bureau, 2010

B.3.3 Development Trends and Changes in Vulnerability

Since the previous hazard mitigation plan was approved in 2010, the City of Lexington has experienced limited growth and development. **Table B.39** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE B.39: BUILDING COUNTS FOR LEXINGTON

Jurisdiction	Total Housing Units (2013)	Units Built 2010 or later	% Building Stock Built Post-2010
Lexington	8,711	0	0.0%

Source: United States Census Bureau

Table B.40 shows population growth estimates for the city from 2010 to 2013 based on the U.S. Census Annual Estimates of Resident Population.

TABLE B.40: POPULATION GROWTH FOR LEXINGTON

Jurisdiction	Population Estimates (as of July 1)				% Change 2010-2013
	2010	2011	2012	2013	
Lexington	19,155	19,082	19,038	18,981	-0.9%

Note: July 1 population estimates were used in this table to allow comparison of annual population counts (April 1 Census estimates were used for all other population counts throughout the plan which is why the counts may differ).
Source: United States Census Bureau

Based on the data above, there has been no residential development or population growth in the city since 2010, and the city has actually experienced a slight population decline. Therefore, development and population growth have not impacted the city's vulnerability since the previous local hazard mitigation plan was approved and there has been no change in the overall vulnerability.

However, it is important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains, moderate landside susceptibility areas, high wildfire risk areas, primary and secondary hazardous materials buffers, or McGuire Nuclear Power Plant's 50-mile buffer.

B.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, modeling tool, or sufficient historical data allow for further analysis. Those results, specific to the City of Lexington, are presented here. All other hazards are assumed to impact the entire planning region (drought, extreme heat, hailstorm, lightning, thunderstorm wind, tornado, and winter storm and freeze) or, due to lack of data, analysis would not lead to credible results (dam and levee failure, erosion, and terror threat). The total city exposure, and thus risk, was presented in **Table B.36**.

The annualized loss estimate for all hazards is presented at the end of this section in **Table B.51.**

The hazards presented in this section include: hurricane and tropical storm winds, earthquake, landslide, flood, hazardous materials incident, nuclear accident, and wildfire.

Hurricane and Tropical Storm

Historical evidence indicates that the City of Lexington has a significant risk to the hurricane and tropical storm hazard. There have been five disaster declarations due to hurricanes (Hurricane Hugo, Hurricane Fran, Hurricane Floyd, Hurricane Isabel, and Hurricane Ivan) in Davidson County. Several tracks have come near or traversed through Davidson County, as shown and discussed in Section B.2.4.

Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, high winds, and precipitation, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore only hurricane winds are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to the hurricane and tropical storm hazard. Hazus-MH 2.1 was used to determine annualized losses for the county as shown below in **Table B.41.** Only losses to buildings, contents, and inventory are reported, in order to best match annualized losses

reported for other hazards. Hazus-MH reports losses at the U.S. Census tract level, so determining participating jurisdiction losses was not possible.

TABLE B.41: ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$637,00	$148,000	$5,000	$790,000

Source: Hazus-MH 2.1

In addition, probable peak wind speeds were calculated in Hazus. These are shown below in **Table B.42.**

TABLE B.42: PROBABLE PEAK HURRICANE / TROPICAL STORM WIND SPEEDS (MPH)

Location	50-year event	100-year event	500-year event	1,000-year event
Lexington	63.8	73.3	92.6	99.7

Source: Hazus-MH 2.1

Social Vulnerability

Given equal susceptibility across the City of Lexington, it is assumed that the total population is at risk to the hurricane and tropical storm hazard.

Critical Facilities

Given equal vulnerability across the City of Lexington, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among other factors. Determining individual building response is beyond the scope of this plan. However, this plan will consider mitigation actions for vulnerable structures, including critical facilities, to reduce the impacts of the hurricane wind hazard. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this section.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in the City of Lexington. Hurricane events can cause substantial damage in their wake including fatalities, extensive debris clean-up, and extended power outages.

Earthquake

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the annualized loss for Davidson County. The results of the analysis reported at the U.S. Census tract level do not make it feasible to estimate losses at the jurisdiction level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to building damage (structural and non-structural), contents, and inventory. However, like the analysis for hurricanes, the comparative annualized loss figures at the end of this section only utilize building losses in order to provide consistency with other hazards. **Table B.43** summarizes the findings.

TABLE B.43: ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Building Loss	Non-Structural Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$39,000	$96,000	$28,000	$2,000	$165,000

Source: Hazus-MH 2.1

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. A list of individual critical facilities and their risk can be found in **Table B.52**.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in the City of Lexington. Minor earthquakes may rattle dishes and cause minimal damage while stronger earthquakes will result in structural damage as indicated in the Hazus scenario above. Impacts of earthquakes include debris clean-up, service disruption and, in severe cases, fatalities due to building collapse. Specific vulnerabilities for assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available. Furthermore, mitigation actions to address earthquake vulnerability will be considered.

Landslide

In order to complete the vulnerability assessment for landslides in the City of Lexington, GIS analysis was used. The potential dollar value of exposed land and property total can be determined using the USGS Landslide Susceptibility Index (detailed in Section B.2.10), county-level tax parcel and building footprint data, and GIS analysis. **Table B.44** presents the potential at-risk property where available. No areas of the City of Lexington are identified as moderate or high incidence areas as determined by the USGS landslide data. However, all areas of the town have moderate landslide susceptibility. Typically, an analysis is run to determine which parcels/buildings are located within the high and moderate incidence areas, but since no high incidence areas exist in the county, only an analysis of moderate incidence areas was carried out.

TABLE B.44: TOTAL POTENTIAL AT-RISK PARCELS FOR THE LANDSLIDE HAZARD

Location	Number of Parcels At Risk	Number of Improvements At Risk	Total Value of Improvements At Risk ($)
Incidence Level	**Moderate**		
Lexington	0	0	$0

Source: United States Geological Survey

Social Vulnerability
Given low incidence and moderate susceptibility across the entire city, it is assumed that the total population is at a low risk to landslides.

Critical Facilities
No critical facilities are located in a moderate incidence area. However, all critical facilities are located in a moderate susceptibility area. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this section.

In conclusion, a landslide has the potential to impact all existing and future buildings, facilities, and populations in the City of Lexington, though most areas are at a very low risk. Due to a variety of factors

such as steep slopes and modified slopes, hilly areas of the city bear a greater risk than flat areas. Specific vulnerabilities for the City of Lexington assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available.

Flood

Historical evidence indicates that the City of Lexington is susceptible to flood events. A total of 11 flood events have been reported by the National Climatic Data Center, resulting in $1,086 (2014 dollars) in property damage. On an annualized level, these damages amounted to $72 for the City of Lexington.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with local tax assessor records for the city. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within an identified floodplain. **Table B.45** presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

TABLE B.45: ESTIMATED EXPOSURE OF PARCELS TO THE FLOOD HAZARD

Location	1.0-percent ACF			0.2-percent ACF		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[23]	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[24]
Lexington	653	193	$119,474,140	335	100	$77,513,480

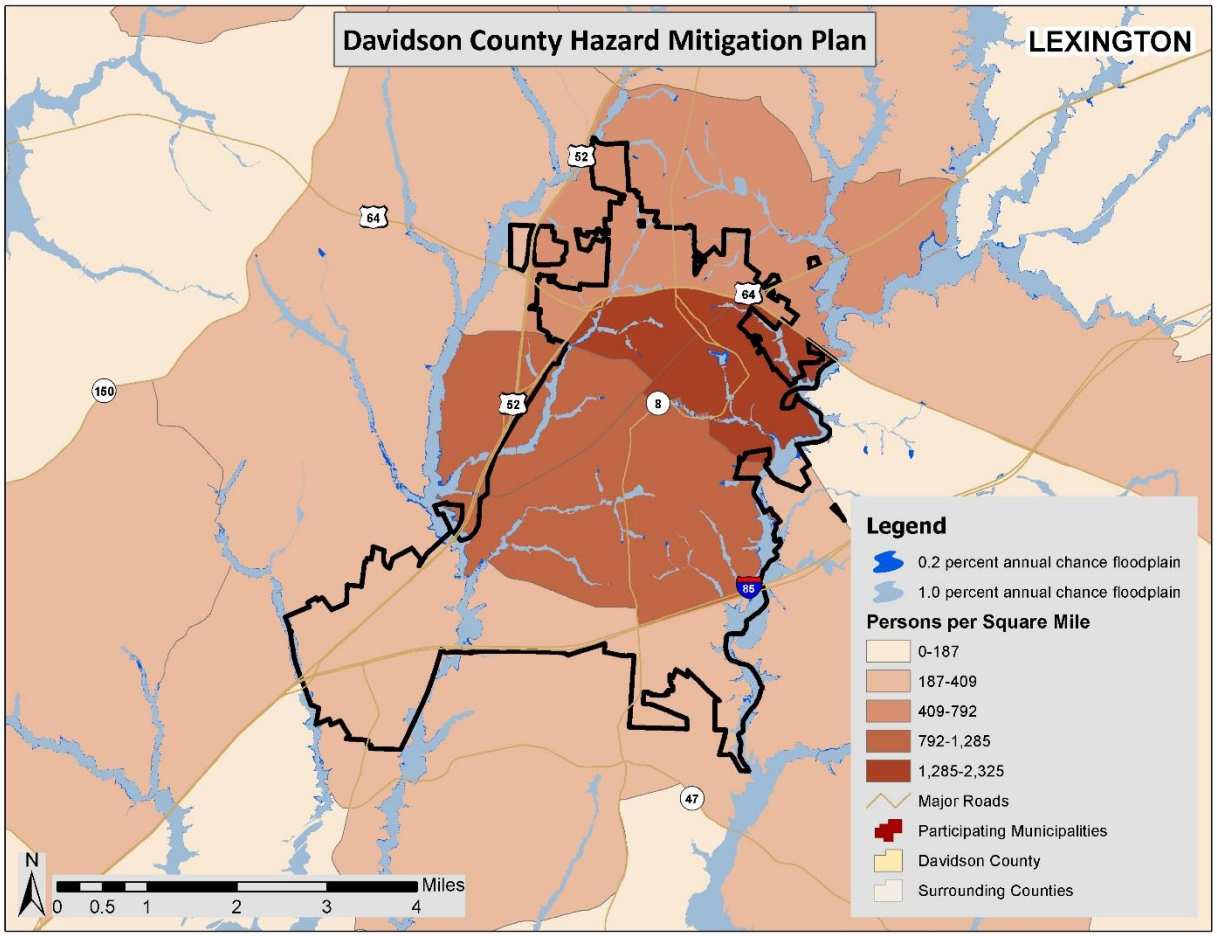
Source: Federal Emergency Management Agency DFIRM

Social Vulnerability

U.S. Census 2010 population at the tract level was used for analysis to determine where areas of high population concentration intersect with flood prone areas in the city. **Figure B.15** is presented to gain a better understanding of the at-risk population.

[23] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-percent annual chance floodplain, since building footprints were not associated with dollar value data.
[24] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 0.2-percent annual chance floodplain, since building footprints were not associated with dollar value data.

FIGURE B.15 : POPULATION DENSITY NEAR FLOODPLAINS



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there is 1 critical facility located in the City of Lexington 1.0-percent annual chance floodplain. This facility is a gas regulator. There are no critical facilities located in the 0.2-percent annual chance floodplain based on FEMA DFIRM boundaries and GIS analysis. (As previously noted, this analysis does not consider building elevation, which may negate risk.) A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this section.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in the City of Lexington, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. As noted, the floodplains used in this analysis include the 100-year and 500-year FEMA regulated floodplain boundaries. It is certainly possible that more severe events could occur beyond these boundaries or urban (flash) flooding could impact additional structures. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

Hazardous Materials Incident

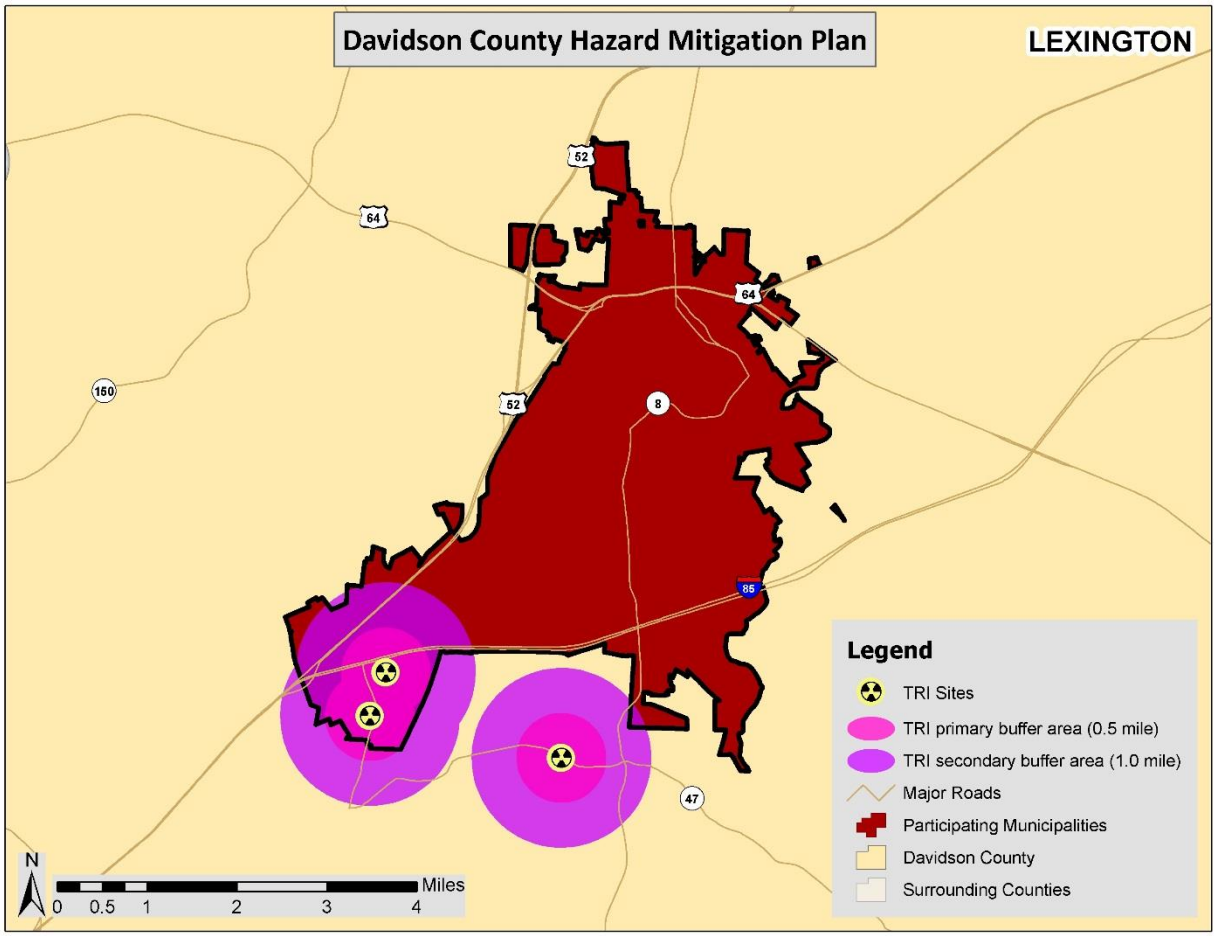
Historical evidence indicates that the City of Lexington is susceptible to hazardous materials events. A total of 35 HAZMAT incidents have been reported by the Pipeline and Hazardous Materials Safety Administration, resulting in $14,613 (2014 dollars) in property damage. On an annualized level, these damages amount to $1,791 for the City of Lexington.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and parcels.[25] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to respect the different levels of effect: immediate (primary) and secondary. Primary and secondary impact sites were selected based on guidance from FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks against Buildings and engineering judgment. For the fixed site analysis, geo-referenced TRI listed toxic sites in the City of Lexington, along with buffers, were used for analysis as shown in **Figure B.16.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure B.17** shows the areas used for mobile toxic release buffer analysis. The results indicate the approximate number of parcels/buildings and improved value, as shown in **Table B.46** (fixed sites), **Table B.47** (mobile road sites) and **Table B.48** (mobile railroad sites).[26]

[25] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an event).
[26] Note that parcels included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE B.16 : TRI SITES WITH BUFFERS IN LEXINGTON



Source: Environmental Protection Agency

TABLE B.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[27]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[28]
Lexington	175	338	$35,953,170	247	503	$82,162,950

[27] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[28] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

FIGURE B.17 : MOBILE HAZMAT BUFFERS IN LEXINGTON

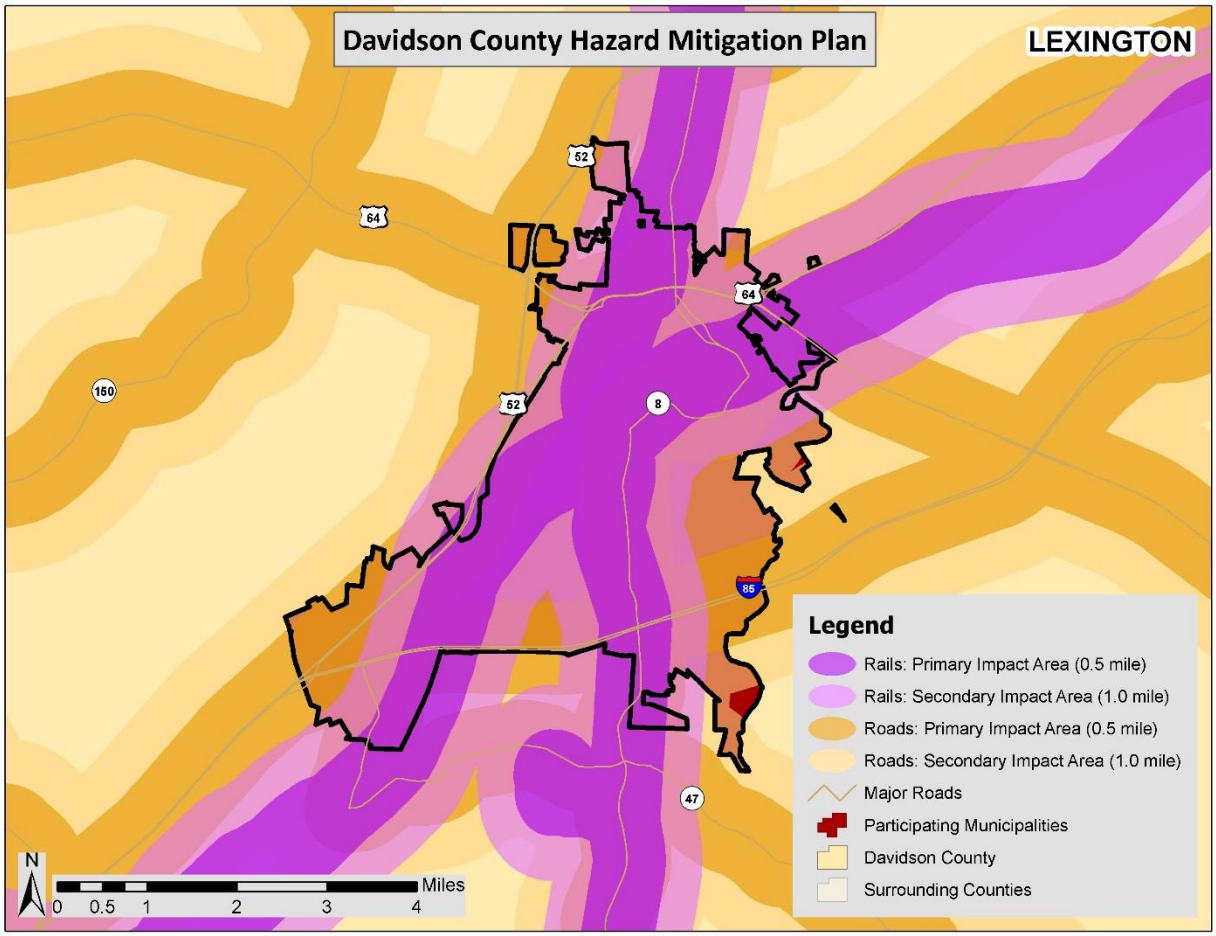


TABLE B.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[29]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[30]
Lexington	7,833	10,715	$769,067,250	9,213	13,095	$882,010,730

[29] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[30] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

TABLE B.48: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[31]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[32]
Lexington	6,335	8,784	$560,058,830	8,397	12,198	$743,509,010

Social Vulnerability

Given high susceptibility across the entire city, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are 2 City of Lexington facilities located in a HAZMAT risk zone. Both of the facilities, the Airport and a power station, are located in the secondary, 1.0-mile, zone. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this section.

Mobile Analysis:

The critical facility analysis for road and railroad transportation corridors in the City of Lexington revealed that there are 42 critical facilities located in the primary and secondary mobile HAZMAT buffer areas for roads and 41 critical facilities located in the railroad HAZMAT buffer areas. The 1.0-mile road buffer area (worst case scenario model) includes the following critical facilities: 4 fire stations, 2 police stations, 2 EMS/rescue stations, 1 medical care facility, 6 schools, and 27 other facilities. The railroad buffer areas include the following: 4 fire stations, 2 police stations, 2 EMS/rescue stations, 1 medical care facility, 6 schools, and 26 other facilities. It should be noted that all of the facilities located in the buffer areas for railroad are also located in the buffer areas for road and/or the fixed site analysis. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this section.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in the City of Lexington. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in conditions that could alter the impact area such direction and speed of wind, volume of release, etc. Further, incidents from neighboring counties could also impact the city.

Nuclear Accident

The location of McGuire Nuclear Power Plant southwest of the City of Lexington demonstrates that the city is at risk to the effects of a nuclear accident. Although there have not been any major events at this plant in the past, there have been major events at other nuclear stations around the country. Additionally, smaller scale incidents at McGuire Nuclear Power Plant have occurred.

[31] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.

[32] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

In order to assess nuclear risk, a GIS-based analysis was used to estimate exposure during a nuclear event within each of the risk zones described in *Section 5: Hazard Profiles*. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within one of the risk zones. There are no properties in Davidson County located within the 10-mile risk zone, so **Table B.49** only presents the potential at-risk property in the 50-mile buffer zone for the City of Lexington. Both the number of parcels/buildings and the approximate value are presented.

TABLE B.49: ESTIMATED EXPOSURE OF PARCELS/BUILDINGS TO A NUCLEAR ACCIDENT

Location	50-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[33]
Lexington	9,213	13,099	$882,010,730

Source: International Atomic Energy Agency

Social Vulnerability

Since the entire area of the city is within the 50-mile buffer area, the total population is considered to be at elevated risk to a nuclear accident.

Critical Facilities

The critical facility analysis revealed that there are 42 critical facilities located in the 50-mile nuclear buffer area in the City of Lexington. This includes the following: 4 fire stations, 2 police stations, 2 EMS/rescue stations, 1 medical care facility, 6 schools, and 27 other facilities. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this section.

In conclusion, a nuclear accident has the potential to impact many existing and future buildings, facilities, and populations in the City of Lexington.

Wildfire

Historical evidence indicates that the City of Lexington is susceptible to wildfire events. A total of 227 wildfires were reported by the North Carolina Division of Forest Resources in Davidson County from 2009 to 2014 resulting in $58,000 in structure damage. On an annualized level, these damages amount to $11,600 for the county (data is only reported at the county level, so it is not possible to calculate damages specific to the city).

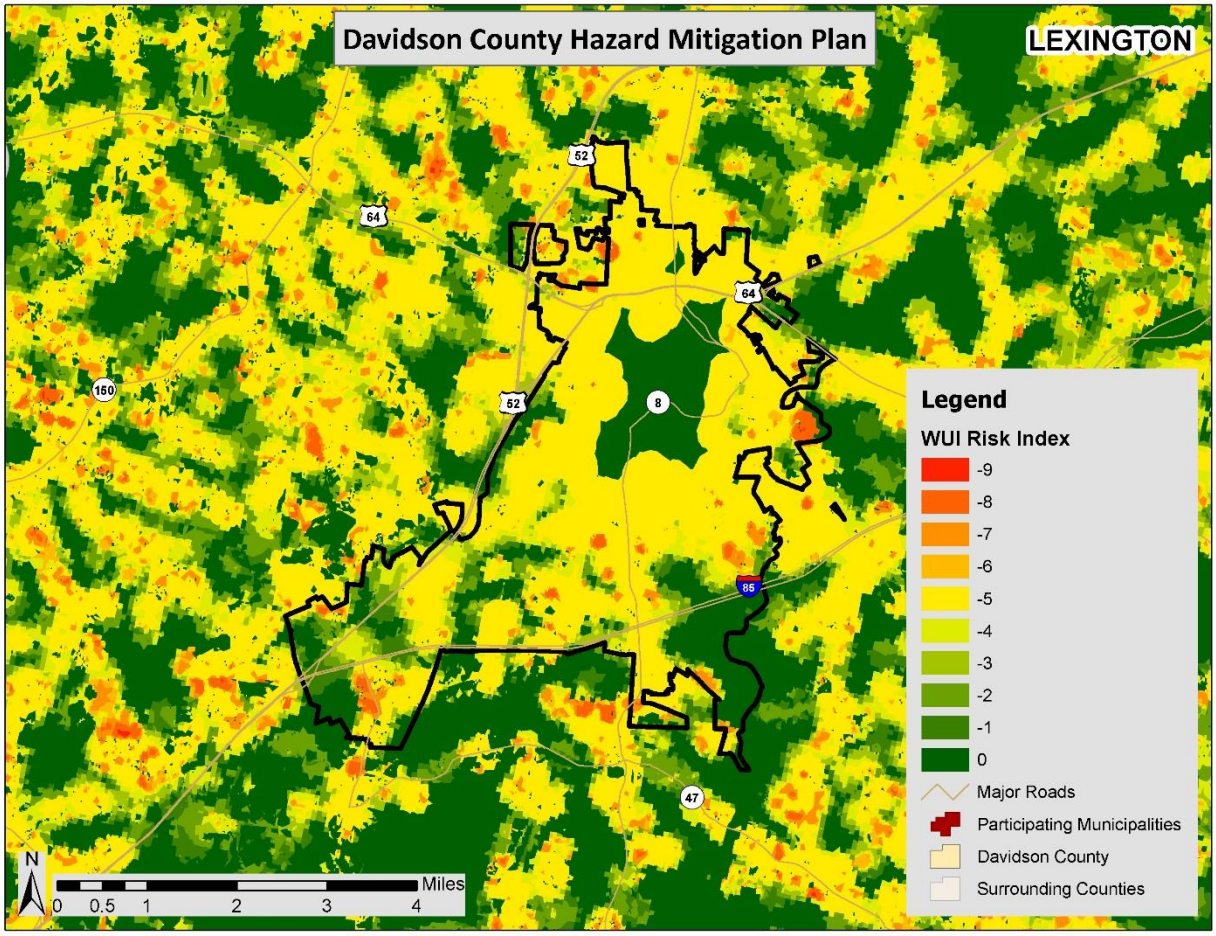
To estimate exposure to wildfire, the approximate number of parcels and their associated improved value was determined using GIS analysis. For the critical facility analysis, areas of risk were intersected with critical facility locations. **Figure B.18**, shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data

[33] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 50-mile buffer, since building footprints were not associated with dollar value data.

ranges from 0 to -9 with lower values being most severe (as noted previously, this is only a measure of relative risk). **Figure B.19** shows the areas of analysis where any grid cell is than -5. Areas with a value below -5 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

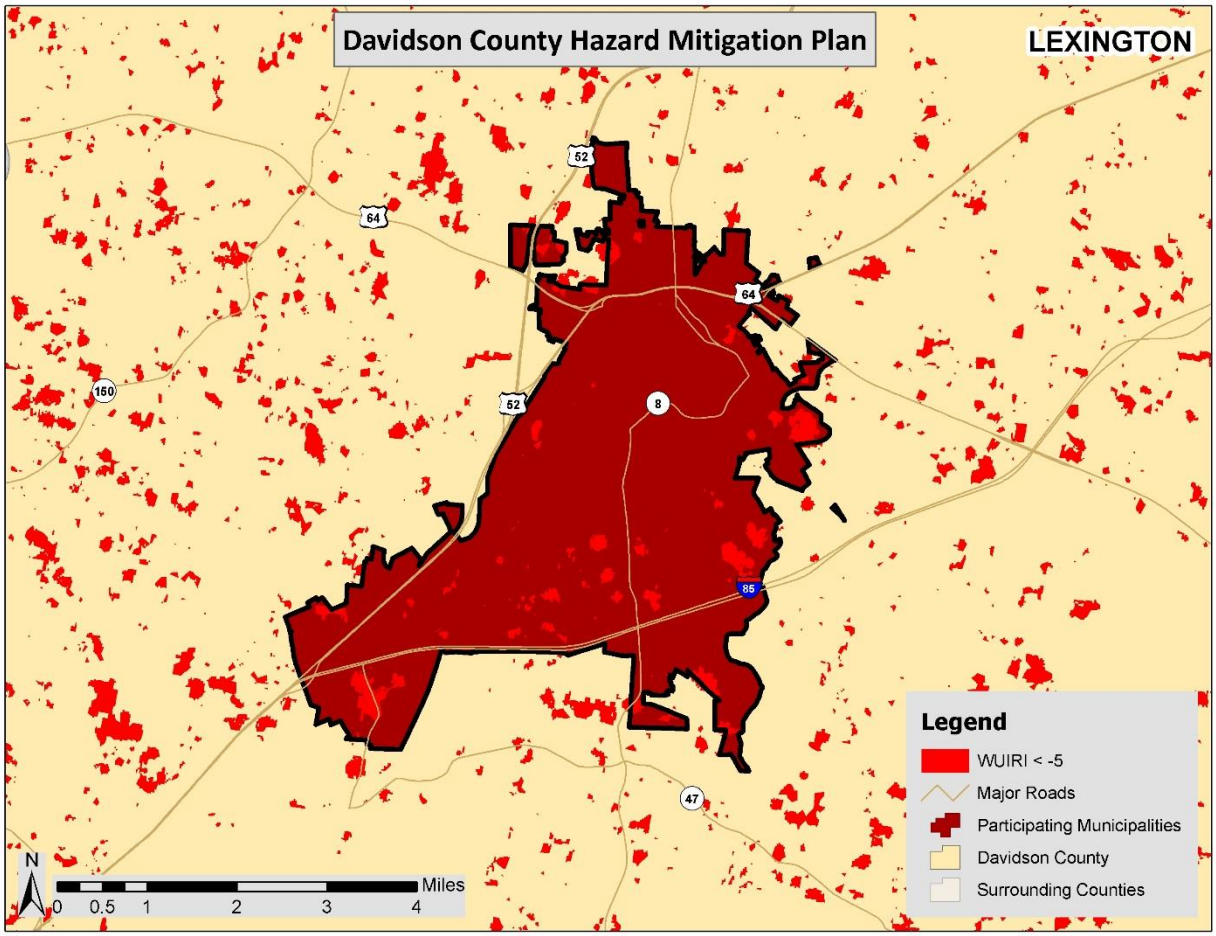
Table B.50 shows the results of the analysis.

FIGURE B.18: WUI RISK INDEX AREAS IN LEXINGTON



Source: Southern Wildfire Risk Assessment Data

FIGURE B.19: HIGH WILDFIRE RISK AREAS IN LEXINGTON



Source: Southern Wildfire Risk Assessment Data

TABLE B.50: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

Location	HIGH WILDFIRE RISK AREA		
	Approx. Number of Parcels	Approx. Number of Buildings	Approx. Improved Value
Lexington	438	394	$101,908,740

Social Vulnerability

Although not all areas have equal vulnerability, there is some susceptibility across the entire city. It is assumed that the total population is at low risk to the wildfire hazard. Determining the exact number of people in wildfire risk areas is difficult with existing data and could be misleading.

Critical Facilities

The critical facility analysis revealed that there are no critical facilities located in the wildfire risk area (areas where the WUIRI is less than -5). However, it should also be noted, that several factors could impact the spread of a wildfire putting all facilities at some risk. A list of specific critical facilities and their associated risk can be found in **Table B.52** at the end of this section.

In conclusion, a wildfire event has the potential to impact many existing and future buildings, critical facilities, and populations in the City of Lexington.

Conclusions on Hazard Vulnerability

Table B.51 presents a summary of annualized loss for each hazard in the City of Lexington. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for the city Therefore, although an annualized loss was determined using the damage reported from historical occurrences at the municipal level (where available), it is likely that the county-wide estimate (found in Section 6: *Vulnerability Assessment*) is a better estimate. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the city.

TABLE B.51: ANNUALIZED LOSS FOR LEXINGTON*

Event	Lexington
Atmospheric Hazards	
Drought	Negligible
Extreme Heat	Negligible
Hailstorm	$15,317
Hurricane & Tropical Storm†	$790,000
Lightning	$21,861
Severe Thunderstorm / High Wind	$6,936
Tornado	Negligible
Winter Storm & Freeze†	$344,444
Geologic Hazards	
Earthquake†	$165,000
Landslide	Negligible
Hydrologic Hazards	
Dam Failure	Negligible
Erosion	Negligible
Flood	$72
Other Hazards	
HAZMAT Incident	$1,791
Nuclear Accident	Negligible
Terror Threat	Negligible
Wildfire†	$11,600

*In this table, the term "Negligible" is used to indicate that no records for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not kept.
†Only county-wide damage estimates were reported for this hazard.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to atmospheric hazards including drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind, tornado, and winter storm and freeze. Some buildings may be more vulnerable to these hazards based on locations, construction, and building type. **Table B.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

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TABLE B.52: AT-RISK CRITICAL FACILITIES IN LEXINGTON

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
LEXINGTON																								
Lexington Municipal Airport	Airport	X	X	X	X	X	X	X	X	X						X	X	X	X	X		X		
Lexington - Base 1	EMS Base	X	X	X	X	X	X	X	X	X							X	X		X		X		
Station #46	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington FD	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington FD	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington FD	Fire Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Gas Regulator-Greensboro St, adj to gov center	Gas Regulator	X	X	X	X	X	X	X	X	X			X				X	X		X		X		
Gas Regulator-int of Hoover Dr & Oak Ave	Gas Regulator	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Gas Regulator-Kirkwood Ave & Talbert Blvd	Gas Regulator	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Gas Regulator-Linwood Rd south of Brown St	Gas Regulator	X	X	X	X	X	X	X	X	X							X	X		X		X		
in NC DOT Right of Way	Gas Regulator	X	X	X	X	X	X	X	X	X							X	X		X		X		
Davidson County Governmental Center	Government Office	X	X	X	X	X	X	X	X	X							X	X		X		X		
Lexington City Hall	Government Office	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Davidson County 911 Center	Government Office	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Davidson County Courthouse	Government Office	X	X	X	X	X	X	X	X	X							X	X	X	X		X		

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Davidson County Health Dept	Government Office	X	X	X	X	X	X	X	X	X							X	X		X		X		
Lexington Memorial Hospital	Hospital	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington Library	Library	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington National Guard Armory	National Guard Armory	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Davidson County Sheriff's Dept	Police	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington Police Dept	Police	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Carolina Avenue Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X		X		X		
Cotton Grove Rd Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Hickory Street Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Market Street Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
N Main Street Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X		X		X		
Sink Inn Road Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Power Station-Albemarle St	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Power Station-E 13th Ave	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Power Station-Hyde St & S Pennington Ave	Power Station	X	X	X	X	X	X	X	X	X							X	X	X	X		X		

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Power Station-off Old Linwood Rd	Power Station	X	X	X	X	X	X	X	X	X						X		X	X	X		X		
Station 6	Rescue Squad	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Charles England Intermmediate	School	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Lexington High	School	X	X	X	X	X	X	X	X	X							X	X		X		X		
Lexington Middle	School	X	X	X	X	X	X	X	X	X							X	X		X		X		
Pickett Elementary	School	X	X	X	X	X	X	X	X	X								X	X	X		X		
South Lexington Elementary	School	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Southwest Elementary	School	X	X	X	X	X	X	X	X	X							X	X		X		X		
Lexington Sewage Treatment Plant	Sewage Treatment Plant	X	X	X	X	X	X	X	X	X								X				X		
Water Tank-Lindsay St off of Swing Dairy Rd	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
S Salisbury St Storage Tank	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X		X		
Stand Pipe Tank -- Abandoned	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X		X		

B.4 CITY OF LEXINGTON CAPABILITY ASSESSMENT

This subsection discusses the capability of the City of Lexington to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

B.4.1 Planning and Regulatory Capability

Table B.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the City of Lexington. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Davidson County Hazard Mitigation Plan.

TABLE B.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System
Lexington	✓	✓	✓	✓	*	✓		✓				✓	✓		✓	✓	✓	✓		✓	✓	✓	✓

A more detailed discussion on the city's planning and regulatory capabilities follows.

Emergency Management

Hazard Mitigation Plan
The City of Lexington was included in the county's previous hazard mitigation plan.

Emergency Operations Plan
The City of Lexington is included in the county's emergency operations plan.

General Planning

Comprehensive Land Use Plan
The City of Lexington has adopted a city land use plan.

Floodplain Management Plan
Although the City of Lexington has not adopted a floodplain management plan, the city's local land use ordinance includes a floodplain management plan.

Capital Improvements Plan
The City of Lexington has a capital improvement plan in place.

Zoning Ordinance
The City of Lexington includes zoning regulations as part of its local land use ordinance.

Subdivision Ordinance
The City of Lexington includes subdivision regulations as part of its local land use ordinance.

Building Codes, Permitting, and Inspections
North Carolina has a state compulsory building code which applies throughout the state. The City of Lexington Building Inspections provides building code enforcement within the city's planning jurisdiction.

Floodplain Management

Table B.54 provides NFIP policy and claim information for the City of Lexington.

TABLE B.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
Lexington	11/01/79	06/16/09	28	$7,227,900	5	$25,649

Source: NFIP Community Status information as of 2/12/15; NFIP claims and policy information as of 11/30/14

Community Rating System
The City of Lexington participates in the CRS and is a Class 7 community.

Flood Damage Prevention Ordinance
All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. The City of Lexington participates in the NFIP and has adopted flood damage prevention regulations.

Open Space Management Plan
The City of Lexington has adopted the county's parks and recreation tourism development master plan. The city has also adopted a city parks and recreation facility development master plan.

Stormwater Management Plan
Although the City of Lexington does not have a stormwater management plan or ordinance in place, the city has included some stormwater regulations in other local ordinances. The city is also in the process of implementing Phase II stormwater management requirements.

B.4.2 Administrative and Technical Capability

Table B.55 provides a summary of the capability assessment results for the City of Lexington with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in the city with the specified knowledge or skill.

TABLE B.55: RELEVANT STAFF / PERSONNEL RESOURCES

Staff / Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
Lexington	✓	✓	✓	✓	✓		✓	✓	✓	✓

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

B.4.3 Fiscal Capability

Table B.56 provides a summary of the results for the City of Lexington with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds) according to the previous county hazard mitigation plan.

TABLE B.56: RELEVANT FISCAL RESOURCES

Fiscal Tool / Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP, PDM, FMA, SBA, other Federal, state, and non-governmental funding sources, etc.
Lexington	✓	✓	✓						✓	✓

B.4.4 Political Capability

The previous hazard mitigation plan indicates that the City of Lexington has widespread support of hazard mitigation practices across its government departments and services. Many officials and department heads are quite knowledgeable about the potential hazards that their community faces and have become familiar with the practices and principles of mitigation. Political willingness to acquire and relocate or replace structures out of floodplains will be considered with documentation of need. Hazard mitigation as a concept and practice is generally accepted and supported.

B.4.5 Conclusions on Local Capability

Table B.57 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in the existing hazard mitigation plan and readily available on the city's government website. According to the assessment, the local capability score for the city is 46, which falls into the high capability ranking.

TABLE B.57: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
Lexington	46	High

B.5 LEXINGTON MITIGATION STRATEGY

This subsection provides the blueprint for the City of Lexington to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Hazard Mitigation Planning

Team and the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

B.5.1 Mitigation Goals

The City of Lexington developed five mitigation goals in coordination with the other participating Davidson County jurisdictions. The county mitigation goals are presented in **Table B.58**.

TABLE B.58: DAVIDSON COUNTY MITIGATION GOALS

	Goal
Goal #1	To enhance local government capability to lessen the impacts of all natural hazards.
Goal #2	To identify and protect critical facilities, services, and infrastructure from the impacts of natural disasters.
Goal #3	To develop an effective public awareness/education/outreach program for natural hazards impacts.
Goal #4	To protect persons and property from damage due to natural hazards.
Goal #5	To ensure disaster resistant future development.

B.5.2 Mitigation Action Plan

The mitigation actions proposed by The City of Lexington are listed in the following individual Mitigation Action Plan.

Lexington Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Establish hazard mitigation as a component of all planning activities.	All	High	Lexington Planning	Local	Accomplished	The Land Use Plan is the primary plan that incorporates hazard mitigation into planning. But all new development is approved only after a multi-department plan review process which takes into consideration hazards and risks identified in the City's Hazard Mitigation Plan.
P-2	Adopt local storm water regulations to reduce urban and small stream flooding and reduce the impact of urban runoff on downstream rivers.	Flood	High	Lexington Planning	Local	2 years (2017)	Lexington is a member of Stormwater SMART, the regional program that provides stormwater and flood control public education in the county. Also, the Zoning Ordinance incorporates many provisions to reduce stormwater runoff in new development. The City has now been designated urban and will soon be under Phase II rules.
P-3	Develop in-house GIS capabilities to track the value of properties within planning areas; and easily identify land in non-buildable areas.	All	High	Lexington Engineering Department	Local	Accomplished	Currently available on Davidson County GIS.
P-4	Coordinate collection and storage of damage assessment information such as type of hazard, location of hazard occurrence, when it occurred, death or injury, property damaged, ***in digitized form*** for easy retrieval and local use in hazard mitigation and land use planning.	All	High	Davidson County Emergency Services, City and County GIS	Local	Accomplished	GIS has this capability. The City has not collected any data on events.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
P-5	Develop program to clear debris from culverts and storm drains in flood prone areas.	Flood	Moderate	Lexington Public Works/Streets Department	Homeland Security Funds	Accomplished	Part of current maintenance program.
P-6	Develop storm water programs to increase water quality and mitigate against storm water or urban flooding.	Flood	High	Lexington Public Works/Planning	Local	Deleted	This action was combined with P-2.
P-7	Through subdivision regulations, encourage that power, cable and telephone lines be buried.	Winter Storm, High Wind	Moderate	Lexington Planning	Local	Accomplished	Regulations require all new subdivision utilities to be underground.
P-8	Establish natural hazard vulnerability assessment as a component of the plans-review –approval process.	All	High	Lexington Planning	Local	Accomplished	The Land Use Plan is the primary plan that incorporates hazard mitigation into planning. But all new development is approved only after a multi-department plan review process which takes into consideration hazards and risks identified in the City's Hazard Mitigation Plan.
P-9	Devise local policy precluding the placement public facilities within a floodplain unless the facility provides an overriding public benefit, will not worsen hazard risk, will not promote further floodplain development, and will be constructed to withstand flood damage.	Flood	High	Lexington Planning	Local	Accomplished	Zoning regulations addresses this issue
P-10	Set up centralized, coordinated permitting process.	All	Low	Lexington Planning	Local	Accomplished	Consolidated through Business and Community Development
P-11	Designate preferred growth areas and develop area plans for target locations.	All	Moderate	Lexington Planning	Local	Accomplished	Land Use Plan Ordinance 2004, updated 2010
P-12	Encourage street interconnectivity in all new subdivisions to allow multiple access points for emergency vehicles.	All	Moderate	Lexington Planning	Local	Accomplished	Land Use Plan Ordinance 2004, updated 2010

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Property Protection							
PP-1	Evaluate current capacity of critical services to deal with power outages.	Winter Storm, High Wind	High	Lexington Information and Technology/ Electric Department	Local	Accomplished	Every building with data network switch has at least a UPS. Also have redundant fiber paths in most buildings. All electric substations are on wireless network.
PP-2	All new critical public structures will be designed and constructed to withstand winds of at least 100 mph.	High Wind	Moderate	Lexington Building Inspections/ Planning	Local	Deleted	Davidson County and City of Lexington refer to NC State Building Code which is 90 mph.
Natural Resource Protection							
NRP-1	Wherever possible preserve natural wetlands, designate conservation corridors, especially along streams through acquisition or conservation easements.	All	High	Lexington Planning	Local	Accomplished	Land Use Ordinance adopted 2004, updated 2010
Emergency Services							
ES-1	Pursue and achieve the designation of Lexington as a "Storm Ready Community" by the National Weather Service to assure timely public warning of impending natural disaster events.	All	Moderate	Lexington Fire Department	Local	2 years (2017)	Work has been started to achieve the designation as a Storm Ready community and should be completed in next 2 years.
ES-2	Develop plans for the notification and evacuation of populations downstream of the Thom-A-Lex dam.	Dam Failure	High	Lexington Water Department, Davidson County Emergency Services	Local	Accomplished	These plans were approved on March 1, 2015
Public Education and Awareness							
PEA-1	Educate and inform local government and elected officials (decision makers) of the need to consider hazard mitigation in policy and budgetary planning and decision making processes.	All	High	Lexington Fire Department	Local	6 months – 3 years (2018)	City employees and elected officials training on NIMS has started and is being updated.
PEA-2	Periodically write a letter to flood plain property owners reminding them of their status and need to purchase flood insurance.	Flood	Moderate	Lexington Engineering Department	Local	Accomplished	Letters sent to repetitive loss property owners annually by Lexington Engineering Department.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
PEA-3	Use available communications resources for outreach and education to promote awareness of natural hazards and mitigation options.	All	Moderate	Lexington Fire Department, Davidson County Emergency Services	Local	Accomplished	Public Awareness Campaign has been developed and implemented
Previously Completed Mitigation Actions							
	Adopt a Unified Development Ordinance regulating the uses of buildings, structures and open land to support mitigation activities.	All	High	Lexington Planning	Local	Completed	Completed in 2004. The Zoning and Flood Plain ordinances are part of the Unified Development Ordinance and regulate building and land use in support of mitigation activities.
	Develop a comprehensive policy regarding drought management and response.	Drought	High	Lexington Public Works/Water Division	Local	Completed	Completed in 2004. Lexington City Council and all governing boards responsible for providing water throughout the County adopted comprehensive water conservation and interconnect plan in 2004 to assure that public water is available for human health and safety even in periods of severe drought.
	Define and identify all “critical facilities.”	All	Moderate	Lexington GIS/Information Technology	Local	Completed	Completed in 2008. These facilities were identified and mapped for the 2004 Plan and have been updated for 2009. The outcome is that all such facilities have either back-up power and/or advanced plans for evacuation.
	Fully assess the vulnerability of each identified critical facility to natural hazards.	All	Moderate	Lexington Engineering Department	Local	Completed	Completed in 2007. These sites have been mapped and inspected for vulnerability to minimize multi-hazard risks.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Modify, relocate, retrofit, or protect to the extent practical, any critical facility vulnerable to natural hazards.	All	Moderate	Lexington Public Buildings	Local	Completed	Completed in 2007. All critical facilities have been evaluated. Facilities that are vulnerable (e.g. County Administration Building and Health Department [within City of Lexington] and City Water Department have been equipped with generators and transfer switches. Records are digitally stored and backed up.
	Identify alternative water supplies.	All	Moderate	Lexington Public Works/Water Division	Local	Completed	Completed in 2004. Lexington has signed the countywide water conservation and interconnect plan which establishes uniform water control measures among jurisdictions and Davidson Water, Inc. and provides for interconnections in case of severe drought.
	Supply critical facilities with back-up power source. Priority needs: • generator for Fire stations • generator for utilities complex	Winter Storm, High Wind	Low	Lexington Finance/Electric Department	Local	Completed	Completed. Generators and transfer switches purchased for all priority sites including all city fire stations and the hospital. City Hall, garage, and a portion of the utilities complex are equipped with emergency generators and automatic transfer switches. This assures that critical municipal functions can continue in-place in case of natural disaster.
	Look for sources of funding to procure and install transfer switches.	Winter Storm, High Wind	Low	Lexington Electric Department/ Information Technology	Homeland Security	Completed	Completed in 2008. Transfer switches purchased for all crucial public facilities.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Identify and designate at least one emergency shelter in Lexington.	All	High	Davidson County Emergency Services	Local	Completed	Completed in 2007. A countywide plan has been developed and enhanced that is applicable in Lexington. Emergency shelters (schools, YMCA, large churches, etc.) are classified and mapped according to the general and special needs they will provide.
	Strengthen floodplain regulation to current standards. (New model regulation).	Flood	High	Lexington Planning	Local	Completed	Completed in 2009. Updated ordinance and new maps have been adopted by the City Council. The number of flood prone properties is reduced from previous maps. This is integrated into the City's GIS mapping system.

Annex C
Town of Midway

This annex includes jurisdiction-specific information for the Town of Midway. It consists of the following five subsections:

- C.1 Town of Midway Community Profile
- C.2 Town of Midway Risk Assessment
- C.3 Town of Midway Vulnerability Assessment
- C.4 Town of Midway Capability Assessment
- C.5 Town of Midway Mitigation Strategy

C.1 TOWN OF MIDWAY COMMUNITY PROFILE

C.1.1 Geography and the Environment

The Town of Midway is located in the northern portion of Davidson County. An orientation map is provided as **Figure C.1**.

The Town of Midway was recently incorporated in 2006. The town derives its name from its relative geographic location, "midway" between the cities of Winston-Salem and Lexington. The total area of the town is 7.7 square miles, none of which is water area.

According to the State Climate Office of North Carolina, Davidson County, and the Town of Midway, enjoys a moderate climate that is characterized by mild winters and hot, humid summers. In general, the spring months are marked by unpredictable weather and changes can occur rapidly with sunny skies yielding to severe thunderstorms in just a few hours. Precipitation is generally well distributed throughout the year and annual totals average 45 inches.

From December to February, the average high temperature ranges from the lower to mid 50s and low temperatures average around 30°F. However, the temperature drops to 10°F or 12°F about once during an average winter over central North Carolina. The mountains also act as a barrier preventing most wintery precipitation from entering the region, and snow and sleet is usually light and occurs on average once or twice per year.

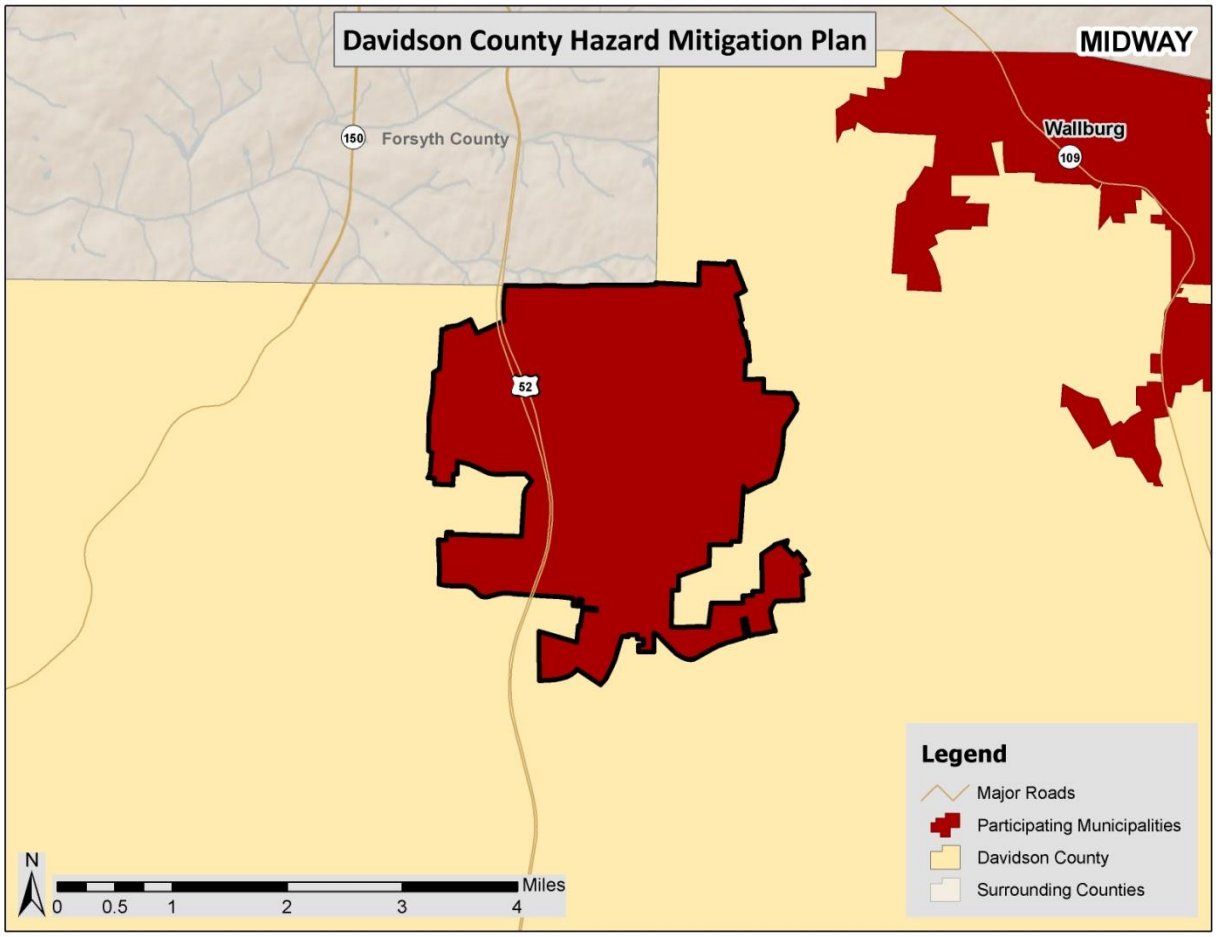
In spring, temperatures begin to rise and the increase in average temperature is greater in April than in any other month. In general, the days are warm and the nights are cool during the spring months. Average high temperatures increase from 63°F in March to 79°F in May. There is a similar increase in average low temperatures, which are in the upper 30s in March and climb to the mid 50s in May. Additionally, tornadoes are most likely early in the spring; however, North Carolina is outside the principal tornado area of the United States.

Tropical air over central North Carolina brings warm temperatures and rather high humidity during the summer. Average high temperatures range from the mid to upper 80s and low temperatures average in

the 60s. Summer rainfall is the most variable, and daily showers as well as periods of one to two weeks without rain are both common. Thunderstorms are also common events during the summer months.

Autumn is the season typified by the most rapidly changing temperature. The drop-off is greatest in October and continues through November. Average high temperatures begin in the lower 80s in September and fall to the low 60s by November. Average lows also drop significantly from the 59°F to about 38°F from September to November.

FIGURE C.1: TOWN OF MIDWAY ORIENTATION MAP



C.1.2 Population and Demographics

According to the 2010 Census, the Town of Midway has a population of 4,679 people. Since the town was incorporated in 2006 growth rates are not available between 2000 and 2010, but the average population density is 610 people per square mile. Population counts from the U.S. Census Bureau for 2010 for the town is presented in **Table C.1**.

TABLE C.1: POPULATION COUNTS FOR MIDWAY

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Midway	--	--	4,679	--

Source: United States Census Bureau

Based on the 2010 Census, the median age of residents of the Town of Midway is 42.5 years. The racial characteristics of the town are presented in **Table C.2**. Whites make up the majority of the population in the town, accounting for over 88 percent of the population.

TABLE C.2: DEMOGRAPHICS OF MIDWAY

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Midway	88.2%	8.2%	0.4%	0.5%	0.1%	1.7%	0.9%	3.5%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau

C.1.3 Housing

According to the 2010 U.S. Census, there are 2,1,963 housing units in the Town of Midway, the majority of which are single family homes. Housing information for the town is presented in **Table C.3**. As shown in the table, the town has a very low percentage of seasonal units.

TABLE C.3: HOUSING CHARACTERISTICS OF MIDWAY

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2009-2013)
Midway	--	1,963	0.1%	$152,400

Source: United States Census Bureau

C.1.4 Infrastructure

Transportation

The Town of Midway has one primary state highway for transportation uses. NC Route 52 runs north-south connecting the town to Lexington and neighboring Forsyth County.

Currently, there is no passenger rail service offered in Midway; however, freight carriers such as Winston-Salem Southbound serve the town.

The Piedmont Triad International Airport is the largest airport closest to Midway. It offers 10 daily non-stop commercial flights on 8 airlines and it is the third busiest airport in North Carolina. It is approximately 30 miles from the center of the town. Davidson County Airport, located in Lexington, also provides public air service as well as one other privately-owned airport, Hiatt Airport, located just

outside of Thomasville. The Charlotte Douglas International Airport and Raleigh-Durham International Airport are two additional large airports that are also in fairly close proximity to the town.

Utilities

Electrical power in the Town of Midway is provided by Duke Energy Progress and EnergyUnited. Duke Energy Progress, the largest electric power holding company in the US, provides service across Davidson County. EnergyUnited is an electricity cooperative that also services the majority of the county.

The Town of Midway does not provide sewer and water service to its residents. Currently, the town's sewer and water services are provided by Davidson County and Davidson Water, Inc.

Community Facilities

There are a number of buildings and community facilities located throughout the Town of Midway. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 1 fire station, 1 EMS/rescue station, and 1 public school located within the town.

There are no hospitals located in Midway; however, there are two nearby in Thomasville and Lexington. Novant Health Thomasville Medical Center is a general acute center with 146 beds and Wake Forest Baptist Health – Lexington Medical Center is also a general acute center with 94 beds.

There are also a number of county and municipal parks located in and near the Town of Midway, including Boone's Cave Park and many community and neighborhood parks. High Rock Lake, Tuckertown Lake, and the Yadkin River also offer additional recreational opportunities nearby.

C.1.5 Land Use

Much of Davidson County is developed and relatively urbanized. However, there are some areas that are more sparsely developed. The incorporated municipalities, including the Town of Midway, are where the county's population is generally concentrated. The incorporated areas are also where many businesses, commercial uses, and institutional uses are located. Land uses in the balance of the study area consist of a variety of types of residential, commercial, industrial, government, and recreational uses. Davidson County's land use pattern can be described as suburban sprawl. Population density is greater in the northern portion of the county while the southern portion is largely rural with primarily residential development. Local land use and associated regulations are further discussed in *Section 7: Capability Assessment*

C.1.6 Employment and Industry

The early modern economy in Davidson County was based on agriculture but it later transitioned to one based on textile and furniture manufacturing in the twentieth century up until the late 1990s. Today, Davidson County, like many communities, is grappling with the evolution of a manufacturing economy shifting to an economy based on the service industry.

According to the North Carolina Employment Security Commission (NCESC), in 2013 (the last full year with data available), Davidson County had an average annual employment of 71,433 workers and an average unemployment rate of 8.4 percent (compared to 8.0 percent for the state). The Manufacturing industry employed 21.9 percent of the county's workforce followed by Retail Trade (12.1%); Health Care

and Social Assistance (11.2%); and Educational Services (10.4%). The American Community Survey (ACS) found the average annual median household income in Davidson County was $43,083 from 2009 to 2013 compared to $46,334 for the state of North Carolina.

C.2 MIDWAY RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to the Town of Midway. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

C.2.1 Drought

Location and Spatial Extent

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that the town would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment.

Historical Occurrences

According to the North Carolina State Office, the Central Piedmont Region, which includes the Town of Midway, experienced moderate to extreme drought occurrences in 11 of the last 14 years (2000-2013). **Table C.4** shows the most severe drought condition reported for each year in the Central Piedmont Region, according to PDSI classifications. However, it should be noted that the most severe classification reported is based on monthly regional averages, and conditions in the Town of Midway may actually have been less or more severe than what is reported.

TABLE C. 4: HISTORICAL DROUGHT OCCURRENCES IN MIDWAY

extreme drought	severe drought	moderate drought	mid-range	moderately moist	very moist	extremely moist
-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

	Midway	
2000	-2.83	Moderate Drought
2001	-3.43	Severe Drought
2002	-4.98	Extreme Drought
2003	-0.38	Mid-range
2004	-2.04	Moderate Drought
2005	-2.37	Moderate Drought
2006	-2.62	Moderate Drought
2007	-4.16	Extreme Drought
2008	-4.37	Extreme Drought
2009	-1.08	Mid-range
2010	-2.53	Moderate Drought
2011	-3.44	Severe Drought
2012	-2.84	Moderate Drought

	Midway	
2013	**-0.37**	Mid-range

Source: North Carolina State Climate Office

Data from the National Climatic Data Center (NCDC) was also reviewed to obtain additional information on historical drought events in the town, but no events were reported in the Town of Midway.

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the Town of Midway has a probability level of likely (10 to 100 percent annual probability) for future drought events. This hazard may vary slightly by location but each area has an equal probability of experiencing a drought. However, historical information also indicates that there is a much lower probability for extreme, long-lasting drought conditions.

C.2.2 Extreme Heat

Location and Spatial Extent

Excessive heat typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire town is susceptible to extreme heat conditions.

Historical Occurrences

Data from the National Climatic Data Center was used to determine historical extreme heat and heat wave events in the Town of Midway, however events are only reported at the county level. One event was reported in Davidson County:

July 22, 1998 – *Excessive Heat* – Excessive heat plagued central North Carolina during July 22 through July 23. Maximum temperatures reached the 98 to 103 degree range combined with dew points in the 78 to 80 degree range with little wind to give heat index values of around 110 degrees for several hours each afternoon. To make matters worse, the minimum temperatures did not fall below 80 at several locations and those that did achieved that feat for only an hour or two. Strong thunderstorms ended the 2 day excessive heat ordeal on the evening of the 23 when rain cooled the environment enough to send temperatures into the lower 70s at most locations.

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been reported at an observation station in Lexington since 1902. The recorded maximum for the county can be found below in **Table C.5**.

TABLE C.5: HIGHEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	07/29/1952	107

Source: State Climate Office of North Carolina

The State Climate Office also reports average maximum temperatures at various stations across the state. There is one station located in Davidson County in Lexington. **Table C.6** shows the average maximum temperatures from 1971 to 2000 at the Lexington observation station which can be used as a general comparison for the town.

TABLE C.6: AVERAGE MAXIMUM TEMPERATURE IN DAVIDSON COUNTY

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. Max (°F)	49.6 °F	54.4 °F	63.3 °F	72.5 °F	79.3 °F	85.5 °F	89.1 °F	87.4 °F	81.6 °F	71.9 °F	61.7 °F	52.6 °F

Source: State Climate Office of North Carolina

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of the Town of Midway has a probability level of possible (1 to 10 percent annual probability) for future extreme heat events to impact the town.

C.2.3 Hailstorm

Location and Spatial Extent

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that the Town of Midway is uniformly exposed to severe thunderstorms; therefore, all areas of the town are equally exposed to hail which may be produced by such storms.

Historical Occurrences

According to the National Climatic Data Center, two recorded hailstorm events have affected the Town of Midway since 1998.[1] **Table C.7** is a summary of the hail events in the Town of Midway. **Table C.8** provides detailed information about each event that occurred in the town. In all, hail occurrences did not result in any reported property damages.[2] Hail ranged in diameter from 0.88 inches to 1.00 inches. It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

TABLE C.7: SUMMARY OF HAIL OCCURRENCES IN MIDWAY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Midway	2	0/0	$0

Source: National Climatic Data Center

TABLE C.8: HISTORICAL HAIL OCCURRENCES IN MIDWAY

	Date	Magnitude	Deaths / Injuries	Property Damage*
Midway				
MIDWAY	6/15/1998	0.88 in.	0/0	$0
MIDWAY	3/24/2012	1.00 in.	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

[1] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through October 2014. It is likely that additional hail events have affected the Town of Midway. In addition to NCDC, the North Carolina Department of Insurance office was contacted for information. As additional local data becomes available, this hazard profile will be amended.

[2] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard (coinciding with thunderstorms), it is assumed that the entire town has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the town.

C.2.4 Hurricane and Tropical Storm

Location and Spatial Extent

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States. While coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland and they can affect the Town of Midway. All areas in the Town of Midway are equally susceptible to hurricane and tropical storms.

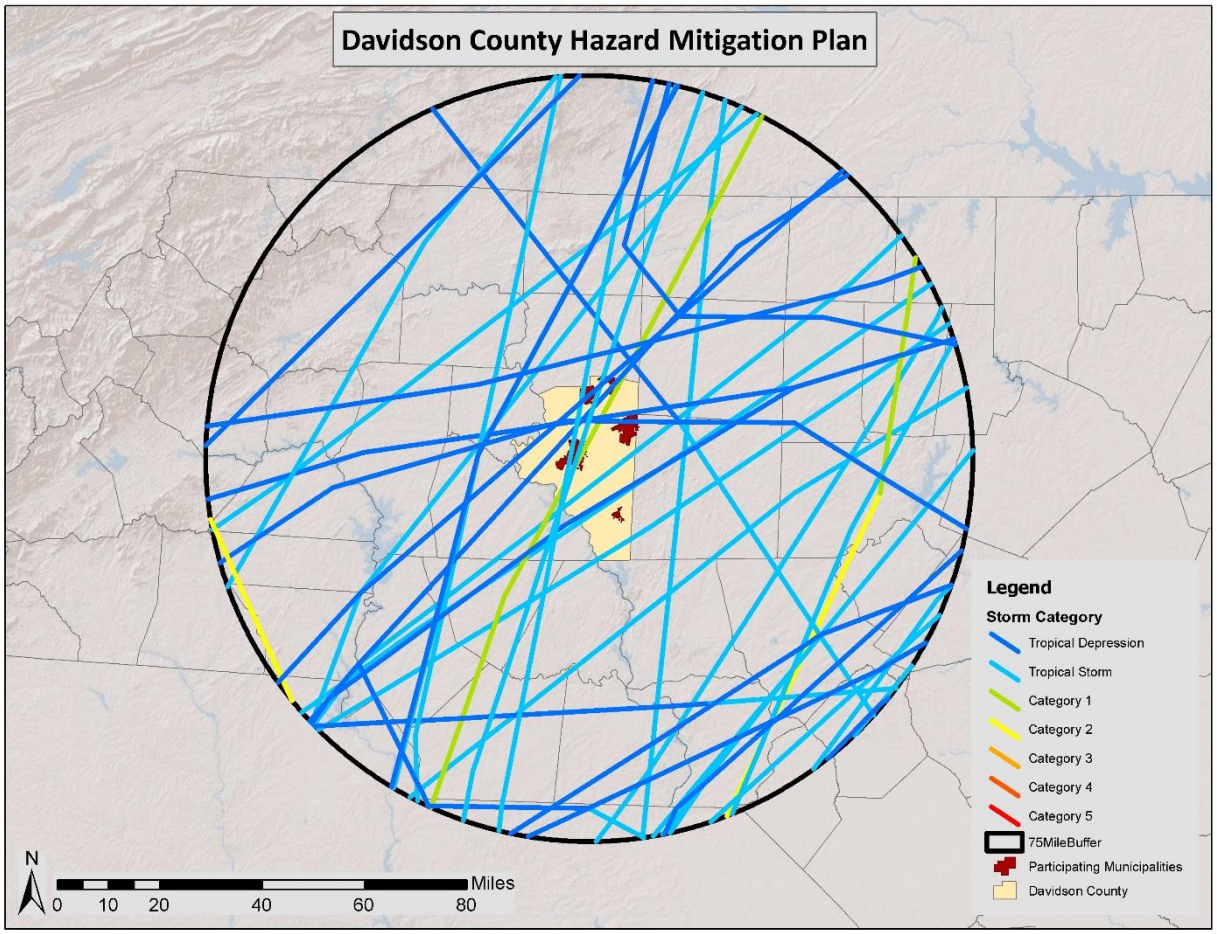
Historical Occurrences

According to the National Hurricane Center's historical storm track records, 45 hurricane/tropical storm tracks have passed within 75 miles of Davidson County since 1859.[3] This includes 6 hurricanes, 23 tropical storms and 16 tropical depressions.

Of the recorded storm events, 11 have traversed directly through Davidson County as shown in **Figure C.2**. **Table C.9** provides the date of occurrence, name (if applicable), maximum wind speed (as recorded within 75 miles of Davidson County), and Category of the storm based on the Saffir-Simpson Scale for each event.

[3] These storm track statistics do not include extra-tropical storms. Though these related hazard events are less severe in intensity, they may cause significant local impact in terms of rainfall and high winds.

FIGURE C.2: HISTORICAL HURRICANE STORM TRACKS WITHIN 75 MILES OF DAVIDSON COUNTY



Source: National Oceanic and Atmospheric Administration; National Hurricane Center

TABLE C.9: HISTORICAL STORM TRACKS WITHIN 75 MILES OF DAVIDSON COUNTY (1850–2014)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/17/1859	UNNAMED	40	Tropical Storm
10/4/1877	UNNAMED	50	Tropical Storm
9/12/1878	UNNAMED	60	Tropical Storm
9/11/1882	UNNAMED	40	Tropical Storm
10/12/1885	UNNAMED	40	Tropical Storm
6/22/1886	UNNAMED	40	Tropical Storm
9/10/1888	UNNAMED	35	Tropical Storm
9/24/1889	UNNAMED	45	Tropical Storm
8/28/1893	UNNAMED	75	Category 1
9/29/1896	UNNAMED	85	Category 2
7/13/1901	UNNAMED	35	Tropical Storm
6/16/1902	UNNAMED	35	Tropical Storm
9/23/1907	UNNAMED	35	Tropical Storm
8/31/1911	UNNAMED	25	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/3/1913	UNNAMED	40	Tropical Storm
8/3/1915	UNNAMED	35	Tropical Storm
9/23/1920	UNNAMED	35	Tropical Storm
10/3/1927	UNNAMED	40	Tropical Storm
8/11/1928	UNNAMED	30	Tropical Depression
10/2/1929	UNNAMED	50	Tropical Storm
9/6/1935	UNNAMED	45	Tropical Storm
10/20/1944	UNNAMED	50	Tropical Storm
9/18/1945	UNNAMED	50	Tropical Storm
10/9/1946	UNNAMED	30	Tropical Depression
8/28/1949	UNNAMED	40	Tropical Storm
8/31/1952	ABLE	45	Tropical Storm
7/10/1959	CINDY	30	Tropical Depression
8/30/1964	CLEO	25	Tropical Depression
6/9/1968	ABBY	25	Tropical Depression
5/26/1970	ALMA	25	Tropical Depression
9/8/1977	BABE	25	Tropical Depression
9/5/1979	DAVID	55	Tropical Storm
7/25/1985	BOB	55	Tropical Storm
8/18/1985	DANNY	25	Tropical Depression
8/29/1988	CHRIS	25	Tropical Depression
9/22/1989	HUGO	85	Category 2
7/21/1994	UNNAMED	20	Tropical Depression
9/6/1996	FRAN*	65	Category 1
7/24/1997	DANNY	30	Tropical Depression
9/5/1999	DENNIS	30	Tropical Depression
9/16/1999	FLOYD*	90	Category 2
9/18/2003	ISABEL*	85	Category 2
9/17/2004	IVAN*	20	Tropical Depression
9/28/2004	JEANNE	20	Tropical Depression
7/7/2005	CINDY	20	Tropical Depression

*Although the track of these storms traversed just outside of the 75 mile buffer area, they were included in the hazard history since a federal disaster area was declared for Davidson County as a result of the storm's impact.
Source: National Hurricane Center

The National Climatic Data Center reported four events associated with a hurricane or tropical storm in Davidson County since 1996. Additionally, Federal records indicate that five disaster declarations were made in 1989 (Hurricane Hugo), 1996 (Hurricane Fran), 1999 (Hurricane Floyd), 2003 (Hurricane Isabel), and 2004 (Hurricane Ivan) for the county.[4]

Flooding is often the greatest hazard of concern with hurricane and tropical storm events in Davidson County. Most events do not carry winds that are above that of the winter storms and straight line winds received by the county. Some anecdotal information is available for the major storms that have impacted that area as found below:

[4] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

Hurricane Hugo – September 22-24, 1989
Hurricane Hugo was one of the largest storms on record in the Atlantic Basin that produced high winds and dumped heavy rains over much of North Carolina and South Carolina. Hugo reached a peak level of Category 5 on the Saffir-Simpson scale and made landfall near Isle of Palms in South Carolina as a Category 4, eventually passing over Charlotte and much of the surrounding area as a Category 1 storm. Although the storm caused its greatest damage in South Carolina, over 1,000 structures were destroyed or severely damaged in North Carolina, causing over $1 billion dollars in damages. Wind gusts reached over 40 mph and numerous trees were downed throughout much of south and western North Carolina.

Hurricane Fran – September 5-6, 1996
After being hit just a few weeks earlier by Hurricane Bertha, North Carolina was impacted by the one of the most devastating storms to ever make landfall along the Atlantic Coast. Fran dropped more than 10 inches of rain in many areas and had sustained winds of around 115 miles per hour as it hit the coast and began its path along the I-40 corridor central North Carolina. In the end, over 3 billion dollars in damages were reported in the state. Damages to infrastructure and agriculture added to the overall toll and more than 1.7 million people in the state were left without power.

Hurricane Floyd – September 16, 1999
Hurricane Floyd, combined with the weather conditions before and immediately after this hurricane, resulted in the most severe flooding and devastation in North Carolina history. In North Carolina, the storm resulted in 35 fatalities, over $3 billion in damages, 7,000 destroyed homes, 56,000 damaged homes, 1,500 people rescued from flooded areas, and more than 500,000 customers without electricity. Additionally, the flooding caused an estimated $813 million in agricultural losses affecting 32,000 farmers. There was also significant loss of livestock including 2,860,827 poultry, 28,000 swine, and 619 cattle.

Hurricane Isabel – September 18, 2003
Hurricane Isabel's worst impacts were along the cost of North Carolina where storm surge in Dare County in particular were extremely strong, damaging thousands of homes. The storm surge created a large inlet on Hatteras Island which left the community isolated for months. Further inland and across the state, trees were downed and power was lost by hundreds of thousands of residents. In most of the state, power was restored within a few days, but the effects to the economy and daily lives of citizens were significant.

Hurricane Ivan – September 16-17, 2004
Just a week and a half following Tropical Storm Frances, the remnants of Hurricane Ivan hit western North Carolina when many streams and rivers were already well above flood stage. The widespread flooding forced many roads to be closed and landslides were common across the mountain region. Wind gusts reached between 40 and 60 mph across the higher elevations of the Appalachian Mountains resulting in numerous downed trees. More than $13.8 million of federal aid was dispersed across North Carolina following Ivan.

Probability of Future Occurrences

Given the inland location of the town, it is more likely to be affected by remnants of hurricane and tropical storm systems (as opposed to a major hurricane) which may result in flooding or high winds. The probability of being impacted is less than coastal areas, but still remains a real threat to the Town of Midway due to induced events like flooding and erosion. Based on historical evidence, the probability level of future occurrence is likely (between 10 and 100 percent annual probability). Given the regional

nature of the hazard, all areas in the town are equally exposed to this hazard. However, when the town is impacted, the damage could be catastrophic, threatening lives and property throughout the planning area.

C.2.5 Lightning

Location and Spatial Extent

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of the Town of Midway is uniformly exposed to lightning.

Historical Occurrences

According to the National Climatic Data Center, there have been no recorded lightning events in the Town of Midway since 1996 (**Table C.10** and **Table C.11**).[5]

It is certain that lightning events have impacted the town. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE C.10: SUMMARY OF LIGHTNING OCCURRENCES IN MIDWAY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Midway	0	0/0	$0

Source: National Climatic Data Center

TABLE C.11: HISTORIC LIGHTNING OCCURRENCES IN MIDWAY

	Date	Deaths / Injuries	Property Damage*	Details
Midway				
None Reported	--	--	--	--

*Property Damage is reported in 2014 dollars; all damage may not have been reported.
Source: National Climatic Data Center

Probability of Future Occurrences

Although there were not any historical lightning events reported in the Town of Midway via NCDC data, it is considered a regular occurrence, especially accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN®), the Town of Midway is located in an area of the country that experienced an average of 3 to 5 lightning flashes per square kilometer per year between 1997 and 2010. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the town.

[5] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is certain that additional lightning events have occurred in the Town of Midway. The State Fire Marshall's office was also contacted for additional information but none could be provided. As additional local data becomes available, this hazard profile will be amended.

C.2.6 Thunderstorm Wind / High Wind

Location and Spatial Extent

A wind event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. Also, the Town of Midway typically experiences several straight-line wind events each year. These wind events can and have caused significant damage. It is assumed that the Town of Midway has uniform exposure to an event and the spatial extent of an impact could be large.

Historical Occurrences

According to NCDC, there have been three reported thunderstorm wind and high wind events since 2003 in the Town of Midway.[6] These events caused more than $1,000 (2014 dollars) in damages.[7] **Table C.12** summarizes this information. **Table C.13** provides detailed thunderstorm wind and high wind event reports including date, magnitude, and associated damages for each event.

TABLE C.12: SUMMARY OF THUNDERSTORM / HIGH WIND OCCURRENCES IN MIDWAY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Midway	3	0/0	$1,086

Source: National Climatic Data Center

TABLE C.13: HISTORICAL THUNDERSTORM / HIGH WIND OCCURRENCES IN MIDWAY

	Date	Type	Magnitude	Deaths / Injuries	Property Damage*
Midway					
MIDWAY	6/8/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
MIDWAY	6/11/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
MIDWAY	6/14/2010	Thunderstorm Wind	50 kts. EG	0/0	$1,086

*Property damage is reported in 2014 dollars; All damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained ;MG = measured gust ;MS = measured sustained
Source: National Climatic Data Center

Probability of Future Occurrences

It is certain that wind events, including straight-line wind and thunderstorm wind, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for future wind events for the entire town.

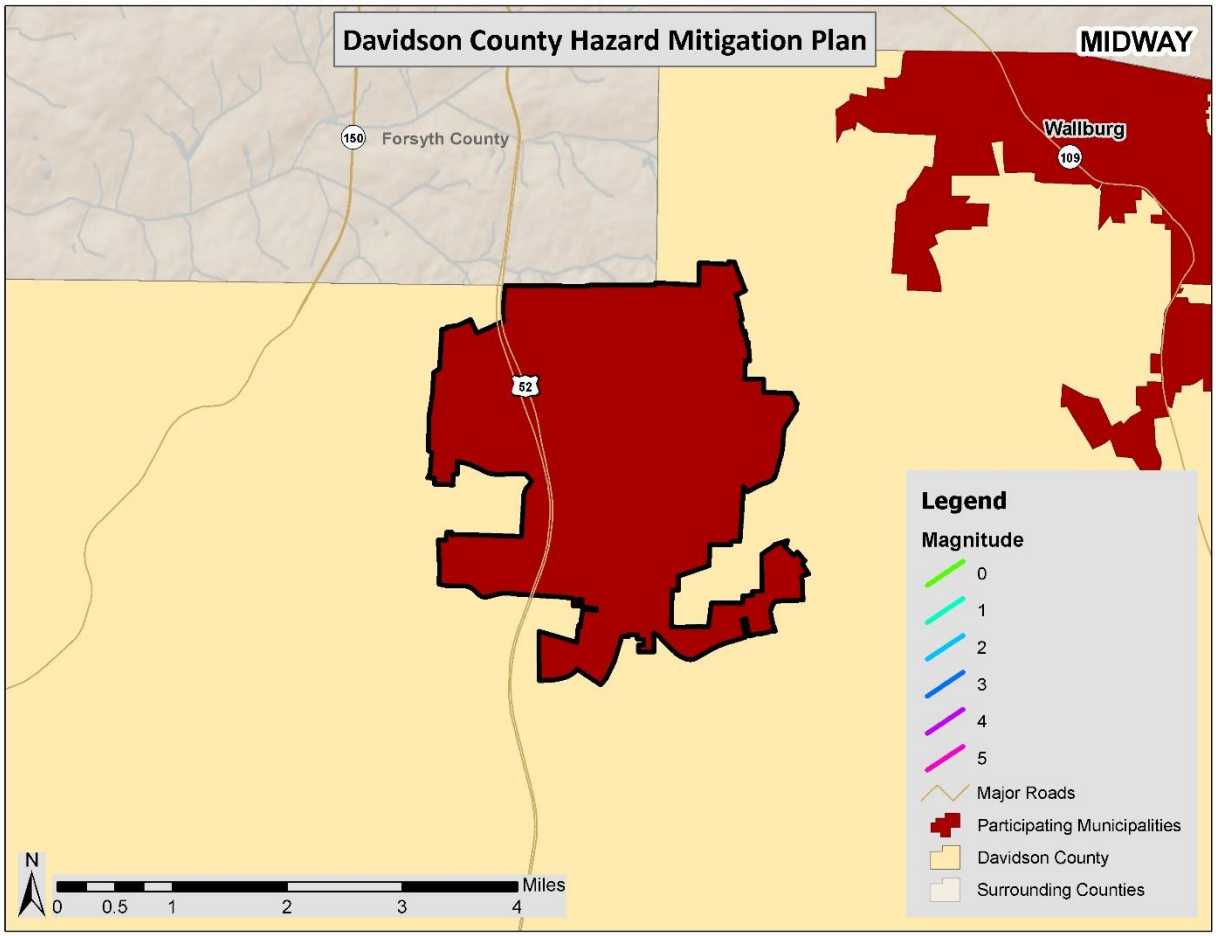
[6] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through October 2014 and these high wind events are only inclusive of those reported by NCDC from 1996 through October 2014. It is likely that additional thunderstorm and high wind events have occurred in the Town of Midway. As additional local data becomes available, this hazard profile will be amended.
[7] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

C.2.7 Tornado

Location and Spatial Extent

Tornadoes occur throughout the state of North Carolina, and thus in Town of Midway. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that the Town of Midway is uniformly exposed to this hazard. With that in mind, **Figure C.3** shows tornado track data for many of the major tornado events that have impacted the town. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE C.3: HISTORICAL TORNADO TRACKS IN MIDWAY



Source: National Weather Service Storm Prediction Center

Historical Occurrences

Tornadoes were responsible for one disaster declaration in Davidson County in 1989.[8] According to the National Climatic Data Center, there have been no recorded tornado events in the Town of Midway

[8] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.

since 1950 (**Table C.14** and **Table C.15**).[9] However an EF1 through EF5 event is possible. It is important to note that only tornadoes that have been reported are factored into this risk assessment. It is likely that a high number of occurrences have gone unreported over the past 64 years.

TABLE C.14: SUMMARY OF TORNADO OCCURRENCES IN MIDWAY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Midway	0	0/0	$0

Source: National Climatic Data Center

TABLE C.15: HISTORICAL TORNADO IMPACTS IN MIDWAY

	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Midway					
None Reported	--	--	--	--	--

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Probability of Future Occurrences

According to historical information, tornado events have not occurred in the town. However, given the town's location in the southeastern United States and history of tornadoes, an occurrence is possible every few years. While the majority of the reported tornado events in Davidson County are small in terms of size, intensity, and duration, they do pose a significant threat should the Town of Midway experience a direct tornado strike. The probability of future tornado occurrences affecting the Town of Midway is likely (10 to 100 percent annual probability).

C.2.8 Winter Storm and Freeze

Location and Spatial Extent

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The Town of Midway is accustomed to severe winter weather conditions and often receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire town has uniform exposure to a winter storm.

Historical Occurrences

Winter weather has resulted in five disaster declarations in Davidson County. This includes the Blizzard of 1996, one subsequent 1996 winter storm, a severe winter storm in 2000, an ice storm in 2002 and a severe winter storm in 2014.[10] The National Climatic Data Center does not report winter storm events at the municipal level, however, there have been a total of 55 recorded winter storm events and 1

[9] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through October 2014. It is likely that additional tornadoes have occurred in the Town of Midway. As additional local data becomes available, this hazard profile will be amended.
[10] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.

extreme cold event in Davidson County since 1996 (**Table C.16**).[11] These events resulted in nearly $6.2 million (2014 dollars) in damages.[12] Detailed information on the recorded winter storm events can be found in **Table C.17**.

TABLE C.16: SUMMARY OF WINTER STORM EVENTS IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Davidson County	55	0/0	$6,200,000

Source: National Climatic Data Center

TABLE C.17: HISTORICAL WINTER STORM IMPACTS IN DAVIDSON COUNTY

	Date	Type of Storm	Deaths / Injuries	Property Damage*
Davidson County				
DAVIDSON (ZONE)	1/6/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/11/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/2/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/16/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/8/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/13/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/29/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/23/1998	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/2/1999	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/20/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/22/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/24/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/28/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/19/2000	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	2/12/2001	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/3/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/23/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/16/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/27/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/13/2003	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/15/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/30/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/15/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2007	Winter Weather	0/0	$0

[11] These winter storm and extreme cold events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is certain that additional winter storm conditions have affected the Town of Midway and Davidson County.
[12] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

	Date	Type of Storm	Deaths / Injuries	Property Damage*
DAVIDSON (ZONE)	2/1/2007	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/7/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/17/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/19/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/13/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/22/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/4/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/1/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/18/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/30/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/29/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/5/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/2/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/16/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/25/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/10/2011	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/26/2013	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/28/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/11/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2014	Winter Storm	0/0	$0
DAVIDSON (ZONE)	3/3/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/6/2014	Ice Storm	0/0	$6,200,000
DAVIDSON (ZONE)	3/17/2014	Winter Weather	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been recorded in Lexington since 1902. The recorded minimum for the county can be found below in **Table C.18**.

TABLE C.18: LOWEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	01/21/1985	-6

Source: State Climate Office of North Carolina

There have been several severe winter weather events in Davidson County. The text below describes two of the major events (one snow and one ice event) and associated impacts on the county. Similar impacts can be expected with most severe winter weather.

1996 Winter Storm – January 6-8, 1996
This storm left two feet of snow in some areas and several thousand citizens without power for up to nine days. Although shelters were opened, some roads were impassible for many days. This event caused considerable disruption to business, industry, schools, and government services.

2002 Ice Storm – December 4-5, 2002
An ice storm produced up to an inch of freezing rain in central North Carolina impacting 40 counties. A total of 24 people were killed, and as many as 1.8 million people were left without electricity. Additionally, property damage was estimated at almost $100 million. New records were also set for traffic accidents and school closing durations. The scale of destruction was comparable to that of hurricanes that have impacted the state, such as Hurricane Fran in 1996. The storm cost the state $97.2 million in response and recovery.

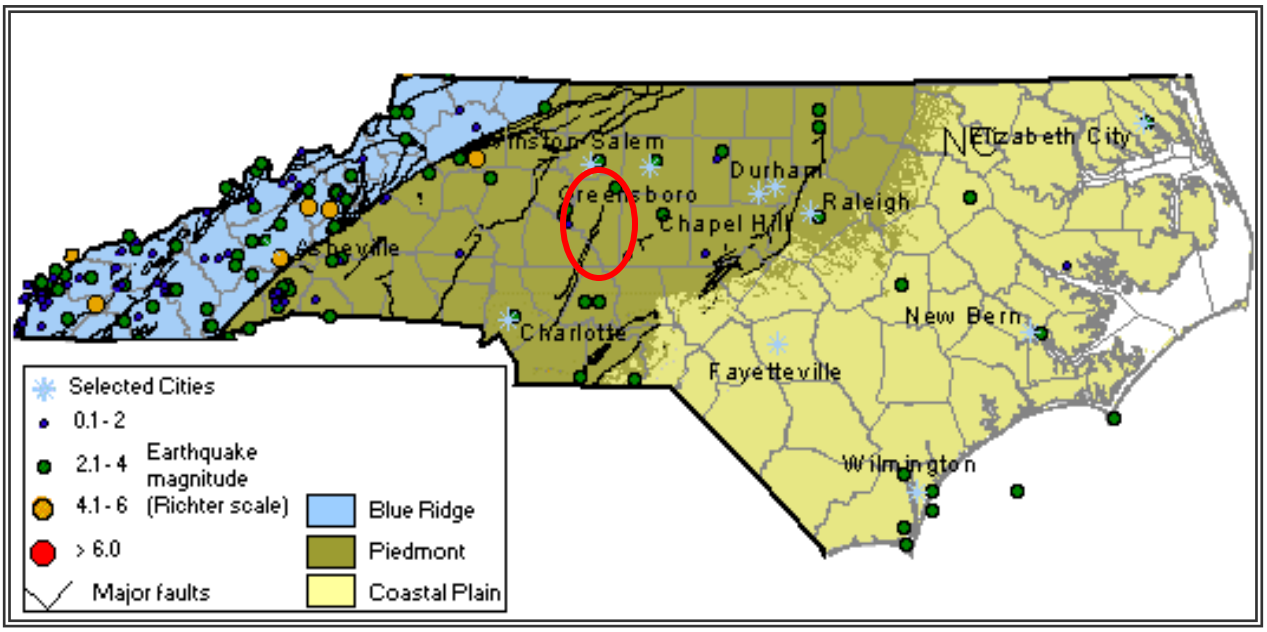
Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

Probability of Future Occurrences
Winter storm events will remain a regular occurrence in the Town of Midway due to its location in the western half of the state. According to historical information, the Town of Midway generally experiences several winter storm events each year. Therefore, the annual probability is highly likely (10 to 100 percent).

C.2.9 Earthquake

Location and Spatial Extent
Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout North Carolina. **Figure C.4** is a map showing geological and seismic information for North Carolina.

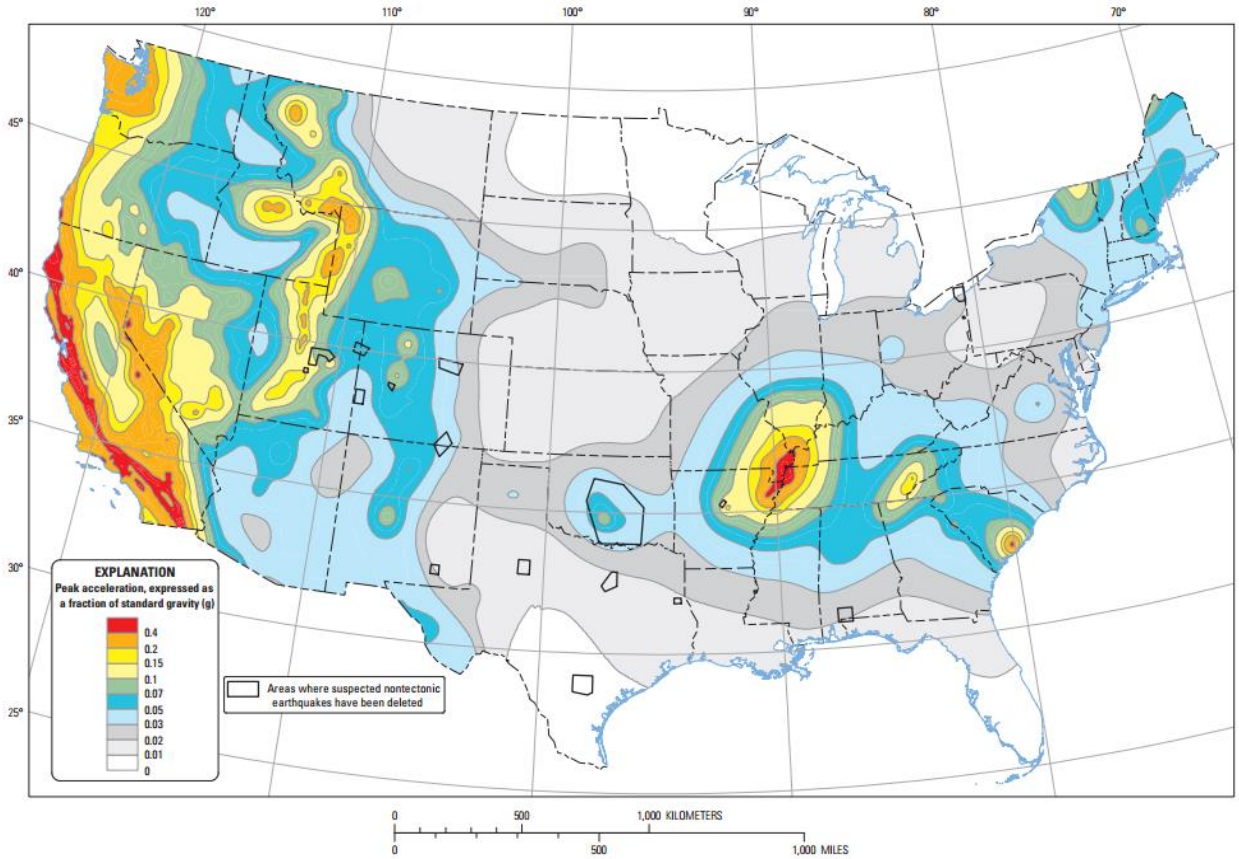
FIGURE C.4: GEOLOGICAL AND SEISMIC INFORMATION FOR NORTH CAROLINA



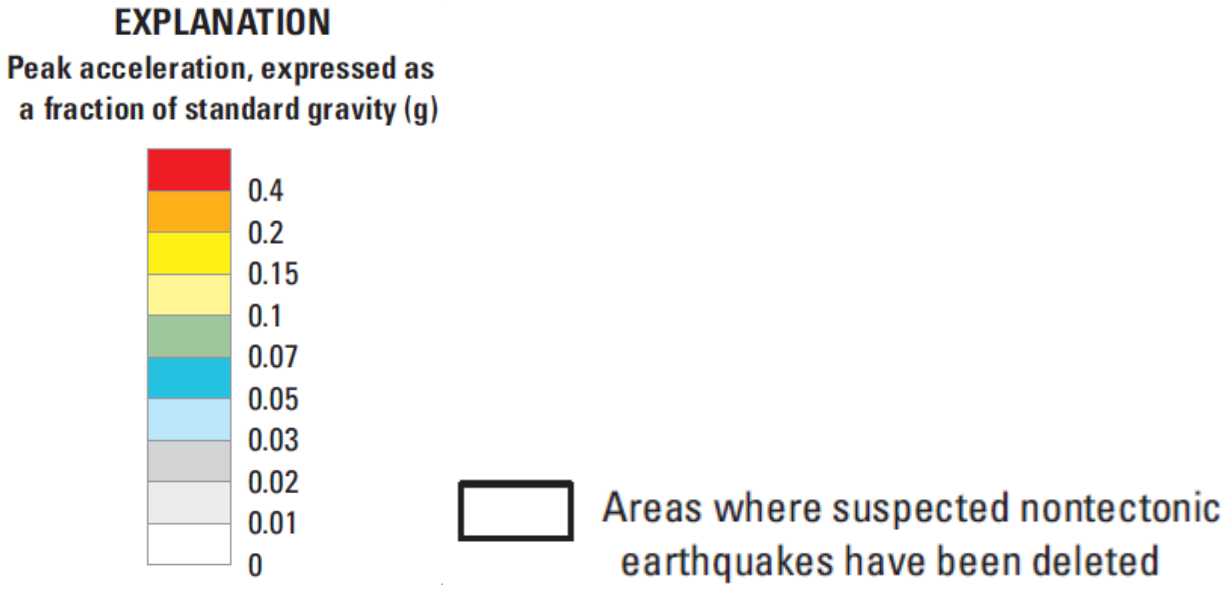
Source: North Carolina Geological Survey

Figure C.5 shows the intensity level associated with the Town of Midway, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, the Town of Midway lies within an approximate zone of 0.03 to 0.05 ground acceleration. This indicates that the town exists within an area of low to moderate seismic risk.

FIGURE C.5: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

Historical Occurrences

No earthquakes are known to have affected the Town of Midway since 1638 (**Table C.19** and **Table C.20**)[13]

TABLE C.19: SUMMARY OF SEISMIC ACTIVITY IN MIDWAY

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Midway	--	--	--

Source: National Geophysical Data Center

TABLE C.20: SIGNIFICANT SEISMIC EVENTS IN MIDWAY (1638 -1985)

Location	Date	Epicentral Distance	Magnitude	MMI
Midway				
None Reported	--	--	--	--

Source: National Geophysical Data Center

Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting the Town of Midway is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the town. The annual probability level for the town is estimated between 1 and 10 percent (possible).

C.2.10 Landslide

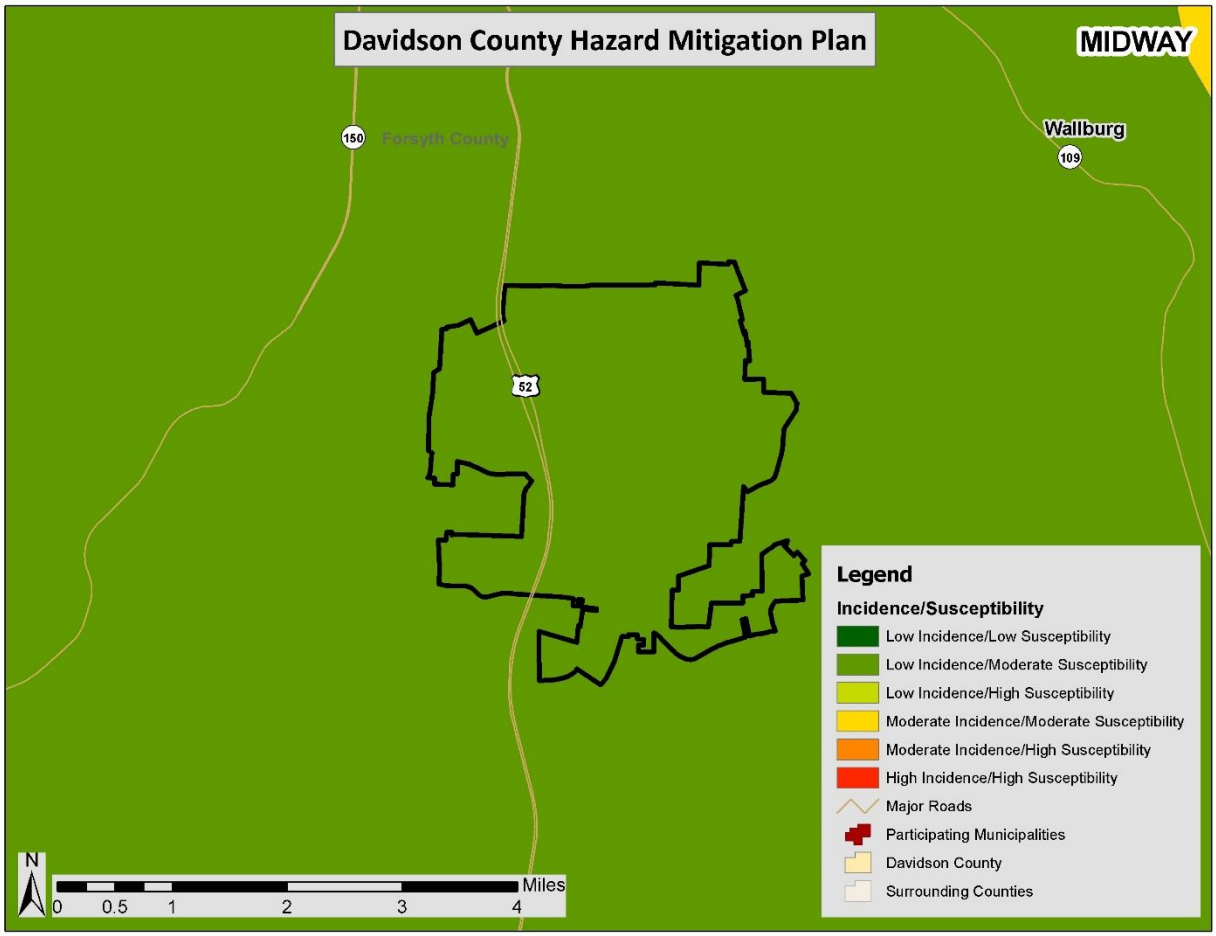
Location and Spatial Extent

Landslides occur along steep slopes when the pull of gravity can no longer be resisted (often due to heavy rain). Human development can also exacerbate risk by building on previously undevelopable steep slopes and constructing roads by cutting through hills or mountains. Landslides are possible throughout the Town of Midway, though the risk is relatively low.

According to **Figure C.6** below, the town has low landslide activity. However, there is moderate susceptibility to landslides throughout the town.

[13] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

FIGURE C.6: LANDSLIDE SUSCEPTIBILITY AND INCIDENCE MAP OF MIDWAY



Source: United States Geological Survey

Historical Occurrences

Relatively flat topography throughout the Town of midway makes the planning area less susceptible to landslides. Most landslides are caused by heavy rainfall in the area. Building on steep slopes that was not previously possible also contributes to risk. Although no landslide incidents have been reported in the town, it should be noted that the North Carolina Geological Survey emphasized the dataset provided was incomplete. Therefore, there may be additional historical landslide occurrences that were not reported. Some incidence mapping has also been completed throughout the western portion of North Carolina though it is not complete either. Again, it should be noted that it is possible more incidents have occurred than what is mapped. Since no incidents were reported, a map was not produced to show the location of previous events.

Probability of Future Occurrences

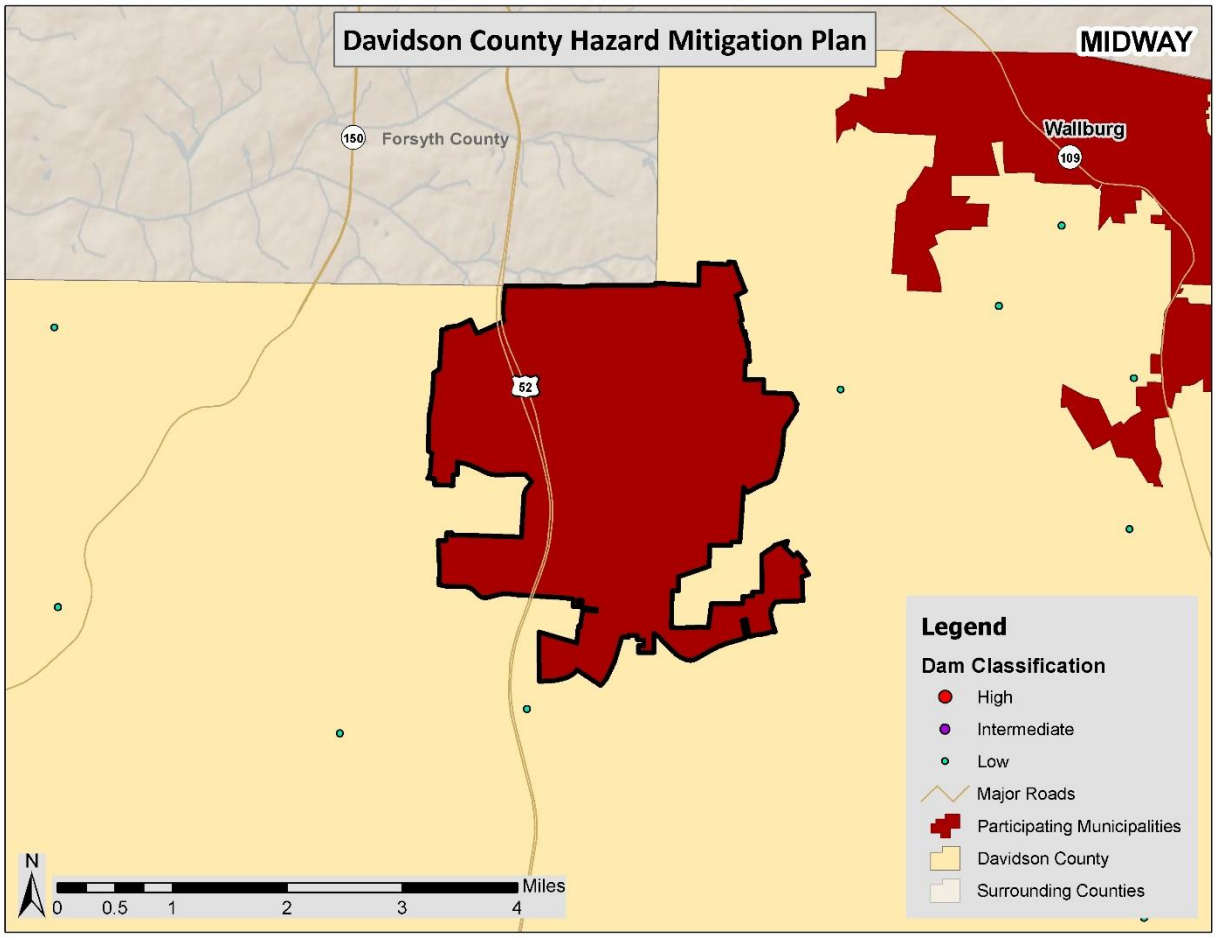
Based on historical information and the USGS susceptibility index, the probability of future landslide events is unlikely (less than 1 percent probability). Local conditions may become more favorable for landslides due to heavy rain, for example. This would increase the likelihood of occurrence. It should also be noted that some areas in the Town of Midway have greater risk than others given factors such as steepness on slope and modification of slopes.

C.2.11 Dam and Levee Failure

Location and Spatial Extent

According to the North Carolina Division of Energy, Mineral, and Land Resources, there are no dams in the Town of Midway.[14] **Figure C.7** shows the dam location and the corresponding hazard ranking for dams located nearby the town. Of these dams, none are classified as high hazard potential (**Table C.21**).

FIGURE C.7: MIDWAY DAM LOCATION AND HAZARD RANKING



Source: North Carolina Division of Energy, Mineral, and Land Resources, 2014

TABLE C.21: MIDWAY HIGH HAZARD DAMS

Dam Name	Hazard Potential	Surface Area (acres)	Max Capacity (Ac-ft)	Owner Type
Midway				
None Reported	--	--	--	--

Source: North Carolina Division of Energy, Mineral, and Land Resources, 2014

[14] The December 2, 2014 list of high hazard dams obtained from the North Carolina Division of Energy, Mineral, and Land Resources (http://portal.ncdenr.org/web/lr/dams) was reviewed and amended by local officials to the best of their knowledge.

Historical Occurrences

According to local sources and a review of the past hazard mitigation plan, there has been no history of dam breach in the Town of Midway.

Probability of Future Occurrences

Given the current dam inventory and historic data, a dam breach is unlikely (less than 1 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

C.2.12 Erosion

Location and Spatial Extent

Erosion in the Town of Midway is typically caused by flash flooding events. Unlike coastal areas, where the soil is mainly composed of fine grained particles such as sand, soils in the Town of Midway have much greater organic matter content. Furthermore, vegetation also helps to prevent erosion in the area. Erosion occurs in the town, particularly along the banks of rivers and streams, but it is not an extreme threat. No areas of concern were reported by the planning team.

Historical Occurrences

Several sources were vetted to identify areas of erosion in the Town of Midway. This includes searching local newspapers, interviewing local officials, and reviewing the previous hazard mitigation plan. Little information could be found beyond the hazard mitigation plan; however, the last update of the county hazard mitigation plan classified erosion as a relatively low concern as the magnitude was determined to be mild.

Probability of Future Occurrences

Erosion remains a natural, dynamic, and continuous process for the Town of Midway, and it will continue to occur. The annual probability level assigned for erosion is possible (between 1 and 10 percent).

C.2.13 Flood

Location and Spatial Extent

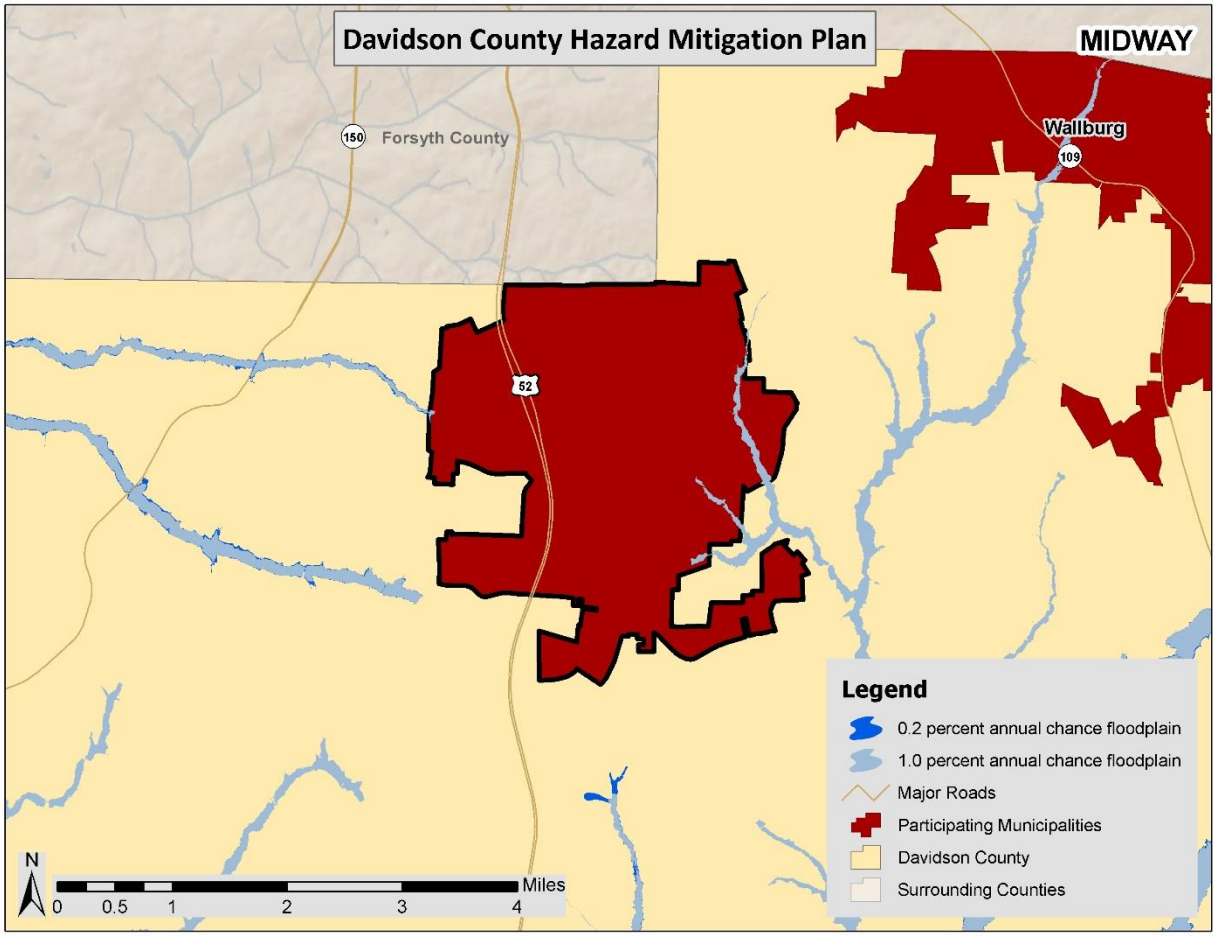
There are areas in the Town of Midway that are susceptible to flood events. Special flood hazard areas in the town were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM).[15] This includes Zone AE (1-percent annual chance floodplain with elevation) and Zone X500 (0.2-percent annual chance floodplain). According to GIS analysis, of the 7.7 square miles of land that make up the Town of Midway, there are 0.2 square miles of land in zone AE (1-percent annual chance floodplain/100-year floodplain) and 0.0 square miles of land in zone X500 (0.2-percent annual chance floodplain/500-year floodplain).

These flood zone values account for 2.6 percent of the total land area in the Town of Midway. It is important to note that while FEMA digital flood data is recognized as best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Flooding and flood-related losses often do occur outside of delineated special flood hazard areas. **Figure C.8** illustrates the

[15] The county-level DFIRM data used for Davidson County were updated in 2009.

location and extent of currently mapped special flood hazard areas for the Town of Midway based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE C.8: SPECIAL FLOOD HAZARD AREAS IN MIDWAY



Source: Federal Emergency Management Agency

Historical Occurrences

Information from the National Climatic Data Center was used to ascertain historical flood events. The National Climatic Data Center reported no events in the Town of Midway since 1996 (**Table C.22** and **Table C.23**).[16]

TABLE C.22: SUMMARY OF FLOOD OCCURRENCES IN MIDWAY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Midway	0	0/0	$0

Source: National Climatic Data Center

[16] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is likely that additional occurrences have occurred and have gone unreported in the Town of Midway.

TABLE C.23: HISTORICAL FLOOD EVENTS IN MIDWAY

	Date	Type	Deaths / Injuries	Property Damage*
Midway				
None Reported	--	--	--	--

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of November 2014, there have been no flood losses reported in the Town of Midway through the National Flood Insurance Program (NFIP) since 1978. A summary of these figures for the town is provided in **Table C.24**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in the Town of Midway were uninsured, denied claims payment, or not reported.

TABLE C.24: SUMMARY OF INSURED FLOOD LOSSES IN MIDWAY

Location	Number of Policies	Flood Losses	Claims Payments
Midway*	--	--	--

*This community does not participate in the National Flood Insurance Program. Therefore, no values are reported.
Source: Federal Emergency Management Agency, National Flood Insurance Program

Repetitive Loss Properties

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 140,000 repetitive loss properties nationwide.

As of August 2014, there are no non-mitigated repetitive loss properties located in the Town of Midway. **Table C.25** presents detailed information on repetitive loss properties and NFIP claims and policies for the town.

TABLE C.25: REPETITIVE LOSS PROPERTIES IN MIDWAY

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Midway*	--	--	--	--	--	--	--

*This community does not participate in the National Flood Insurance Program. Therefore, no values are reported.
Source: National Flood Insurance Program

Probability of Future Occurrences

Flood events will remain a threat in the Town of Midway, and the probability of future occurrences will remain possible (between 1 and 10 percent annual probability). The town has risk to flooding, though not all areas will experience floods. The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above, which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain).

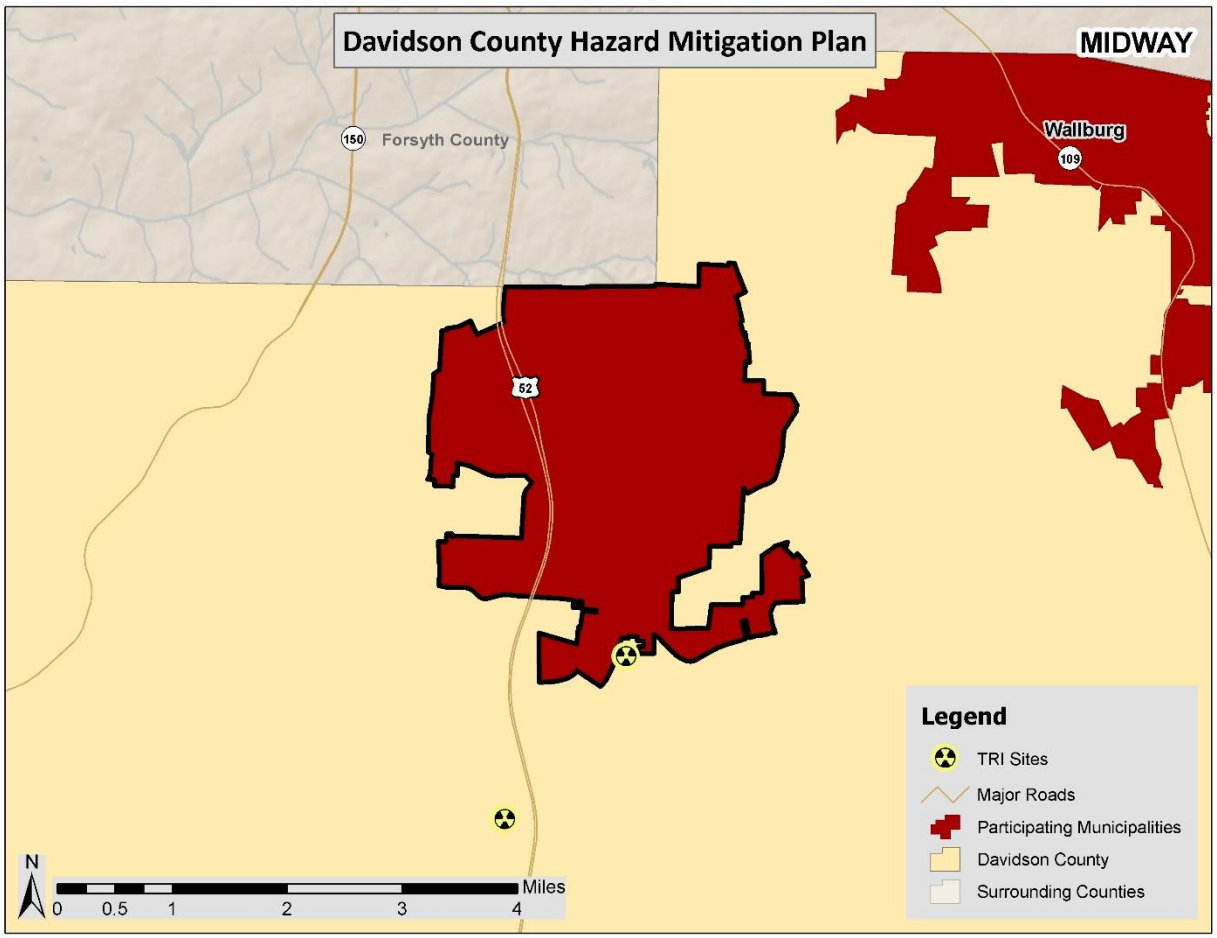
It can be inferred from the floodplain location map, previous occurrences, and repetitive loss properties that risk varies throughout Davidson County. For example, areas along the southeastern boundary of the Town of Midway have more floodplain and thus a higher risk of flood than within the town itself. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

C.2.14 Hazardous Materials Incidents

Location and Spatial Extent

The Town of Midway does not have any TRI sites, however, there are two sites located outside the town limits. These sites are shown in **Figure C.9.**

FIGURE C.9: TOXIC RELEASE INVENTORY (TRI) SITES IN MIDWAY



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the town via roadways and rail. Many roads in the town are subject to hazardous materials transport and all roads that permit hazardous material transport are considered potentially at risk to an incident.

Historical Occurrences

There have been no HAZMAT incidents reported by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) in the Town of Midway (**Table C.26** and **Table C.27**).

TABLE C.26: SUMMARY OF HAZMAT INCIDENTS IN MIDWAY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Midway	0	0/0	$0

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE C.27: HAZMAT INCIDENTS IN MIDWAY

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
Midway							
None Reported	--	--	--	--	--	--	--

*Property damage is reported in 2014 dollars.

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

Probability of Future Occurrences

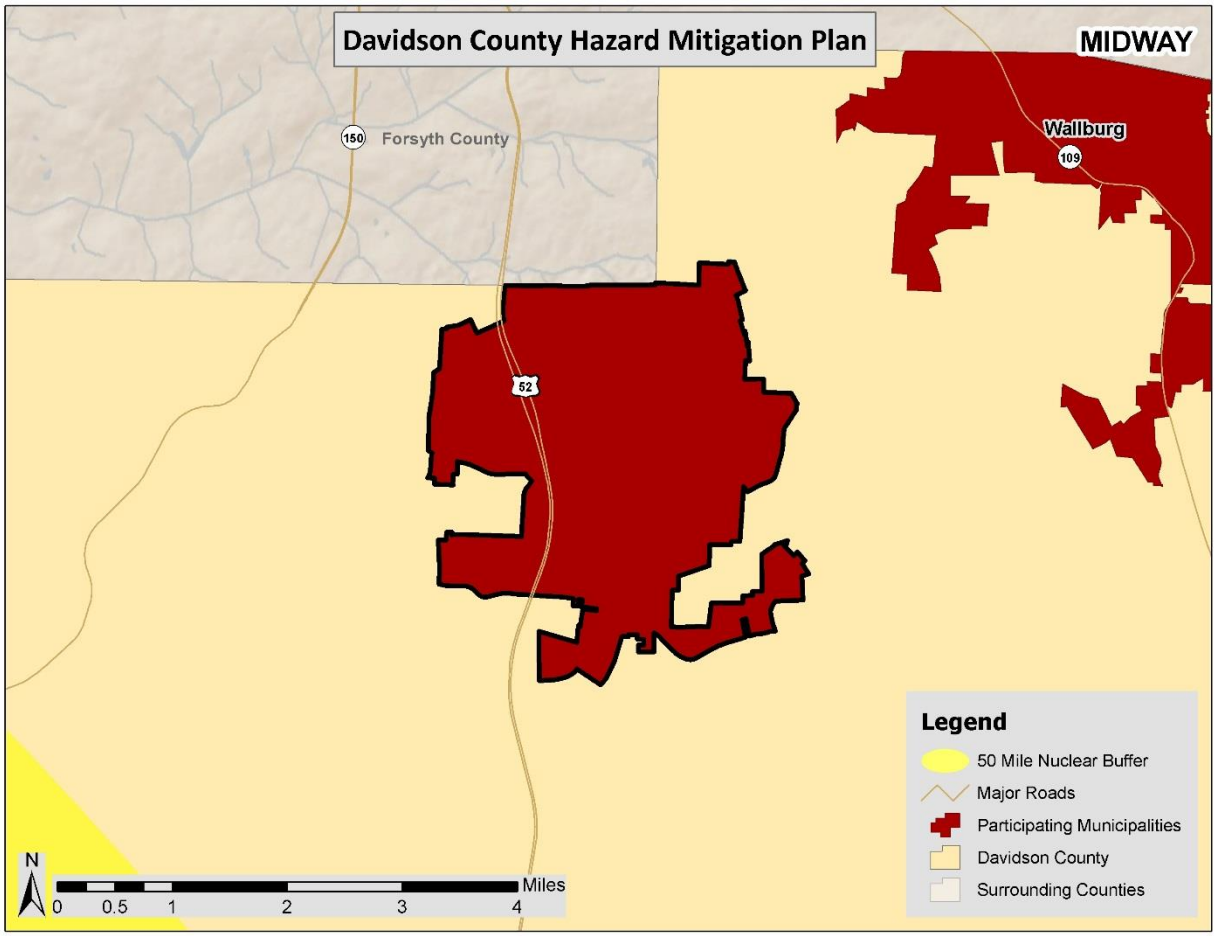
Given the location of two toxic release inventory sites near the Town of Midway as well as roads in the town that are subject to hazardous materials transport, it is possible that a hazardous material incident may occur in the town (between 1 and 10 percent annual probability). However, town officials are mindful of this possibility and take precautions to prevent such an event from occurring. Additionally, there are detailed plans in place to respond to an occurrence.

C.2.15 Nuclear Accident

Location and Spatial Extent

None of the town is susceptible to a nuclear incident due to its location outside of the 50-mile radius of the McGuire Nuclear Power Plant, which is the area considered to be at risk (**Figure C.10**).

FIGURE C.10: NUCLEAR POWER PLANT INCIDENT HAZARD ZONES IN MIDWAY



Source: International Atomic Energy Agency

Historical Occurrences

Although there have been no major nuclear events at the McGuire Nuclear Power Plant, there is some possibility that one could occur as there have been incidents in the past in the United States at other facilities and at facilities around the world.

Probability of Future Occurrences

A nuclear event is a very rare occurrence in the United States due to the intense regulation of the industry. There have been incidents in the past, but it is considered unlikely (less than 1 percent annual probability).

C.2.16 Terror Threat

Location and Spatial Extent

A terror threat could potentially occur at any location in the town. However, the very definition of a terrorist event indicates that it is most likely to be targeted at a critical or symbolic resource/location. Ensuring and protecting the continuity of critical infrastructure and key resources (CIKR) of the United States is essential to the Nation's security, public health and safety, economic vitality, and way of life. CIKR includes physical and/or virtual systems or assets that, if damaged, would have a detrimental

impact on national security, including large-scale human casualties, property destruction, economic disruption, and significant damage to morale and public confidence. **Table C.28** lists the U.S. Department of Homeland Security's (DHS) identified main critical infrastructure sectors.

TABLE C.28 U.S. DEPARTMENT OF HOMELAND SECURITY CRITICAL INFRASTRUCTURE SECTORS

- Agriculture and Food
- Banking and Finance
- Chemical
- Commercial Facilities
- Communications
- Critical Manufacturing
- Dams
- Defense Industrial Base
- Emergency Services
- Energy
- Government Facilities
- Healthcare and Public Health
- Information Technology
- National Monuments and Icons
- Nuclear Reactors, Materials, and Waste
- Postal and Shipping
- Transportation Systems
- Water

All critical facilities (see Section C.3.1) are at a heightened level of risk in the Town of Midway. However, there are no facilities in the town that have been identified as the likely primary targets (**Table C.29**).

TABLE C.29: FACILITIES/EVENTS AT ELEVATED RISK OF TERROR THREAT IN MIDWAY

Critical Facility
Midway
None Identified

Source: Local Government

Historical Occurrences

Although there have been no major terror events in the Town of Midway, there is some possibility that one could occur in the future as there have been incidents in the United States in the past and there are several facilities that could be potential targets.

Probability of Future Occurrences

The Town of Midway has no recorded terrorist events. Due to no recorded incidents against the town, the probability of future occurrences of a terrorist attack is unlikely (less than 1 percent annual probability).

C.2.17 Wildfire

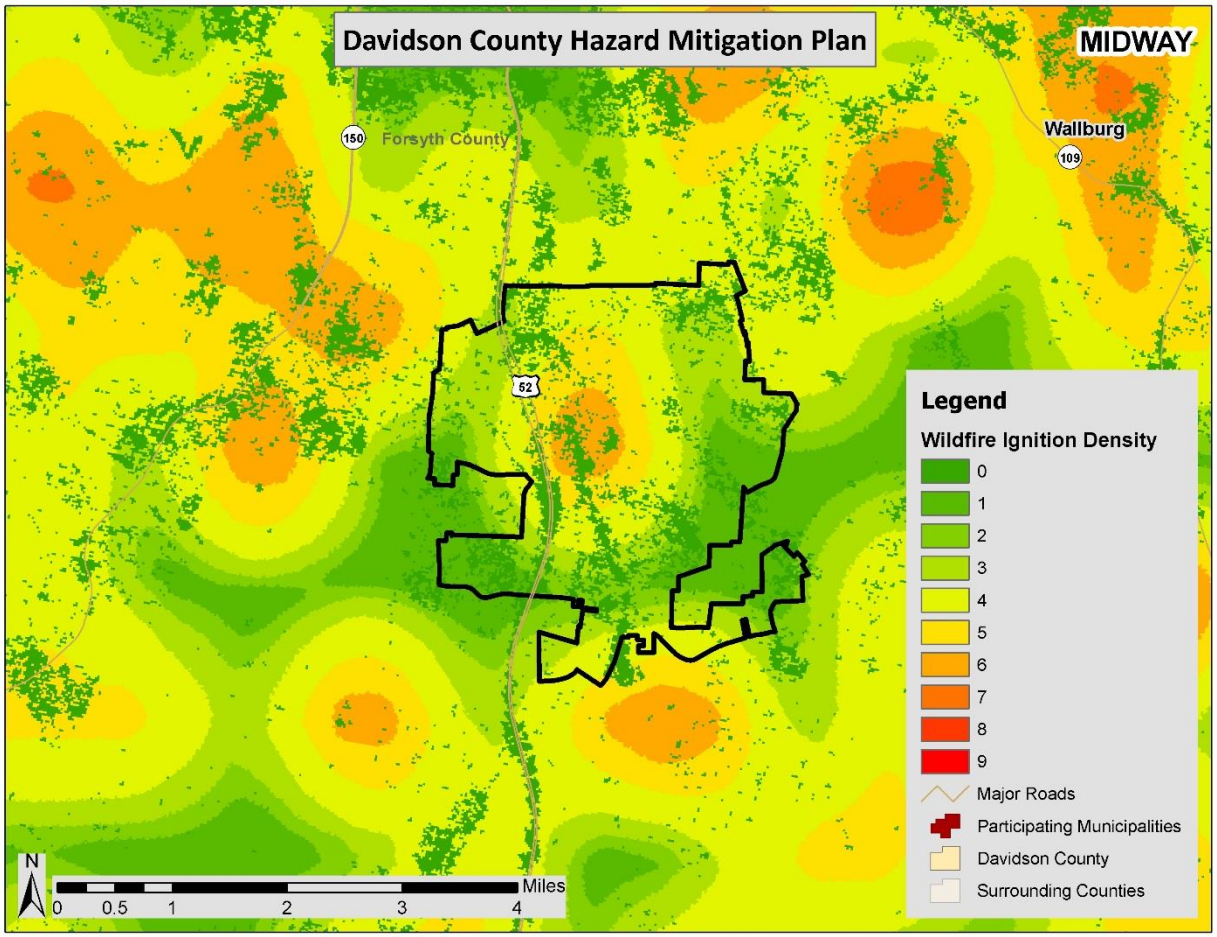
Location and Spatial Extent

The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below gives an indication of historic location in the Town of Midway.

Historical Occurrences

Figure C.11 shows the Wildfire Ignition Density in the Town of Midway based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[17]

FIGURE C.11: WILDFIRE IGNITION DENSITY IN MIDWAY



Source: Southern Wildfire Risk Assessment

Based on data from the North Carolina Division of Forest Resources from 2005 to 2014, Davidson County experienced an average of 39 wildfires annually which burn a combined average of 53.6 acres per year. The data indicates that most of these fires are small, averaging 1.4 acre per fire. **Table C.30** lists the number of reported wildfire occurrences in the county between the years 2005 and 2014.

[17] Southern Wildfire Risk Assessment, 2014.

TABLE C.30: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	27	53	47	36	16	40	48	30	47	46
Number of Acres	55.3	56.5	84.5	39.7	19	40.6	46.5	146.3	26.3	21.7

Source: North Carolina Division of Forest Resources

Since 2009, the NCDFR has also kept data on the number of structures damaged/destroyed. This information is presented in **Table C.31**.

TABLE C.31: STRUCTURES DAMAGED/DESTROYED BY WILDFIRE IN DAVIDSON COUNTY

Year	2009	2010	2011	2012	2013	2014
Davidson County						
Number of Structures	0	2	11	6	8	9
Cost of Damages to Structures	$0	$1,500	$13,600	$10,500	$14,600	$17,800

Source: North Carolina Division of Forest Resources

In addition, the North Carolina Department of Insurance collects fire data and reports it on an annual basis. This data is included in **Table C.32** to supplement the NCDFR data.

TABLE C.32: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

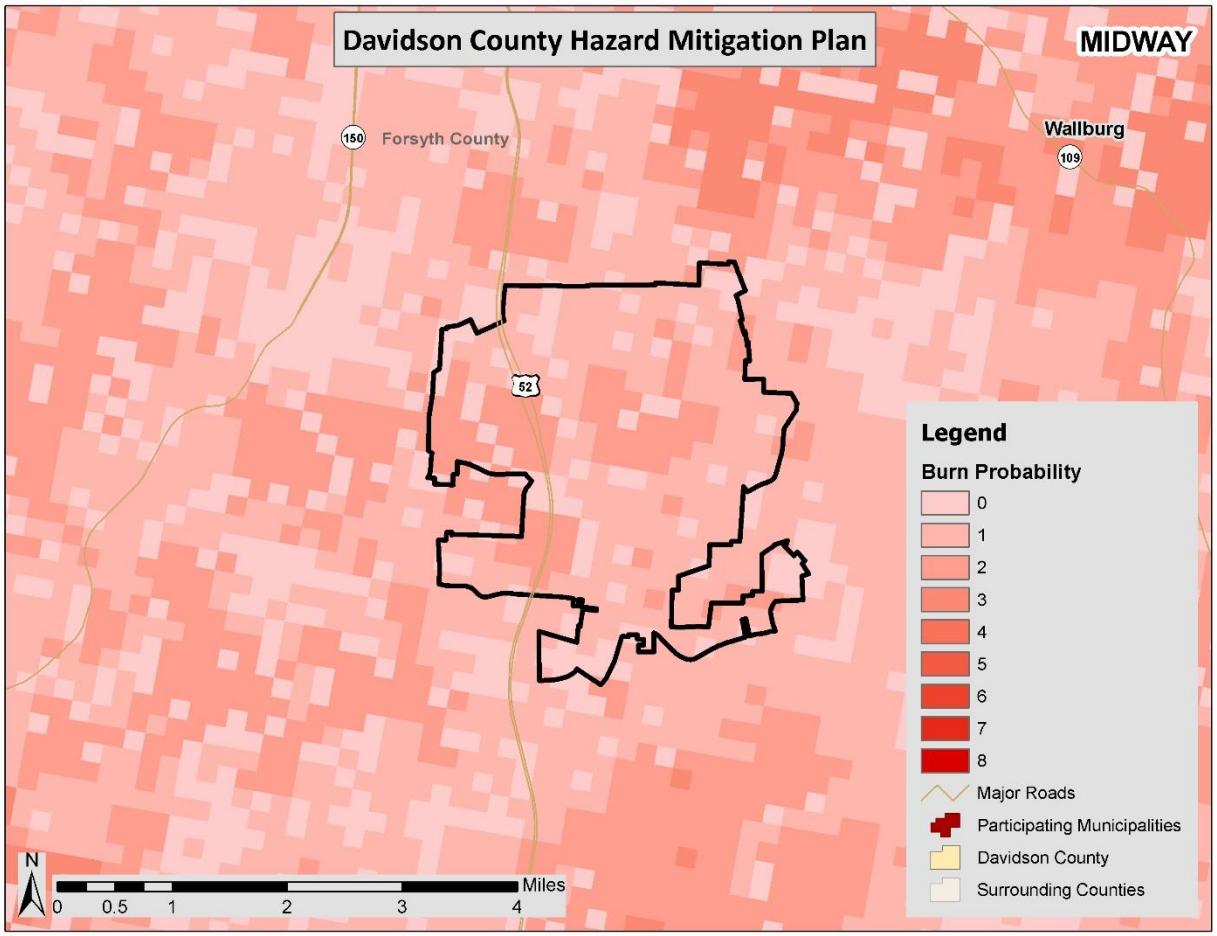
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	28	74	195	187	120	167	176	116	141	242
Property Loss	$0	$5,300	$650	$1,050	$1,550	$230	$1,940	$1,202	$10,700	$8,380

Source: North Carolina Department of Insurance

Probability of Future Occurrences

Wildfire events will be an ongoing occurrence around the Town of Midway. **Figure C.12** shows that there is some probability a wildfire will occur near the town. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to the Town of Midway for future wildfire events is likely (10 to 100 percent annual probability).

FIGURE C.12: BURN PROBABILITY IN MIDWAY



Source: Southern Wildfire Risk Assessment

C.2.18 Conclusions on Hazard Risk

The hazard profiles presented above were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

Hazard Extent

Table C.33 describes the extent of each natural hazard identified for the Town of Midway. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE C.33 EXTENT OF MIDWAY HAZARDS

Atmospheric Hazards	
Drought	Drought extent is defined by PDSI classifications which include Extremely Moist, Very Moist, Mid-Range, Moderate Drought, Severe Drought, and Extreme Drought classifications (pages 5:5-5:6). According to the PDSI classifications, the most severe drought condition is Extreme. Davidson County has received this ranking 3 times over the 14-year reporting period.
Extreme Heat	The extent of extreme heat can be defined by the maximum temperature reached. The highest temperature recorded in Davidson County is 107 degrees Fahrenheit (reported on July 29, 1952).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in the Town of Midway was 1.00 inches (reported on March 24, 2012). It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5 (Table 5.11). The greatest classification of hurricanes to traverse directly through Davidson County was an unnamed storm in 1893 which reached a maximum wind speed of 65 knots in the county. Although the county is much more likely to be impacted by the remnants of a hurricane or tropical storm, it is possible that a storm can impact the county directly.
Lightning	According to the Vaisala flash density map (Figure 5.5), the Town of Midway is located in an area that experiences 3 to 5 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Thunderstorm Wind / High Wind	Thunderstorm extent is defined by the number of thunder events and wind speeds reported. The strongest recorded wind event in the Town of Midway was last reported on June 14, 2010 at 50 knots (approximately 58 mph). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by tornado occurrences in the US provided by FEMA (Figure 5.6) as well as the Fujita/Enhanced Fujita Scale (Tables 5.18 and 5.19). According to NCDC data, no tornadoes have impacted the town. However, the greatest magnitude reported in the county was an EF2 (last reported on November 16, 2011). It should be noted that an EF5 tornado is possible.
Winter Storm and Freeze	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest 24-hour snowfall reported in the county was 20.3 inches on February 12, 1905. Due to unpredictable variations in snowfall throughout the county, extent totals will vary for each participating jurisdiction and reliable data on snowfall totals is not abundantly available. In addition, the lowest temperature reached in the county was -6 degrees Fahrenheit (January 21, 1985).
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale (Table 5.25) and the Modified Mercalli Intensity (MMI) scale (Table 5.26) and the distance of the epicenter from the Town of Midway. According to data provided by the National Geophysical Data Center, no earthquakes have impacted the town. However, the greatest MMI to impact the county was IV (moderate) with a correlating Richter Scale measurement of approximately 4.7 (reported on November 30, 1973). The epicenter of this earthquake was located 334.0 km away.

Landslide	As noted above in the landslide profile, the landslide data provided by the North Carolina Geological survey is incomplete. This provides a challenge when trying to determine an accurate extent for the landslide hazard. However, when using the USGS landslide susceptibility index, extent can be measured with incidence, which is low throughout the town. Additionally, there is moderate susceptibility throughout the Town of Midway.
Hydrologic Hazards	
Dam Failure	Dam failure extent is defined using the North Carolina Division of Energy, Mineral, and Land Resources criteria (Table 5.30). There are no dams in the Town of Midway.
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records available for the Town of Midway.
Flood	Flood extent can be measured by the amount of land and property in the floodplain as well as flood height and velocity. The amount of land in the floodplain accounts for 2.6 percent of the total land area in the Town of Midway. Flood depth and velocity are recorded via United States Geological Survey stream gages throughout Davidson County. While a gage does not exist within the Town of Midway, there is one located relatively nearby at Lexington. The greatest peak discharge recorded at Lexington was reported on September 25, 1947. Water reached a discharge of 14,800 cubic feet per second and the stream gage height was 22.12 feet.
Other Hazards	
Hazardous Materials Incident	According to USDOT PHMSA, there have been no hazardous materials incidents reported in the town. However, the largest hazardous materials incident reported in the county was 36,000 LGA released on the railway on July 11, 1978. It should be noted that larger events are possible.
Nuclear Accident	Although there is no history of a nuclear accident at the McGuire Power Plant, other events across the globe and in the United States in particular indicate that an event is possible. Since several national and international events were Level 7 events on the INES, the potential for a Level 7 event at McGuire is possible.
Terror Threat	There is no history of terror threats in the Town of Midway; however; it is possible that one of these events could occur. If this were to take place, the magnitude of the event could range on the scale of critical damage with many fatalities and injuries to the population.
Wildfire	Wildfire data was provided by the North Carolina Division of Forest Resources and is reported annually by county from 2005-2014. The greatest number of fires to occur in Davidson County in any year was 53 in 2006. The greatest number of acres to burn in the county in a single year occurred in 2012 when 146.3 acres were burned. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.

Priority Risk Index Results

In order to draw some meaningful planning conclusions on hazard risk for the Town of Midway, the results of the hazard profiling process were used to generate countywide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.20.2.

Table C.34 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles

developed for this section, as well as input from the Hazard Mitigation Planning Team. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE C.34: SUMMARY OF PRI RESULTS FOR MIDWAY

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Atmospheric Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Extreme Heat	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Hailstorm	Highly Likely	Minor	Moderate	6 to 12 hours	Less than 6 hours	**2.5**
Hurricane and Tropical Storm	Likely	Limited	Large	More than 24 hours	Less than 24 hours	**2.6**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Thunderstorm / High Wind	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Tornado	Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.7**
Winter Storm and Freeze	Highly Likely	Limited	Moderate	More than 24 hours	Less than 1 week	**2.8**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Landslide	Unlikely	Minor	Small	Less than 6 hours	Less than 6 hours	**1.5**
Hydrologic Hazards						
Dam and Levee Failure	Unlikely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.1**
Erosion	Possible	Minor	Small	More than 24 hours	More than 1 week	**1.8**
Flood	Possible	Minor	Small	6 to 12 hours	Less than 1 week	**1.9**
Other Hazards						
Hazardous Materials Incident	Possible	Limited	Small	Less than 6 hours	Less than 24 hours	**2.2**
Nuclear Accident	Unlikely	Limited	Negligible	6 to 12 hours	Less than 1 week	**1.7**
Terror Threat	Unlikely	Critical	Small	Less than 6 hours	Less than 24 hours	**2.2**
Wildfire	Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.3**

C.2.19 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for the Town of Midway, including the PRI results and input from the Hazard Mitigation Planning Team, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table C.35**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of the Town of Midway. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section C.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

TABLE C.35: CONCLUSIONS ON HAZARD RISK FOR MIDWAY

HIGH RISK	Thunderstorm / High Wind Winter Storm and Freeze Tornado
MODERATE RISK	Hurricane and Tropical Storm Drought Hailstorm Lightning Wildfire
LOW RISK	Hazardous Materials Incident Terror Threat Extreme Heat Dam and Levee Failure Earthquake Flood Erosion Nuclear Accident Landslide

C.3 MIDWAY VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of the Town of Midway to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the town and assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

C.3.1 Asset Inventory

Table C.36 lists the number of parcels, total value of parcels, total number of parcels with improvements, and the total assessed value of improvements for the Town of Midway (study area of vulnerability assessment).[18]

[18] Total assessed values for improvements is based on tax assessor records as joined to digital parcel data. This data does not include dollar figures for tax-exempt improvements such as publicly-owned buildings and facilities. It should also be noted that, due to record keeping, some duplication is possible thus potentially resulting in an inflated value exposure for an area.

TABLE C.36: IMPROVED PROPERTY IN MIDWAY

Location	Number of Parcels	Total Assessed Value of Parcels	Estimated Number of Buildings	Total Estimated Value of Improvements[19]
Midway	2,232	$309,140,740	4,104	$215,022,020

Source: Davidson County GIS Department

Table C.37 lists the fire stations, police stations, EMS/rescue stations, medical care facilities, schools and other critical facilities located in the Town of Midway. These facilities were identified as primary critical facilities in that they are necessary to maintain government functions and protect the life, health, safety, and welfare of citizens. These facilities were geospatially mapped and used as the basis for further geographic analysis of the hazards that could potentially affect critical facilities. All critical facility information was provided by the local government and the Davidson County GIS department.

In addition, **Figure C.13** shows the locations of primary critical facilities in the Town of Midway. **Table C.52**, near the end of this section, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. As noted previously, this list is not all-inclusive and only includes information provided by the local government.

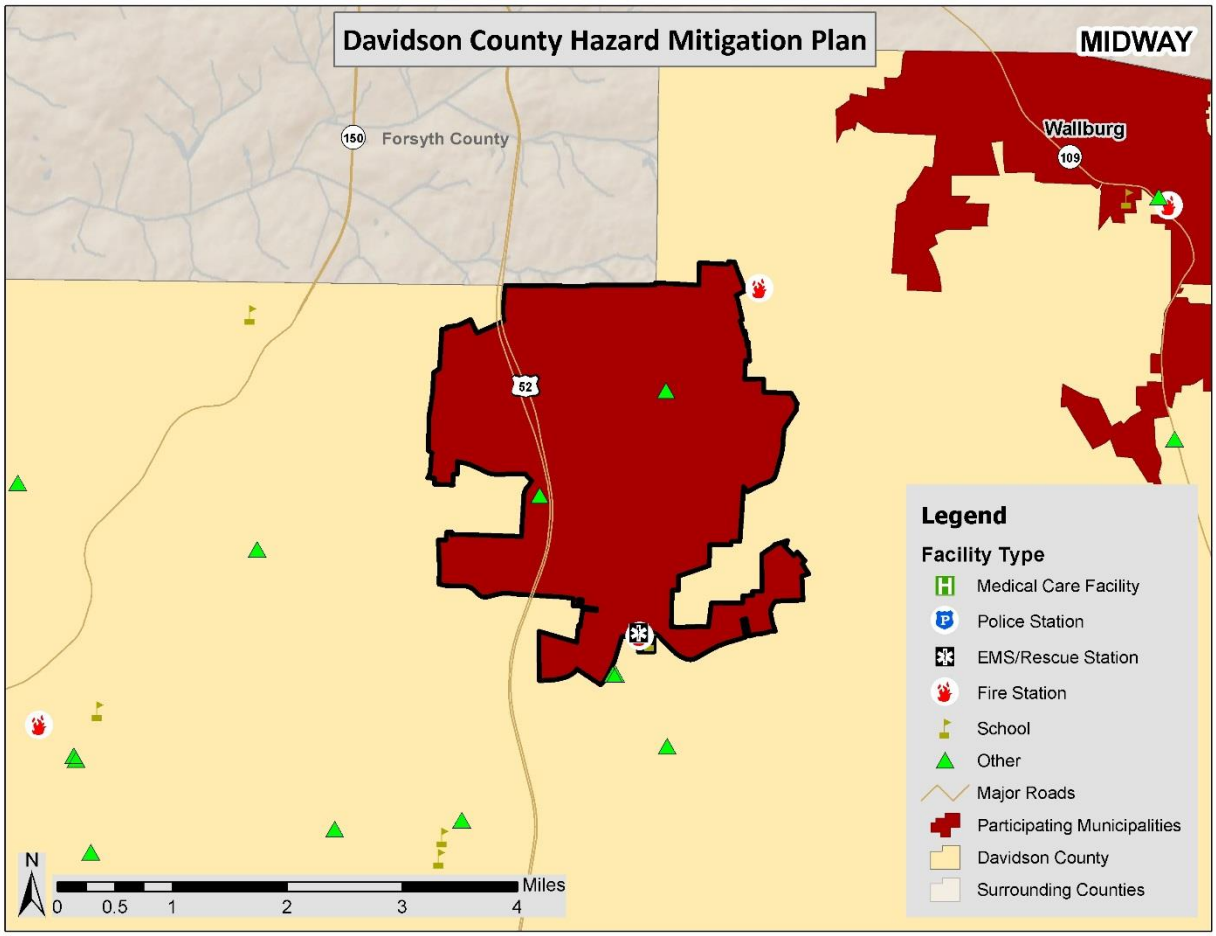
TABLE C.37: CRITICAL FACILITY INVENTORY IN MIDWAY

Location	Fire Stations	Police Stations	EMS/Rescue Stations	Medical Care Facilities	Schools	Other
Midway	1	0	1	0	1	2

Source: Local Government

[19] Building value for each jurisdiction is based on the dollar value of parcels with a building value greater than zero.

FIGURE C.13: CRITICAL FACILITY LOCATIONS IN MIDWAY



Source: Local Government

C.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in the Town of Midway that are potentially at risk to these hazards.

Table C.38 lists the population according to U.S. Census 2010 population estimates. The total population in the Town of Midway according to Census data is 4,679 persons. Additional population estimates are presented above in Section C.1.

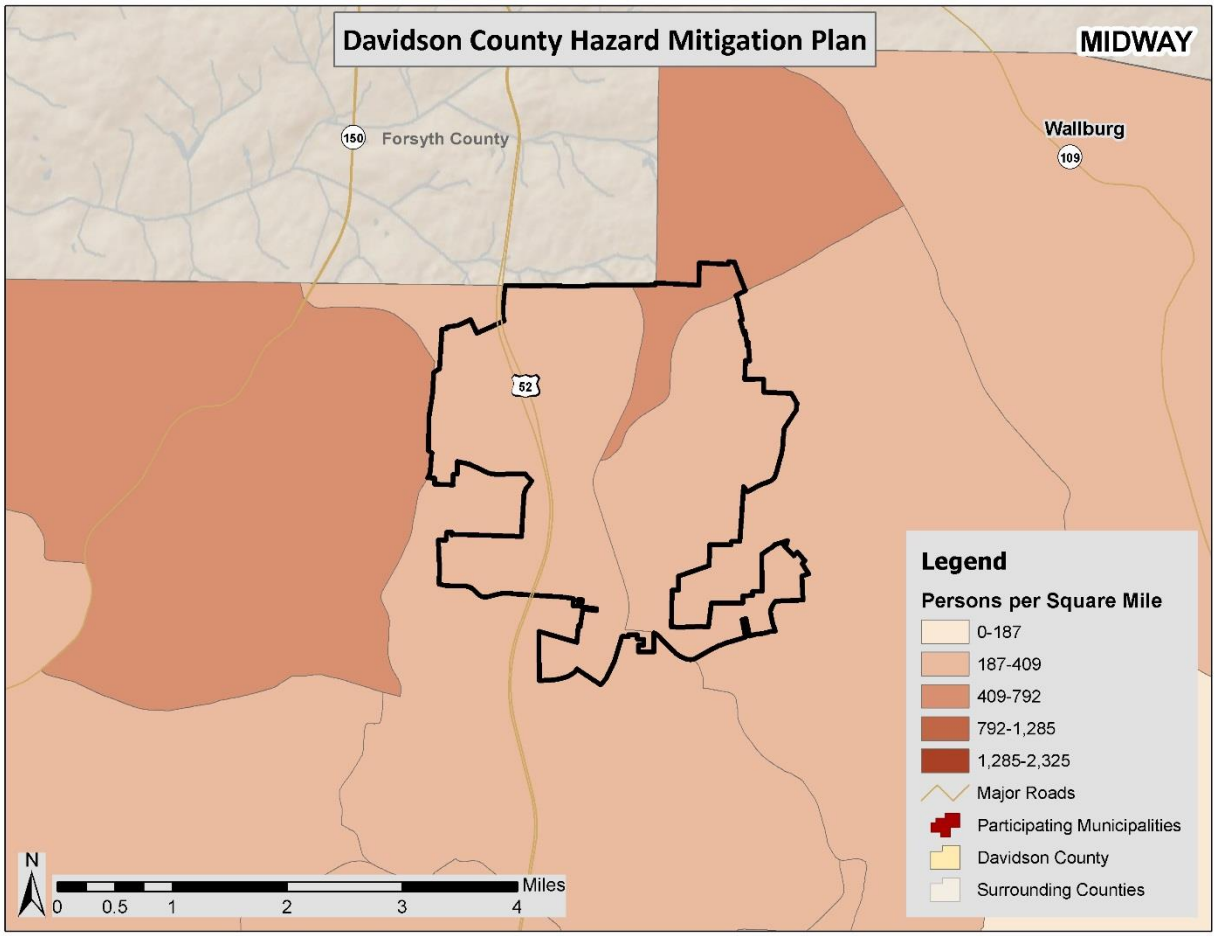
TABLE C.38: TOTAL POPULATION IN MIDWAY

Location	Total 2010 Population
Midway	4,679

Source: United States Census 2010

In addition, **Figure C.14** illustrates the population density by census tract as it was reported by the U.S. Census Bureau in 2010.

FIGURE C.14: POPULATION DENSITY IN MIDWAY



Source: United States Census Bureau, 2010

C.3.3 Development Trends and Changes in Vulnerability

Since the previous hazard mitigation plan was approved in 2010, the Town of Midway has experienced some growth and development. **Table C.39** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE C.39: BUILDING COUNTS FOR MIDWAY

Jurisdiction	Total Housing Units (2013)	Units Built 2010 or later	% Building Stock Built Post-2010
Midway	2,157	43	2.0%

Source: United States Census Bureau

Table C.40 shows population growth estimates for the town from 2010 to 2013 based on the U.S. Census Annual Estimates of Resident Population.

TABLE C.40: POPULATION GROWTH FOR MIDWAY

Jurisdiction	Population Estimates (as of July 1)				% Change 2010-2013
	2010	2011	2012	2013	
Midway	4,666	4,673	4,694	4,698	0.7%

Note: July 1 population estimates were used in this table to allow comparison of annual population counts (April 1 Census estimates were used for all other population counts throughout the plan which is why the counts may differ).
Source: United States Census Bureau

Based on the data above, there has been a low rate of residential development and population growth in the town since 2010. This has resulted in an increased number of structures that are vulnerable to the potential impacts of the identified hazards as well as a greater number of people exposed to the identified hazards. Therefore, development and population growth have impacted the town's vulnerability since the previous local hazard mitigation plan was approved and there has been a slight increase in the overall vulnerability.

It is also important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains, moderate landside susceptibility areas, high wildfire risk areas, primary and secondary hazardous materials buffers, or McGuire Nuclear Power Plant's 50-mile buffer.

C.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, modeling tool, or sufficient historical data allow for further analysis. Those results, specific to the Town of Midway, are presented here. All other hazards are assumed to impact the entire planning region (drought, extreme heat, hailstorm, lightning, thunderstorm/high wind, tornado, and winter storm and freeze) or, due to lack of data, analysis would not lead to credible results (dam and levee failure, erosion, and terror threat). The total town exposure, and thus risk, was presented in **Table C.36**.

The annualized loss estimate for all hazards is presented at the end of this section in **Table C.51.**

The hazards presented in this section include: hurricane and tropical storm winds, earthquake, landslide, flood, hazardous materials incident, nuclear accident, and wildfire.

Hurricane and Tropical Storm

Historical evidence indicates that the Town of Midway has some risk to the hurricane and tropical storm hazard. There have been five disaster declarations due to hurricanes (Hurricane Hugo, Hurricane Fran, Hurricane Floyd, Hurricane Isabel, and Hurricane Ivan) in Davidson County. Several tracks have come near or traversed through Davidson County, as shown and discussed in Section C.2.4.

Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, high winds, and precipitation, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore only hurricane winds are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to the hurricane and tropical storm hazard. Hazus-MH 2.1 was used to determine annualized losses for the county as shown below in **Table C.41.**

Only losses to buildings, contents, and inventory are reported, in order to best match annualized losses reported for other hazards. Hazus-MH reports losses at the U.S. Census tract level, so determining participating jurisdiction losses was not possible.

TABLE C.41: ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$637,00	$148,000	$5,000	$790,000

Source: Hazus-MH 2.1

In addition, probable peak wind speeds were calculated in Hazus. These are shown below in **Table C.42.**

TABLE C.42: PROBABLE PEAK HURRICANE / TROPICAL STORM WIND SPEEDS (MPH)

Location	50-year event	100-year event	500-year event	1,000-year event
Midway	62.1	71.7	91.2	98.0

Source: Hazus-MH 2.1

Social Vulnerability

Given equal susceptibility across the Town of Midway, it is assumed that the total population is at risk to the hurricane and tropical storm hazard.

Critical Facilities

Given equal vulnerability across the Town of Midway, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among other factors. Determining individual building response is beyond the scope of this plan. However, this plan will consider mitigation actions for vulnerable structures, including critical facilities, to reduce the impacts of the hurricane wind hazard. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this section.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in the Town of Midway. Hurricane events can cause substantial damage in their wake including fatalities, extensive debris clean-up, and extended power outages.

Earthquake

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the annualized loss for Davidson County. The results of the analysis reported at the U.S. Census tract level do not make it feasible to estimate losses at the jurisdiction level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to building damage (structural and non-structural), contents, and inventory. However, like the analysis for hurricanes, the comparative annualized loss figures at the end of this section only utilize building losses in order to provide consistency with other hazards. **Table C.43** summarizes the findings.

TABLE C.43: ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Building Loss	Non-Structural Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$39,000	$96,000	$28,000	$2,000	$165,000

Source: Hazus-MH 2.1

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. A list of individual critical facilities and their risk can be found in **Table C.52**.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in the Town of Midway. Minor earthquakes may rattle dishes and cause minimal damage while stronger earthquakes will result in structural damage as indicated in the Hazus scenario above. Impacts of earthquakes include debris clean-up, service disruption and, in severe cases, fatalities due to building collapse. Specific vulnerabilities for assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available. Furthermore, mitigation actions to address earthquake vulnerability will be considered.

Landslide

In order to complete the vulnerability assessment for landslides in the Town of Midway, GIS analysis was used. The potential dollar value of exposed land and property total can be determined using the USGS Landslide Susceptibility Index (detailed in Section C.2.10), county-level tax parcel and building footprint data, and GIS analysis. **Table C.44** presents the potential at-risk property where available. No areas of the Town of Midway are identified as moderate or high incidence areas as determined by the USGS landslide data. However, all areas of the town have moderate landslide susceptibility. Typically, an analysis is run to determine which parcels/buildings are located within the high and moderate incidence areas, but since no high incidence areas exist in the county, only an analysis of moderate incidence areas was carried out.

TABLE C.44: TOTAL POTENTIAL AT-RISK PARCELS FOR THE LANDSLIDE HAZARD

Location	Number of Parcels At Risk	Number of Improvements At Risk	Total Value of Improvements At Risk ($)
Incidence Level	Moderate		
Midway	0	0	$0

Source: United States Geological Survey

Social Vulnerability
Given low incidence and moderate susceptibility across the entire town, it is assumed that the total population is at a low risk to landslides.

Critical Facilities
No critical facilities are located in a moderate incidence area. However, all critical facilities are located in a moderate susceptibility area. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this section.

In conclusion, a landslide has the potential to impact all existing and future buildings, facilities, and populations in the Town of Midway, though most areas are at a very low risk. Due to a variety of factors

such as steep slopes and modified slopes, hilly areas of the town bear a greater risk than flat areas. Specific vulnerabilities for the Town of Midway assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available.

Flood

Although existing floodplains indicate that the Town of Midway is susceptible to flood events, there are few reports of damage. Therefore, it is difficult to calculate a reliable annualized loss figure. It is assumed that while one major event could result in significant losses, annualizing structural losses over a long period of time would most likely yield a negligible annualized loss estimate for the Town of Midway.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with local tax assessor records for the town. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within an identified floodplain. **Table C.45** presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

TABLE C.45: ESTIMATED EXPOSURE OF PARCELS TO THE FLOOD HAZARD

Location	1.0-percent ACF			0.2-percent ACF		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[20]	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[21]
Midway	45	0	$0	3	140	$39,860

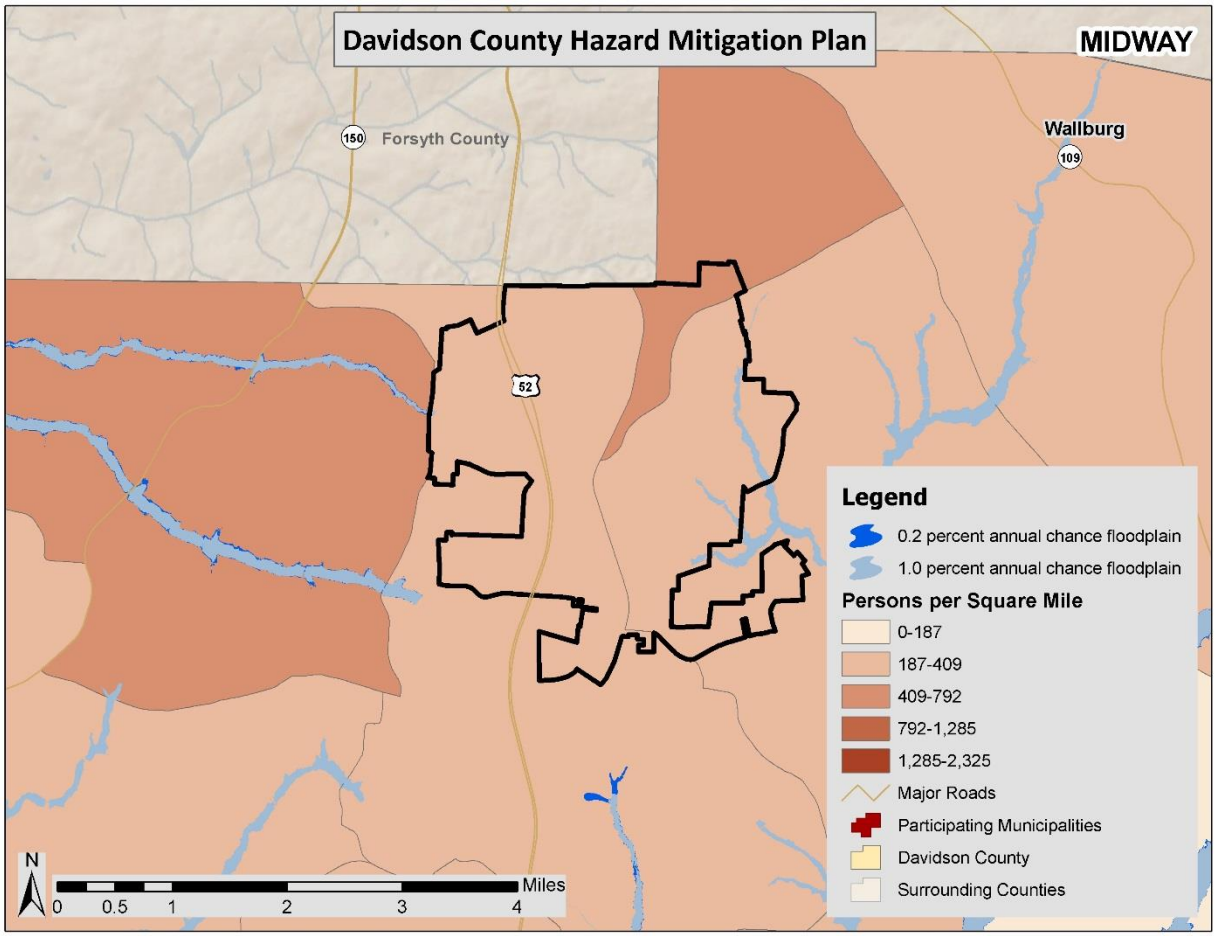
Source: Federal Emergency Management Agency DFIRM

Social Vulnerability

U.S. Census 2010 population at the tract level was used for analysis to determine where areas of high population concentration intersect with flood prone areas in the town. **Figure C.15** is presented to gain a better understanding of the at-risk population.

[20] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-percent annual chance floodplain, since building footprints were not associated with dollar value data.
[21] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 0.2-percent annual chance floodplain, since building footprints were not associated with dollar value data.

FIGURE C.15 : POPULATION DENSITY NEAR FLOODPLAINS



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no critical facilities in the Town of Midway located in the 1.0-percent annual chance floodplain or the 0.2-percent annual chance floodplain based on FEMA DFIRM boundaries and GIS analysis. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this section.

In conclusion, a flood has the potential to impact existing and future buildings, facilities, and populations in the Town of Midway, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. As noted, the floodplains used in this analysis include the 100-year and 500-year FEMA regulated floodplain boundaries. It is certainly possible that more severe events could occur beyond these boundaries or urban (flash) flooding could impact additional structures. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

Hazardous Materials Incident

Although historical evidence and existing Toxic Release Inventory sites indicate that the Town of Midway is susceptible to hazardous materials events, there are few reports of damage. Therefore, it is difficult

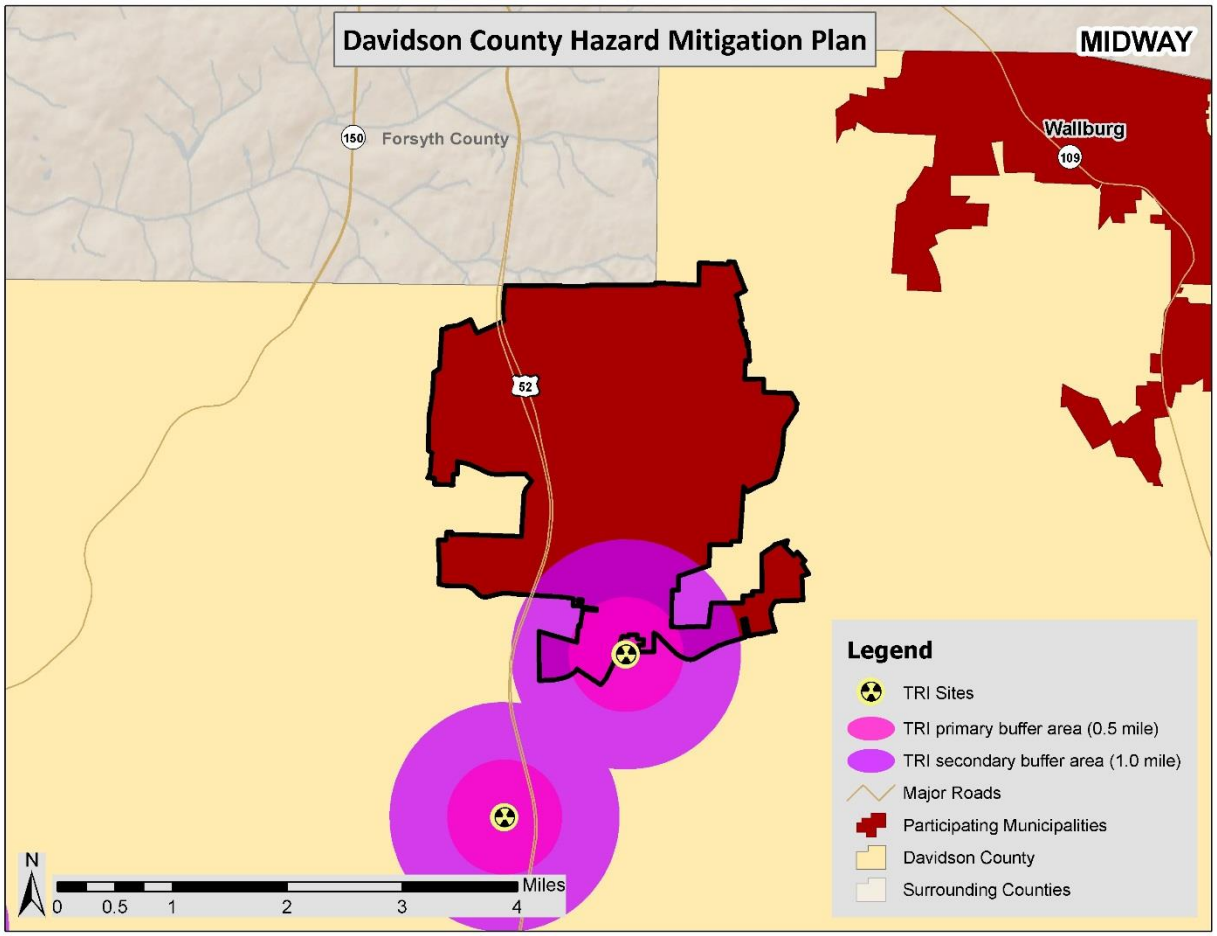
to calculate a reliable annualized loss figure. It is assumed that while one major event could result in significant losses, annualizing structural losses over a long period of time would most likely yield a negligible annualized loss estimate for the Town of Midway.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and parcels.[22] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to respect the different levels of effect: immediate (primary) and secondary. Primary and secondary impact sites were selected based on guidance from FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks against Buildings and engineering judgment. For the fixed site analysis, geo-referenced TRI listed toxic sites in the Town of Midway, along with buffers, were used for analysis as shown in **Figure C.16.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure C.17** shows the areas used for mobile toxic release buffer analysis. The results indicate the approximate number of parcels/buildings and improved value, as shown in **Table C.46** (fixed sites), **Table C.47** (mobile road sites) and **Table C.48** (mobile railroad sites).[23]

[22] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an event).
[23] Note that parcels included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE C.16 : TRI SITES WITH BUFFERS IN MIDWAY



Source: Environmental Protection Agency

TABLE C.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[24]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[25]
Midway	140	301	$14,155,860	438	880	$38,090,150

[24] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[25] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

FIGURE C.17 : MOBILE HAZMAT BUFFERS IN MIDWAY

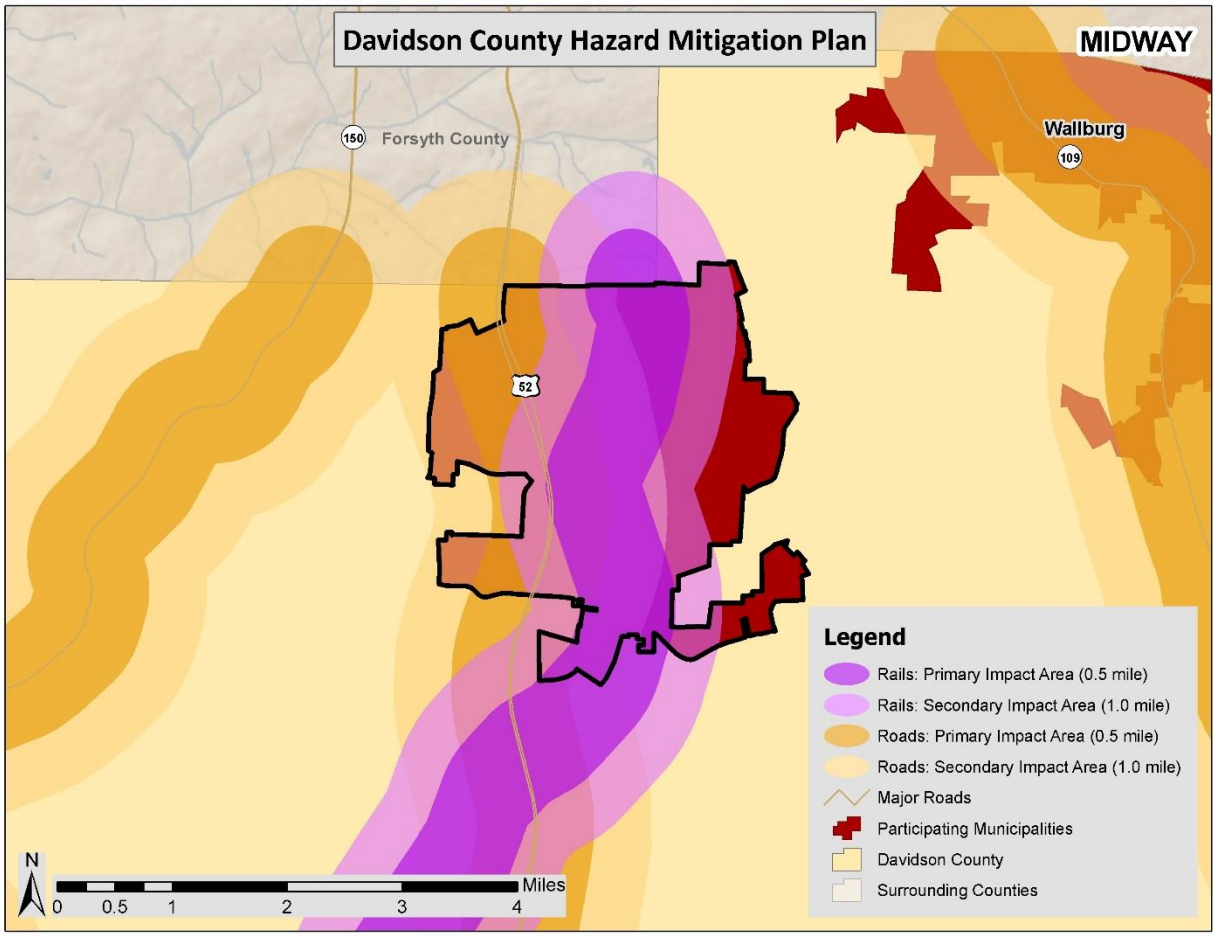


TABLE C.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[26]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[27]
Midway	836	1,375	$91,119,200	1,379	2,494	$144,152,990

[26] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[27] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

TABLE C.48: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[28]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[29]
Midway	703	1,412	$71,582,930	1,302	2,516	$124,666,630

Social Vulnerability

Given high susceptibility across the entire town, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are 3 Town of Midway facilities located in a HAZMAT risk zone. Both the primary impact zone and the secondary, 1.0-mile, zone include three facilities: 1 EMS/rescue station, 1 fire station, and 1 school. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this section.

Mobile Analysis:

The critical facility analysis for road and railroad transportation corridors in the Town of Midway revealed that there are 3 critical facilities located in the primary and secondary mobile HAZMAT buffer areas for roads and 5 critical facilities located in the railroad HAZMAT buffer areas. The 1.0-mile road buffer area (worst case scenario model) includes the following critical facilities: 1 EMS/rescue station, 1 fire station, and 1 school. The railroad buffer areas include the following: 1 EMS/rescue station, 1 fire station, 1 school, and 2 other facilities. It should be noted that all of the facilities located in the buffer areas for railroad are also located in the buffer areas for road and/or the fixed site analysis. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this section.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in the Town of Midway. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in conditions that could alter the impact area such direction and speed of wind, volume of release, etc. Further, incidents from neighboring counties could also impact the town.

Nuclear Accident

The location of the Town of Midway outside of the 50-mile radius of the McGuire Nuclear Power Plant indicates that the town is at low risk to a nuclear accident.

In order to assess nuclear risk, a GIS-based analysis was used to estimate exposure during a nuclear event within each of the risk zones described in Section 5: *Hazard Profiles*. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within one of the

[28] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.

[29] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

risk zones. There are no properties in Davidson County located within the 10-mile risk zone, so **Table C.49** only presents the potential at-risk property in the 50-mile buffer zone for the Town of Midway. Both the number of parcels/buildings and the approximate value are presented.

TABLE C.49: ESTIMATED EXPOSURE OF PARCELS/BUILDINGS TO A NUCLEAR ACCIDENT

Location	50-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[30]
Midway	0	0	$0

Source: International Atomic Energy Agency

Social Vulnerability

Since no areas of the town are within the 50-mile buffer area, the total population is considered to be at low risk to a nuclear hazard.

Critical Facilities

The critical facility analysis revealed that there are no critical facilities located in the 50-mile nuclear buffer area in the Town of Midway. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this section.

In conclusion, a nuclear accident has low potential to impact existing and future buildings, facilities, and populations in the Town of Midway since none of the town is located within the 50-mile buffer area.

Wildfire

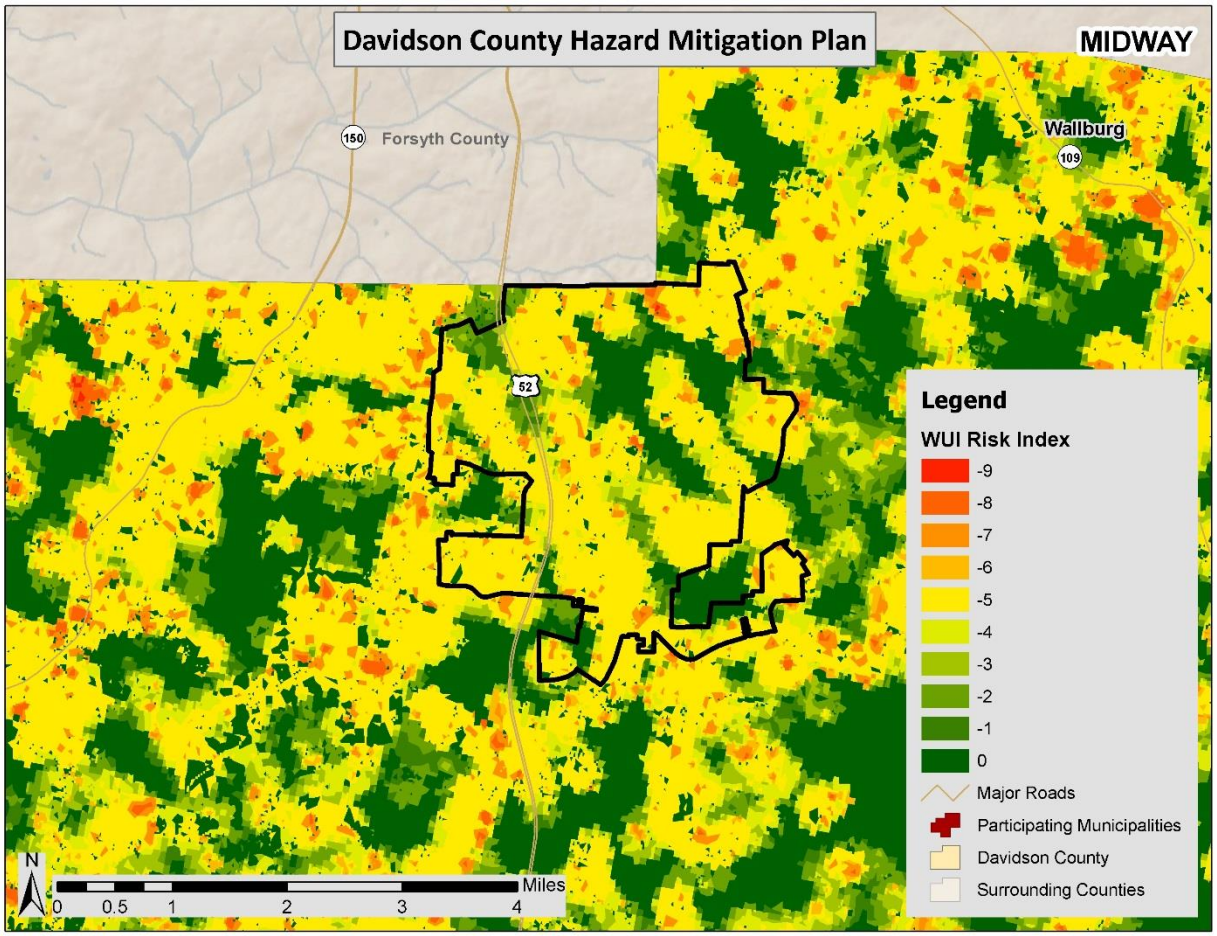
Historical evidence indicates that the Town of Midway is susceptible to wildfire events. A total of 227 wildfires were reported by the North Carolina Division of Forest Resources in Davidson County from 2009 to 2014 resulting in $58,000 in structure damage. On an annualized level, these damages amount to $11,600 for the county (data is only reported at the county level, so it is not possible to calculate damages specific to the town).

To estimate exposure to wildfire, the approximate number of parcels and their associated improved value was determined using GIS analysis. For the critical facility analysis, areas of risk were intersected with critical facility locations. **Figure C.18**, shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to -9 with lower values being most severe (as noted previously, this is only a measure of relative risk). **Figure C.19** shows the areas of analysis where any grid cell is than -5. Areas with a value below -5 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

[30] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 50-mile buffer, since building footprints were not associated with dollar value data.

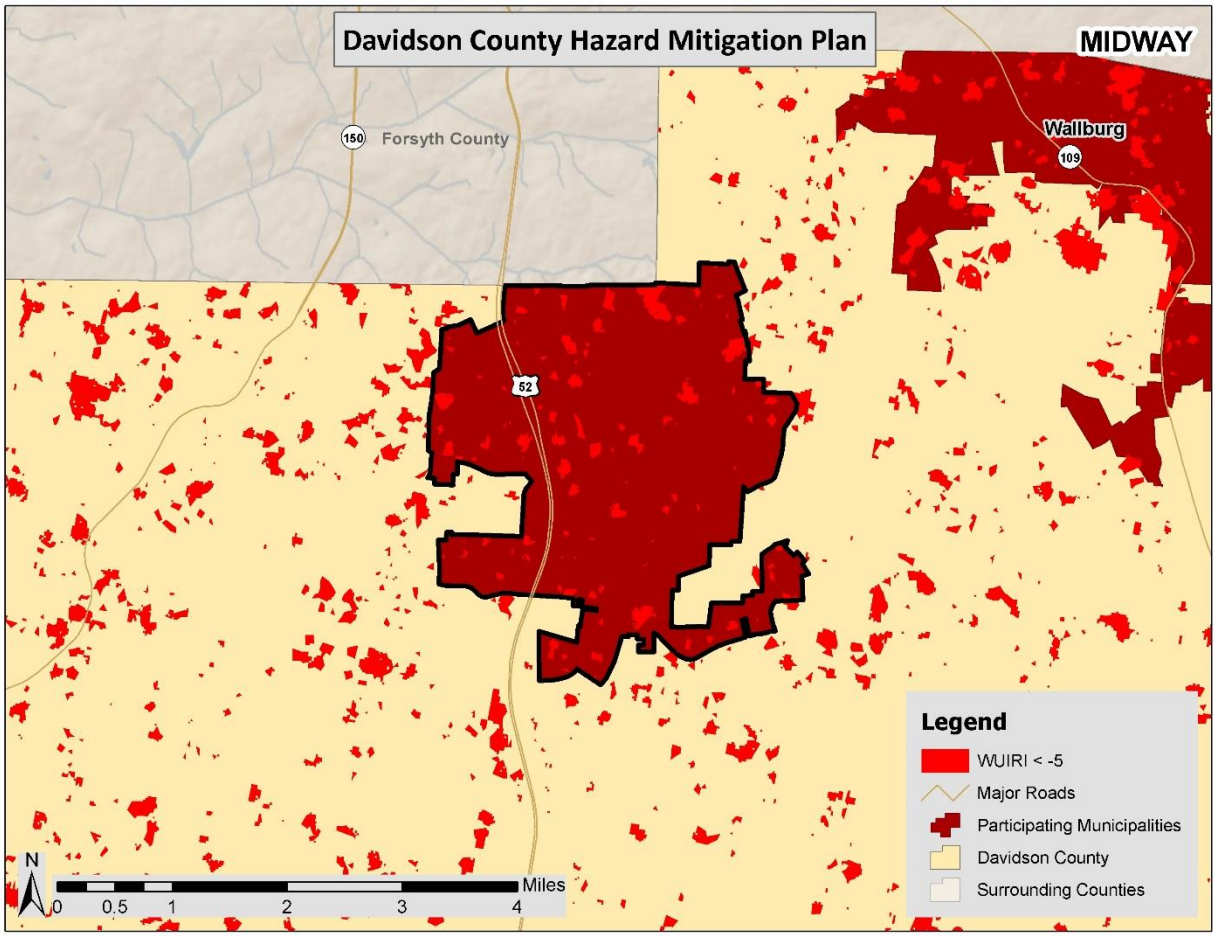
Table C.50 shows the results of the analysis.

FIGURE C.18: WUI RISK INDEX AREAS IN MIDWAY



Source: Southern Wildfire Risk Assessment Data

FIGURE C.19: HIGH WILDFIRE RISK AREAS IN MIDWAY



Source: Southern Wildfire Risk Assessment Data

TABLE C.50: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

Location	HIGH WILDFIRE RISK AREA		
	Approx. Number of Parcels	Approx. Number of Buildings	Approx. Improved Value
Midway	399	299	$37,779,880

Social Vulnerability

Although not all areas have equal vulnerability, there is some susceptibility across the entire town. It is assumed that the total population is at low risk to the wildfire hazard. Determining the exact number of people in wildfire risk areas is difficult with existing data and could be misleading.

Critical Facilities

The critical facility analysis revealed that there are no critical facilities located in the in the wildfire risk area (areas where the WUIRI is less than -5). However, it should also be noted, that several factors could impact the spread of a wildfire putting all facilities at some risk. A list of specific critical facilities and their associated risk can be found in **Table C.52** at the end of this section.

In conclusion, a wildfire event has the potential to impact some existing and future buildings, critical facilities, and populations in the Town of Midway.

Conclusions on Hazard Vulnerability

Table C.51 presents a summary of annualized loss for each hazard in the Town of Midway. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for the town. Therefore, although an annualized loss was determined using the damage reported from historical occurrences at the municipal level (where available), it is likely that the county-wide estimate (found in Section 6: *Vulnerability Assessment*) is a better estimate. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the town.

TABLE C.51: ANNUALIZED LOSS FOR MIDWAY*

Event	Midway
Atmospheric Hazards	
Drought	Negligible
Extreme Heat	Negligible
Hailstorm	Negligible
Hurricane & Tropical Storm†	$790,000
Lightning	Negligible
Severe Thunderstorm / High Wind	$99
Tornado	Negligible
Winter Storm & Freeze†	$344,444
Geologic Hazards	
Earthquake†	$165,000
Landslide	Negligible
Hydrologic Hazards	
Dam Failure	Negligible
Erosion	Negligible
Flood	Negligible
Other Hazards	
HAZMAT Incident	Negligible
Nuclear Accident	Negligible
Terror Threat	Negligible
Wildfire†	$11,600

*In this table, the term "Negligible" is used to indicate that no records for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not kept.
†Only county-wide damage estimates were reported for this hazard.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to atmospheric hazards including drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind, tornado, and winter storm and freeze. Some buildings may be more vulnerable to these hazards based on locations, construction, and building type. **Table C.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

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TABLE C.52: AT-RISK CRITICAL FACILITIES IN MIDWAY

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
MIDWAY																								
North - Base 3	EMS Base	X	X	X	X	X	X	X	X	X					X	X		X	X	X				
Station #86	Fire Station	X	X	X	X	X	X	X	X	X					X	X		X	X	X				
Midway Elementary	School	X	X	X	X	X	X	X	X	X					X	X			X	X				
Water Tank-Gumtree Rd at Norman Shoaf Rd	Water Tank	X	X	X	X	X	X	X	X	X									X	X				
Water Tank-Pin Oak Dr along US 52	Water Tank	X	X	X	X	X	X	X	X	X							X	X		X				

C.4 TOWN OF MIDWAY CAPABILITY ASSESSMENT

This subsection discusses the capability of the Town of Midway to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

C.4.1 Planning and Regulatory Capability

Table C.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the Town of Midway. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Davidson County Hazard Mitigation Plan.

TABLE C.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System
Midway	✓	*						✓							✓	✓	✓			✓	✓		

A more detailed discussion on the town's planning and regulatory capabilities follows.

Emergency Management

Hazard Mitigation Plan
The Town of Midway was included in the county's previous hazard mitigation plan.

Emergency Operations Plan
The Town of Midway is included in the county's emergency operations plan.

General Planning

Comprehensive Land Use Plan
Midway is currently in the process of developing a town land use plan and a draft of the plan has been completed.

Zoning Ordinance
The Town of Midway has adopted a standalone zoning ordinance.

Subdivision Ordinance
The Town of Midway has adopted a standalone subdivision ordinance.

Building Codes, Permitting, and Inspections
North Carolina has a state compulsory building code which applies throughout the state. Davidson County provides building inspection services for the Town of Midway through contractual agreement.

Floodplain Management

Table C.54 provides NFIP policy and claim information for the Town of Midway.

TABLE C.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
Midway*	--	--	--	--	--	--

* Community does not participate in the NFIP
Source: NFIP Community Status information as of 2/12/15; NFIP claims and policy information as of 11/30/14

Flood Damage Prevention Ordinance
Although the Town of Midway does not participate in the NFIP, it has adopted Davidson County's flood damage prevention ordinance.

C.4.2 Administrative and Technical Capability

Table C.55 provides a summary of the capability assessment results for the Town of Midway with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in the town with the specified knowledge or skill.

TABLE C.55: RELEVANT STAFF / PERSONNEL RESOURCES

Staff / Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
Midway	✓	✓		✓	✓		✓	✓		

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

C.4.3 Fiscal Capability

Table C.56 provides a summary of the results for the Town of Midway with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds) according to the previous county hazard mitigation plan.

TABLE C.56: RELEVANT FISCAL RESOURCES

Fiscal Tool / Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP, PDM, FMA, SBA, other Federal, state, and non-governmental funding sources, etc.
Midway	✓	✓	✓							✓

C.4.4 Political Capability

The previous hazard mitigation plan indicates that the Town of Midway supports hazard mitigation practices and strategies to the extent that it is able to pursue development of strategies. Public awareness has increased through the planning process. Political willpower has yet to be developed through education and awareness programs.

C.4.5 Conclusions on Local Capability

Table C.57 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in the existing hazard mitigation plan and readily available on the town's government website. According to the assessment, the local capability score for the town is 19, which falls into the limited capability ranking.

TABLE C.57: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
Midway	19	Limited

C.5 MIDWAY MITIGATION STRATEGY

This subsection provides the blueprint for the Town of Midway to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Hazard Mitigation Planning Team and the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

C.5.1 Mitigation Goals

The Town of Midway developed five mitigation goals in coordination with the other participating Davidson County jurisdictions. The county mitigation goals are presented in **Table C.58**.

TABLE C.58: DAVIDSON COUNTY MITIGATION GOALS

	Goal
Goal #1	To enhance local government capability to lessen the impacts of all natural hazards.
Goal #2	To identify and protect critical facilities, services, and infrastructure from the impacts of natural disasters.
Goal #3	To develop an effective public awareness/education/outreach program for natural hazards impacts.
Goal #4	To protect persons and property from damage due to natural hazards.
Goal #5	To ensure disaster resistant future development.

C.5.2 Mitigation Action Plan

The mitigation actions proposed the Town of Midway are listed in the following individual Mitigation Action Plan.

Midway Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Establish hazard mitigation as a component of all planning activities.	All	Moderate	Midway Town Manager	n/a	2019	Although hazard mitigation has been integrated into many planning activities, the town will attempt to improve its integration into all planning activities going forward.
P-2	Currently developing a comprehensive land use plan that will be implemented in phases.	All	Moderate	Midway Town Manager/Planning Zoning Board	n/a	Completed	The town has developed a comprehensive land use plan.
P-3	Adopted Davidson County's policy regarding drought management and response.	Drought	Low	Midway Town Manager	n/a	Completed	The town has adopted Davidson County's policy regarding drought management and response.
P-4	Clear debris from culverts and storm drains in flood prone areas.	Flood	High	NC DOT	n/a	Deleted	NC Department of Transportation clears debris from culverts and storm drains in flood prone areas.
P-5	Consider tree ordinances or programs to encourage planting trees less susceptible to damage from ice and wind.	Winter Storm, High Wind	Low	Midway Town Manager	n/a	2015-2016	The town has not established an ordinance or program related to tree planting, but it will do so in the next two years.
P-6	Through a subdivision regulation plan, encourage that power, cable and telephone lines be buried. This will be implemented in phases.	Winter Storm, High Wind	Low	Midway Town Manager/Planning Zoning Board	Local	2016	The town will be requiring that utility lines be buried in all new subdivisions
P-7	Through development of land use plan, designate preferred growth areas and develop area plans for target locations. This will be implemented in phases.	All	Low	Midway Town Manager/Planning Zoning Board	Local	2015-2016	The town is working to develop a land use plan and currently has a draft plan developed. It will be finalized no later than December 2016.
P-8	Consider a subdivision ordinance to allow clustering to maximize density while preserving high hazard areas (areas prone to flood, landslide, erosion).	All	Low	Midway Town Manager/Planning Zoning Board	Local	2015/16	The town will be adopting a subdivision ordinance to be finalize no later than December 2016

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Property Protection							
PP-1	Evaluate capacity of critical services to deal with power outages.	All	High	Midway Town Manager/Duke Power	n/a	Deleted	Duke Power currently evaluates capacity of critical services to deal with power outages.
Natural Resource Protection							
NRP-1	Through development of land use plan, Wherever possible preserve natural wetlands, designate conservation corridors, especially along streams through acquisition or conservation easements.	All	Low	Midway Town Manager/Planning Zoning Board	Local	2018	The town has been working to develop a land use plan and currently has a draft plan developed. It will look to finalize this plan before the next HMP update.
Emergency Services							
ES-1	Emergency water supply capability is handled through Davidson Water Inc.	All	High	Midway Town Manager, Davidson Water Inc.	n/a	Deleted	Emergency water supply capability is handled through Davidson Water Inc
ES-2	Generators for emergency shelter (Midway Elementary School) and fire station.	All	High	Midway Fire and Rescue	Local	2020	The town is looking into investing in generators for the emergency shelter and fire station but has not purchased these yet.
ES-3	Countywide 911 reverse call system.	All	High	Davidson County	n/a	2017	A countywide reverse 911 system is in place, but the county is looking to improve and upgrade this system in the next few years.
ES-4	Identify and designate at least one emergency shelter in Midway (Midway Elementary School).	All	High	Midway Fire Services/Town Manager	n/a	Completed	The county has designated Midway Elementary School as an emergency shelter.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Public Education and Awareness							
PEA-1	Educate and inform local government and elected officials (decision makers) of the need to consider hazard mitigation in policy and budgetary planning and decision-making processes. Will be attending **National Incident Management System course.**	All	High	Midway Town Manager	Local	2016, Annually	Many efforts have been taken to inform local government and elected officials about the need to consider hazard mitigation in planning and policy-making decisions, however, this effort will need to be continued due to turnover of officials and to keep this on the radar of those officials

Annex D
City of Thomasville

This annex includes jurisdiction-specific information for the City of Thomasville. It consists of the following five subsections:

- D.1 City of Thomasville Community Profile
- D.2 City of Thomasville Risk Assessment
- D.3 City of Thomasville Vulnerability Assessment
- D.4 City of Thomasville Capability Assessment
- D.5 City of Thomasville Mitigation Strategy

D.1 CITY OF THOMASVILLE COMMUNITY PROFILE

D.1.1 Geography and the Environment

The City of Thomasville is located in the northeastern part of Davidson County. An orientation map is provided as **Figure D.1**.

The City of Thomasville was incorporated in 1857. The city was named after its founder John Warwick Thomas who built the community's first store in 1852. The total area of the city is 16.8 square miles, 0.01 square miles of which is water area. A small portion of land (0.3 square miles) that makes up Thomasville is located in neighboring Randolph County.

According to the State Climate Office of North Carolina, Davidson County, and the City of Thomasville, enjoys a moderate climate that is characterized by mild winters and hot, humid summers. In general, the spring months are marked by unpredictable weather and changes can occur rapidly with sunny skies yielding to severe thunderstorms in just a few hours. Precipitation is generally well distributed throughout the year and annual totals average 45 inches.

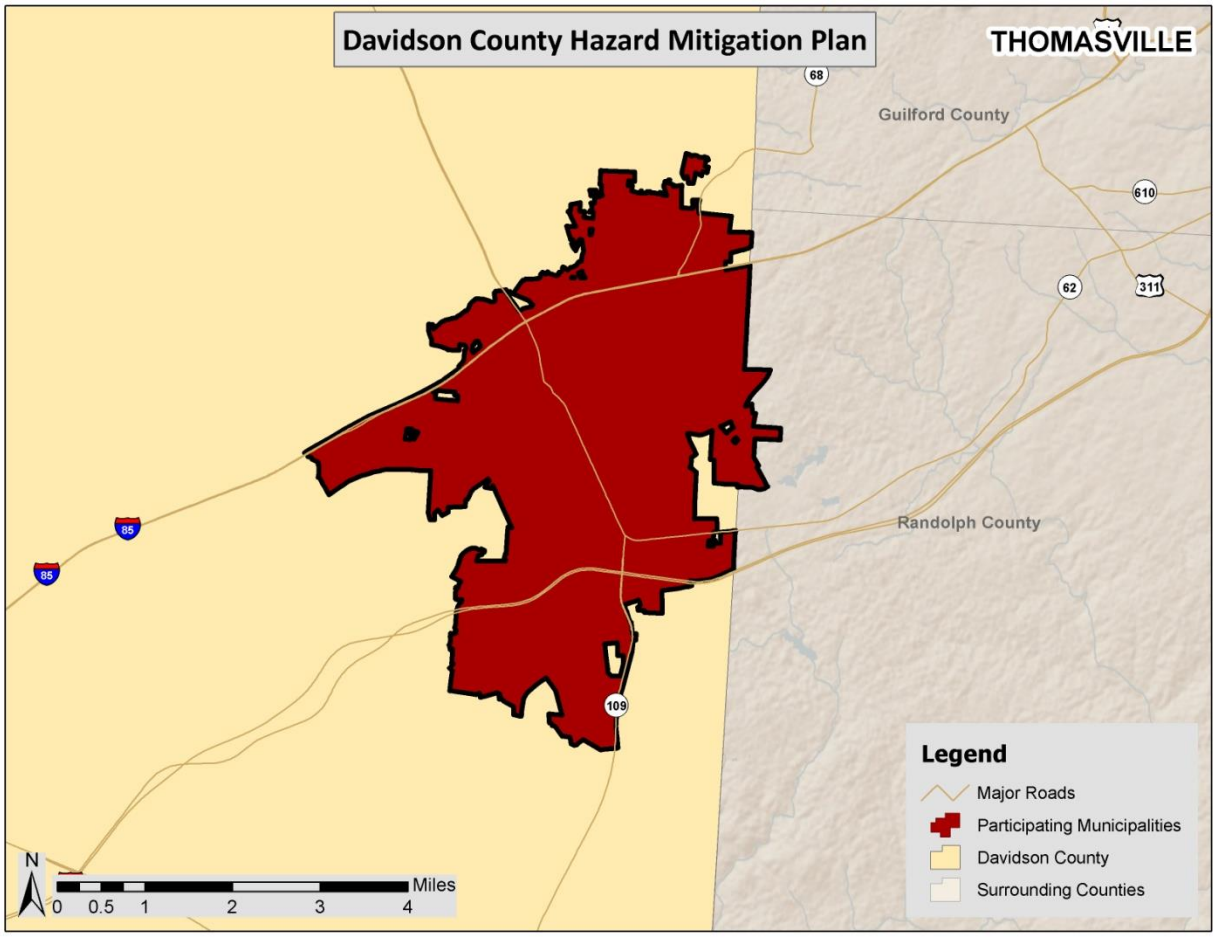
From December to February, the average high temperature ranges from the lower to mid 50s and low temperatures average around 30°F. However, the temperature drops to 10°F or 12°F about once during an average winter over central North Carolina. The mountains also act as a barrier preventing most wintery precipitation from entering the region, and snow and sleet is usually light and occurs on average once or twice per year.

In spring, temperatures begin to rise and the increase in average temperature is greater in April than in any other month. In general, the days are warm and the nights are cool during the spring months. Average high temperatures increase from 63°F in March to 79°F in May. There is a similar increase in average low temperatures, which are in the upper 30s in March and climb to the mid 50s in May. Additionally, tornadoes are most likely early in the spring; however, North Carolina is outside the principal tornado area of the United States.

Tropical air over central North Carolina brings warm temperatures and rather high humidity during the summer. Average high temperatures range from the mid to upper 80s and low temperatures average in the 60s. Summer rainfall is the most variable, and daily showers as well as periods of one to two weeks without rain are both common. Thunderstorms are also common events during the summer months.

Autumn is the season typified by the most rapidly changing temperature. The drop-off is greatest in October and continues through November. Average high temperatures begin in the lower 80s in September and fall to the low 60s by November. Average lows also drop significantly from the 59°F to about 38°F from September to November.

FIGURE D.1: CITY OF THOMASVILLE ORIENTATION MAP



D.1.2 Population and Demographics

According to the 2010 Census, the City of Thomasville has a population of 26,757 people. The city has seen over 35 percent growth between 2000 and 2010, and the average population density is 1,596 people per square mile. Population counts from the U.S. Census Bureau for 1990, 2000, and 2010 for the city are presented in **Table D.1**.

TABLE D.1: POPULATION COUNTS FOR THOMASVILLE

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Thomasville*	15,915	19,788	26,757	35.2%

*The 2010 total population of Thomasville includes population (264 people) residing in Randolph County.
Source: United States Census Bureau

Based on the 2010 Census, the median age of residents of the City of Thomasville is 36.2 years. The racial characteristics of the city are presented in **Table D.2**. Whites make up the majority of the population in the city, accounting for over 68 percent of the population, but there is a substantial minority population as well.

TABLE D.2: DEMOGRAPHICS OF THOMASVILLE

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Thomasville	68.3%	19.6%	0.7%	1.1%	0.0%	8.1%	2.1%	14.4%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau

D.1.3 Housing

According to the 2010 U.S. Census, there are 11,870 housing units in the City of Thomasville, the majority of which are single family homes. Housing information for the city is presented in **Table D.3**. As shown in the table, the city has a very low percentage of seasonal housing units.

TABLE D.3: HOUSING CHARACTERISTICS OF THOMASVILLE

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2009-2013)
Thomasville*	8,515	11,870	0.2%	$105,500

Source: United States Census Bureau

D.1.4 Infrastructure

Transportation

There is one interstate that crosses the City of Thomasville. Interstate 85 is the major east-west thoroughfare that runs through Thomasville connecting the county to Rowan and Randolph. There are also several US highways that cross the city. US Route 70 is an additional east-west thoroughfare that links the county to Randolph County and passes through Lexington. The major north-south highway, NC Route 109, which links Davidson County to Forsyth and Montgomery Counties also traverses Thomasville.

Within the City of Thomasville, a public transportation system operated by Davidson County serves participating local human service agencies as well as the general public.

Currently, there is no passenger rail service offered in the city; however, freight carriers such as High Point, Thomasville & Denton Railroad serve the city.

The Piedmont Triad International Airport is the largest airport closest to Thomasville. It offers 10 daily non-stop commercial flights on 8 airlines and it is the third busiest airport in North Carolina. It is approximately 27 miles from the center of the city. Davidson County Airport, located in Lexington, also provides public air service to the city as well as one other privately-owned airport, Hiatt Airport, located just outside of Thomasville. The Charlotte Douglas International Airport and Raleigh-Durham International Airport are two additional large airports that are also in fairly close proximity to the city.

Utilities

Electrical power in the City of Thomasville is provided by Duke Energy Progress and EnergyUnited. Duke Energy Progress, the largest electric power holding company in the US, provides service across Davidson County. EnergyUnited is an electricity cooperative that also services the majority of the county.

Sewer and water service are both provided by the City of Thomasville. The city operates one wastewater treatment plant and one water treatment plant.

Community Facilities

There are a number of buildings and community facilities located throughout the City of Thomasville. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 5 fire stations, 2 police stations, 2 EMS/rescue stations, and 8 public schools located within the city.

One major hospital is located in the City of Thomasville: Novant Health Thomasville Medical Center. Novant Health Thomasville Medical Center is a general acute center with 146 beds.

There are also a number of county and municipal parks located in and near the City of Thomasville, including Boone's Cave Park and many community and neighborhood parks. High Rock Lake, Tuckertown Lake, and the Yadkin River also offer additional recreational opportunities nearby.

D.1.5 Land Use

Much of Davidson County is developed and relatively urbanized. However, there are some areas that are more sparsely developed. The incorporated municipalities, including the City of Thomasville, are where the county's population is generally concentrated. The incorporated areas are also where many businesses, commercial uses, and institutional uses are located. Land uses in the balance of the study area consist of a variety of types of residential, commercial, industrial, government, and recreational uses. Davidson County's land use pattern can be described as suburban sprawl. Population density is greater in the northern portion of the county while the southern portion is largely rural with primarily residential development. Local land use and associated regulations are further discussed in *Section 7: Capability Assessment*

D.1.6 Employment and Industry

The early modern economy in Davidson County was based on agriculture but it later transitioned to one based on textile and furniture manufacturing in the twentieth century up until the late 1990s. Today,

Davidson County, like many communities, is grappling with the evolution of a manufacturing economy shifting to an economy based on the service industry.

According to the North Carolina Employment Security Commission (NCESC), in 2013 (the last full year with data available), Davidson County had an average annual employment of 71,433 workers and an average unemployment rate of 8.4 percent (compared to 8.0 percent for the state). The Manufacturing industry employed 21.9 percent of the county's workforce followed by Retail Trade (12.1%); Health Care and Social Assistance (11.2%); and Educational Services (10.4%). The American Community Survey (ACS) found the average annual median household income in Davidson County was $43,083 from 2009 to 2013 compared to $46,334 for the state of North Carolina.

D.2 THOMASVILLE RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to the City of Thomasville. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

D.2.1 Drought

Location and Spatial Extent

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that the city would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment.

Historical Occurrences

According to the North Carolina Drought Monitor, the Central Piedmont Region, which includes the City of Thomasville, experienced moderate to extreme drought occurrences in 11 of the last 14 years (2000-2013). **Table D.4** shows the most severe drought condition reported for each year in the Central Piedmont Region, according to PDSI classifications. However, it should be noted that the most severe classification reported is based on monthly regional averages, and conditions in the City of Thomasville may actually have been less or more severe than what is reported.

TABLE D. 4: HISTORICAL DROUGHT OCCURRENCES IN THOMASVILLE

extreme drought	severe drought	moderate drought	mid-range	moderately moist	very moist	extremely moist
-4.00 and below	-3.00 to -3.99	-2.00 to -2.99	-1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

	Thomasville	
2000	-2.83	Moderate Drought
2001	-3.43	Severe Drought
2002	-4.98	Extreme Drought
2003	-0.38	Mid-range
2004	-2.04	Moderate Drought
2005	-2.37	Moderate Drought
2006	-2.62	Moderate Drought

	Thomasville	
2007	-4.16	Extreme Drought
2008	-4.37	Extreme Drought
2009	-1.08	Mid-range
2010	-2.53	Moderate Drought
2011	-3.44	Severe Drought
2012	-2.84	Moderate Drought
2013	-0.37	Mid-range

Source: North Carolina State Climate Office

Data from the National Climatic Data Center (NCDC) was also reviewed to obtain additional information on historical drought events in the town, but no events were reported in the City of Thomasville.

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the City of Thomasville has a probability level of likely (10 to 100 percent annual probability) for future drought events. This hazard may vary slightly by location but each area has an equal probability of experiencing a drought. However, historical information also indicates that there is a much lower probability for extreme, long-lasting drought conditions.

D.2.2 Extreme Heat

Location and Spatial Extent

Excessive heat typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire city is susceptible to extreme heat conditions.

Historical Occurrences

Data from the National Climatic Data Center was used to determine historical extreme heat and heat wave events in the City of Thomasville, however events are only reported at the county level. One event was reported in Davidson County:

July 22, 1998 – *Excessive Heat* – Excessive heat plagued central North Carolina during July 22 through July 23. Maximum temperatures reached the 98 to 103 degree range combined with dew points in the 78 to 80 degree range with little wind to give heat index values of around 110 degrees for several hours each afternoon. To make matters worse, the minimum temperatures did not fall below 80 at several locations and those that did achieved that feat for only an hour or two. Strong thunderstorms ended the 2 day excessive heat ordeal on the evening of the 23 when rain cooled the environment enough to send temperatures into the lower 70s at most locations

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been reported at an observation station in Lexington since 1902. The recorded maximum for the county can be found below in **Table D.5**.

TABLE D.5: HIGHEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	07/29/1952	107

Source: State Climate Office of North Carolina

The State Climate Office also reports average maximum temperatures at various stations across the state. There is one station located in Davidson County in Lexington. **Table D.6** shows the average maximum temperatures from 1971 to 2000 at the Lexington observation station which can be used as a general comparison for the city.

TABLE D.6: AVERAGE MAXIMUM TEMPERATURE IN DAVIDSON COUNTY

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. Max (°F)	49.6 °F	54.4 °F	63.3 °F	72.5 °F	79.3 °F	85.5 °F	89.1 °F	87.4 °F	81.6 °F	71.9 °F	61.7 °F	52.6 °F

Source: State Climate Office of North Carolina

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of the City of Thomasville has a probability level of possible (1 to 10 percent annual probability) for future extreme heat events to impact the city.

D.2.3 Hailstorm

Location and Spatial Extent

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that the City of Thomasville is uniformly exposed to severe thunderstorms; therefore, all areas of the city are equally exposed to hail which may be produced by such storms.

Historical Occurrences

According to the National Climatic Data Center, 10 recorded hailstorm events have affected the City of Thomasville since 1997.[1] **Table D.7** is a summary of the hail events in the City of Thomasville. **Table D.8** provides detailed information about each event that occurred in the city. In all, hail occurrences did not result in any reported property damages.[2] Hail ranged in diameter from 0.75 inches to 1.75 inches. It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

TABLE D.7: SUMMARY OF HAIL OCCURRENCES IN THOMASVILLE

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Thomasville	10	0/0	$0

Source: National Climatic Data Center

[1] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through October 2014. It is likely that additional hail events have affected the City of Thomasville. In addition to NCDC, the North Carolina Department of Insurance office was contacted for information. As additional local data becomes available, this hazard profile will be amended.

[2] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE D.8: HISTORICAL HAIL OCCURRENCES IN THOMASVILLE

	Date	Magnitude	Deaths / Injuries	Property Damage*
Thomasville				
THOMASVILLE	5/1/1997	0.75 in.	0/0	$0
THOMASVILLE	4/17/1998	0.88 in.	0/0	$0
THOMASVILLE	5/1/1998	0.75 in.	0/0	$0
THOMASVILLE	8/5/2003	0.75 in.	0/0	$0
THOMASVILLE	5/19/2005	0.75 in.	0/0	$0
THOMASVILLE	10/21/2005	1.00 in.	0/0	$0
THOMASVILLE	6/11/2006	1.75 in.	0/0	$0
THOMASVILLE	5/20/2008	0.75 in.	0/0	$0
THOMASVILLE	2/28/2011	1.00 in.	0/0	$0
THOMASVILLE	5/14/2012	0.88 in.	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard (coinciding with thunderstorms), it is assumed that the City of Thomasville has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the city.

D.2.4 Hurricane and Tropical Storm

Location and Spatial Extent

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States. While coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland and they can affect the City of Thomasville. All areas in the City of Thomasville are equally susceptible to hurricane and tropical storms.

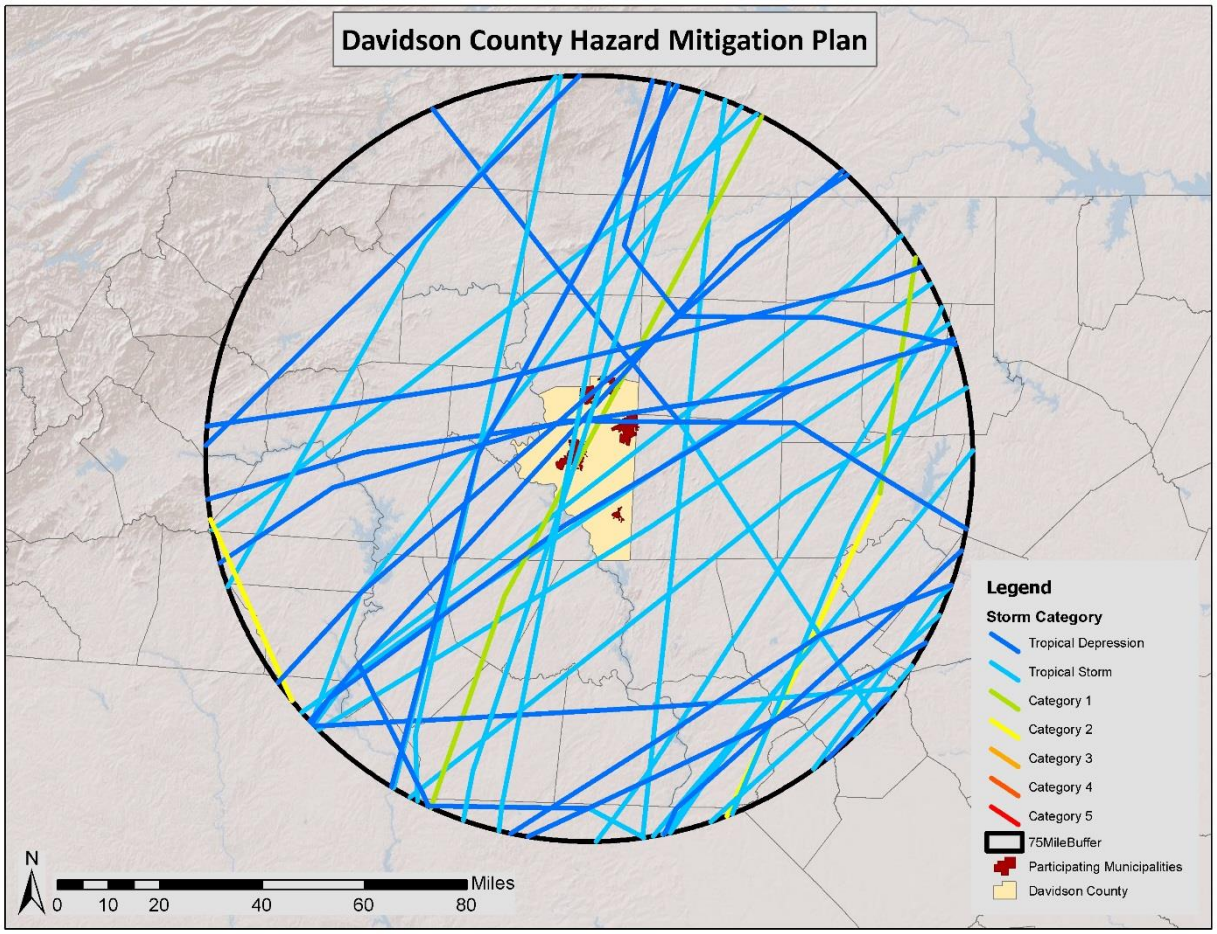
Historical Occurrences

According to the National Hurricane Center's historical storm track records, 45 hurricane/tropical storm tracks have passed within 75 miles of Davidson County since 1859.[3] This includes 6 hurricanes, 23 tropical storms and 16 tropical depressions.

Of the recorded storm events, 11 have traversed directly through Davidson County as shown in **Figure D.2**. **Table D.9** provides the date of occurrence, name (if applicable), maximum wind speed (as recorded within 75 miles of Davidson County), and Category of the storm based on the Saffir-Simpson Scale for each event.

[3] These storm track statistics do not include extra-tropical storms. Though these related hazard events are less severe in intensity, they may cause significant local impact in terms of rainfall and high winds.

FIGURE D.2: HISTORICAL HURRICANE STORM TRACKS WITHIN 75 MILES OF DAVIDSON COUNTY



Source: National Oceanic and Atmospheric Administration; National Hurricane Center

TABLE D.9: HISTORICAL STORM TRACKS WITHIN 75 MILES OF DAVISON COUNTY (1850–2014)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/17/1859	UNNAMED	40	Tropical Storm
10/4/1877	UNNAMED	50	Tropical Storm
9/12/1878	UNNAMED	60	Tropical Storm
9/11/1882	UNNAMED	40	Tropical Storm
10/12/1885	UNNAMED	40	Tropical Storm
6/22/1886	UNNAMED	40	Tropical Storm
9/10/1888	UNNAMED	35	Tropical Storm
9/24/1889	UNNAMED	45	Tropical Storm
8/28/1893	UNNAMED	75	Category 1
9/29/1896	UNNAMED	85	Category 2
7/13/1901	UNNAMED	35	Tropical Storm
6/16/1902	UNNAMED	35	Tropical Storm
9/23/1907	UNNAMED	35	Tropical Storm
8/31/1911	UNNAMED	25	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/3/1913	UNNAMED	40	Tropical Storm
8/3/1915	UNNAMED	35	Tropical Storm
9/23/1920	UNNAMED	35	Tropical Storm
10/3/1927	UNNAMED	40	Tropical Storm
8/11/1928	UNNAMED	30	Tropical Depression
10/2/1929	UNNAMED	50	Tropical Storm
9/6/1935	UNNAMED	45	Tropical Storm
10/20/1944	UNNAMED	50	Tropical Storm
9/18/1945	UNNAMED	50	Tropical Storm
10/9/1946	UNNAMED	30	Tropical Depression
8/28/1949	UNNAMED	40	Tropical Storm
8/31/1952	ABLE	45	Tropical Storm
7/10/1959	CINDY	30	Tropical Depression
8/30/1964	CLEO	25	Tropical Depression
6/9/1968	ABBY	25	Tropical Depression
5/26/1970	ALMA	25	Tropical Depression
9/8/1977	BABE	25	Tropical Depression
9/5/1979	DAVID	55	Tropical Storm
7/25/1985	BOB	55	Tropical Storm
8/18/1985	DANNY	25	Tropical Depression
8/29/1988	CHRIS	25	Tropical Depression
9/22/1989	HUGO	85	Category 2
7/21/1994	UNNAMED	20	Tropical Depression
9/6/1996	FRAN*	65	Category 1
7/24/1997	DANNY	30	Tropical Depression
9/5/1999	DENNIS	30	Tropical Depression
9/16/1999	FLOYD*	90	Category 2
9/18/2003	ISABEL*	85	Category 2
9/17/2004	IVAN*	20	Tropical Depression
9/28/2004	JEANNE	20	Tropical Depression
7/7/2005	CINDY	20	Tropical Depression

*Although the track of these storms traversed just outside of the 75 mile buffer area, they were included in the hazard history since a federal disaster area was declared for Davidson County as a result of the storm's impact.
Source: National Hurricane Center

The National Climatic Data Center reported four events associated with a hurricane or tropical storm in Davidson County since 1996. Additionally, Federal records indicate that five disaster declarations were made in 1989 (Hurricane Hugo), 1996 (Hurricane Fran), 1999 (Hurricane Floyd), 2003 (Hurricane Isabel), and 2004 (Hurricane Ivan) for the county.[4]

Flooding is often the greatest hazard of concern with hurricane and tropical storm events in Davidson County. Most events do not carry winds that are above that of the winter storms and straight line winds received by the county. Some anecdotal information is available for the major storms that have impacted that area as found below:

[4] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

Hurricane Hugo – September 22-24, 1989
Hurricane Hugo was one of the largest storms on record in the Atlantic Basin that produced high winds and dumped heavy rains over much of North Carolina and South Carolina. Hugo reached a peak level of Category 5 on the Saffir-Simpson scale and made landfall near Isle of Palms in South Carolina as a Category 4, eventually passing over Charlotte and much of the surrounding area as a Category 1 storm. Although the storm caused its greatest damage in South Carolina, over 1,000 structures were destroyed or severely damaged in North Carolina, causing over $1 billion dollars in damages. Wind gusts reached over 40 mph and numerous trees were downed throughout much of south and western North Carolina.

Hurricane Fran – September 5-6, 1996
After being hit just a few weeks earlier by Hurricane Bertha, North Carolina was impacted by the one of the most devastating storms to ever make landfall along the Atlantic Coast. Fran dropped more than 10 inches of rain in many areas and had sustained winds of around 115 miles per hour as it hit the coast and began its path along the I-40 corridor central North Carolina. In the end, over 3 billion dollars in damages were reported in the state. Damages to infrastructure and agriculture added to the overall toll and more than 1.7 million people in the state were left without power.

Hurricane Floyd – September 16, 1999
Hurricane Floyd, combined with the weather conditions before and immediately after this hurricane, resulted in the most severe flooding and devastation in North Carolina history. In North Carolina, the storm resulted in 35 fatalities, over $3 billion in damages, 7,000 destroyed homes, 56,000 damaged homes, 1,500 people rescued from flooded areas, and more than 500,000 customers without electricity. Additionally, the flooding caused an estimated $813 million in agricultural losses affecting 32,000 farmers. There was also significant loss of livestock including 2,860,827 poultry, 28,000 swine, and 619 cattle.

Hurricane Isabel – September 18, 2003
Hurricane Isabel's worst impacts were along the cost of North Carolina where storm surge in Dare County in particular were extremely strong, damaging thousands of homes. The storm surge created a large inlet on Hatteras Island which left the community isolated for months. Further inland and across the state, trees were downed and power was lost by hundreds of thousands of residents. In most of the state, power was restored within a few days, but the effects to the economy and daily lives of citizens were significant.

Hurricane Ivan – September 16-17, 2004
Just a week and a half following Tropical Storm Frances, the remnants of Hurricane Ivan hit western North Carolina when many streams and rivers were already well above flood stage. The widespread flooding forced many roads to be closed and landslides were common across the mountain region. Wind gusts reached between 40 and 60 mph across the higher elevations of the Appalachian Mountains resulting in numerous downed trees. More than $13.8 million of federal aid was dispersed across North Carolina following Ivan.

Probability of Future Occurrences

Given the inland location of the city, it is more likely to be affected by remnants of hurricane and tropical storm systems (as opposed to a major hurricane) which may result in flooding or high winds. The probability of being impacted is less than coastal areas, but still remains a real threat to the City of Thomasville due to induced events like flooding and landsliding. Based on historical evidence, the probability level of future occurrence is likely (between 10 and 100 percent annual probability). Given

the regional nature of the hazard, all areas in the city are equally exposed to this hazard. However, when the city is impacted, the damage could be catastrophic, threatening lives and property throughout the planning area.

D.2.5 Lightning

Location and Spatial Extent

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of the City of Thomasville is uniformly exposed to lightning.

Historical Occurrences

According to the National Climatic Data Center, there have been two recorded lightning events in the City of Thomasville since 2002 **Table D.10**.[5] These events resulted in almost $123,000 (2014 dollars) in damages.[6] A complete listing of those events can be found in **Table D.11**.

It is certain that more than two lightning events have impacted the city. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE D.10: SUMMARY OF LIGHTNING OCCURRENCES IN THOMASVILLE

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Thomasville	2	0/0	$122,711

Source: National Climatic Data Center

TABLE D.11: HISTORIC LIGHTNING OCCURRENCES IN THOMASVILLE

	Date	Deaths / Injuries	Property Damage*	Details
Thomasville				
THOMASVILLE	8/15/2002	0/0	$111,854	Lightning set fire to a house.
THOMASVILLE	7/27/2010	0/0	$10,857	A house at 3 Red Oak Court was damaged due to a lightning strike. A deck at the back of the home was destroyed and also the exterior of the home was damaged. Monetary damages were estimated.

*Property Damage is reported in 2014 dollars; all damage may not have been reported.
Source: National Climatic Data Center

[5] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is certain that additional lightning events have occurred in the City of Thomasville. The State Fire Marshall's office was also contacted for additional information but none could be provided. As additional local data becomes available, this hazard profile will be amended.

[6] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

Probability of Future Occurrences

Although there was not a high number of historical lightning events reported in the City of Thomasville via NCDC data, it is considered a regular occurrence, especially accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN®), the City of Thomasville is located in an area of the country that experienced an average of 3 to 5 lightning flashes per square kilometer per year between 1997 and 2010. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the city.

D.2.6 Thunderstorm Wind / High Wind

Location and Spatial Extent

A wind event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. Also, the City of Thomasville typically experiences several straight-line wind events each year. These wind events can and have caused significant damage. It is assumed that the City of Thomsville has uniform exposure to an event and the spatial extent of an impact could be large.

Historical Occurrences

According to NCDC, there have been 12 reported thunderstorm wind and high wind events since 1997 in the City of Thomasville.[7] These events did not result in any reported damages.[8] **Table D.12** summarizes this information. **Table D.13** presents detailed thunderstorm wind and high wind event reports including date, magnitude, and associated damages for each event.

TABLE D.12: SUMMARY OF THUNDERSTORM / HIGH WIND OCCURRENCES IN THOMASVILLE

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Thomasville	12	0/0	$0

Source: National Climatic Data Center

TABLE D.13: HISTORICAL THUNDERSTORM / HIGH WIND OCCURRENCES IN THOMASVILLE

	Date	Type	Magnitude	Deaths / Injuries	Property Damage*
Thomasville					
THOMASVILLE	7/4/1997	Thunderstorm Wind	50 kts.	0/0	$0
THOMASVILLE	5/7/1998	Thunderstorm Wind	50 kts.	0/0	$0
THOMASVILLE	5/20/2000	Thunderstorm Wind	60 kts. E	0/0	$0
THOMASVILLE	5/22/2001	Thunderstorm Wind	50 kts. E	0/0	$0

[7] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through October 2014 and these high wind events are only inclusive of those reported by NCDC from 1996 through October 2014. It is likely that additional thunderstorm and high wind events have occurred in the City of Thomasville. As additional local data becomes available, this hazard profile will be amended.

[8] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

	Date	Type	Magnitude	Deaths / Injuries	Property Damage*
THOMASVILLE	5/2/2003	Thunderstorm Wind	60 kts. EG	0/0	$0
THOMASVILLE	6/8/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	10/14/2003	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	7/12/2009	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	4/8/2010	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	8/11/2010	Thunderstorm Wind	50 kts. EG	0/0	$0
THOMASVILLE	7/31/2011	Thunderstorm Wind	50 kts. EG	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained ;MG = measured gust ;MS = measured sustained
Source: National Climatic Data Center

Probability of Future Occurrences

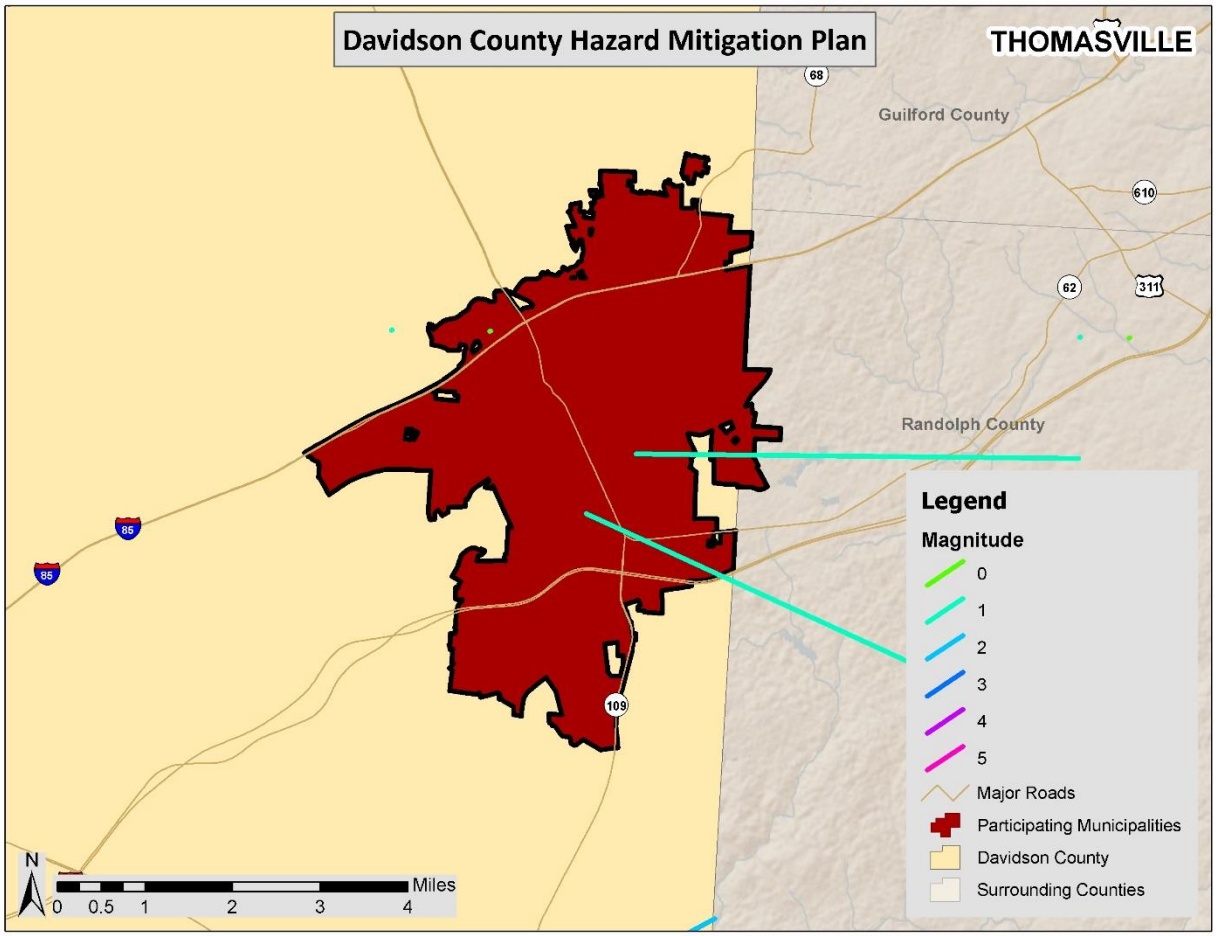
It is certain that wind events, including straight-line wind and thunderstorm wind, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for future wind events for the entire city.

D.2.7 Tornado

Location and Spatial Extent

Tornadoes occur throughout the state of North Carolina, and thus in the City of Thomasville. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that the City of Thomasville is uniformly exposed to this hazard. With that in mind, **Figure D.3** shows tornado track data for many of the major tornado events that have impacted the city. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE D.3: HISTORICAL TORNADO TRACKS IN THOMASVILLE



Source: National Weather Service Storm Prediction Center

Historical Occurrences

Tornadoes were responsible for one disaster declaration in Davidson County in 1989.[9] According to the National Climatic Data Center, there have been a total of two recorded tornado events in the City of Thomasville since 2007 (**Table D.14**), resulting in no reported property damage (**Table D.15**).[10] [11] The magnitude of these tornadoes were both EF0 in intensity, although an EF1 through EF5 event is possible. It is important to note that only tornadoes that have been reported are factored into this risk assessment. It is likely that a high number of occurrences have gone unreported over the past 64 years.

[9] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.
[10] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through October 2014. It is likely that additional tornadoes have occurred in the City of Thomasville. As additional local data becomes available, this hazard profile will be amended.
[11] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE D.14: SUMMARY OF TORNADO OCCURRENCES IN THOMASVILLE

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Thomasville	2	0/0	$0

Source: National Climatic Data Center

TABLE D.15: HISTORICAL TORNADO IMPACTS IN THOMASVILLE

	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Thomasville					
THOMASVILLE	9/14/2007	EF0	0/0	$0	Law enforcement reported a tornado touchdown on HWY 52 northwest of Thomasville.
THOMASVILLE	9/14/2007	EF0	0/0	$0	Law enforcement reported a tornado touchdown on HWY 52 northwest of Thomasville.

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Probability of Future Occurrences

According to historical information, tornado events are not an annual occurrence for the city. However, given the city's location in the southeastern United States and history of tornadoes, an occurrence is possible every few years. While the majority of the reported tornado events are small in terms of size, intensity, and duration, they do pose a significant threat should the City of Thomasville experience a direct tornado strike. The probability of future tornado occurrences affecting the City of Thomasville is likely (10 to 100 percent annual probability).

D.2.8 Winter Storm and Freeze

Location and Spatial Extent

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The City of Thomasville is accustomed to severe winter weather conditions and often receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire city has uniform exposure to a winter storm.

Historical Occurrences

Winter weather has resulted in five disaster declarations in Davidson County. This includes the Blizzard of 1996, one subsequent 1996 winter storm, a severe winter storm in 2000, an ice storm in 2002 and a severe winter storm in 2014.[12] The National Climatic Data Center does not report winter storm events at the municipal level, however, there have been a total of 55 recorded winter storm events and 1 extreme cold event in Davidson County since 1996 (**Table D.16**).[13] These events resulted in nearly $6.2

[12] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.
[13] These ice and winter storm events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is certain that additional winter storm conditions have affected the City of Thomasville and Davidson County.

million (2014 dollars) in damages.[14] Detailed information on the recorded winter storm events can be found in **Table D.17**.

TABLE D.16: SUMMARY OF WINTER STORM EVENTS IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Davidson County	55	0/0	$6,200,000

Source: National Climatic Data Center

TABLE D.17: HISTORICAL WINTER STORM IMPACTS IN DAVIDSON COUNTY

	Date	Type of Storm	Deaths / Injuries	Property Damage*
Davidson County				
DAVIDSON (ZONE)	1/6/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/11/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/2/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/16/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/8/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/13/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/29/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/23/1998	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/2/1999	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/20/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/22/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/24/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/28/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/19/2000	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	2/12/2001	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/3/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/23/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/16/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/27/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/13/2003	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/15/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/30/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/15/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/1/2007	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/7/2007	Winter Weather	0/0	$0

[14] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

	Date	Type of Storm	Deaths / Injuries	Property Damage*
DAVIDSON (ZONE)	1/17/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/19/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/13/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/22/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/4/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/1/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/18/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/30/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/29/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/5/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/2/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/16/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/25/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/10/2011	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/26/2013	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/28/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/11/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2014	Winter Storm	0/0	$0
DAVIDSON (ZONE)	3/3/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/6/2014	Ice Storm	0/0	$6,200,000
DAVIDSON (ZONE)	3/17/2014	Winter Weather	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been recorded in Lexington since 1902. The recorded minimum for the county can be found below in **Table D.18**.

TABLE D.18: LOWEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	01/21/1985	-6

Source: State Climate Office of North Carolina

There have been several severe winter weather events in Davidson County. The text below describes two of the major events (one snow and one ice event) and associated impacts on the county. Similar impacts can be expected with most severe winter weather.

1996 Winter Storm – January 6-8, 1996
This storm left two feet of snow in some areas and several thousand citizens without power for up to nine days. Although shelters were opened, some roads were impassible for many days. This event caused considerable disruption to business, industry, schools, and government services.

2002 Ice Storm – December 4-5, 2002
An ice storm produced up to an inch of freezing rain in central North Carolina impacting 40 counties. A total of 24 people were killed, and as many as 1.8 million people were left without electricity. Additionally, property damage was estimated at almost $100 million. New records were also set for traffic accidents and school closing durations. The scale of destruction was comparable to that of hurricanes that have impacted the state, such as Hurricane Fran in 1996. The storm cost the state $97.2 million in response and recovery.

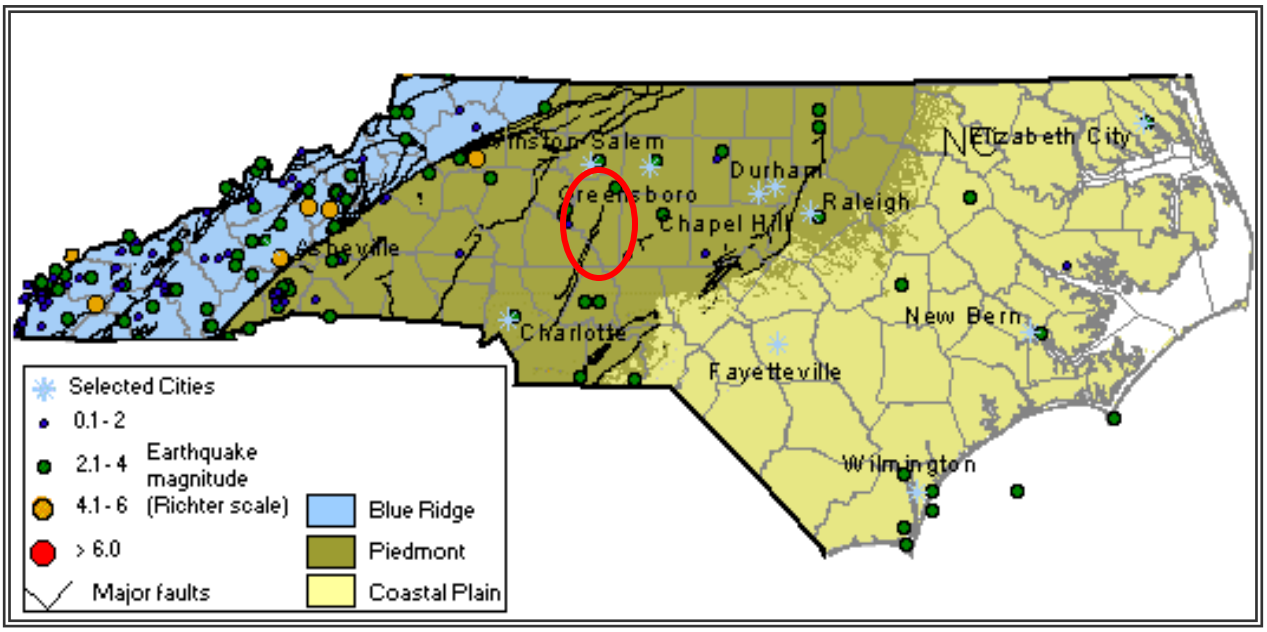
Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

Probability of Future Occurrences
Winter storm events will remain a regular occurrence in the City of Thomasville due to its location in the western half of the state. According to historical information, the City of Thomasville generally experiences several winter storm events each year. Therefore, the annual probability is highly likely (10 to 100 percent).

D.2.9 Earthquake

Location and Spatial Extent
Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout North Carolina. **Figure D.4** is a map showing geological and seismic information for North Carolina.

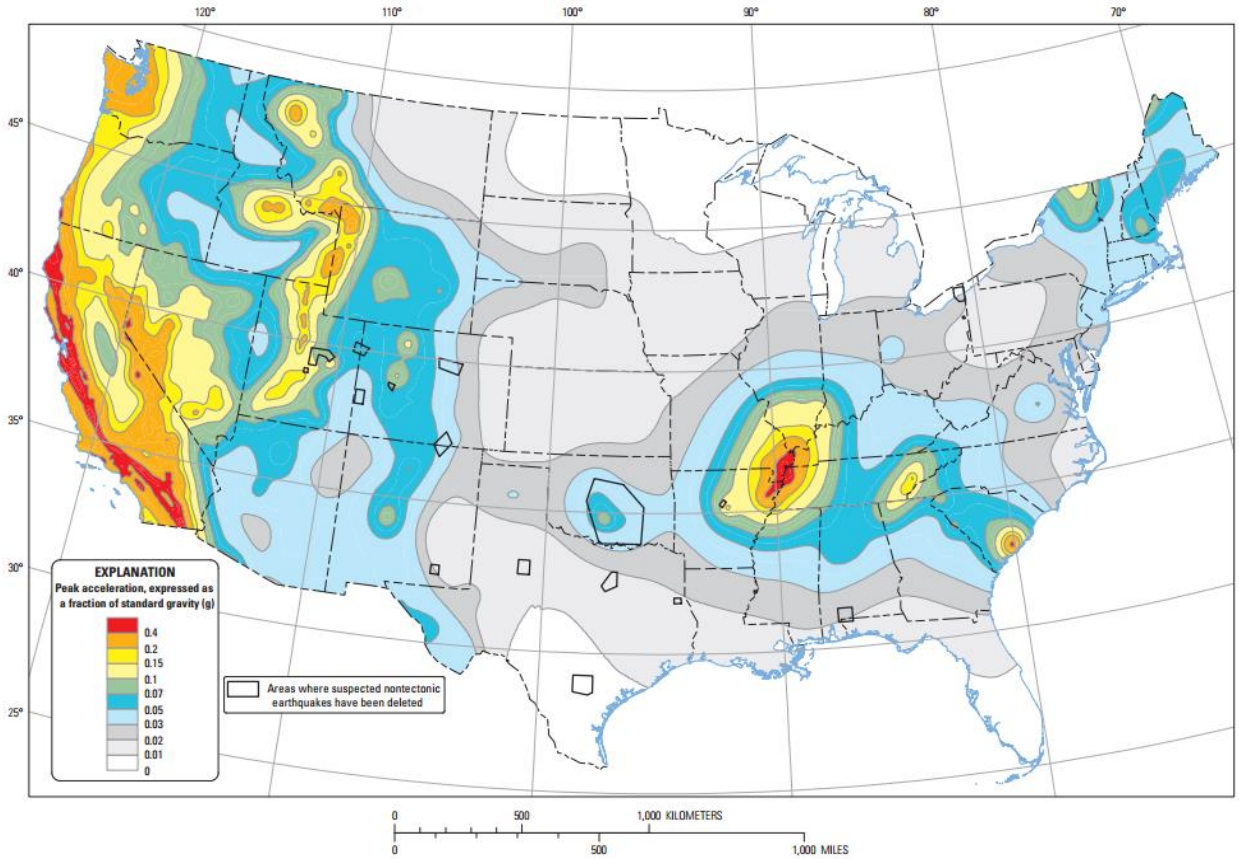
FIGURE D.4: GEOLOGICAL AND SEISMIC INFORMATION FOR NORTH CAROLINA



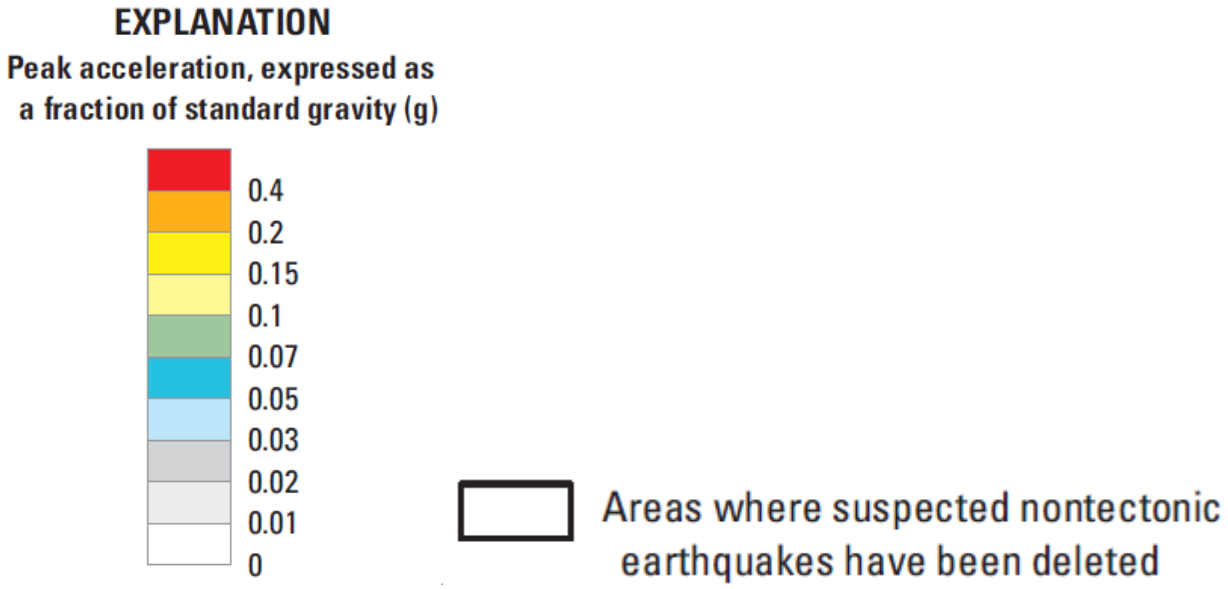
Source: North Carolina Geological Survey

Figure D.5 shows the intensity level associated with the City of Thomsville, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, The City of Thomasville lies within an approximate zone of level 0.03 to 0.05 ground acceleration. This indicates that the city exists within an area of low to moderate seismic risk.

FIGURE D.5: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

Historical Occurrences

No earthquakes are known to have affected the City of Thomasville since 1638 (**Table D.19** and **Table D.20**)[15]

TABLE D.19: SUMMARY OF SEISMIC ACTIVITY IN THOMASVILLE

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Thomasville	--	--	--

Source: National Geophysical Data Center

TABLE D.20: SIGNIFICANT SEISMIC EVENTS IN THOMASVILLE (1638 -1985)

Location	Date	Epicentral Distance	Magnitude	MMI
Thomasville				
None Reported	--	--	--	--

Source: National Geophysical Data Center

Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting the City of Thomasville is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the town. The annual probability level for the town is estimated between 1 and 10 percent (possible).

D.2.10 Landslide

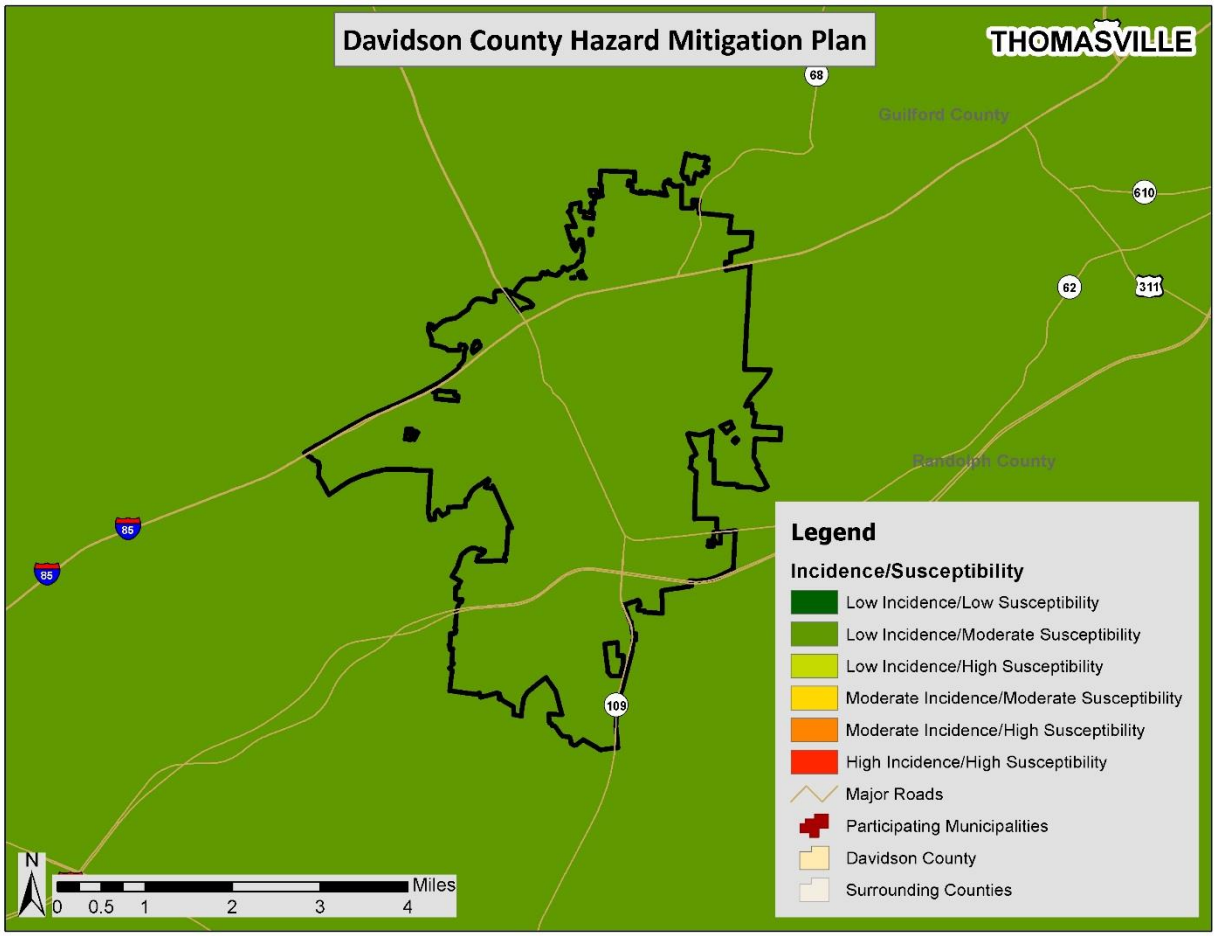
Location and Spatial Extent

Landslides occur along steep slopes when the pull of gravity can no longer be resisted (often due to heavy rain). Human development can also exacerbate risk by building on previously undevelopable steep slopes and constructing roads by cutting through hills or mountains. Landslides are possible throughout the City of Thomasville, though the risk is relatively low.

According to **Figure D.6** below, the city has low landslide activity. However, there is moderate susceptibility throughout the city.

[15] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

FIGURE D.6: LANDSLIDE SUSCEPTIBILITY AND INCIDENCE MAP OF THOMASVILLE



Source: United States Geological Survey

Historical Occurrences

Relatively flat topography throughout the City of Thomasville makes the planning area less susceptible to landslides. Most landslides are caused by heavy rainfall in the area. Building on steep slopes that was not previously possible also contributes to risk. Although no landslide incidents have been reported in the city, it should be noted that the North Carolina Geological Survey emphasized the dataset provided was incomplete. Therefore, there may be additional historical landslide occurrences that were not reported. Some incidence mapping has also been completed throughout the western portion of North Carolina though it is not complete either. Again, it should be noted that it is possible more incidents have occurred than what is mapped. Since no incidents were reported, a map was not produced to show the location of previous events.

Probability of Future Occurrences

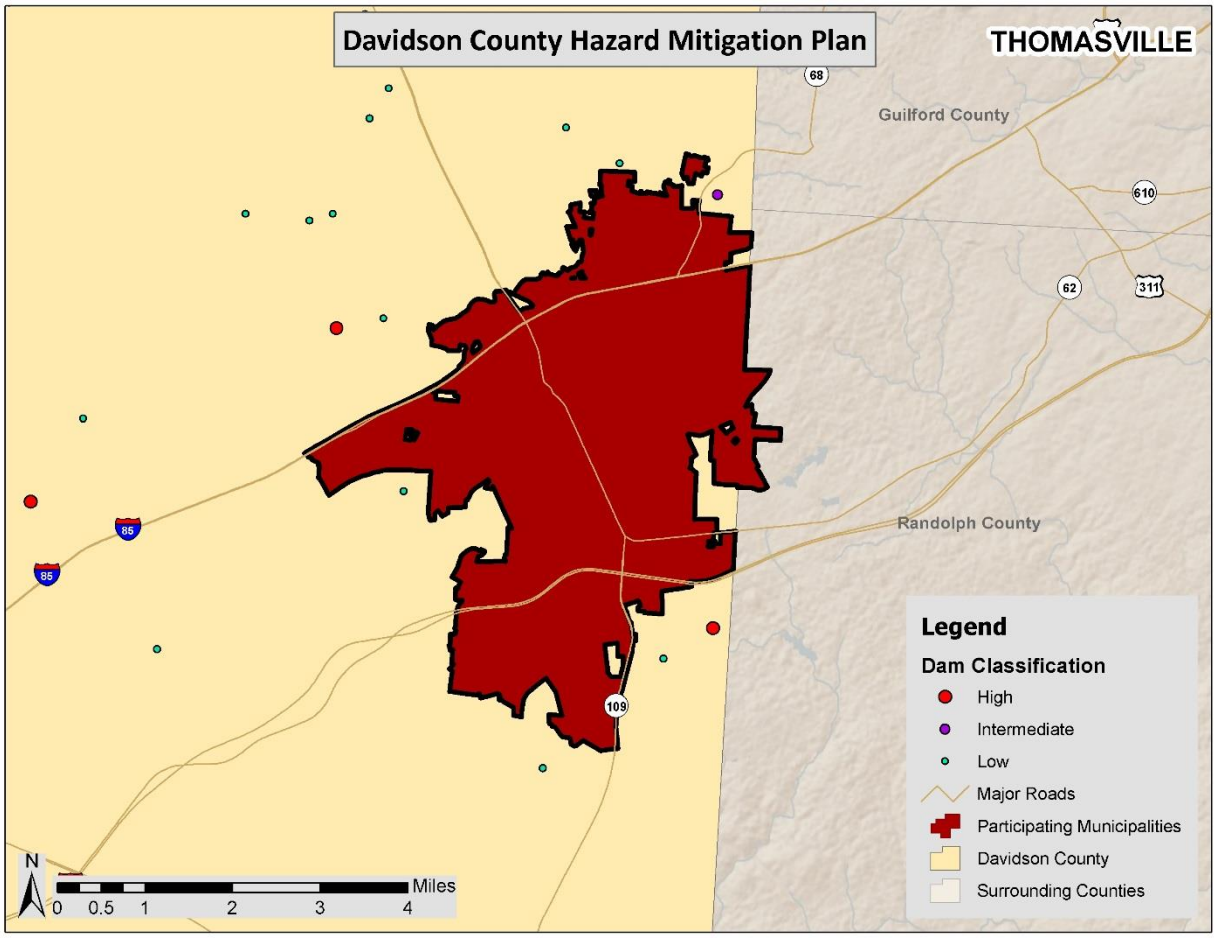
Based on historical information and the USGS susceptibility index, the probability of future landslide events is unlikely (less than 1 percent probability). Local conditions may become more favorable for landslides due to heavy rain, for example. This would increase the likelihood of occurrence. It should also be noted that some areas in the City of Thomasville have greater risk than others given factors such as steepness on slope and modification of slopes.

D.2.11 Dam and Levee Failure

Location and Spatial Extent

According to the North Carolina Division of Energy, Mineral, and Land Resources, there are no dams in the City of Thomasville.[16] **Figure D.7** shows the dam location and the corresponding hazard ranking for dams located nearby the city. Of these dams, none are classified as high hazard potential (**Table D.21**).

FIGURE D.7: THOMASVILLE DAM LOCATION AND HAZARD RANKING



Source: North Carolina Division of Energy, Mineral, and Land Resources, 2014

TABLE D.21: THOMASVILLE HIGH HAZARD DAMS

Dam Name	Hazard Potential	Surface Area (acres)	Max Capacity (Ac-ft)	Owner Type
Thomasville				
None Reported	--	--	--	--

Source: North Carolina Division of Energy, Mineral, and Land Resources, 2014

[16] The December 2, 2014 list of high hazard dams obtained from the North Carolina Division of Energy, Mineral, and Land Resources (http://portal.ncdenr.org/web/lr/dams) was reviewed and amended by local officials to the best of their knowledge.

Historical Occurrences

According to local sources and a review of the past hazard mitigation plan, there has been no history of dam breach in the City of Thomasville.

Probability of Future Occurrences

Given the current dam inventory and historic data, a dam breach is unlikely (less than 1 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

D.2.12 Erosion

Location and Spatial Extent

Erosion in the City of Thomasville is typically caused by flash flooding events. Unlike coastal areas, where the soil is mainly composed of fine grained particles such as sand, soils in the City of Thomasville have much greater organic matter content. Furthermore, vegetation also helps to prevent erosion in the area. Erosion occurs in the city, particularly along the banks of rivers and streams, but it is not an extreme threat. No areas of concern were reported by the planning team.

Historical Occurrences

Several sources were vetted to identify areas of erosion in the City of Thomasville. This includes searching local newspapers, interviewing local officials, and reviewing the previous hazard mitigation plan. Little information could be found beyond the hazard mitigation plan; however, the last update of the county hazard mitigation plan classified erosion as a relatively low concern as the magnitude was determined to be mild.

Probability of Future Occurrences

Erosion remains a natural, dynamic, and continuous process for the City of Thomasville, and it will continue to occur. The annual probability level assigned for erosion is possible (between 1 and 10 percent).

D.2.13 Flood

Location and Spatial Extent

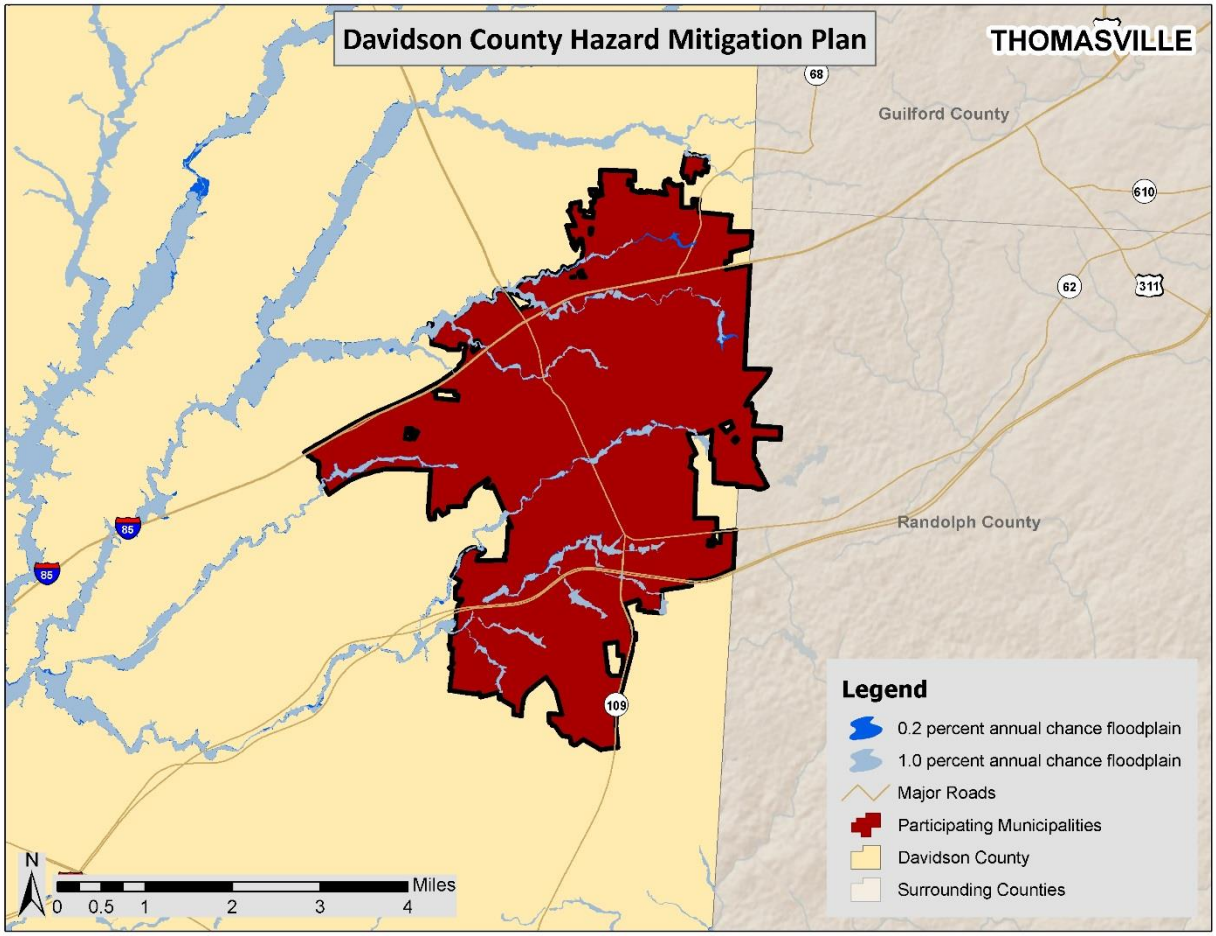
There are areas in the City of Thomasville that are susceptible to flood events. Special flood hazard areas in the city were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM).[17] This includes Zone AE (1-percent annual chance floodplain with elevation) and Zone X500 (0.2-percent annual chance floodplain). According to GIS analysis, of the 16.8 square miles of land that make up the City of Thomasville, there are 0.9 square miles of land in zone AE (1-percent annual chance floodplain/100-year floodplain) and 0.1 square miles of land in zone X500 (0.2-percent annual chance floodplain/500-year floodplain).

These flood zone values account for 6.0 percent of the total land area in the City of Thomasville. It is important to note that while FEMA digital flood data is recognized as best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Flooding and flood-related losses often do occur outside of delineated special flood hazard areas. **Figure D.8** illustrates the

[17] The county-level DFIRM data used for Davidson County were updated in 2009.

location and extent of currently mapped special flood hazard areas for the City of Thomasville based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE D.8: SPECIAL FLOOD HAZARD AREAS IN THOMASVILLE



Source: Federal Emergency Management Agency

Historical Occurrences

Information from the National Climatic Data Center was used to ascertain historical flood events. The National Climatic Data Center reported a total of 11 events in the City of Thomasville since 1996.[18] A summary of these events is presented in **Table D.22**. These events did not account for any property damage in the city.[19] Specific information on flood events, including date, type of flooding, and deaths and injuries, can be found in **Table D.23**.

[18] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is likely that additional occurrences have occurred and have gone unreported in the City of Thomasville.
[19] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

TABLE D.22: SUMMARY OF FLOOD OCCURRENCES IN THOMASVILLE

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Thomasville	11	0/0	$0

Source: National Climatic Data Center

TABLE D.23: HISTORICAL FLOOD EVENTS IN THOMASVILLE

	Date	Type	Deaths / Injuries	Property Damage*
Thomasville				
THOMASVILLE	9/3/1996	Flash Flood	0/0	$0
THOMASVILLE	4/17/1998	Flood	0/0	$0
THOMASVILLE	8/9/2003	Flash Flood	0/0	$0
THOMASVILLE	8/17/2003	Flash Flood	0/0	$0
THOMASVILLE	8/31/2003	Flash Flood	0/0	$0
THOMASVILLE	9/8/2004	Flash Flood	0/0	$0
THOMASVILLE	6/27/2006	Flash Flood	0/0	$0
THOMASVILLE	8/27/2008	Flash Flood	0/0	$0
THOMASVILLE	7/13/2009	Flash Flood	0/0	$0
THOMASVILLE	9/30/2010	Flash Flood	0/0	$0
THOMASVILLE	9/30/2010	Flash Flood	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of November 2014, there have been nine flood losses reported in the City of Thomasville through the National Flood Insurance Program (NFIP) since 1978. A summary of these figures for the city is provided in **Table D.24**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in the City of Thomasville were either uninsured, denied claims payment, or not reported.

TABLE D.24: SUMMARY OF INSURED FLOOD LOSSES IN THOMASVILLE

Location	Number of Policies	Flood Losses	Claims Payments
Thomasville	58	9	$82,810

Source: Federal Emergency Management Agency, National Flood Insurance Program

Repetitive Loss Properties

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 140,000 repetitive loss properties nationwide.

As of August 2014, there are two non-mitigated repetitive loss properties located in the City of Thomasville, which accounted for six losses and over $24,000 in claims payments under the NFIP. The average claims payment for these properties is $4,082. One of the properties is single-family residential

and the other property is non-residential (commercial). **Table D.25** presents detailed information on repetitive loss properties and NFIP claims and policies for the City of Thomasville.

TABLE D.25: REPETITIVE LOSS PROPERTIES IN THOMASVILLE

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Thomasville	2	1 single-family; 1 non-residential	6	$24,492	$0	$24,492	$4,082

Source: National Flood Insurance Program

Probability of Future Occurrences

Flood events will remain a threat in the City of Thomasville, and the probability of future occurrences will remain highly likely (100 percent annual probability). The probability of future flood events based on magnitude and according to best available data is illustrated in the figures above, which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain).

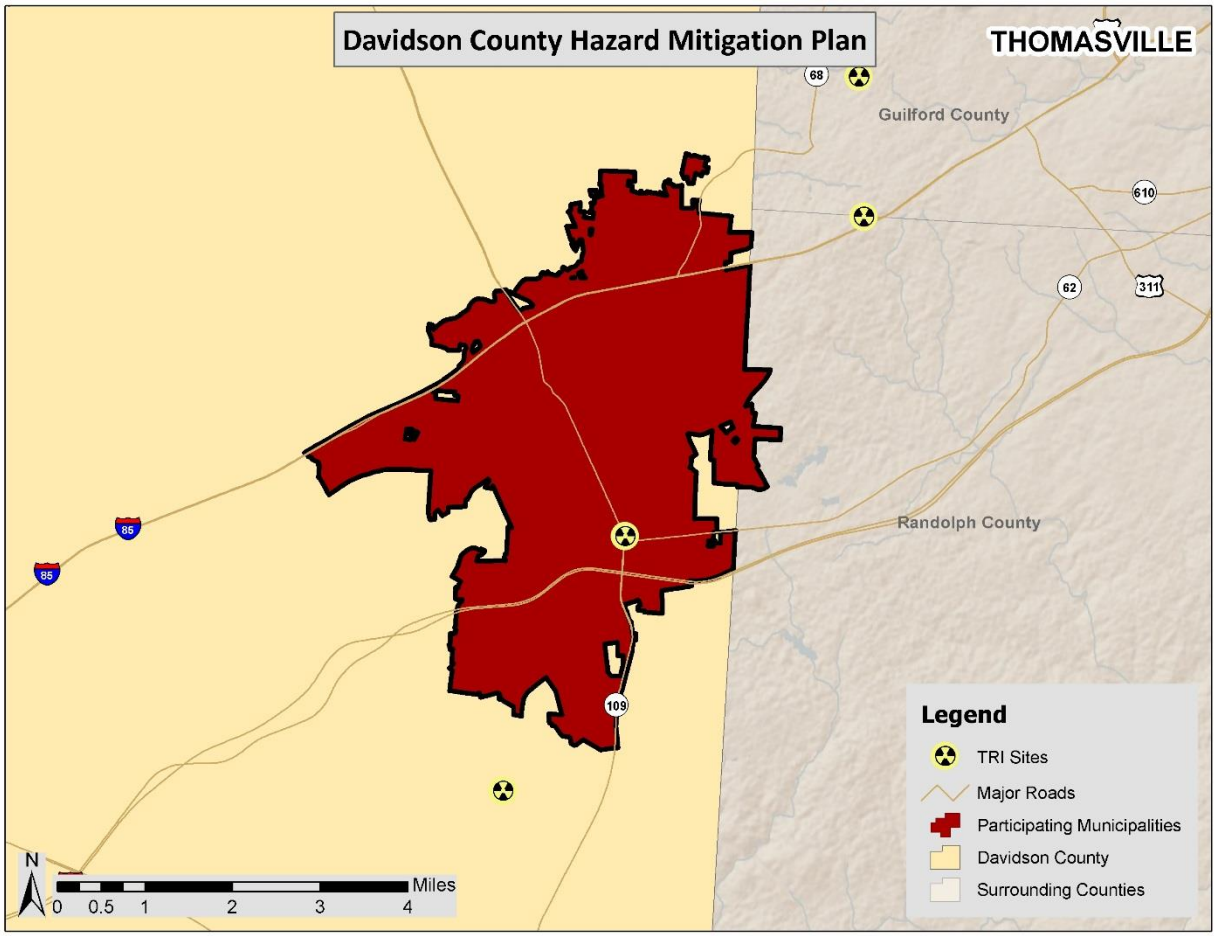
It can be inferred from the floodplain location maps, previous occurrences, and repetitive loss properties that risk varies throughout the City of Thomasville. For example, areas in the upper and lower thirds of the city have more floodplain and thus a higher risk of flood than the rest of the city. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

D.2.14 Hazardous Materials Incidents

Location and Spatial Extent

The City of Thomasville has one TRI site. The site is shown in **Figure D.9.**

FIGURE D.9: TOXIC RELEASE INVENTORY (TRI) SITES IN THOMASVILLE



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the city via roadways and rail. Many roads in the city are subject to hazardous materials transport and all roads that permit hazardous material transport are considered potentially at risk to an incident.

Historical Occurrences

There have been a total of 50 recorded HAZMAT incidents in the city of Thomasville since 1972 (**Table D.26**). These events resulted in more than $10,000 (2014 dollars) in property damages.[20] **Table D.27** presents detailed information on historical HAZMAT incidents in the City of Thomasville as reported by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA).

TABLE D.26: SUMMARY OF HAZMAT INCIDENTS IN THOMASVILLE

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Thomasville	50	0/0	$10,311

[20] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE D.27: HAZMAT INCIDENTS IN THOMASVILLE

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
Thomasville							
I-1972020197	1/25/1972	THOMASVILLE	Highway	No	0/0	$0	0
I-1973070664	7/25/1973	THOMASVILLE	Highway	No	0/0	$0	0
I-1974070057	6/23/1974	THOMASVILLE	Highway	No	0/0	$0	0
I-1974100387	10/1/1974	THOMASVILLE	Highway	No	0/0	$0	0
I-1975070643	7/11/1975	THOMASVILLE	Highway	No	0/0	$0	0
I-1975070642	7/16/1975	THOMASVILLE	Highway	No	0/0	$0	0
I-1975070955	7/18/1975	THOMASVILLE	Highway	No	0/0	$0	0
I-1975110813	11/18/1975	THOMASVILLE	Highway	No	0/0	$0	0
I-1975120541	12/11/1975	THOMASVILLE	Highway	No	0/0	$0	0
I-1976080207	5/30/1976	THOMASVILLE	Highway	No	0/0	$0	0
I-1976070506	6/10/1976	THOMASVILLE	Highway	No	0/0	$0	0
I-1976070972	7/20/1976	THOMASVILLE	Highway	No	0/0	$0	4 LGA
I-1976080914	8/14/1976	THOMASVILLE	Highway	No	0/0	$0	0
I-1976080830	8/19/1976	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1976100792	10/16/1976	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1976110726	10/25/1976	THOMASVILLE	Highway	No	0/0	$0	0
I-1977040950	4/8/1977	THOMASVILLE	Highway	No	0/0	$0	0
I-1977050794	5/6/1977	THOMASVILLE	Highway	No	0/0	$0	0
I-1977061323	5/26/1977	THOMASVILLE	Highway	No	0/0	$0	10 LGA
I-1977061324	6/8/1977	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1977070358	6/18/1977	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1977080527	7/18/1977	THOMASVILLE	Highway	No	0/0	$0	0
I-1977081292	8/5/1977	THOMASVILLE	Highway	No	0/0	$0	0
I-1977081625	8/19/1977	THOMASVILLE	Highway	No	0/0	$0	8 LGA
I-1978010732	1/4/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978020098	1/31/1978	THOMASVILLE	Highway	No	0/0	$0	5 LGA
I-1978020099	1/31/1978	THOMASVILLE	Highway	No	0/0	$0	0
I-1978040402	4/1/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978060110	5/16/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978061434	6/6/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978070301	6/27/1978	THOMASVILLE	Highway	No	0/0	$0	0
I-1978070309	7/2/1978	THOMASVILLE	Highway	No	0/0	$0	3 LGA
I-1978071619	7/7/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978080786	7/26/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978091353	9/17/1978	THOMASVILLE	Highway	No	0/0	$0	60 LGA
I-1978100270	9/19/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978100090	9/19/1978	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1978100515	9/26/1978	THOMASVILLE	Highway	No	0/0	$0	0
I-1979020098	1/22/1979	THOMASVILLE	Highway	No	0/0	$0	0
I-1979031094	3/13/1979	THOMASVILLE	Highway	No	0/0	$0	2 LGA

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
I-1979070636	6/30/1979	THOMASVILLE	Highway	No	0/0	$0	2 LGA
I-1979120319	11/28/1979	THOMASVILLE	Highway	No	0/0	$0	1 LGA
I-1980020366	2/1/1980	THOMASVILLE	Highway	No	0/0	$0	0
I-1980040512	3/28/1980	THOMASVILLE	Highway	No	0/0	$0	0
I-1994060998	6/2/1994	THOMASVILLE	Highway	No	0/0	$0	10 LGA
I-1995071271	6/21/1995	THOMASVILLE	Highway	No	0/0	$0	5 LGA
I-2002030402	11/28/2001	THOMASVILLE	Highway	No	0/0	$0	7 LGA
I-2004010574	1/9/2004	THOMASVILLE	Highway	No	0/0	$0	60 LGA
I-2009040370	3/30/2009	THOMASVILLE	Highway	No	0/0	$0	5 LGA
E-2012120308	11/20/2012	THOMASVILLE	Highway	Yes	0/0	$10,311	1,500 SLB

*Property damage is reported in 2014 dollars.

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

Probability of Future Occurrences

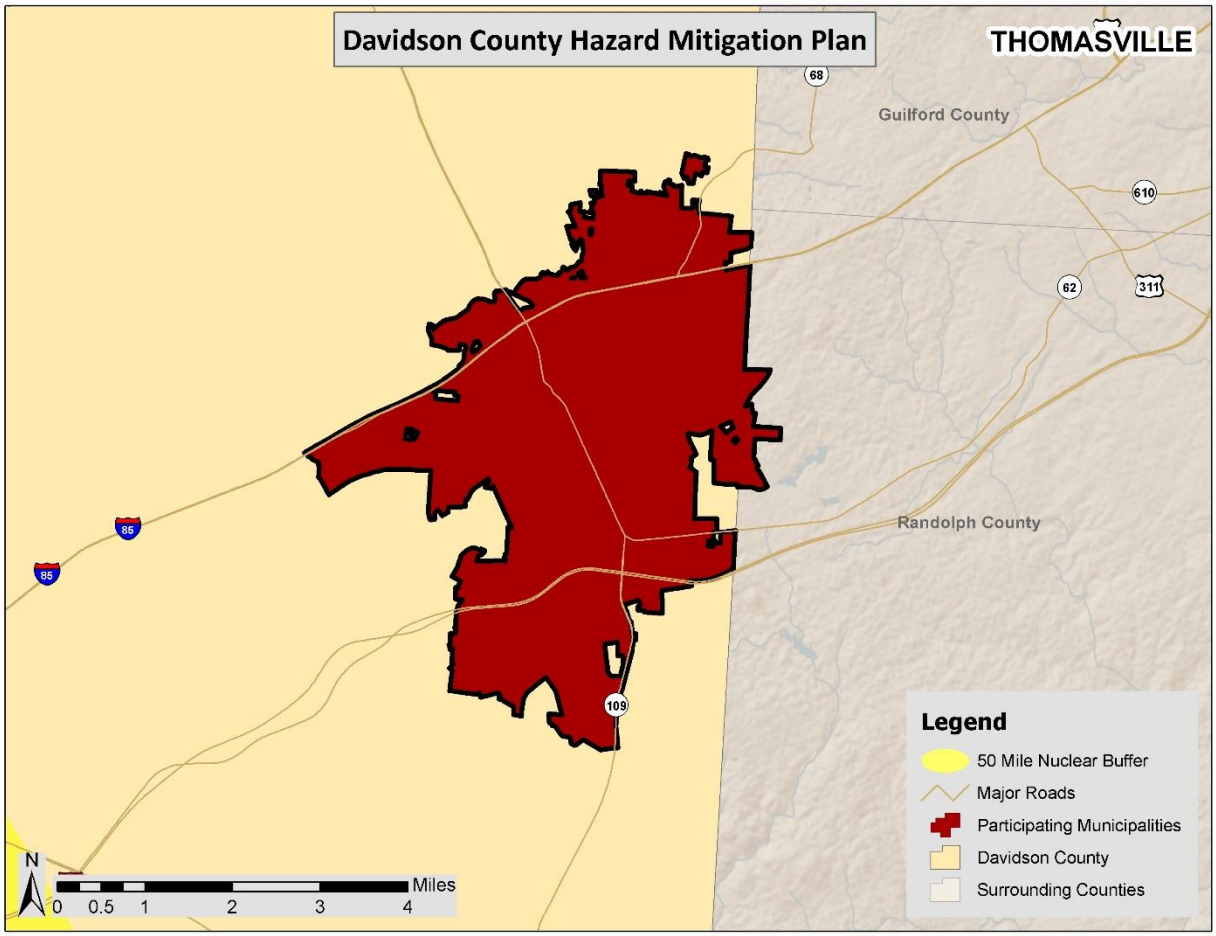
Given the location of one toxic release inventory site in the City of Thomasville and prior roadway incidents, it is likely that a hazardous material incident may occur in the city (between 10 and 100 percent annual probability). However, city officials are mindful of this possibility and take precautions to prevent such an event from occurring. Additionally, there are detailed plans in place to respond to an occurrence.

D.2.15 Nuclear Accident

Location and Spatial Extent

None of the city is susceptible to a nuclear incident due to its location outside of the 50-mile radius of the McGuire Nuclear Power Plant, which is the area considered to be at risk (**Figure D.10**).

FIGURE D.10: NUCLEAR POWER PLANT INCIDENT HAZARD ZONES IN THOMASVILLE



Source: International Atomic Energy Agency

Historical Occurrences

Although there have been no major nuclear events at the McGuire Nuclear Power Plant, there is some possibility that one could occur as there have been incidents in the past in the United States at other facilities and at facilities around the world.

Probability of Future Occurrences

A nuclear event is a very rare occurrence in the United States due to the intense regulation of the industry. There have been incidents in the past, but it is considered unlikely (less than 1 percent annual probability).

D.2.16 Terror Threat

Location and Spatial Extent

A terror threat could potentially occur at any location in the city. However, the very definition of a terrorist event indicates that it is most likely to be targeted at a critical or symbolic resource/location. Ensuring and protecting the continuity of critical infrastructure and key resources (CIKR) of the United States is essential to the Nation's security, public health and safety, economic vitality, and way of life. CIKR includes physical and/or virtual systems or assets that, if damaged, would have a detrimental

impact on national security, including large-scale human casualties, property destruction, economic disruption, and significant damage to morale and public confidence. **Table D.28** lists the U.S. Department of Homeland Security's (DHS) identified main critical infrastructure sectors.

TABLE D.28 U.S. DEPARTMENT OF HOMELAND SECURITY CRITICAL INFRASTRUCTURE SECTORS

- Agriculture and Food
- Banking and Finance
- Chemical
- Commercial Facilities
- Communications
- Critical Manufacturing
- Dams
- Defense Industrial Base
- Emergency Services
- Energy
- Government Facilities
- Healthcare and Public Health
- Information Technology
- National Monuments and Icons
- Nuclear Reactors, Materials, and Waste
- Postal and Shipping
- Transportation Systems
- Water

All critical facilities (see Section D.3.3) are at a heightened level of risk in the City of Thomasville. However, there are several facilities and events in the city that have been identified as the likely primary targets. These are listed in **TableD.29**.

TABLE D.29: FACILITIES/EVENTS AT ELEVATED RISK OF TERROR THREAT IN THOMASVILLE

Critical Facility
Thomasville
Everybody's Day Festival (held annually, late September)
National Guard Armory (Thomasville)
Thomasville Medical Center

Source: Local Government

Historical Occurrences

Although there have been no major terror events in the City of Thomasville, there is some possibility that one could occur in the future as there have been incidents in the United States in the past and there are several facilities that could be potential targets.

Probability of Future Occurrences

The City of Thomasville has no recorded terrorist events. Due to no recorded incidents against the city, the probability of future occurrences of a terrorist attack is unlikely (less than 1 percent annual probability).

D.2.17 Wildfire

Location and Spatial Extent

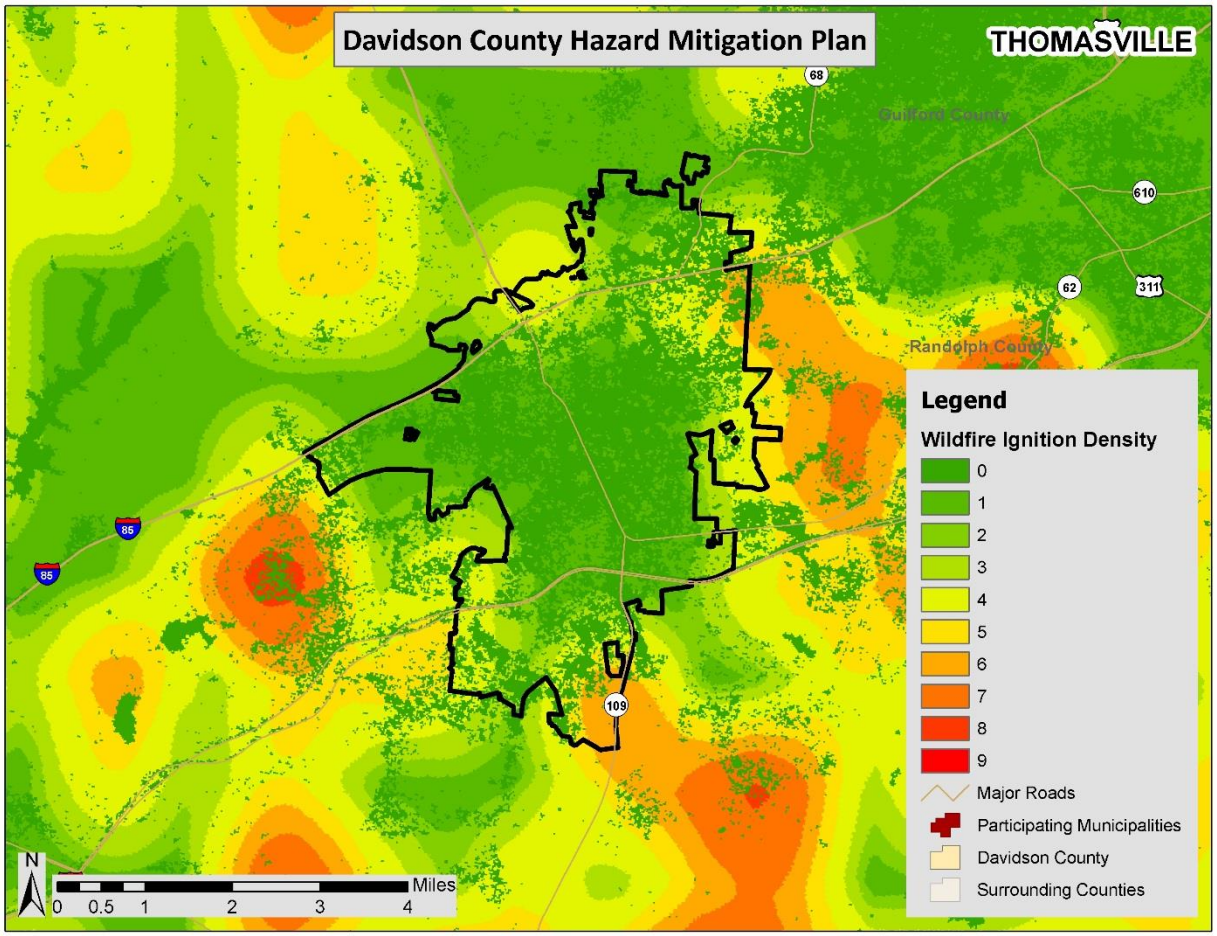
The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly

undeveloped areas. The Wildfire Ignition Density data in the figure below give an indication of historic location in the City of Thomasville.

Historical Occurrences

Figure D.11 shows the Wildfire Ignition Density in the City of Thomasville based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[21]

FIGURE D.11: WILDFIRE IGNITION DENSITY IN THOMASVILLE



Source: Southern Wildfire Risk Assessment

Based on data from the North Carolina Division of Forest Resources from 2005 to 2014, Davidson County experienced an average of 39 wildfires annually which burn a combined average of 53.6 acres per year. The data indicates that most of these fires are small, averaging 1.4 acre per fire. **Table D.30** lists the number of reported wildfire occurrences in the county between the years 2005 and 2014.

[21] Southern Wildfire Risk Assessment, 2014.

TABLE D.30: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	27	53	47	36	16	40	48	30	47	46
Number of Acres	55.3	56.5	84.5	39.7	19	40.6	46.5	146.3	26.3	21.7

Source: North Carolina Division of Forest Resources

Since 2009, the NCDFR has also kept data on the number of structures damaged/destroyed. This information is presented in **Table D.31**.

TABLE D.31: STRUCTURES DAMAGED/DESTROYED BY WILDFIRE IN DAVIDSON COUNTY

Year	2009	2010	2011	2012	2013	2014
Davidson County						
Number of Structures	0	2	11	6	8	9
Cost of Damages to Structures	$0	$1,500	$13,600	$10,500	$14,600	$17,800

Source: North Carolina Division of Forest Resources

In addition, the North Carolina Department of Insurance collects fire data and reports it on an annual basis. This data is included in **Table D.32** to supplement the NCDFR data.

TABLE D.32: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

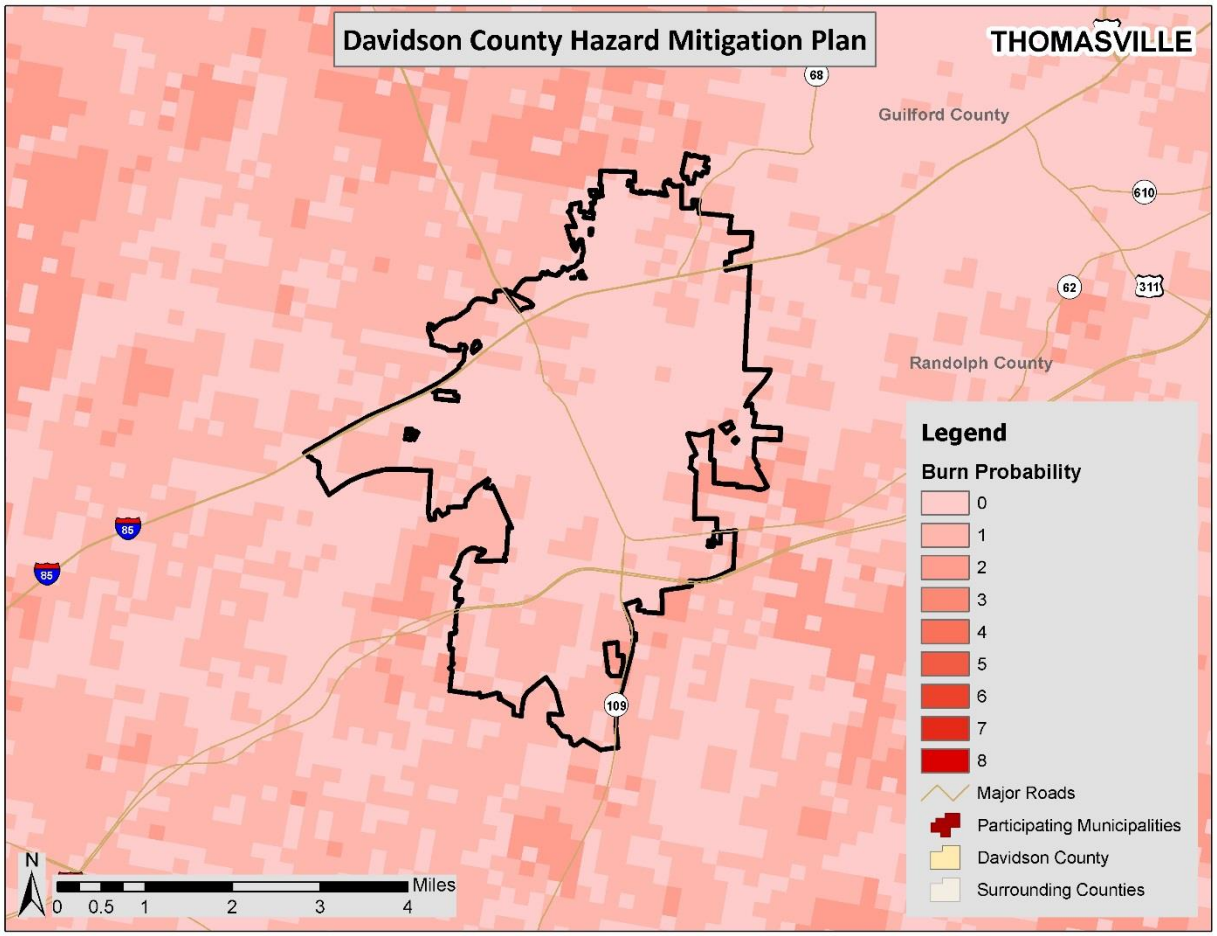
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	28	74	195	187	120	167	176	116	141	242
Property Loss	$0	$5,300	$650	$1,050	$1,550	$230	$1,940	$1,202	$10,700	$8,380

Source: North Carolina Department of Insurance

Probability of Future Occurrences

Wildfire events will be an ongoing occurrence around the City of Thomasville. **Figure D.12** shows that there is some probability a wildfire will occur near the city. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to the City of Thomasville for future wildfire events is likely (10 to 100 percent annual probability).

FIGURE D.12: BURN PROBABILITY IN THOMASVILLE



Source: Southern Wildfire Risk Assessment

D.2.18 Conclusions on Hazard Risk

The hazard profiles presented above were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

Hazard Extent

Table D.33 describes the extent of each natural hazard identified for the City of Thomasville. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE D.33 EXTENT OF THOMASVILLE HAZARDS

Atmospheric Hazards	
Drought	Drought extent is defined by PDSI classifications which include Extremely Moist, Very Moist, Mid-Range, Moderate Drought, Severe Drought, and Extreme Drought classifications (pages 5:5-5:6). According to the PDSI classifications, the most severe drought condition is Extreme. Davidson County has received this ranking 3 times over the 14-year reporting period.
Extreme Heat	The extent of extreme heat can be defined by the maximum temperature reached. The highest temperature recorded in Davidson County is 107 degrees Fahrenheit (reported on July 29, 1952).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in the City of Thomasville was 1.75 inches (reported on June 11, 2006). It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5 (Table 5.11). The greatest classification of hurricanes to traverse directly through Davidson County was an unnamed storm in 1893 which reached a maximum wind speed of 65 knots in the county. Although the county is much more likely to be impacted by the remnants of a hurricane or tropical storm, it is possible that a storm can impact the county directly.
Lightning	According to the Vaisala flash density map (Figure 5.5), the City of Thomasville is located in an area that experiences 3 to 5 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Thunderstorm Wind / High Wind	Thunderstorm extent is defined by the number of thunder events and wind speeds reported. The strongest recorded wind event in City of Thomasville was last reported on May 2, 2003 at 60 knots (approximately 69 mph). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by tornado occurrences in the US provided by FEMA (Figure 5.6) as well as the Fujita/Enhanced Fujita Scale (Tables 5.18 and 5.19). The greatest magnitude reported in the city was an EF0 (reported on September 14, 2007). It should be noted that an EF5 tornado is possible.
Winter Storm and Freeze	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest 24-hour snowfall reported in the county was 20.3 inches on February 12, 1905. Due to unpredictable variations in snowfall throughout the county, extent totals will vary for each participating jurisdiction and reliable data on snowfall totals is not abundantly available. In addition, the lowest temperature reached in the county was -6 degrees Fahrenheit (January 21, 1985).
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale (Table 5.25) and the Modified Mercalli Intensity (MMI) scale (Table 5.26) and the distance of the epicenter from the Town of Thomasville. According to data provided by the National Geophysical Data Center, no earthquakes have impacted the city. However, the greatest MMI to impact the county was IV (slight) with a correlating Richter Scale measurement of approximately 4.7 (reported on November 30, 1973). The epicenter of this earthquake was located 334.0 km away.

Landslide	As noted above in the landslide profile, the landslide data provided by the North Carolina Geological survey is incomplete. This provides a challenge when trying to determine an accurate extent for the landslide hazard. However, when using the USGS landslide susceptibility index, extent can be measured with incidence, which is low throughout the city. Additionally, there is moderate susceptibility throughout the City of Thomasville.
Hydrologic Hazards	
Dam Failure	Dam failure extent is defined using the North Carolina Division of Energy, Mineral, and Land Resources criteria (Table 5.30). There are no dams in the City of Thomasville.
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records available for the City of Thomasville.
Flood	Flood extent can be measured by the amount of land and property in the floodplain as well as flood height and velocity. The amount of land in the floodplain accounts for 6.0 percent of the total land area in the City of Thomasville. Flood depth and velocity are recorded via United States Geological Survey stream gages throughout Davidson County. While a gage does not exist within the City of Thomasville, there is one located relatively nearby at Lexington. The greatest peak discharge recorded at Lexington was reported on September 25, 1947. Water reached a discharge of 14,800 cubic feet per second and the stream gage height was 22.12 feet.
Other Hazards	
Hazardous Materials Incident	According to USDOT PHMSA, the largest hazardous materials incident reported in the city was 1,500 SLB released on the highway on November 20, 2012. It should be noted that larger events are possible.
Nuclear Accident	Although there is no history of a nuclear accident at the McGuire Power Plant, other events across the globe and in the United States in particular indicate that an event is possible. Since several national and international events were Level 7 events on the INES, the potential for a Level 7 event at McGuire is possible.
Terror Threat	There is no history of terror threats in the City of Thomasville; however; it is possible that one of these events could occur. If this were to take place, the magnitude of the event could range on the scale of critical damage with many fatalities and injuries to the population.
Wildfire	Wildfire data was provided by the North Carolina Division of Forest Resources and is reported annually by county from 2005-2014. The greatest number of fires to occur in Davidson County in any year was 53 in 2006. The greatest number of acres to burn in the county in a single year occurred in 2012 when 146.3 acres were burned. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.

Priority Risk Index Results

In order to draw some meaningful planning conclusions on hazard risk for the City of Thomasville, the results of the hazard profiling process were used to generate city-wide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.20.2.

Table D.34 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles

developed for this section, as well as input from the Hazard Mitigation Planning Team. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE D.34: SUMMARY OF PRI RESULTS FOR THOMASVILLE

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Atmospheric Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Extreme Heat	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Hailstorm	Highly Likely	Minor	Moderate	6 to 12 hours	Less than 6 hours	**2.5**
Hurricane and Tropical Storm	Likely	Limited	Large	More than 24 hours	Less than 24 hours	**2.6**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Thunderstorm / High Wind	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Tornado	Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.7**
Winter Storm and Freeze	Highly Likely	Limited	Moderate	More than 24 hours	Less than 1 week	**2.8**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Landslide	Unlikely	Minor	Small	Less than 6 hours	Less than 6 hours	**1.5**
Hydrologic Hazards						
Dam and Levee Failure	Unlikely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.1**
Erosion	Possible	Minor	Small	More than 24 hours	More than 1 week	**1.8**
Flood	Highly Likely	Minor	Small	6 to 12 hours	Less than 1 week	**2.5**
Other Hazards						
Hazardous Materials Incident	Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.5**
Nuclear Accident	Unlikely	Limited	Negligible	6 to 12 hours	Less than 1 week	**1.7**
Terror Threat	Unlikely	Critical	Small	Less than 6 hours	Less than 24 hours	**2.2**
Wildfire	Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.3**

D.2.19 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for the City of Thomasville, including the PRI results and input from the Hazard Mitigation Planning Team, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table D.35**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of the City of Thomasville. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section D.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

TABLE D.35: CONCLUSIONS ON HAZARD RISK FOR THOMASVILLE

HIGH RISK	Thunderstorm / High Wind Winter Storm and Freeze Tornado Flood
MODERATE RISK	Hurricane and Tropical Storm Drought Hailstorm Hazardous Materials Incident Lightning Nuclear Accident Wildfire
LOW RISK	Terror Threat Extreme Heat Dam and Levee Failure Earthquake Erosion Landslide

D.3 THOMASVILLE VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of the City of Thomasville to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the city and assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

D.3.1 Asset Inventory

Table D.36 lists the number of parcels, total value of parcels, total number of parcels with improvements, and the total assessed value of improvements for the City of Thomasville (study area of vulnerability assessment).[22]

[22] Total assessed values for improvements is based on tax assessor records as joined to digital parcel data. This data does not include dollar figures for tax-exempt improvements such as publicly-owned buildings and facilities. It should also be noted that, due to record keeping, some duplication is possible thus potentially resulting in an inflated value exposure for an area.

TABLE D.36: IMPROVED PROPERTY IN THOMASVILLE

Location	Number of Parcels	Total Assessed Value of Parcels	Estimated Number of Buildings	Total Estimated Value of Improvements[23]
Thomasville	11,128	$1,470,949,820	17,806	$1,052,333,910

Source: Davidson County GIS Department

Table D.37 lists the fire stations, police stations, EMS/rescue stations, medical care facilities, schools, and other critical facilities located in the City of Thomasville. These facilities were identified as primary critical facilities in that they are necessary to maintain government functions and protect the life, health, safety, and welfare of citizens. These facilities were geospatially mapped and used as the basis for further geographic analysis of the hazards that could potentially affect critical facilities. All critical facility information was provided by the local government and the Davidson County GIS department.

In addition, **Figure D.13** shows the locations of essential facilities in the City of Thomasville. **Table D.52**, near the end of this section, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. As noted previously, this list is not all-inclusive and only includes information provided by the local government.

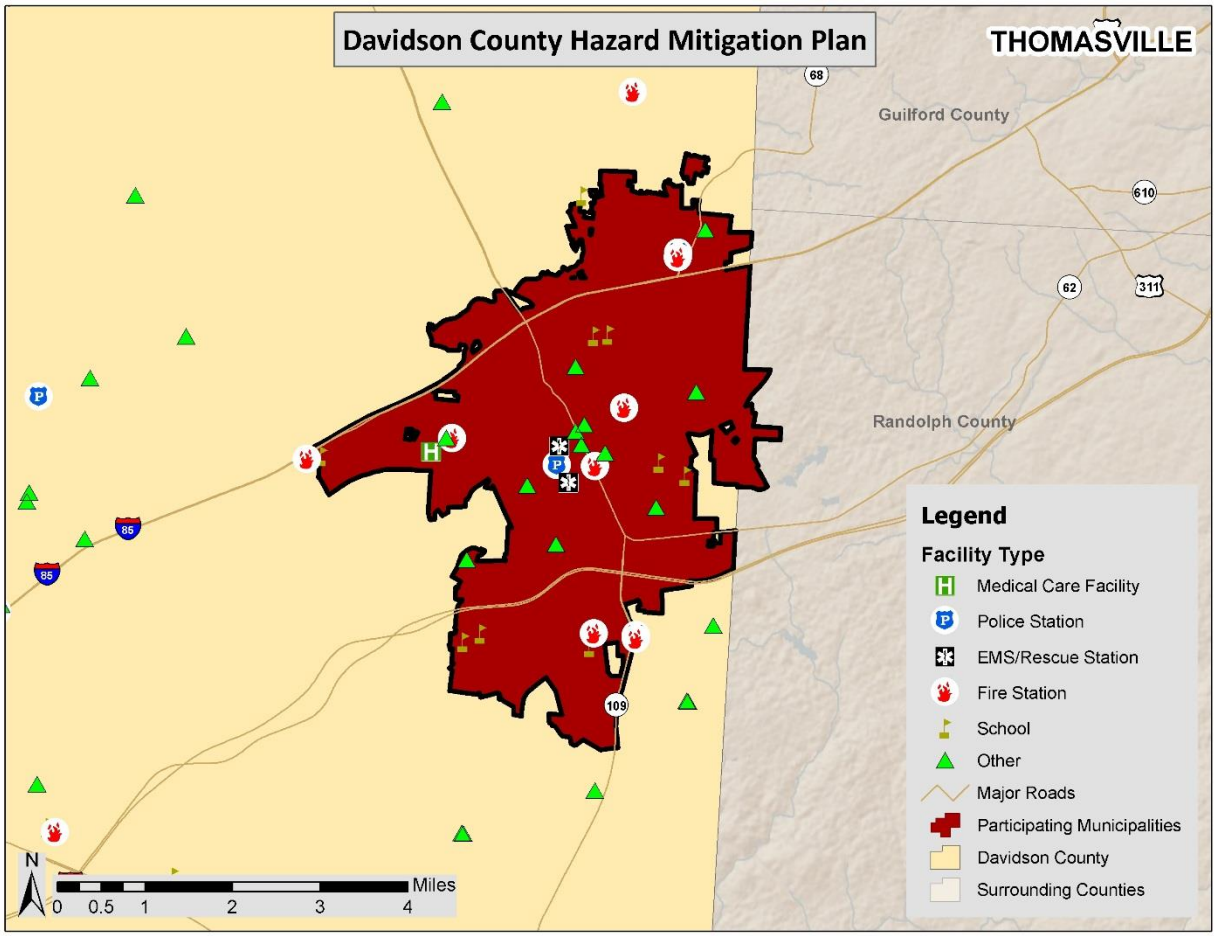
TABLE D.37: CRITICAL FACILITY INVENTORY IN THOMASVILLE

Location	Fire Stations	Police Stations	EMS/Rescue Stations	Medical Care Facilities	Schools	Other
Thomasville	5	2	2	1	8	12

Source: Local Government

[23] Building value for each jurisdiction is based on the dollar value of parcels with a building value greater than zero.

FIGURE D.13: CRITICAL FACILITY LOCATIONS IN THOMASVILLE



Source: Local Government

D.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in the City of Thomasville that are potentially at risk to these hazards.

Table D.38 lists the population according to U.S. Census 2010 population estimates. The total population in the City of Thomasville according to Census data is 26,757 persons. Additional population estimates are presented above in Section D.1.

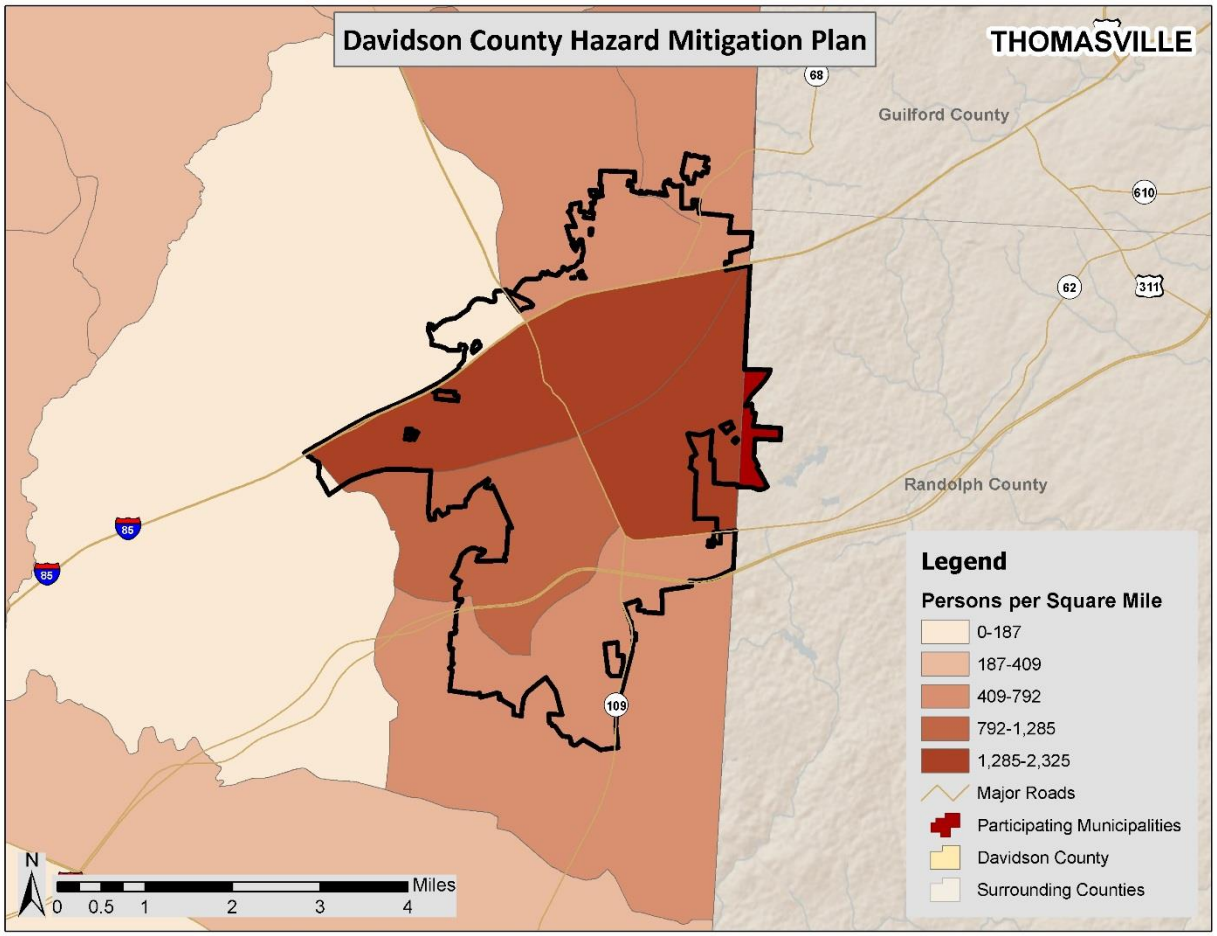
TABLE D.38: TOTAL POPULATION IN THOMASVILLE

Jurisdiction	2010 Census Population
Thomasville	26,757

Source: United States Census 2010

In addition, **Figure D.14** illustrates the population density by census tract as it was reported by the U.S. Census Bureau in 2010.

FIGURE D.14: POPULATION DENSITY IN THOMASVILLE



Source: United States Census Bureau, 2010

D.3.3 Development Trends and Changes in Vulnerability

Since the previous hazard mitigation plan was approved in 2010, the City of Thomasville has experienced limited growth and development. **Table D.39** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE D.39: BUILDING COUNTS FOR THOMASVILLE

Jurisdiction	Total Housing Units (2013)	Units Built 2010 or later	% Building Stock Built Post-2010
Thomasville	11,887	19	0.2%

Source: United States Census Bureau

Table D.40 shows population growth estimates for the city from 2010 to 2013 based on the U.S. Census Annual Estimates of Resident Population.

TABLE D.40: POPULATION GROWTH FOR THOMASVILLE

Jurisdiction	Population Estimates (as of July 1)				% Change 2010-2013
	2010	2011	2012	2013	
Thomasville	26,319	26,507	26,760	26,983	2.5%

Note: July 1 population estimates were used in this table to allow comparison of annual population counts (April 1 Census estimates were used for all other population counts throughout the plan which is why the counts may differ).
Source: United States Census Bureau

Based on the data above, there has been a low rate of residential development and population growth in the city since 2010. This has resulted in an increased number of structures that are vulnerable to the potential impacts of the identified hazards as well as a greater number of people exposed to the identified hazards. Therefore, development and population growth have impacted the city's vulnerability since the previous local hazard mitigation plan was approved and there has been a slight increase in the overall vulnerability.

It is also important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains, moderate landside susceptibility areas, high wildfire risk areas, primary and secondary hazardous materials buffers, or McGuire Nuclear Power Plant's 50-mile buffer.

D.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, modeling tool, or sufficient historical data allow for further analysis. Those results, specific to the City of Thomasville, are presented here. All other hazards are assumed to impact the entire planning region (drought, extreme heat, hailstorm, lightning, thunderstorm wind, tornado, and winter storm and freeze) or, due to lack of data, analysis would not lead to credible results (dam and levee failure, erosion, and terror threat). The total city exposure, and thus risk, was presented in **Table D.36**.

The annualized loss estimate for all hazards is presented at the end of this section in **Table D.51.**

The hazards presented in this section include: hurricane and tropical storm winds, earthquake, landslide, flood, hazardous materials incident, nuclear accident, and wildfire.

Hurricane and Tropical Storm

Historical evidence indicates that the City of Thomasville has a significant risk to the hurricane and tropical storm hazard. There have been five disaster declarations due to hurricanes (Hurricane Hugo, Hurricane Fran, Hurricane Floyd, Hurricane Isabel, and Hurricane Ivan) in Davidson County. Several tracks have come near or traversed through Davidson County, as shown and discussed in Section D.2.4.

Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, high winds, and precipitation, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore only hurricane winds are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to the hurricane and tropical storm hazard. Hazus-MH 2.1 was used to determine annualized losses for the county as shown below in **Table D.41.**

Only losses to buildings, contents, and inventory are reported, in order to best match annualized losses reported for other hazards. Hazus-MH reports losses at the U.S. Census tract level, so determining participating jurisdiction losses was not possible.

TABLE D.41: ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$637,00	$148,000	$5,000	$790,000

Source: Hazus-MH 2.1

In addition, probable peak wind speeds were calculated in Hazus. These are shown below in **Table D.42.**

TABLE D.42: PROBABLE PEAK HURRICANE / TROPICAL STORM WIND SPEEDS (MPH)

Location	50-year event	100-year event	500-year event	1,000-year event
Thomasville	63.6	72.9	92.9	99.3

Source: Hazus-MH 2.1

Social Vulnerability

Given equal susceptibility across the City of Thomasville, it is assumed that the total population is at risk to the hurricane and tropical storm hazard.

Critical Facilities

Given equal vulnerability across the City of Thomasville, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among other factors. Determining individual building response is beyond the scope of this plan. However, this plan will consider mitigation actions for vulnerable structures, including critical facilities, to reduce the impacts of the hurricane wind hazard. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this section.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in the City of Thomasville. Hurricane events can cause substantial damage in their wake including fatalities, extensive debris clean-up, and extended power outages.

Earthquake

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the annualized loss for Davidson County. The results of the analysis reported at the U.S. Census tract level do not make it feasible to estimate losses at the jurisdiction level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to building damage (structural and non-structural), contents, and inventory. However, like the analysis for hurricanes, the comparative annualized loss figures at the end of this section only utilize building losses in order to provide consistency with other hazards. **Table D.43** summarizes the findings.

TABLE D.43: ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Building Loss	Non-Structural Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$39,000	$96,000	$28,000	$2,000	$165,000

Source: Hazus-MH 2.1

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. A list of individual critical facilities and their risk can be found in **Table D.52**.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in the City of Thomasville. Minor earthquakes may rattle dishes and cause minimal damage while stronger earthquakes will result in structural damage as indicated in the Hazus scenario above. Impacts of earthquakes include debris clean-up, service disruption and, in severe cases, fatalities due to building collapse. Specific vulnerabilities for assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available. Furthermore, mitigation actions to address earthquake vulnerability will be considered.

Landslide
In order to complete the vulnerability assessment for landslides in the City of Thomasville, GIS analysis was used. The potential dollar value of exposed land and property total can be determined using the USGS Landslide Susceptibility Index (detailed in Section D.2.10), county-level tax parcel and building footprint data, and GIS analysis. **Table D.44** presents the potential at-risk property where available. No areas of the City of Thomasville are identified as moderate or high incidence areas as determined by the USGS landslide data. However, all areas of the town have moderate landslide susceptibility. Typically, an analysis is run to determine which parcels/buildings are located within the high and moderate incidence areas, but since no high incidence areas exist in the county, only an analysis of moderate incidence areas was carried out.

TABLE D.44: TOTAL POTENTIAL AT-RISK PARCELS FOR THE LANDSLIDE HAZARD

Location	Number of Parcels At Risk	Number of Improvements At Risk	Total Value of Improvements At Risk ($)
Incidence Level	**Moderate**		
Thomasville	0	0	$0

Source: United States Geological Survey

Social Vulnerability
Given low incidence and moderate susceptibility across the entire city, it is assumed that the total population is at a low risk to landslides.

Critical Facilities
No critical facilities are located in a moderate incidence area. However, all critical facilities are located in a moderate susceptibility area. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this section.

In conclusion, a landslide has the potential to impact all existing and future buildings, facilities, and populations in the City of Thomasville, though most areas are at a very low risk. Due to a variety of

factors such as steep slopes and modified slopes, hilly areas of the city bear a greater risk than flat areas. Specific vulnerabilities for the City of Thomasville assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available.

Flood

Historical evidence indicates that the City of Thomasville is susceptible to flood events. A total of 11 flood events have been reported by the National Climatic Data Center, resulting in no property damage. On an annualized level, damages are negligible for the City of Thomasville.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with local tax assessor records for the city. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within an identified floodplain. **Table D.45** presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

TABLE D.45: ESTIMATED EXPOSURE OF PARCELS TO THE FLOOD HAZARD

Location	1.0-percent ACF			0.2-percent ACF		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[24]	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[25]
Thomasville	626	208	$134,172,600	493	0	$115,462,950

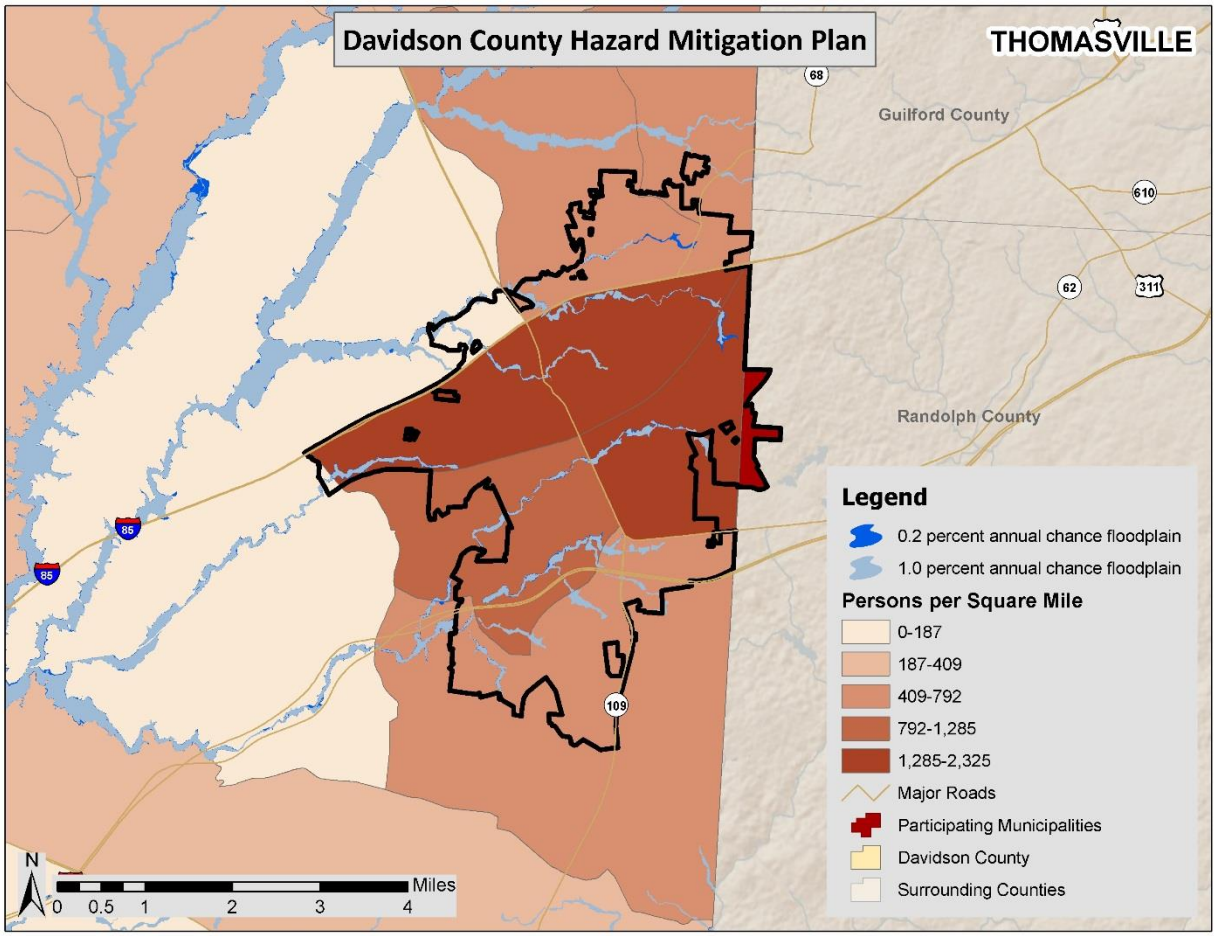
Source: Federal Emergency Management Agency DFIRM

Social Vulnerability

U.S. Census 2010 population at the tract level was used for analysis to determine where areas of high population concentration intersect with flood prone areas in the city. **Figure D.15** is presented to gain a better understanding of the at-risk population.

[24] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-percent annual chance floodplain, since building footprints were not associated with dollar value data.
[25] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 0.2-percent annual chance floodplain, since building footprints were not associated with dollar value data.

FIGURE D.15 : POPULATION DENSITY NEAR FLOODPLAINS



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there is 1 critical facility located in the City of Thomasville 1.0-percent annual chance floodplain. This facility is a power station. There are no critical facilities located in the 0.2-percent annual chance floodplain based on FEMA DFIRM boundaries and GIS analysis. (As previously noted, this analysis does not consider building elevation, which may negate risk.) A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this section.

In conclusion, a flood has the potential to impact many existing and future buildings, facilities, and populations in the City of Thomasville, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. As noted, the floodplains used in this analysis include the 100-year and 500-year FEMA regulated floodplain boundaries. It is certainly possible that more severe events could occur beyond these boundaries or urban (flash) flooding could impact additional structures. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

Hazardous Materials Incident

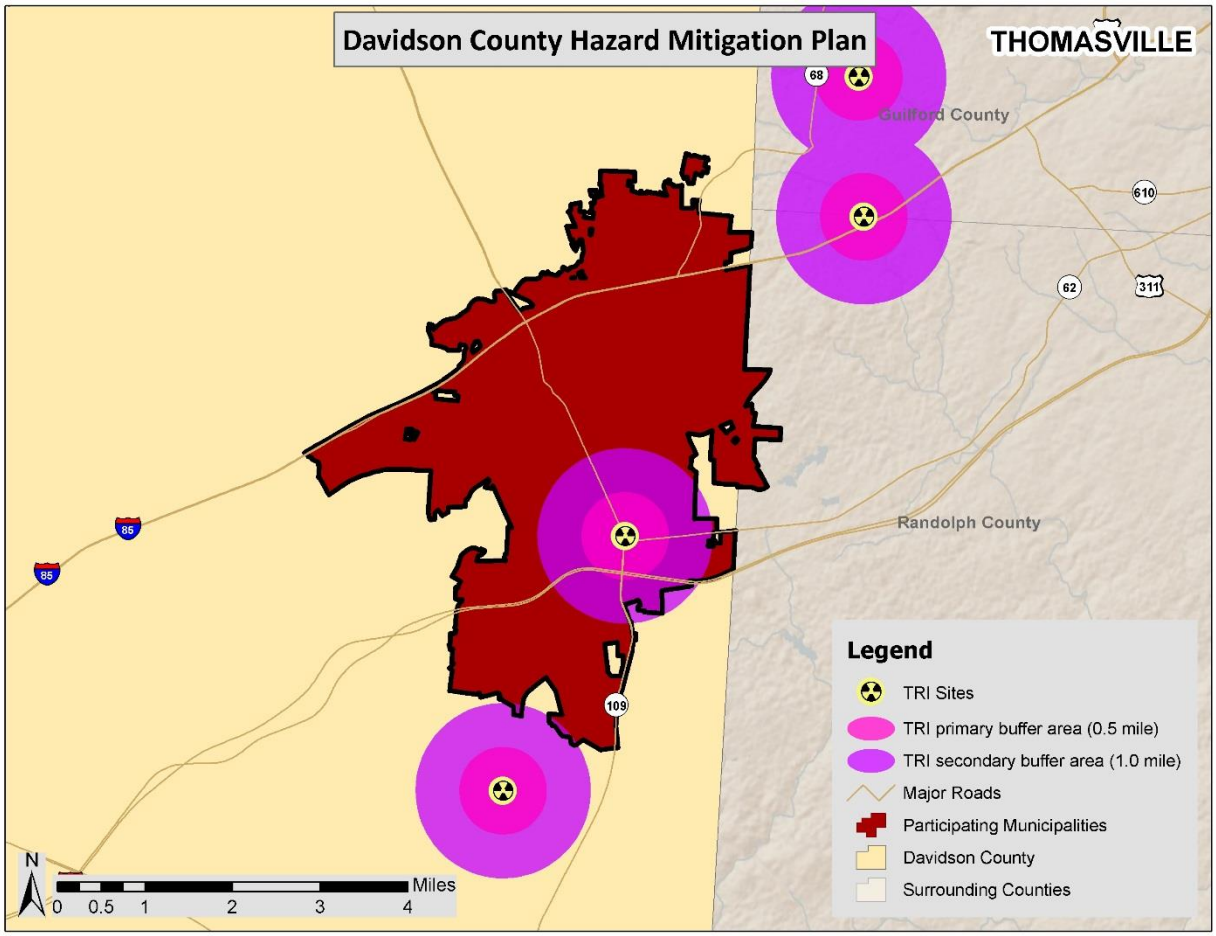
Historical evidence indicates that the City of Thomasville is susceptible to hazardous materials events. A total of 50 HAZMAT incidents have been reported by the Pipeline and Hazardous Materials Safety Administration, resulting in $10,311 (2014 dollars) in property damage. On an annualized level, these damages amount to $5,156 for the City of Thomasville.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and parcels.[26] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to respect the different levels of effect: immediate (primary) and secondary. Primary and secondary impact sites were selected based on guidance from FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks against Buildings and engineering judgment. For the fixed site analysis, geo-referenced TRI listed toxic sites in the City of Thomasville, along with buffers, were used for analysis as shown in **Figure D.16.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure D.17** shows the areas used for mobile toxic release buffer analysis. The results indicate the approximate number of parcels/buildings and improved value, as shown in **Table D.46** (fixed sites), **Table D.47** (mobile road sites) and **Table D.48** (mobile railroad sites).[27]

[26] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an event).
[27] Note that parcels included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE D.16 : TRI SITES WITH BUFFERS IN THOMASVILLE



Source: Environmental Protection Agency

TABLE D.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[28]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[29]
Thomasville	378	595	$79,871,810	2,312	3,547	$235,456,690

[28] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[29] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

FIGURE D.17 : MOBILE HAZMAT BUFFERS IN THOMASVILLE

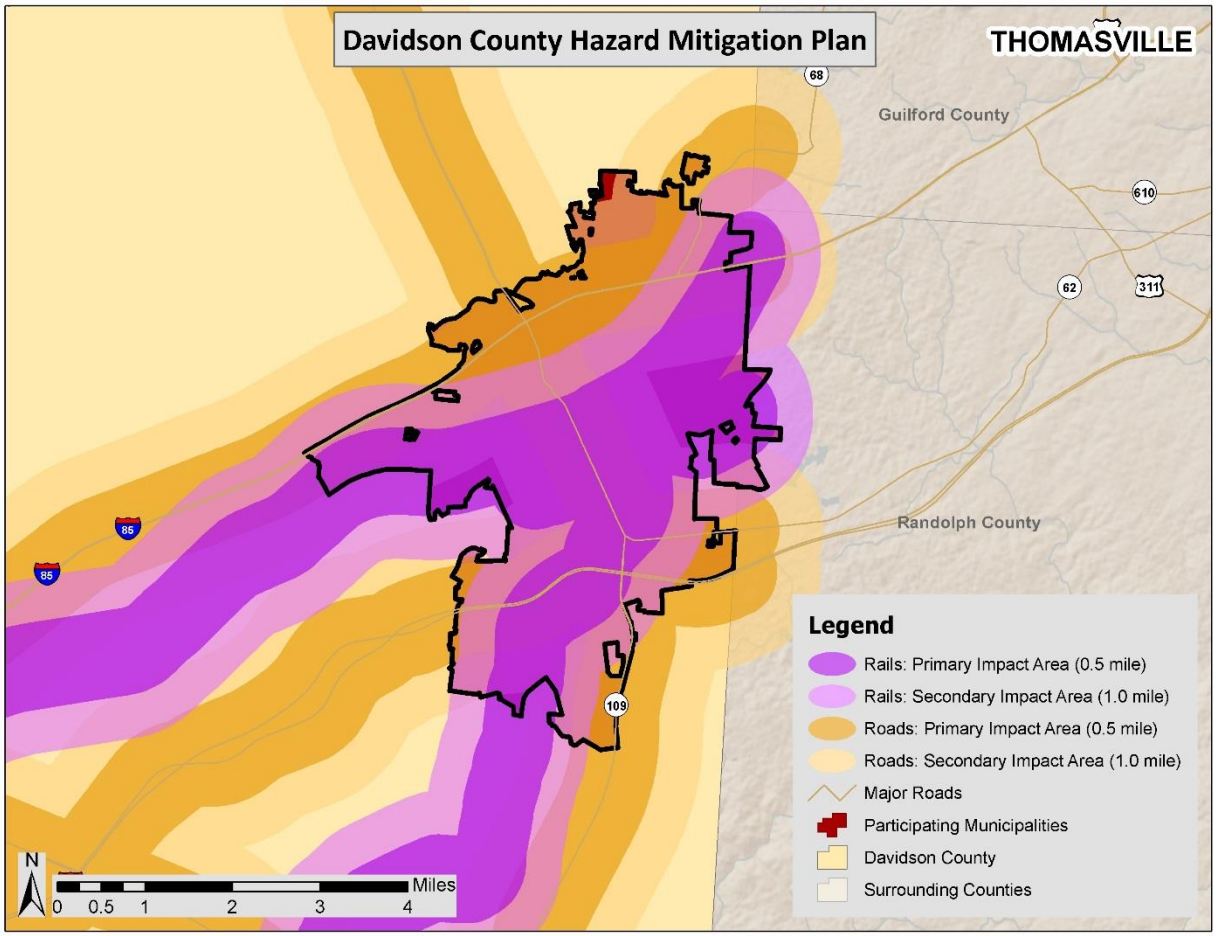


TABLE D.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[30]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[31]
Thomasville	6,298	9,628	$671,434,150	10,067	16,097	$963,669,280

[30] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[31] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

TABLE D.48: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[32]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[33]
Thomasville	7,183	11,096	$653,836,580	9,659	15,425	$907,813,800

Social Vulnerability

Given high susceptibility across the entire city, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are 6 City of Thomasville facilities located in a HAZMAT risk zone. All 6 of the facilities are located in the secondary, 1.0-mile, zone, including: 1 fire station, 1 EMS/rescue station, 2 schools, and 2 other facilities. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this section.

Mobile Analysis:

The critical facility analysis for road and railroad transportation corridors in the City of Thomasville revealed that there are 30 critical facilities located in the primary and secondary mobile HAZMAT buffer areas for roads and 30 critical facilities located in the railroad HAZMAT buffer areas. The 1.0-mile road buffer area (worst case scenario model) includes the following critical facilities: 6 fire stations, 2 police stations, 2 EMS/rescue stations, 1 medical care facility, 8 schools, and 11 other facilities. The railroad buffer areas include the following: 6 fire stations, 2 police stations, 2 EMS/rescue stations, 1 medical care facility, 8 schools, and 11 other facilities. It should be noted that nearly all of the facilities located in the buffer areas for road are also located in the buffer areas for railroad and/or the fixed site analysis. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this section.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in the City of Thomasville. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in conditions that could alter the impact area such direction and speed of wind, volume of release, etc. Further, incidents from neighboring counties could also impact the city.

Nuclear Accident

The location of the City of Thomasville outside of the 50-mile radius of the McGuire Nuclear Power Plant indicates that the city is at low risk to a nuclear accident.

In order to assess nuclear risk, a GIS-based analysis was used to estimate exposure during a nuclear event within each of the risk zones described in Section 5: *Hazard Profiles*. The determination of

[32] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.

[33] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within one of the risk zones. There are no properties in Davidson County located within the 10-mile risk zone, so **Table D.49** only presents the potential at-risk property in the 50-mile buffer zone for the City of Thomasville. Both the number of parcels/buildings and the approximate value are presented.

TABLE D.49: ESTIMATED EXPOSURE OF PARCELS/BUILDINGS TO A NUCLEAR ACCIDENT

Location	50-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[34]
Thomasville	0	0	$0

Source: International Atomic Energy Agency

Social Vulnerability

Since no areas of the city are within the 50-mile buffer area, the total population is considered to be at low risk to a nuclear hazard.

Critical Facilities

The critical facility analysis revealed that there are no critical facilities located in the 50-mile nuclear buffer area in the City of Thomasville. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this section.

In conclusion, a nuclear accident has low potential to impact existing and future buildings, facilities, and populations in the City of Thomasville since none of the city is located within the 50-mile buffer area.

Wildfire

Historical evidence indicates that the City of Thomasville is susceptible to wildfire events. A total of 227 wildfires were reported by the North Carolina Division of Forest Resources in Davidson County from 2009 to 2014 resulting in $58,000 in structure damage. On an annualized level, these damages amount to $11,600 for the county (data is only reported at the county level, so it is not possible to calculate damages specific to the city).

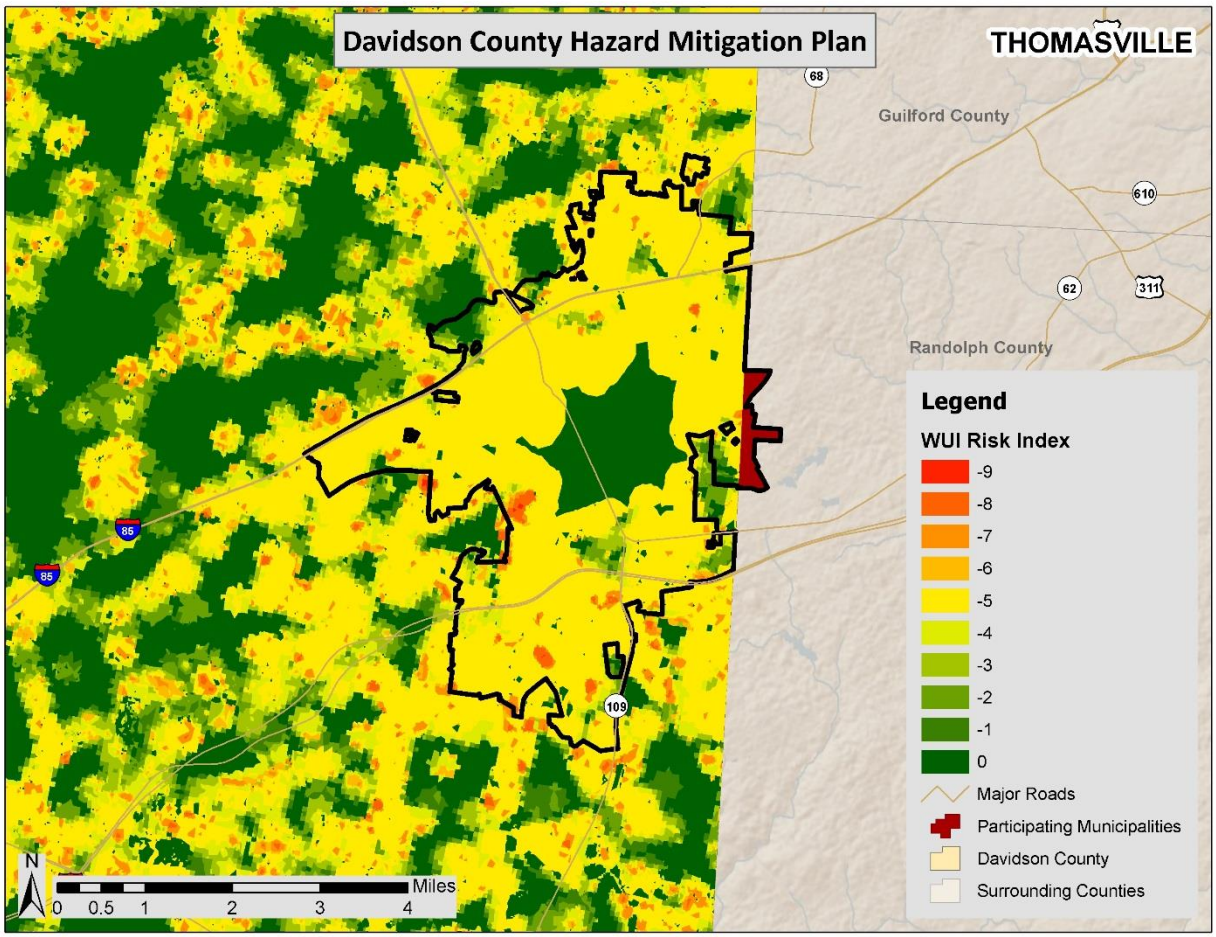
To estimate exposure to wildfire, the approximate number of parcels and their associated improved value was determined using GIS analysis. For the critical facility analysis, areas of risk were intersected with critical facility locations. **Figure D.18**, shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to -9 with lower values being most severe (as noted previously, this is only a measure of relative risk). **Figure D.19** shows the areas of analysis where any grid cell is than -5. Areas with a value

[34] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 50-mile buffer, since building footprints were not associated with dollar value data.

below -5 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

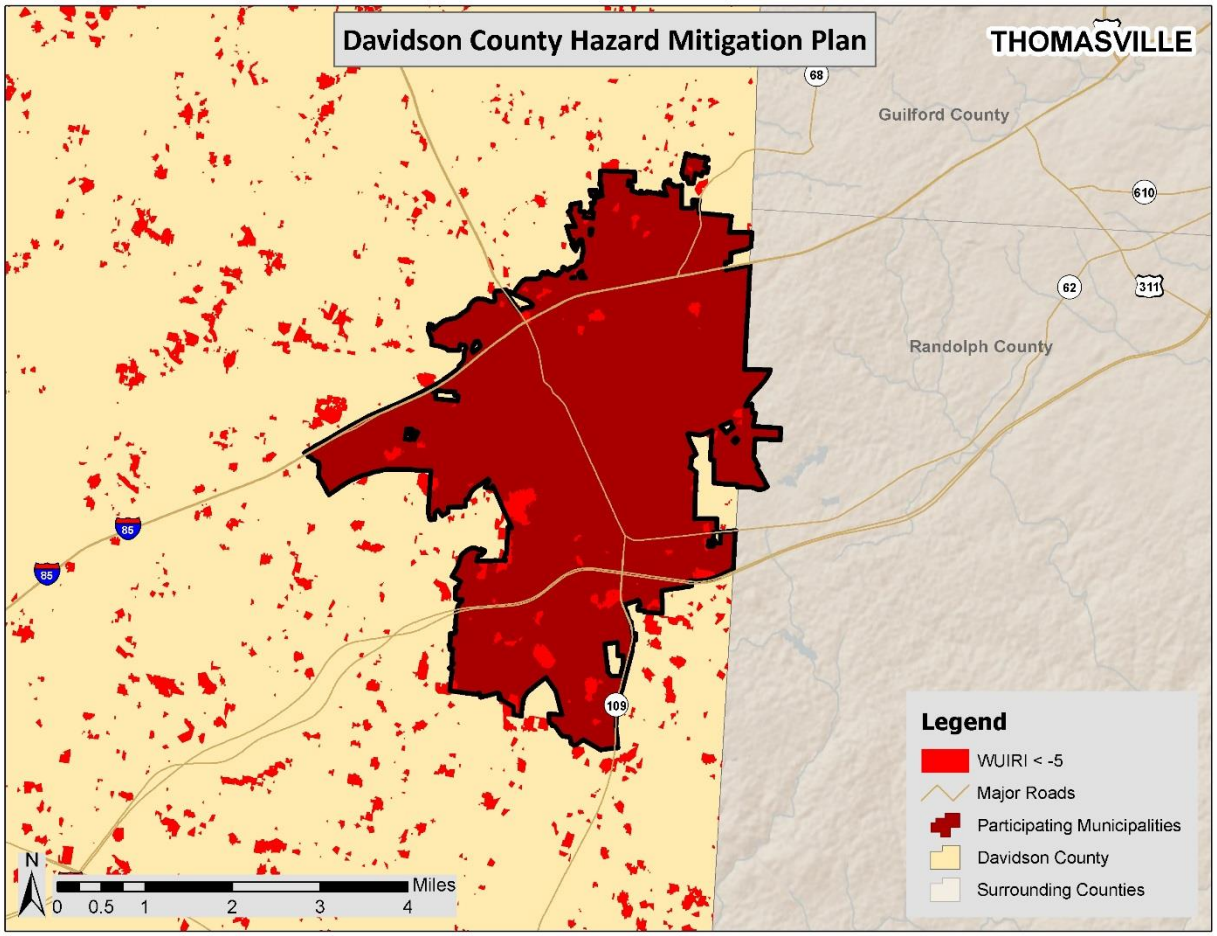
Table D.50 shows the results of the analysis.

FIGURE D.18: WUI RISK INDEX AREAS IN THOMASVILLE



Source: Southern Wildfire Risk Assessment Data

FIGURE D.19: HIGH WILDFIRE RISK AREAS IN THOMASVILLE



Source: Southern Wildfire Risk Assessment Data

TABLE D.50: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

Location	HIGH WILDFIRE RISK AREA		
	Approx. Number of Parcels	Approx. Number of Buildings	Approx. Improved Value
Thomasville	437	386	$76,966,140

Social Vulnerability

Although not all areas have equal vulnerability, there is some susceptibility across the entire city. It is assumed that the total population is at low risk to the wildfire hazard. Determining the exact number of people in wildfire risk areas is difficult with existing data and could be misleading.

Critical Facilities

The critical facility analysis revealed that there are no critical facilities located in the wildfire risk area (areas where the WUIRI is less than -5). However, it should also be noted, that several factors could impact the spread of a wildfire putting all facilities at some risk. A list of specific critical facilities and their associated risk can be found in **Table D.52** at the end of this section.

In conclusion, a wildfire event has the potential to impact many existing and future buildings, critical facilities, and populations in the City of Thomasville.

Conclusions on Hazard Vulnerability

Table D.51 presents a summary of annualized loss for each hazard in the City of Thomasville. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for the city. Therefore, although an annualized loss was determined using the damage reported from historical occurrences at the municipal level (where available), it is likely that the county-wide estimate (found in Section 6: *Vulnerability Assessment*) is a better estimate. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the city.

TABLE D.51: ANNUALIZED LOSS FOR THOMASVILLE*

Event	Thomasville
Atmospheric Hazards	
Drought	Negligible
Extreme Heat	Negligible
Hailstorm	Negligible
Hurricane & Tropical Storm†	$790,000
Lightning	$10,226
Severe Thunderstorm / High Wind	Negligible
Tornado	Negligible
Winter Storm & Freeze†	$344,444
Geologic Hazards	
Earthquake†	$165,000
Landslide	Negligible
Hydrologic Hazards	
Dam Failure	Negligible
Erosion	Negligible
Flood	Negligible
Other Hazards	
HAZMAT Incident	$5,156
Nuclear Accident	Negligible
Terror Threat	Negligible
Wildfire†	$11,600

*In this table, the term "Negligible" is used to indicate that no records for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not kept.
†Only county-wide damage estimates were reported for this hazard.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to atmospheric hazards including drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind, tornado, and winter storm and freeze. Some buildings may be more vulnerable to these hazards based on locations, construction, and building type. **Table D.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

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TABLE D.52: AT-RISK CRITICAL FACILITIES IN THOMASVILLE

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
THOMASVILLE																								
Freeman Lake Dam	Dam	X	X	X	X	X	X	X	X	X						X	X	X		X				
Liberty Drive Dam	Dam	X	X	X	X	X	X	X	X	X							X	X	X	X				
Thomasville - Base 2	EMS Base	X	X	X	X	X	X	X	X	X							X	X	X	X				
City of Thomasville FD	Fire Station	X	X	X	X	X	X	X	X	X							X	X		X				
City of thomasville FD	Fire Station	X	X	X	X	X	X	X	X	X							X	X		X				
Station #43	Fire Station	X	X	X	X	X	X	X	X	X							X	X		X				
Thomasville FD	Fire Station	X	X	X	X	X	X	X	X	X								X	X	X				
Thomasville FD	Fire Station	X	X	X	X	X	X	X	X	X						X	X	X	X	X				
Thomasville FD	Fire Station	X	X	X	X	X	X	X	X	X								X	X	X				
Thomasville City Hall	Government Office	X	X	X	X	X	X	X	X	X							X	X	X	X				
Thomasville Medical Center	Hospital	X	X	X	X	X	X	X	X	X								X	X	X				
Thomasville Library	Library	X	X	X	X	X	X	X	X	X							X	X	X	X				
Thomasville National Guard Armory	National Guard Armory	X	X	X	X	X	X	X	X	X							X	X		X				
City of Thomasville Police	Police	X	X	X	X	X	X	X	X	X							X	X		X				
Davidson County Sheriff's Dept	Police	X	X	X	X	X	X	X	X	X							X	X	X	X				
Power Station-off Finch Ave	Power Station	X	X	X	X	X	X	X	X	X								X	X	X				
Power Station-off Unity St	Power Station	X	X	X	X	X	X	X	X	X									X	X				

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
Power Station-Taylor St	Power Station	X	X	X	X	X	X	X	X	X			X			X	X	X	X	X				
Station 5	Rescue Squad	X	X	X	X	X	X	X	X	X						X	X	X	X	X				
E Lawson Brown Middle	School	X	X	X	X	X	X	X	X	X							X	X		X				
East Davidson High	School	X	X	X	X	X	X	X	X	X							X	X		X				
Fair Grove Elementary	School	X	X	X	X	X	X	X	X	X							X	X		X				
Liberty Drive Elementary	School	X	X	X	X	X	X	X	X	X						X		X	X	X				
Pilot Elementary	School	X	X	X	X	X	X	X	X	X							X	X	X	X				
Thomasville High	School	X	X	X	X	X	X	X	X	X								X		X				
Thomasville Middle	School	X	X	X	X	X	X	X	X	X							X	X		X				
Thomasville Primary	School	X	X	X	X	X	X	X	X	X						X		X	X	X				
Thomasville Sewage Treatment Plant	Sewage Treatment Plant	X	X	X	X	X	X	X	X	X								X						
Thomasville Water Works	Water Plant	X	X	X	X	X	X	X	X	X								X	X	X				
Water Tank-int of Commerce St & E Guilford St	Water Tank	X	X	X	X	X	X	X	X	X							X	X	X	X				
Water Tank-Int of Hasty School Rd and Transit Ave	Water Tank	X	X	X	X	X	X	X	X	X							X	X		X				

D.4 CITY OF THOMASVILLE CAPABILITY ASSESSMENT

This subsection discusses the capability of the City of Thomasville to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

D.4.1 Planning and Regulatory Capability

Table D.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the City of Thomasville. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Davidson County Hazard Mitigation Plan.

TABLE D.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System
Thomasville	✓	✓		✓	✓			✓				✓	✓		✓	✓	✓			✓	✓	✓	

A more detailed discussion on the city's planning and regulatory capabilities follows.

Emergency Management

Hazard Mitigation Plan
The City of Thomasville was included in the county's previous hazard mitigation plan.

Emergency Operations Plan
The City of Thomasville is included in the county's emergency operations plan.

General Planning

Comprehensive Land Use Plan
The City of Thomasville has adopted a city land use plan.

Capital Improvements Plan
The City of Thomasville has a capital improvement plan in place.

Zoning Ordinance
The City of Thomasville has adopted a standalone zoning ordinance.

Subdivision Ordinance
The City of Thomasville has adopted a standalone subdivision ordinance.

Building Codes, Permitting, and Inspections
North Carolina has a state compulsory building code which applies throughout the state. The City of Thomasville Building Inspections provides building code enforcement within the city's planning jurisdiction.

Floodplain Management

Table D.54 provides NFIP policy and claim information for the City of Thomsville.

TABLE D.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
Thomasville	09/28/79	06/16/09	58	$14,753,400	9	$82,810

Source: NFIP Community Status information as of 2/12/15; NFIP claims and policy information as of 11/30/14

Flood Damage Prevention Ordinance
All communities participating in the NFIP are required to adopt a local flood damage prevention ordinance. The City of Thomasville participates in the NFIP and has adopted flood damage prevention regulations.

Open Space Management Plan
The City of Thomasville has adopted the county's parks and recreation tourism development master plan.

Stormwater Management Plan
Although the City of Thomasville does not have a stormwater management plan in place, the city has adopted a stormwater ordinance.

D.4.2 Administrative and Technical Capability

Table D.55 provides a summary of the capability assessment results for the City of Thomasville with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in the city with the specified knowledge or skill.

TABLE D.55: RELEVANT STAFF / PERSONNEL RESOURCES

Staff / Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
Thomasville	✓	✓	✓	✓	✓		✓	✓	✓	

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

D.4.3 Fiscal Capability

Table D.56 provides a summary of the results for the City of Thomasville with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds) according to the previous county hazard mitigation plan.

TABLE D.56: RELEVANT FISCAL RESOURCES

Fiscal Tool / Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP, PDM, FMA, SBA, other Federal, state, and non-governmental funding sources, etc.
Thomasville	✓	✓	✓						✓	✓

D.4.4 Political Capability

The previous hazard mitigation plan indicates that the City of Thomasville has limited support of hazard mitigation practices and strategies. Public awareness has increased through the planning process. Political willpower has yet to be developed through education and awareness programs.

D.4.5 Conclusions on Local Capability

Table D.57 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in the existing hazard mitigation plan and readily available on the city's government website. According to the assessment, the local capability score for the city is 36, which falls into the moderate capability ranking.

TABLE D.57: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
Thomasville	36	Moderate

D.5 THOMASVILLE MITIGATION STRATEGY

This subsection provides the blueprint for the City of Thomasville to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Hazard Mitigation Planning Team and the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

D.5.1 Mitigation Goals

The City of Thomasville developed five mitigation goals in coordination with the other participating Davidson County jurisdictions. The county mitigation goals are presented in **Table D.58**.

TABLE D.58: DAVIDSON COUNTY MITIGATION GOALS

	Goal
Goal #1	To enhance local government capability to lessen the impacts of all natural hazards.
Goal #2	To identify and protect critical facilities, services, and infrastructure from the impacts of natural disasters.
Goal #3	To develop an effective public awareness/education/outreach program for natural hazards impacts.
Goal #4	To protect persons and property from damage due to natural hazards.
Goal #5	To ensure disaster resistant future development.

D.5.2 Mitigation Action Plan

The mitigation actions proposed by the City of Thomasville are listed in the following individual Mitigation Action Plan.

Thomasville Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Establish hazard mitigation as a component of all planning activities.	All	High	Thomasville Planning	Local	2018	Comprehensive land use plan implemented in December 2008. The city will need to evaluate and update the plan in the future so this action is deferred.
P-2	Implement storm water management program.	Flood	High	Thomasville Water Resources/Public Works	Local	Completed	Thomasville is a Phase II Stormwater city and adopted a Stormwater Management Ordinance in 2006.
P-3	Continue to clear debris from culverts and storm drains in flood prone areas.	Flood	Moderate	Thomasville Public Works	Local	Completed	Thomasville is a Phase II Stormwater city and adopted a Stormwater Management Ordinance in 2006. Thomasville joined the Stormwater SMART. Implemented program to clear drains and install stormwater devices.
P-4	Consider tree ordinances or programs to encourage planting trees less susceptible to damage from ice and wind.	Winter Storm, High Wind	Low	Thomasville Planning	Urban and Community Forestry Grant	Completed	Thomasville has adopted a utility guideline that meets these requirements.
P-5	Through subdivision regulations, encourage that power, cable and telephone lines be buried.	Winter Storm, High Wind	High	Thomasville Planning	Local	Completed	Subdivision regulations are included in the zoning ordinance.
P-6	Set up Centralized, coordinated permitting process.	All	Low	Thomasville Planning	Local	Completed	Thomasville has implemented a coordinated permitted process.
P-7	Designate preferred growth areas and develop area plans for target locations	All	Low	Thomasville Planning	Local	2018	Thomasville implemented a new Land Development plan in 2008. This steers growth and development away from flood prone areas. The city will need to evaluate and update the plan in the future so this action is deferred.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
P-8	Consider amending subdivision ordinance to allow clustering to maximize density while preserving high hazard areas (areas prone to flood, landslide, erosion).	All	Moderate	Thomasville Planning	Local	3-5 years (2020)	The option of cluster development would be an amendment to the Zoning ordinance. Future considerations for this type of development will be considered among local officials and developers.
Property Protection							
PP-1	Evaluate current capacity of critical services to deal with power outages.	Winter Storm, High Wind	High	Thomasville Public Services Department	Local	3-5years (2020)	Thomasville periodically evaluates status and need of its critical facilities to deal with power outages- with first time generators, transfer switches or possible upgrades. The city will continue to evaluate critical services capacity and make improvements as necessary.
PP-2	Supply critical facilities with back up power source. Priority needs • 1 generator for City Hall • 2 generators for Fire Service • 2 generators for water/wastewater plants • 1 generator for Public Works Building (ADDED 2009)	Winter Storm, High Wind	Low	Thomasville Finance Department/ Public Services Department	Local	3-5years (2020)	Thomasville periodically evaluates status and need of its critical facilities to deal with power outages- with first time generators, transfer switches or possible upgrades. All four fire stations are powered with generator backups.
PP-3	Look for sources of funding to procure and install transfer switches	Winter Storm, High Wind	Low	Thomasville Public Services Department	Hazard Mitigation Funding	3-5 years (2020)	The city has not installed any new transfer switches but ill implement as funding becomes available

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Natural Resource Protection							
NRP-1	Wherever possible preserve natural wetlands, designate conservation corridors, especially along streams through acquisition or conservation easements.	All	High	Thomasville Planning	Local	2019	Thomasville is doing some local watershed planning which will be the basis for future preservation, buffer protection and easement. This work is incomplete and will need to be continued going forward.
Structural Projects							
SP-1	Build and develop property to house a new Police Department	All	High	Thomasville Police and City Manager	Local	2-4 years (2019)	This has not been completed, but Thomasville is working through a design process to establish structural needs for the Thomasville Police Department.
Emergency Services							
ES-1	Identify and designate at least one emergency shelter in Thomasville.	All	Moderate	Davidson County Emergency Management, Thomasville City Manager	Local	Completed	Thomasville has several locations designated for sheltering.
ES-2	Seek funding to support of the implementation of an emergency operating center to fund - four phone lines, four portable radios Bluetooth printer, two projectors, two laptop computers, two HD televisions, and two whiteboards. The equipment will support the EOC and serve as a reserve EOC for Davidson County Emergency Management	All	High	Davidson Co EM and Thomasville Fire Department	Local	6-12 Months (2016)	Thomasville is working on implementing an emergency operating center that will serve as a primary EOC for Thomasville and reserve EOC for Davidson County EM.
ES-3	Design and implement an emergency operating center for the entire city; EOC will be available as an alternate location for Davidson County	All	High	Thomasville Fire Department	Local	3-6 months (2016)	Thomasville is working on implementing an emergency operating center that will serve as a primary EOC for Thomasville and reserve EOC for Davidson County EM.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
ES-4	Pursue and participate in the Community Rating System (CRS) through the National Flood Insurance Program (NFIP)	Flood	High	Thomasville Fire Department, Public Works, Planning and Zoning	Local	2-4 Years (2019)	The city is not in the CRS, but is currently in the planning phase of participation in the program.
ES-5	Pursue and achieve the designation of Lexington as a "Storm Ready Community" by the National Weather Service to assure timely public warning of impending natural disaster events.	All	Moderate	Thomasville Fire Department	Local	2-4 years (2019)	The city is not a StormReady community but is currently in the planning phase of participation in the program.
ES-6	Use available communications resources for outreach and education to promote awareness of natural hazards and mitigation options	All	Moderate	Davidson Co EM and Thomasville Fire Department	N/A	3-6 months (2016)	Thomasville has developed an "Elected Officials Guidebook to Emergency Response". The implementation has begun as outreach has started.
ES-7	Put in place a countywide emergency notification call system for location specific warning to public of impending disaster (i.e. NIXLE)	All	High	Davidson Co EM and Thomasville Fire Department	Local	3-6 months (2016)	Thomasville Fire is looking to participate with Davidson County EM in this program.
Public Education and Awareness							
PEA-1	Educate and inform local government and elected officials (decision makers) of the need to consider hazard mitigation in policy and budgetary planning and decision making processes.	All	High	Thomasville Fire Department	Local	3-6 months	Expected completion date of July 2015. Elected officials guides will be distributed April 2015
Previously Completed Mitigation Actions							
	Adopt and implement local storm water management plan to reduce urban and small stream flooding and reduce the impact of urban run off on downstream rivers.	Flood	High	Thomasville Public Services Department	Local	Completed	Completed in 2006 and implementation is ongoing. Thomasville is a Phase II Stormwater city and is required to adopt a Stormwater Management Plan which it did in 2006. Implementation of the plan is ongoing. It is enforced for all development review. Features of the plan will continue to be implemented and strengthened.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Consider expanding partnership with Davidson County for increased access to GIS capabilities to track the location and value of properties within planning areas.	All	Low	Thomasville Planning	Local	Completed	Completed in 2006 and implementation is ongoing. Thomasville has expended its contract with Davidson County for comprehensive GIS services. As the already strong capacity of the GIS office grows, Thomasville will receive the same enhanced services as the County. Information on location and value of properties is readily available through County GIS and the County Tax Department.
	Develop emergency water supply capability.	All	High	Thomasville Assistant City Manager	Local	Completed	Completed in 2004 and implementation is ongoing. Thomasville is a part of the comprehensive countywide water conservation and interconnect plan which was developed in 2004. It establishes uniform water control measures among jurisdictions and Davidson Water, Inc. and provides for interconnections in case of severe drought.
	Identify alternative water supplies.	All	Moderate	Thomasville Assistant City Manager/Public Works	Local	Completed	Completed in 2006 and implementation is ongoing. Thomasville has two alternative water supplies and one under construction. The City has 1 interconnect with Davidson Water, Inc., a private water supplier, and a 2nd interconnect with the City of High Point. Another interconnect is being constructed with Davidson Water, Inc.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Strengthen floodplain regulation to current standards. (New model regulation).	Flood	High	Thomasville Planning	Local	Completed	Completed in 2009. City Council adopted new FIRM maps and the new floodplain ordinance, February 2009.

Annex E
Town of Wallburg

This annex includes jurisdiction-specific information for the Town of Wallburg. It consists of the following five subsections:

- E.1 Town of Wallburg Community Profile
- E.2 Town of Wallburg Risk Assessment
- E.3 Town of Wallburg Vulnerability Assessment
- E.4 Town of Wallburg Capability Assessment
- E.5 Town of Wallburg Mitigation Strategy

E.1 TOWN OF WALLBURG COMMUNITY PROFILE

E.1.1 Geography and the Environment

The Town of Wallburg is located in the northern portion of Davidson County. An orientation map is provided as **Figure E.1**.

The Town of Wallburg was incorporated in 2004. The town was never recognized as a Census Designated Place (CDP) prior to its incorporation. The total area of the town is 5.6 square miles, none of which is water area.

According to the State Climate Office of North Carolina, Davidson County, and the Town of Wallburg, enjoys a moderate climate that is characterized by mild winters and hot, humid summers. In general, the spring months are marked by unpredictable weather and changes can occur rapidly with sunny skies yielding to severe thunderstorms in just a few hours. Precipitation is generally well distributed throughout the year and annual totals average 45 inches.

From December to February, the average high temperature ranges from the lower to mid 50s and low temperatures average around 30°F. However, the temperature drops to 10°F or 12°F about once during an average winter over central North Carolina. The mountains also act as a barrier preventing most wintery precipitation from entering the region, and snow and sleet is usually light and occurs on average once or twice per year.

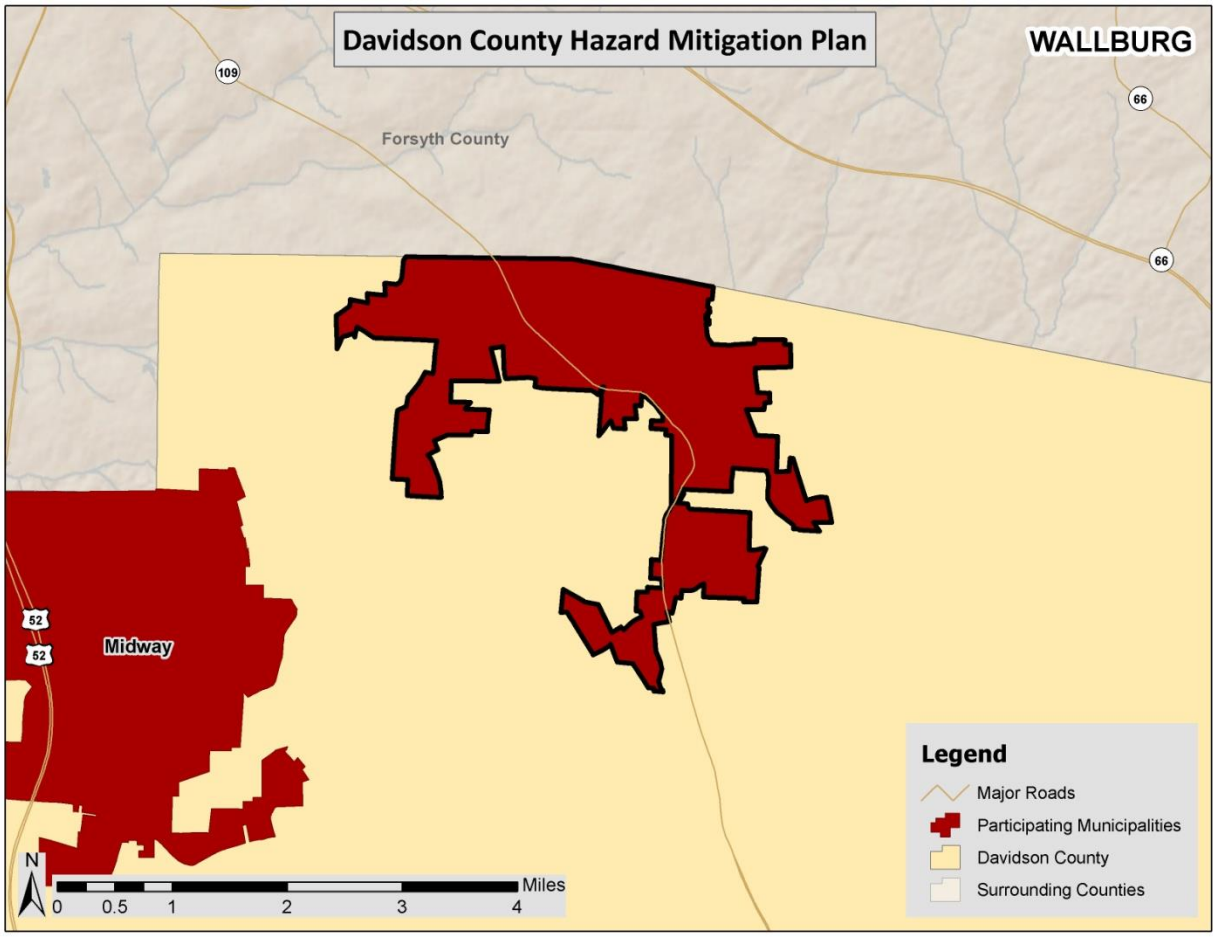
In spring, temperatures begin to rise and the increase in average temperature is greater in April than in any other month. In general, the days are warm and the nights are cool during the spring months. Average high temperatures increase from 63°F in March to 79°F in May. There is a similar increase in average low temperatures, which are in the upper 30s in March and climb to the mid 50s in May. Additionally, tornadoes are most likely early in the spring; however, North Carolina is outside the principal tornado area of the United States.

Tropical air over central North Carolina brings warm temperatures and rather high humidity during the summer. Average high temperatures range from the mid to upper 80s and low temperatures average in

the 60s. Summer rainfall is the most variable, and daily showers as well as periods of one to two weeks without rain are both common. Thunderstorms are also common events during the summer months.

Autumn is the season typified by the most rapidly changing temperature. The drop-off is greatest in October and continues through November. Average high temperatures begin in the lower 80s in September and fall to the low 60s by November. Average lows also drop significantly from the 59°F to about 38°F from September to November.

FIGURE E.1: TOWN OF WALLBURG ORIENTATION MAP



E.1.2 Population and Demographics

According to the 2010 Census, the Town of Wallburg has a population of 3,047 people. Since the town was incorporated in 2004 growth rates are not available between 2000 and 2010, but the average population density is 547 people per square mile. Population counts from the U.S. Census Bureau for 2010 for the town are presented in **Table E.1**.

TABLE E.1: POPULATION COUNTS FOR WALLBURG

Jurisdiction	1990 Census Population	2000 Census Population	2010 Census Population	% Change 2000-2010
Wallburg	--	--	3,047	--

Source: United States Census Bureau

Based on the 2010 Census, the median age of residents of the Town of Wallburg is 41.5 years. The racial characteristics of the town are presented in **Table E.2**. Whites make up the majority of the population in the town, accounting for almost 95 percent of the population.

TABLE E.2: DEMOGRAPHICS OF WALLBURG

Jurisdiction	White, Percent (2010)	Black or African American, Percent (2010)	American Indian or Alaska Native, Percent (2010)	Asian, Percent (2010)	Native Hawaiian or Other Pacific Islander, Percent (2010)	Other Race, Percent (2010)	Two or More Races, percent (2010)	Persons of Hispanic Origin, Percent (2010)*
Wallburg	94.9%	0.9%	0.5%	0.8%	0.0%	1.8%	1.1%	3.1%

*Hispanics may be of any race, so also are included in applicable race categories
Source: United States Census Bureau

E.1.3 Housing

According to the 2010 U.S. Census, there are 1,217 housing units in the Town of Wallburg, the majority of which are single family homes or mobile homes. Housing information for the town is presented in **Table E.3**. As shown in the table, the town has a very low percentage of seasonal housing units.

TABLE E.3: HOUSING CHARACTERISTICS OF WALLBURG

Jurisdiction	Housing Units (2000)	Housing Units (2010)	Seasonal Units, Percent (2010)	Median Home Value (2009-2013)
Wallburg	--	1,217	0.7%	$156,500

Source: United States Census Bureau

E.1.4 Infrastructure

Transportation

The Town of Wallburg has one primary state highway for transportation uses. NC Route 109 runs north-south connecting the town to Thomasville and neighboring Forsyth County.

Currently, there is no passenger or freight rail service offered in Wallburg.

The Piedmont Triad International Airport is the largest airport closest to Wallburg. It offers 10 daily non-stop commercial flights on 8 airlines and it is the third busiest airport in North Carolina. It is approximately 21 miles from the center of the town. Davidson County Airport, located in Lexington, also provides public air service as well as one other privately-owned airport, Hiatt Airport, located just

outside of Thomasville. The Charlotte Douglas International Airport and Raleigh-Durham International Airport are two additional large airports that are also in fairly close proximity to the town.

Utilities

Electrical power in the Town of Wallburg is provided by Duke Energy Progress and EnergyUnited. Duke Energy Progress, the largest electric power holding company in the US, provides service across Davidson County. EnergyUnited is an electricity cooperative that also services the majority of the county.

The Town of Wallburg does not provide sewer and water service to its residents. Currently, the town's sewer and water services are provided by Davidson County and Davidson Water, Inc.

Community Facilities

There are a number of buildings and community facilities located throughout the Town of Wallburg. According to the data collected for the vulnerability assessment (Section 6.4.1), there are 1 fire station, and 1 public school located within the town.

There are no hospitals located in Wallburg; however, there are two nearby in Thomasville and Lexington. Novant Health Thomasville Medical Center is a general acute center with 146 beds and Wake Forest Baptist Health – Lexington Medical Center is also a general acute center with 94 beds.

There are also a number of county and municipal parks located in and near the Town of Wallburg, including Boone's Cave Park and many community and neighborhood parks. High Rock Lake, Tuckertown Lake, and the Yadkin River also offer additional recreational opportunities nearby.

E.1.5 Land Use

Much of Davidson County is developed and relatively urbanized. However, there are some areas that are more sparsely developed. The incorporated municipalities, including the Town of Wallburg, are where the county's population is generally concentrated. The incorporated areas are also where many businesses, commercial uses, and institutional uses are located. Land uses in the balance of the study area consist of a variety of types of residential, commercial, industrial, government, and recreational uses. Davidson County's land use pattern can be described as suburban sprawl. Population density is greater in the northern portion of the county while the southern portion is largely rural with primarily residential development. Local land use and associated regulations are further discussed in *Section 7: Capability Assessment.*

E.1.6 Employment and Industry

The early modern economy in Davidson County was based on agriculture but it later transitioned to one based on textile and furniture manufacturing in the twentieth century up until the late 1990s. Today, Davidson County, like many communities, is grappling with the evolution of a manufacturing economy shifting to an economy based on the service industry.

According to the North Carolina Employment Security Commission (NCESC), in 2013 (the last full year with data available), Davidson County had an average annual employment of 71,433 workers and an average unemployment rate of 8.4 percent (compared to 8.0 percent for the state). The Manufacturing industry employed 21.9 percent of the county's workforce followed by Retail Trade (12.1%); Health Care

and Social Assistance (11.2%); and Educational Services (10.4%). The American Community Survey (ACS) found the average annual median household income in Davidson County was $43,083 from 2009 to 2013 compared to $46,334 for the state of North Carolina.

E.2 WALLBURG RISK ASSESSMENT

This subsection includes hazard profiles for each of the significant hazards identified in Section 4: *Hazard Identification* as they pertain to the Town of Wallburg. Each hazard profile includes a description of the hazard's location and extent, notable historical occurrences, and the probability of future occurrences. Additional information can be found in Section 5: *Hazard Profiles*.

E.2.1 Drought

Location and Spatial Extent

Drought typically covers a large area and cannot be confined to any geographic or political boundaries. Furthermore, it is assumed that the town would be uniformly exposed to drought, making the spatial extent potentially widespread. It is also notable that drought conditions typically do not cause significant damage to the built environment.

Historical Occurrences

According to the North Carolina State Office, the Central Piedmont Region, which includes the Town of Wallburg, experienced moderate to extreme drought occurrences in 11 of the last 14 years (2000-2013). **Table E.4** shows the most severe drought condition reported for each year in the Central Piedmont Region, according to PDSI classifications. However, it should be noted that the most severe classification reported is based on monthly regional averages, and conditions in the Town of Wallburg may actually have been less or more severe than what is reported.

TABLE E. 4: HISTORICAL DROUGHT OCCURRENCES IN WALLBURG

extreme drought	severe drought	moderate drought	mid-range	moderately moist	very moist	extremely moist
−4.00 and below	−3.00 to −3.99	−2.00 to −2.99	−1.99 to +1.99	+2.00 to +2.99	+3.00 to +3.99	+4.00 and above

	Wallburg	
2000	-2.83	Moderate Drought
2001	-3.43	Severe Drought
2002	-4.98	Extreme Drought
2003	-0.38	Mid-range
2004	-2.04	Moderate Drought
2005	-2.37	Moderate Drought
2006	-2.62	Moderate Drought
2007	-4.16	Extreme Drought
2008	-4.37	Extreme Drought
2009	-1.08	Mid-range
2010	-2.53	Moderate Drought
2011	-3.44	Severe Drought
2012	-2.84	Moderate Drought

	Wallburg	
2013	**-0.37**	Mid-range

Source: North Carolina State Climate Office

Data from the National Climatic Data Center (NCDC) was also reviewed to obtain additional information on historical drought events in the town, but no events were reported in the Town of Wallburg.

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the Town of Wallburg has a probability level of likely (10 to 100 percent annual probability) for future drought events. This hazard may vary slightly by location but each area has an equal probability of experiencing a drought. However, historical information also indicates that there is a much lower probability for extreme, long-lasting drought conditions.

E.2.2 Extreme Heat

Location and Spatial Extent

Excessive heat typically impacts a large area and cannot be confined to any geographic or political boundaries. The entire town is susceptible to extreme heat conditions.

Historical Occurrences

Data from the National Climatic Data Center was used to determine historical extreme heat and heat wave events in the Town of Wallburg, however events are only reported at the county level. One event was reported in Davidson County:

July 22, 1998 – *Excessive Heat* – Excessive heat plagued central North Carolina during July 22 through July 23. Maximum temperatures reached the 98 to 103 degree range combined with dew points in the 78 to 80 degree range with little wind to give heat index values of around 110 degrees for several hours each afternoon. To make matters worse, the minimum temperatures did not fall below 80 at several locations and those that did achieved that feat for only an hour or two. Strong thunderstorms ended the 2 day excessive heat ordeal on the evening of the 23 when rain cooled the environment enough to send temperatures into the lower 70s at most locations.

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been reported at an observation station in Lexington since 1902. The recorded maximum for the county can be found below in **Table E.5**.

TABLE E.5: HIGHEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	07/29/1952	107

Source: State Climate Office of North Carolina

The State Climate Office also reports average maximum temperatures at various stations across the state. There is one station located in Davidson County in Lexington. **Table E.6** shows the average maximum temperatures from 1971 to 2000 at the Lexington observation station which can be used as a general comparison for the town.

TABLE E.6: AVERAGE MAXIMUM TEMPERATURE IN DAVIDSON COUNTY

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Avg. Max (°F)	49.6 °F	54.4 °F	63.3 °F	72.5 °F	79.3 °F	85.5 °F	89.1 °F	87.4 °F	81.6 °F	71.9 °F	61.7 °F	52.6 °F

Source: State Climate Office of North Carolina

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that all of the Town of Wallburg has a probability level of possible (1 to 10 percent annual probability) for future extreme heat events to impact the town.

E.2.3 Hailstorm

Location and Spatial Extent

Hailstorms frequently accompany thunderstorms, so their locations and spatial extents coincide. It is assumed that the Town of Wallburg is uniformly exposed to severe thunderstorms; therefore, all areas of the town are equally exposed to hail which may be produced by such storms.

Historical Occurrences

According to the National Climatic Data Center, two recorded hailstorm events have affected the Town of Wallburg since 1998.[1] **Table E.7** is a summary of the hail events in the Town of Wallburg. **Table E.8** provides detailed information about each event that occurred in the town. In all, hail occurrences did not result in any reported property damages.[2] Hail ranged in diameter from 0.75 inches to 1.00 inches. It should be noted that hail is notorious for causing substantial damage to cars, roofs, and other areas of the built environment that may not be reported to the National Climatic Data Center. Therefore, it is likely that damages are greater than the reported value.

TABLE E.7: SUMMARY OF HAIL OCCURRENCES IN WALLBURG

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Wallburg	2	0/0	$0

Source: National Climatic Data Center

TABLE E.8: HISTORICAL HAIL OCCURRENCES IN WALLBURG

	Date	Magnitude	Deaths / Injuries	Property Damage*
Wallburg				
WALLBURG	6/3/1998	0.75 in.	0/0	$0
WALLBURG	5/16/2011	1.00 in.	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

[1] These hail events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through October 2014. It is likely that additional hail events have affected the Town of Wallburg. In addition to NCDC, the North Carolina Department of Insurance office was contacted for information. As additional local data becomes available, this hazard profile will be amended.

[2] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

Probability of Future Occurrences

Based on historical occurrence information, it is assumed that the probability of future hail occurrences is highly likely (100 percent annual probability). Since hail is an atmospheric hazard (coinciding with thunderstorms), it is assumed that the entire town has equal exposure to this hazard. It can be expected that future hail events will continue to cause minor damage to property and vehicles throughout the town.

E.2.4 Hurricane and Tropical Storm

Location and Spatial Extent

Hurricanes and tropical storms threaten the entire Atlantic and Gulf seaboard of the United States. While coastal areas are most directly exposed to the brunt of landfalling storms, their impact is often felt hundreds of miles inland and they can affect the Town of Wallburg. All areas in the Town of Wallburg are equally susceptible to hurricane and tropical storms.

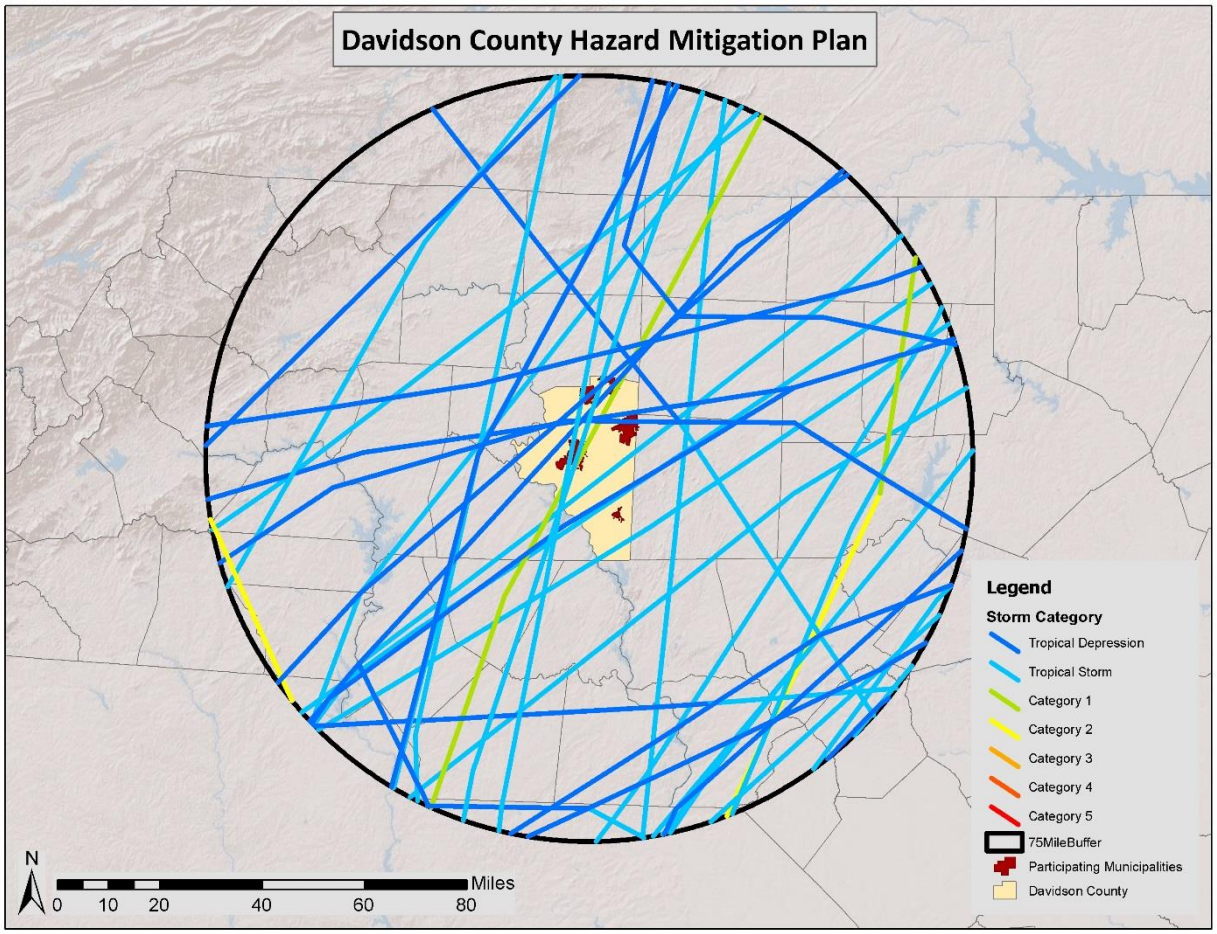
Historical Occurrences

According to the National Hurricane Center's historical storm track records, 45 hurricane/tropical storm tracks have passed within 75 miles of Davidson County since 1859.[3] This includes 6 hurricanes, 23 tropical storms and 16 tropical depressions.

Of the recorded storm events, 11 have traversed directly through Davidson County as shown in **Figure E.2**. **Table E.9** provides the date of occurrence, name (if applicable), maximum wind speed (as recorded within 75 miles of Davidson County), and Category of the storm based on the Saffir-Simpson Scale for each event.

[3] These storm track statistics do not include extra-tropical storms. Though these related hazard events are less severe in intensity, they may cause significant local impact in terms of rainfall and high winds.

FIGURE E.2: HISTORICAL HURRICANE STORM TRACKS WITHIN 75 MILES OF DAVIDSON COUNTY



Source: National Oceanic and Atmospheric Administration; National Hurricane Center

TABLE E.9: HISTORICAL STORM TRACKS WITHIN 75 MILES OF DAVIDSON COUNTY (1850–2014)

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/17/1859	UNNAMED	40	Tropical Storm
10/4/1877	UNNAMED	50	Tropical Storm
9/12/1878	UNNAMED	60	Tropical Storm
9/11/1882	UNNAMED	40	Tropical Storm
10/12/1885	UNNAMED	40	Tropical Storm
6/22/1886	UNNAMED	40	Tropical Storm
9/10/1888	UNNAMED	35	Tropical Storm
9/24/1889	UNNAMED	45	Tropical Storm
8/28/1893	UNNAMED	75	Category 1
9/29/1896	UNNAMED	85	Category 2
7/13/1901	UNNAMED	35	Tropical Storm
6/16/1902	UNNAMED	35	Tropical Storm
9/23/1907	UNNAMED	35	Tropical Storm
8/31/1911	UNNAMED	25	Tropical Depression

Date of Occurrence	Storm Name	Maximum Wind Speed (knots)	Storm Category
9/3/1913	UNNAMED	40	Tropical Storm
8/3/1915	UNNAMED	35	Tropical Storm
9/23/1920	UNNAMED	35	Tropical Storm
10/3/1927	UNNAMED	40	Tropical Storm
8/11/1928	UNNAMED	30	Tropical Depression
10/2/1929	UNNAMED	50	Tropical Storm
9/6/1935	UNNAMED	45	Tropical Storm
10/20/1944	UNNAMED	50	Tropical Storm
9/18/1945	UNNAMED	50	Tropical Storm
10/9/1946	UNNAMED	30	Tropical Depression
8/28/1949	UNNAMED	40	Tropical Storm
8/31/1952	ABLE	45	Tropical Storm
7/10/1959	CINDY	30	Tropical Depression
8/30/1964	CLEO	25	Tropical Depression
6/9/1968	ABBY	25	Tropical Depression
5/26/1970	ALMA	25	Tropical Depression
9/8/1977	BABE	25	Tropical Depression
9/5/1979	DAVID	55	Tropical Storm
7/25/1985	BOB	55	Tropical Storm
8/18/1985	DANNY	25	Tropical Depression
8/29/1988	CHRIS	25	Tropical Depression
9/22/1989	HUGO	85	Category 2
7/21/1994	UNNAMED	20	Tropical Depression
9/6/1996	FRAN*	65	Category 1
7/24/1997	DANNY	30	Tropical Depression
9/5/1999	DENNIS	30	Tropical Depression
9/16/1999	FLOYD*	90	Category 2
9/18/2003	ISABEL*	85	Category 2
9/17/2004	IVAN*	20	Tropical Depression
9/28/2004	JEANNE	20	Tropical Depression
7/7/2005	CINDY	20	Tropical Depression

*Although the track of these storms traversed just outside of the 75 mile buffer area, they were included in the hazard history since a federal disaster area was declared for Davidson County as a result of the storm's impact.
Source: National Hurricane Center

The National Climatic Data Center reported four events associated with a hurricane or tropical storm in Davidson County since 1996. Additionally, Federal records indicate that five disaster declarations were made in 1989 (Hurricane Hugo), 1996 (Hurricane Fran), 1999 (Hurricane Floyd), 2003 (Hurricane Isabel), and 2004 (Hurricane Ivan) for the county.[4]

Flooding is often the greatest hazard of concern with hurricane and tropical storm events in Davidson County. Most events do not carry winds that are above that of the winter storms and straight line winds received by the county. Some anecdotal information is available for the major storms that have impacted that area as found below:

[4] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Identification*.

Hurricane Hugo – September 22-24, 1989
Hurricane Hugo was one of the largest storms on record in the Atlantic Basin that produced high winds and dumped heavy rains over much of North Carolina and South Carolina. Hugo reached a peak level of Category 5 on the Saffir-Simpson scale and made landfall near Isle of Palms in South Carolina as a Category 4, eventually passing over Charlotte and much of the surrounding area as a Category 1 storm. Although the storm caused its greatest damage in South Carolina, over 1,000 structures were destroyed or severely damaged in North Carolina, causing over $1 billion dollars in damages. Wind gusts reached over 40 mph and numerous trees were downed throughout much of south and western North Carolina.

Hurricane Fran – September 5-6, 1996
After being hit just a few weeks earlier by Hurricane Bertha, North Carolina was impacted by the one of the most devastating storms to ever make landfall along the Atlantic Coast. Fran dropped more than 10 inches of rain in many areas and had sustained winds of around 115 miles per hour as it hit the coast and began its path along the I-40 corridor central North Carolina. In the end, over 3 billion dollars in damages were reported in the state. Damages to infrastructure and agriculture added to the overall toll and more than 1.7 million people in the state were left without power.

Hurricane Floyd – September 16, 1999
Hurricane Floyd, combined with the weather conditions before and immediately after this hurricane, resulted in the most severe flooding and devastation in North Carolina history. In North Carolina, the storm resulted in 35 fatalities, over $3 billion in damages, 7,000 destroyed homes, 56,000 damaged homes, 1,500 people rescued from flooded areas, and more than 500,000 customers without electricity. Additionally, the flooding caused an estimated $813 million in agricultural losses affecting 32,000 farmers. There was also significant loss of livestock including 2,860,827 poultry, 28,000 swine, and 619 cattle.

Hurricane Isabel – September 18, 2003
Hurricane Isabel's worst impacts were along the cost of North Carolina where storm surge in Dare County in particular were extremely strong, damaging thousands of homes. The storm surge created a large inlet on Hatteras Island which left the community isolated for months. Further inland and across the state, trees were downed and power was lost by hundreds of thousands of residents. In most of the state, power was restored within a few days, but the effects to the economy and daily lives of citizens were significant.

Hurricane Ivan – September 16-17, 2004
Just a week and a half following Tropical Storm Frances, the remnants of Hurricane Ivan hit western North Carolina when many streams and rivers were already well above flood stage. The widespread flooding forced many roads to be closed and landslides were common across the mountain region. Wind gusts reached between 40 and 60 mph across the higher elevations of the Appalachian Mountains resulting in numerous downed trees. More than $13.8 million of federal aid was dispersed across North Carolina following Ivan.

Probability of Future Occurrences

Given the inland location of the town, it is more likely to be affected by remnants of hurricane and tropical storm systems (as opposed to a major hurricane) which may result in flooding or high winds. The probability of being impacted is less than coastal areas, but still remains a real threat to the Town of Wallburg due to induced events like flooding and erosion. Based on historical evidence, the probability level of future occurrence is likely (between 10 and 100 percent annual probability). Given the regional

nature of the hazard, all areas in the town are equally exposed to this hazard. However, when the town is impacted, the damage could be catastrophic, threatening lives and property throughout the planning area.

E.2.5 Lightning

Location and Spatial Extent

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed that all of the Town of Wallburg is uniformly exposed to lightning.

Historical Occurrences

According to the National Climatic Data Center, there has been one recorded lightning event in the Town of Wallburg since 2002, as listed in summary **Table E.10**.[5] These events resulted in almost $132,000 (2014 dollars) in damages.[6] A complete listing of those events can be found in **Table E.11**. Many of the reported events are those that caused damage, and it should be expected that damages are likely much higher for this hazard than what is reported.

TABLE E.10: SUMMARY OF LIGHTNING OCCURRENCES IN WALLBURG

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Wallburg	1	0/0	$131,593

Source: National Climatic Data Center

TABLE E.11: HISTORIC LIGHTNING OCCURRENCES IN WALLBURG

	Date	Deaths / Injuries	Property Damage*	Details
Wallburg				
WALLBURG	7/22/2002	0/0	$131,593	Lightning started a fire in a home.

*Property Damage is reported in 2014 dollars; all damage may not have been reported.

Source: National Climatic Data Center

Probability of Future Occurrences

Although there was not a high number of historical lightning events reported in the Town of Wallburg via NCDC data, it is considered a regular occurrence, especially accompanied by thunderstorms. In fact, lightning events will assuredly happen on an annual basis, though not all events will cause damage. According to Vaisala's U.S. National Lightning Detection Network (NLDN®), the Town of Wallburg is located in an area of the country that experienced an average of 3 to 5 lightning flashes per square kilometer per year between 1997 and 2010. Therefore, the probability of future events is highly likely (100 percent annual probability). It can be expected that future lightning events will continue to threaten life and cause minor property damages throughout the town.

[5] These lightning events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is certain that additional lightning events have occurred in the Town of Wallburg. The State Fire Marshall's office was also contacted for additional information but none could be provided. As additional local data becomes available, this hazard profile will be amended.

[6] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

E.2.6 Thunderstorm Wind / High Wind

Location and Spatial Extent

A wind event is an atmospheric hazard, and thus has no geographic boundaries. It is typically a widespread event that can occur in all regions of the United States. However, thunderstorms are most common in the central and southern states because atmospheric conditions in those regions are favorable for generating these powerful storms. Also, the Town of Wallburg typically experiences several straight-line wind events each year. These wind events can and have caused significant damage. It is assumed that the Town of Wallburg has uniform exposure to an event and the spatial extent of an impact could be large.

Historical Occurrences

According to NCDC, there have been six reported thunderstorm wind and high wind events since 1998 in the Town of Wallburg.[7] These events did not result in any reported damages.[8] **Table E.12** summarizes this information. **Table E.13** presents detailed thunderstorm wind and high wind event reports including date, magnitude, and associated damages for each event.

TABLE E.12: SUMMARY OF THUNDERSTORM / HIGH WIND OCCURRENCES IN WALLBURG

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Wallburg	6	0/0	$0

Source: National Climatic Data Center

TABLE E.13: HISTORICAL THUNDERSTORM / HIGH WIND OCCURRENCES IN WALLBURG

	Date	Type	Magnitude	Deaths / Injuries	Property Damage*
Wallburg					
WALLBURG	5/26/1998	Thunderstorm Wind	50 kts.	0/0	$0
WALLBURG	6/24/2007	Thunderstorm Wind	50 kts. EG	0/0	$0
WALLBURG	8/2/2008	Thunderstorm Wind	50 kts. EG	0/0	$0
WALLBURG	6/9/2011	Thunderstorm Wind	50 kts. EG	0/0	$0
WALLBURG	6/10/2013	Thunderstorm Wind	50 kts. EG	0/0	$0
WALLBURG	3/12/2014	Thunderstorm Wind	50 kts. EG	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
†E = estimated; EG = estimated gust; ES = estimated sustained ;MG = measured gust ;MS = measured sustained
Source: National Climatic Data Center

Probability of Future Occurrences

It is certain that wind events, including straight-line wind and thunderstorm wind, will occur in the future. This results in a probability level of highly likely (100 percent annual probability) for future wind events for the entire town.

[7] These thunderstorm events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1955 through October 2014 and these high wind events are only inclusive of those reported by NCDC from 1996 through October 2014. It is likely that additional thunderstorm and high wind events have occurred in the Town of Wallbueg. As additional local data becomes available, this hazard profile will be amended.

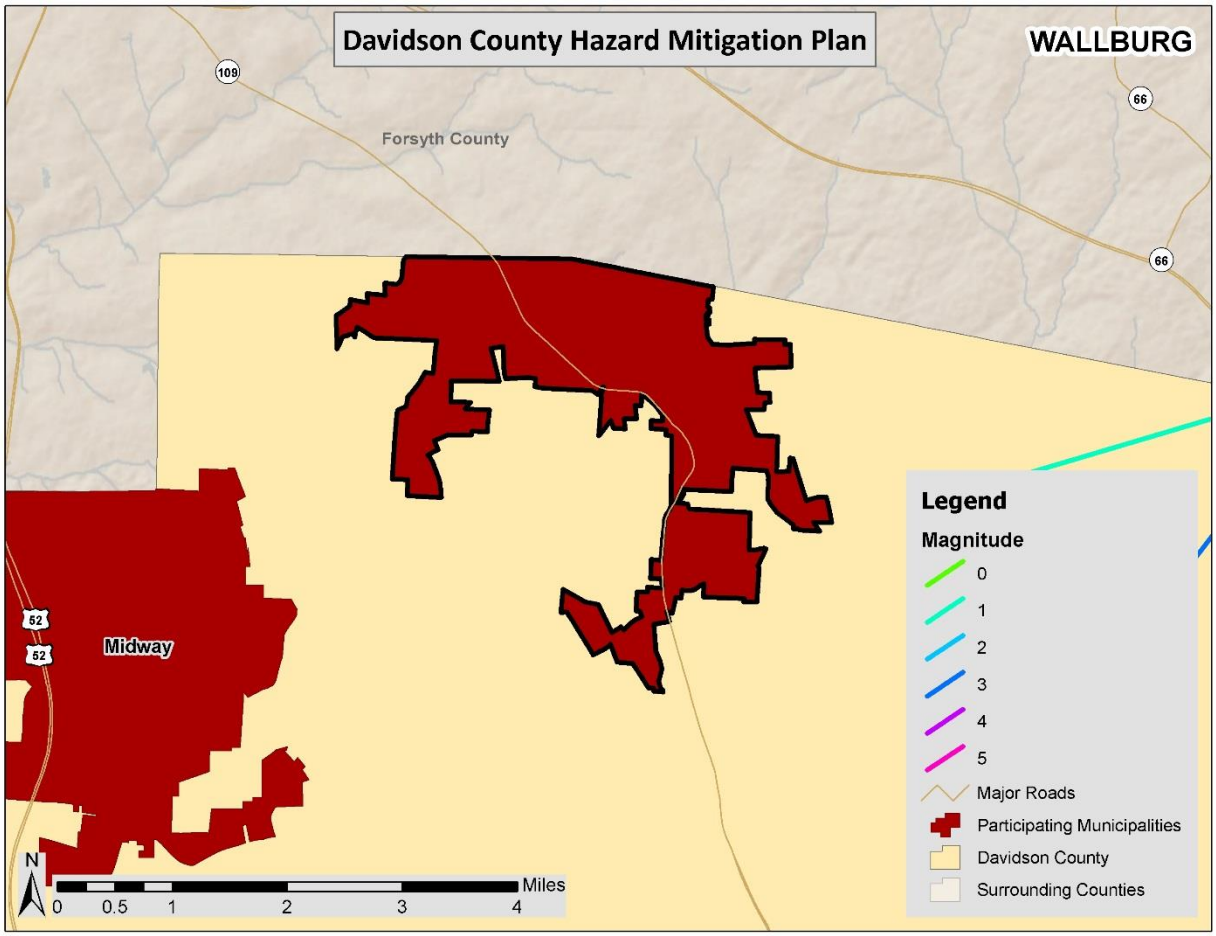
[8] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

E.2.7 Tornado

Location and Spatial Extent

Tornadoes occur throughout the state of North Carolina, and thus in the Town of Wallburg. Tornadoes typically impact a relatively small area, but damage may be extensive. Event locations are completely random and it is not possible to predict specific areas that are more susceptible to tornado strikes over time. Therefore, it is assumed that the Town of Wallburg is uniformly exposed to this hazard. With that in mind, **Figure E.3** shows tornado track data for many of the major tornado events that have impacted the town. While no definitive pattern emerges from this data, some areas that have been impacted in the past may be potentially more susceptible in the future.

FIGURE E.3: HISTORICAL TORNADO TRACKS IN WALLBURG



Source: National Weather Service Storm Prediction Center

Historical Occurrences

According to the National Climatic Data Center, there have been a total of two recorded tornado events in the Town of Wallburg since 1998 (**Table E.14**), resulting in almost $900,000 (2014 dollars) in property

damages (**Table E.15**).[9] [10] The magnitude of these tornadoes were F1 and EF1 in intensity, although an EF2 through F5 event is possible. It is important to note that only tornadoes that have been reported are factored into this risk assessment. It is likely that a high number of occurrences have gone unreported over the past 64 years.

TABLE E.14: SUMMARY OF TORNADO OCCURRENCES IN WALLBURG

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Wallburg	2	0/0	$886,868

Source: National Climatic Data Center

TABLE E.15: HISTORICAL TORNADO IMPACTS IN WALLBURG

	Date	Magnitude	Deaths/ Injuries	Property Damage*	Details
Wallburg					
WALLBURG	5/7/1998	F1	0/0	$72,618	Many trees were blown on homes. Around 15 homes sustained serious damage. A service station lost most of its roof.
WALLBURG	3/28/2010	EF1	0/0	$814,250	An EF-1 tornado touched down in a wooded area south of Chestnut Street Extension where it caused extensive tree damage. The tornado proceeded northeast across Chestnut Street Extension where it caused minor damage to a single family residence when it ripped away the attached carport. The tornado tracked then tracked through a wooded area before it hit the Valley Mobile Home Park located off Sink Lake Road. Approximately 20 mobile homes were completely destroyed or damaged so severe that they can no longer be occupied. One of the destroyed mobile homes and a full size SUV was uplifted and displaced into an adjacent lake. There were four occupants inside the mobile home but remarkably no one was seriously injured. The tornado then lifted in a wooded area northeast of the mobile home park.

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

[9] These tornado events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1950 through October 2014. It is likely that additional tornadoes have occurred in the Town of Wallburg. As additional local data becomes available, this hazard profile will be amended.
[10] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

Probability of Future Occurrences

According to historical information, tornado events are not an annual occurrence for the town. However, given the town's location in the southeastern United States and history of tornadoes, an occurrence is possible every few years. While the majority of the reported tornado events are small in terms of size, intensity, and duration, they do pose a significant threat should the Town of Wallburg experience a direct tornado strike. The probability of future tornado occurrences affecting the Town of Wallburg is likely (10 to 100 percent annual probability).

E.2.8 Winter Storm and Freeze

Location and Spatial Extent

Nearly the entire continental United States is susceptible to winter storm and freeze events. Some ice and winter storms may be large enough to affect several states, while others might affect limited, localized areas. The degree of exposure typically depends on the normal expected severity of local winter weather. The Town of Wallburg is accustomed to severe winter weather conditions and often receives winter weather during the winter months. Given the atmospheric nature of the hazard, the entire town has uniform exposure to a winter storm.

Historical Occurrences

Winter weather has resulted in five disaster declarations in Davidson County. This includes the Blizzard of 1996, one subsequent 1996 winter storm, a severe winter storm in 2000, an ice storm in 2002 and a severe winter storm in 2014.[11] The National Climatic Data Center does not report winter storm events at the municipal level, however, there have been a total of 55 recorded winter storm events and 1 extreme cold event in Davidson County since 1996 (**Table E.16**).[12] These events resulted in nearly $6.2 million (2014 dollars) in damages.[13] Detailed information on the recorded winter storm events can be found in **Table E.17**.

TABLE E.16: SUMMARY OF WINTER STORM EVENTS IN DAVIDSON COUNTY

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Davidson County	55	0/0	$6,200,000

Source: National Climatic Data Center

TABLE E.17: HISTORICAL WINTER STORM IMPACTS IN DAVIDSON COUNTY

	Date	Type of Storm	Deaths / Injuries	Property Damage*
Davidson County				
DAVIDSON (ZONE)	1/6/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/11/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/2/1996	Ice Storm	0/0	$0
DAVIDSON (ZONE)	2/16/1996	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	1/8/1997	Winter Storm	0/0	$0

[11] A complete listing of historical disaster declarations can be found in Section 4: *Hazard Profiles*.
[12] These winter storm and extreme cold events are only inclusive of those reported by the National Climatic Data Center (NCDC). It is certain that additional winter storm conditions have affected the Town of Wallburg and Davidson County.
[13] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

	Date	Type of Storm	Deaths / Injuries	Property Damage*
DAVIDSON (ZONE)	2/13/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/29/1997	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/23/1998	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/2/1999	Ice Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/20/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/22/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/24/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/28/2000	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/19/2000	Heavy Snow	0/0	$0
DAVIDSON (ZONE)	2/12/2001	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/3/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2002	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/23/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/16/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/27/2003	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/13/2003	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/15/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/26/2004	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/30/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/15/2005	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/18/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/1/2007	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/7/2007	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/17/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/19/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/13/2008	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/22/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/4/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/1/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/18/2009	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/30/2009	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/29/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	2/5/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/12/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/2/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	12/4/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/16/2010	Winter Weather	0/0	$0
DAVIDSON (ZONE)	12/25/2010	Winter Storm	0/0	$0
DAVIDSON (ZONE)	1/10/2011	Winter Storm	0/0	$0
DAVIDSON (ZONE)	11/26/2013	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/21/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	1/28/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	2/11/2014	Winter Weather	0/0	$0

	Date	Type of Storm	Deaths / Injuries	Property Damage*
DAVIDSON (ZONE)	2/12/2014	Winter Storm	0/0	$0
DAVIDSON (ZONE)	3/3/2014	Winter Weather	0/0	$0
DAVIDSON (ZONE)	3/6/2014	Ice Storm	0/0	$6,200,000
DAVIDSON (ZONE)	3/17/2014	Winter Weather	0/0	$0

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

In addition, information from the State Climate Office of North Carolina was reviewed to obtain historical temperature records in the county. Temperature information has been recorded in Lexington since 1902. The recorded minimum for the county can be found below in **Table E.18**.

TABLE E.18: LOWEST RECORDED TEMPERATURE IN DAVIDSON COUNTY

Location	Date	Temperature (°F)
Lexington	01/21/1985	-6

Source: State Climate Office of North Carolina

There have been several severe winter weather events in Davidson County. The text below describes two of the major events (one snow and one ice event) and associated impacts on the county. Similar impacts can be expected with most severe winter weather.

1996 Winter Storm – January 6-8, 1996
This storm left two feet of snow in some areas and several thousand citizens without power for up to nine days. Although shelters were opened, some roads were impassible for many days. This event caused considerable disruption to business, industry, schools, and government services.

2002 Ice Storm – December 4-5, 2002
An ice storm produced up to an inch of freezing rain in central North Carolina impacting 40 counties. A total of 24 people were killed, and as many as 1.8 million people were left without electricity. Additionally, property damage was estimated at almost $100 million. New records were also set for traffic accidents and school closing durations. The scale of destruction was comparable to that of hurricanes that have impacted the state, such as Hurricane Fran in 1996. The storm cost the state $97.2 million in response and recovery.

Winter storms throughout the planning area have several negative externalities including hypothermia, cost of snow and debris cleanup, business and government service interruption, traffic accidents, and power outages. Furthermore, citizens may resort to using inappropriate heating devices that could to fire or an accumulation of toxic fumes.

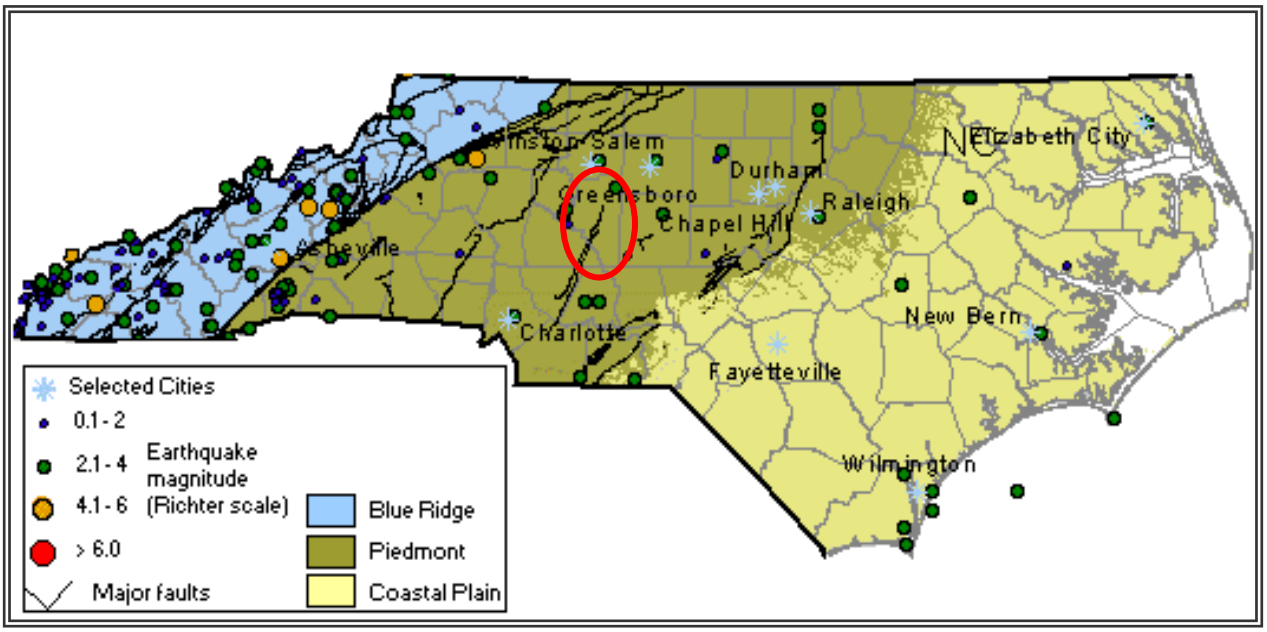
Probability of Future Occurrences
Winter storm events will remain a regular occurrence in the Town of Wallburg due to its location in the western half of the state. According to historical information, the Town of Wallburg generally experiences several winter storm events each year. Therefore, the annual probability is highly likely (10 to 100 percent).

E.2.9 Earthquake

Location and Spatial Extent

Approximately two-thirds of North Carolina is subject to earthquakes, with the western and southeast region most vulnerable to a very damaging earthquake. The state is affected by both the Charleston Fault in South Carolina and New Madrid Fault in Tennessee. Both of these faults have generated earthquakes measuring greater than 8 on the Richter Scale during the last 200 years. In addition, there are several smaller fault lines throughout North Carolina. **Figure E.4** is a map showing geological and seismic information for North Carolina.

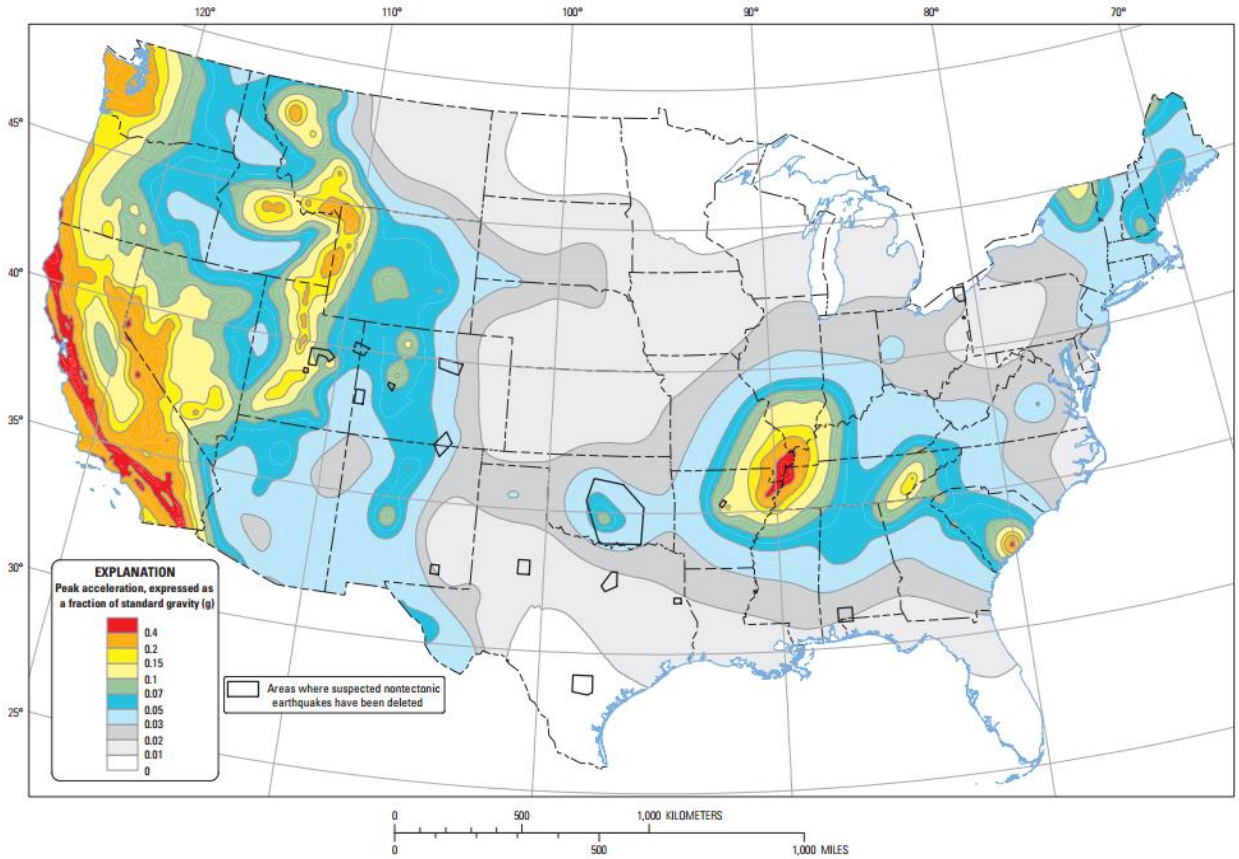
FIGURE E.4: GEOLOGICAL AND SEISMIC INFORMATION FOR NORTH CAROLINA



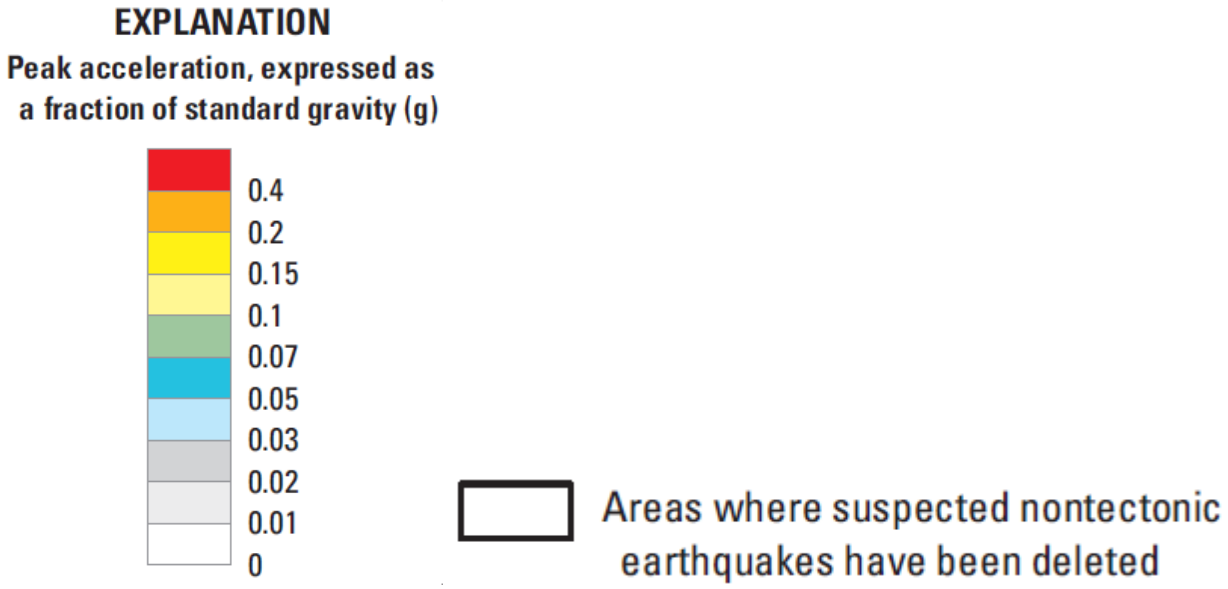
Source: North Carolina Geological Survey

Figure E.5 shows the intensity level associated with the Town of Wallburg, based on the national USGS map of peak acceleration with 10 percent probability of exceedance in 50 years. It is the probability that ground motion will reach a certain level during an earthquake. The data show peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 10 percent probability of exceedance in 50 years. The map was compiled by the U.S. Geological Survey (USGS) Geologic Hazards Team, which conducts global investigations of earthquake, geomagnetic, and landslide hazards. According to this map, the Town of Wallburg lies within an approximate zone of 0.03 to 0.05 ground acceleration. This indicates that the town exists within an area of low to moderate seismic risk.

FIGURE E.5: PEAK ACCELERATION WITH 10 PERCENT PROBABILITY OF EXCEEDANCE IN 50 YEARS



Ten-percent probability of exceedance in 50 years map of peak ground acceleration



Source: United States Geological Survey, 2014

Historical Occurrences

At least one earthquake is known to have affected the Town of Wallburg since 1970. This event measured a III on the Modified Mercalli Intensity (MMI) scale. **Table E.19** provides a summary of earthquake events reported by the National Geophysical Data Center between 1638 and 1985. **Table E.20** presents a detailed occurrence of each event including the date, distance from the epicenter, magnitude, and Modified Mercalli Intensity (if known). [14]

TABLE E.19: SUMMARY OF SEISMIC ACTIVITY IN WALLBURG

Location	Number of Occurrences	Greatest MMI Reported	Richter Scale Equivalent
Wallburg	1	III	< 4.8

Source: National Geophysical Data Center

TABLE E.20: SIGNIFICANT SEISMIC EVENTS IN WALLBURG (1638 -1985)

Location	Date	Epicentral Distance	Magnitude	MMI
Wallburg				
Wallburg	9/10/1970	113.0 km	--	III

Source: National Geophysical Data Center

Probability of Future Occurrences

The probability of significant, damaging earthquake events affecting the Town of Wallburg is unlikely. However, it is possible that future earthquakes resulting in light to moderate perceived shaking and damages ranging from none to very light will affect the town. The annual probability level for the town is estimated between 1 and 10 percent (possible).

E.2.10 Landslide

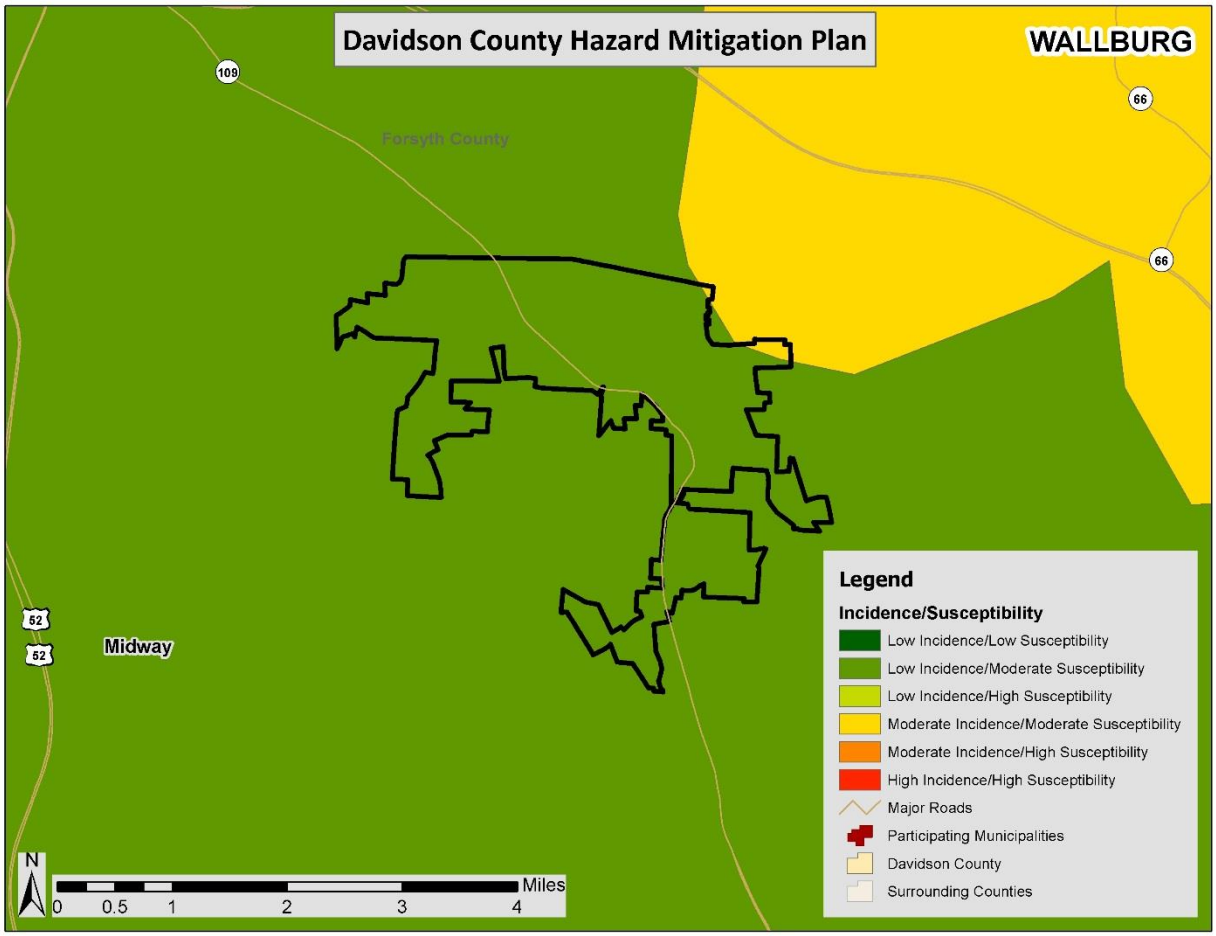
Location and Spatial Extent

Landslides occur along steep slopes when the pull of gravity can no longer be resisted (often due to heavy rain). Human development can also exacerbate risk by building on previously undevelopable steep slopes and constructing roads by cutting through hills or mountains. Landslides are possible throughout the Town of Wallburg, though the risk is relatively low.

According to **Figure E.6** below, a very small area in the north east corner of the town has moderate landslide activity, however, the vast majority of the town has low landslide activity. There is moderate susceptibility across the entire town.

[14] Due to reporting mechanisms, not all earthquakes events were recorded during this time. Furthermore, some are missing data, such as the epicenter location, due to a lack of widely used technology. In these instances, a value of "unknown" is reported.

FIGURE E.6: LANDSLIDE SUSCEPTIBILITY AND INCIDENCE MAP OF WALLBURG



Source: United States Geological Survey

Historical Occurrences

Relatively flat topography throughout the Town of Wallburg makes the planning area less susceptible to landslides. Most landslides are caused by heavy rainfall in the area. Building on steep slopes that was not previously possible also contributes to risk. Although no landslide incidents have been reported in the town, it should be noted that the North Carolina Geological Survey emphasized the dataset provided was incomplete. Therefore, there may be additional historical landslide occurrences that were not reported. Some incidence mapping has also been completed throughout the western portion of North Carolina though it is not complete either. Again, it should be noted that it is possible more incidents have occurred than what is mapped. Since no incidents were reported, a map was not produced to show the location of previous events.

Probability of Future Occurrences

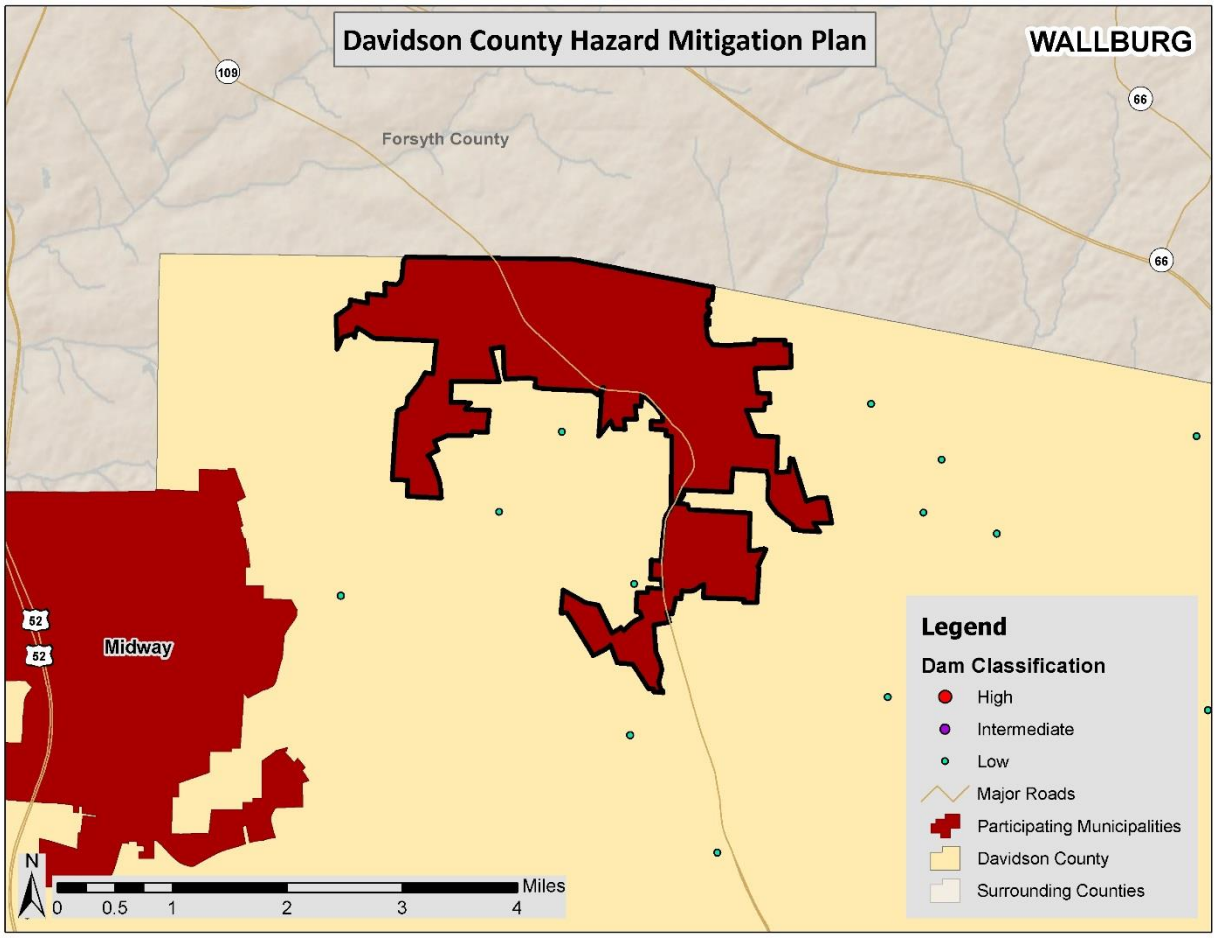
Based on historical information and the USGS susceptibility index, the probability of future landslide events is unlikely (less than 1 percent probability). Local conditions may become more favorable for landslides due to heavy rain, for example. This would increase the likelihood of occurrence. It should also be noted that some areas in the Town of Wallburg have greater risk than others given factors such as steepness on slope and modification of slopes.

E.2.11 Dam and Levee Failure

Location and Spatial Extent

According to the North Carolina Division of Energy, Mineral, and Land Resources, there are no dams in the Town of Wallburg.[15] **Figure E.7** shows the dam location and the corresponding hazard ranking for dams located nearby the town. Of these dams, none are classified as high hazard potential (**Table E.21**).

FIGURE E.7: WALLBURG DAM LOCATION AND HAZARD RANKING



Source: North Carolina Division of Energy, Mineral, and Land Resources, 2014

TABLE E.21: WALLBURG HIGH HAZARD DAMS

Dam Name	Hazard Potential	Surface Area (acres)	Max Capacity (Ac-ft)	Owner Type
Wallburg				
None Reported	--	--	--	--

Source: North Carolina Division of Energy, Mineral, and Land Resources, 2014

[15] The December 2, 2014 list of high hazard dams obtained from the North Carolina Division of Energy, Mineral, and Land Resources (http://portal.ncdenr.org/web/lr/dams) was reviewed and amended by local officials to the best of their knowledge.

Historical Occurrences

According to local sources and a review of the past hazard mitigation plan, there has been no history of dam breach in the Town of Wallburg.

Probability of Future Occurrences

Given the current dam inventory and historic data, a dam breach is unlikely (less than 1 percent annual probability) in the future. However, as has been demonstrated in the past, regular monitoring is necessary to prevent these events.

E.2.12 Erosion

Location and Spatial Extent

Erosion in the Town of Wallburg is typically caused by flash flooding events. Unlike coastal areas, where the soil is mainly composed of fine grained particles such as sand, soils in the Town of Wallburg have much greater organic matter content. Furthermore, vegetation also helps to prevent erosion in the area. Erosion occurs in the town, particularly along the banks of rivers and streams, but it is not an extreme threat. No areas of concern were reported by the planning team.

Historical Occurrences

Several sources were vetted to identify areas of erosion in the Town of Wallburg. This includes searching local newspapers, interviewing local officials, and reviewing the previous hazard mitigation plan. Little information could be found beyond the hazard mitigation plan; however, the last update of the county hazard mitigation plan classified erosion as a relatively low concern as the magnitude was determined to be mild.

Probability of Future Occurrences

Erosion remains a natural, dynamic, and continuous process for the Town of Wallburg, and it will continue to occur. The annual probability level assigned for erosion is possible (between 1 and 10 percent).

E.2.13 Flood

Location and Spatial Extent

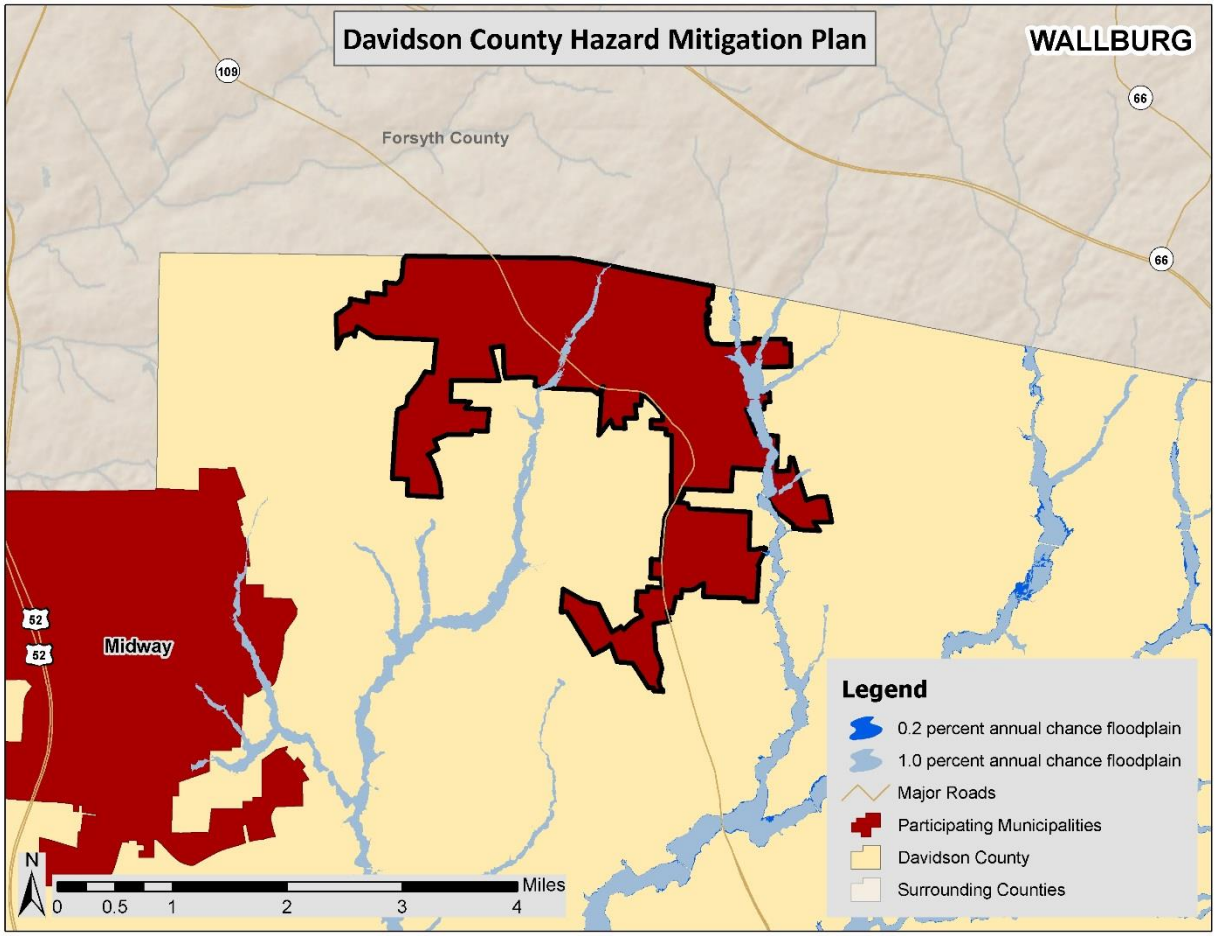
There are areas in the Town of Wallburg that are susceptible to flood events. Special flood hazard areas in the town were mapped using Geographic Information System (GIS) and FEMA Digital Flood Insurance Rate Maps (DFIRM).[16] This includes Zone AE (1-percent annual chance floodplain with elevation) and Zone X500 (0.2-percent annual chance floodplain). According to GIS analysis, of the 5.6 square miles of land that make up the Town of Wallburg, there are 0.3 square miles of land in zone AE (1-percent annual chance floodplain/100-year floodplain) and 0.0 square miles of land in zone X500 (0.2-percent annual chance floodplain/500-year floodplain).

These flood zone values account for 5.4 percent of the total land area in the Town of Wallburg. It is important to note that while FEMA digital flood data is recognized as best available data for planning purposes, it does not always reflect the most accurate and up-to-date flood risk. Flooding and flood-related losses often do occur outside of delineated special flood hazard areas. **Figure E.8** illustrates the

[16] The county-level DFIRM data used for Davidson County were updated in 2009.

location and extent of currently mapped special flood hazard areas for the Town of Wallburg based on best available FEMA Digital Flood Insurance Rate Map (DFIRM) data.

FIGURE E.8: SPECIAL FLOOD HAZARD AREAS IN WALLBURG



Source: Federal Emergency Management Agency

Historical Occurrences

Information from the National Climatic Data Center was used to ascertain historical flood events. The National Climatic Data Center reported no events in the Town of Wallburg since 1996 (**Table E.22** and **Table E.23**).[17]

TABLE E.22: SUMMARY OF FLOOD OCCURRENCES IN WALLBURG

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Wallburg	0	0/0	$0

Source: National Climatic Data Center

[17] These flood events are only inclusive of those reported by the National Climatic Data Center (NCDC) from 1996 through October 2014. It is likely that additional occurrences have occurred and have gone unreported in the Town of Wallburg.

TABLE E.23: HISTORICAL FLOOD EVENTS IN WALLBURG

	Date	Type	Deaths / Injuries	Property Damage*
Wallburg				
None Reported	--	--	--	--

*Property damage is reported in 2014 dollars; All damage may not have been reported.
Source: National Climatic Data Center

Historical Summary of Insured Flood Losses

According to FEMA flood insurance policy records as of November 2014, there have been no flood losses reported in the Town of Wallburg through the National Flood Insurance Program (NFIP) since 1978. A summary of these figures for the town is provided in **Table E.24**. It should be emphasized that these numbers include only those losses to structures that were insured through the NFIP policies, and for losses in which claims were sought and received. It is likely that many additional instances of flood loss in the Town of Wallburg were uninsured, denied claims payment, or not reported.

TABLE E.24: SUMMARY OF INSURED FLOOD LOSSES IN WALLBURG

Location	Number of Policies	Flood Losses	Claims Payments
Wallburg*	--	--	--

*This community does not participate in the National Flood Insurance Program. Therefore, no values are reported.
Source: Federal Emergency Management Agency, National Flood Insurance Program

Repetitive Loss Properties

FEMA defines a repetitive loss property as any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling 10-year period, since 1978. A repetitive loss property may or may not be currently insured by the NFIP. Currently there are over 140,000 repetitive loss properties nationwide.

As of August 2014, there are no non-mitigated repetitive loss properties located in the Town of Wallburg. **Table E.25** presents detailed information on repetitive loss properties and NFIP claims and policies for the town.

TABLE E.25: REPETITIVE LOSS PROPERTIES IN WALLBURG

Location	Number of Properties	Types of Properties	Number of Losses	Building Payments	Content Payments	Total Payments	Average Payment
Wallburg*	--	--	--	--	--	--	--

*This community does not participate in the National Flood Insurance Program. Therefore, no values are reported.
Source: National Flood Insurance Program

Probability of Future Occurrences

Flood events will remain a threat in the Town of Wallburg, and the probability of future occurrences will remain possible (between 1 and 10 percent annual probability). The town has risk to flooding, though not all areas will experience floods. The probability of future flood events based on magnitude and according to best available data is illustrated in the figure above, which indicates those areas susceptible to the 1-percent annual chance flood (100-year floodplain) and the 0.2-percent annual chance flood (500-year floodplain).

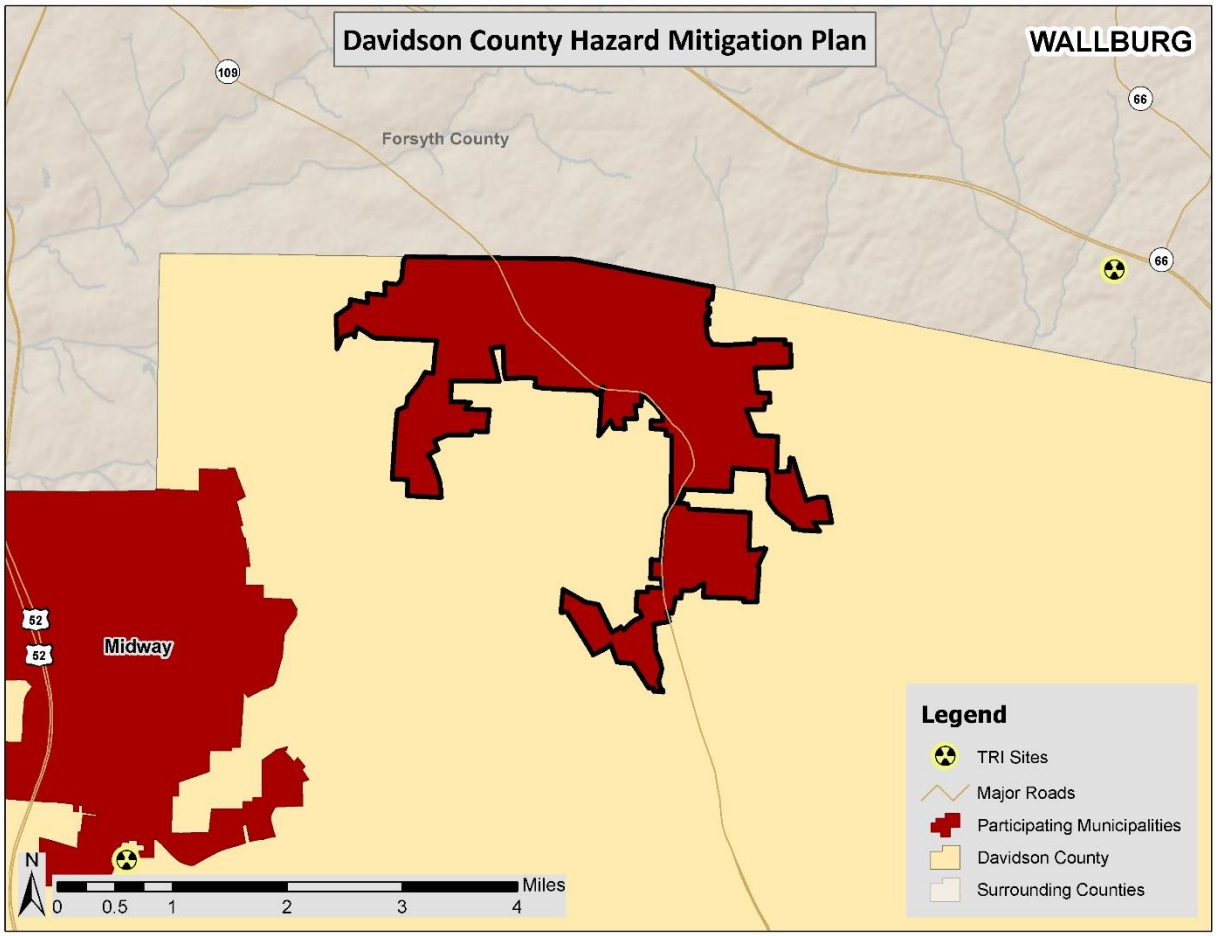
It can be inferred from the floodplain location map, previous occurrences, and repetitive loss properties that risk varies throughout Davidson County. For example, areas along the eastern boundary of the Town of Wallburg have more floodplain and thus a higher risk of flood than within the town itself. Flood is not the greatest hazard of concern but will continue to occur and cause damage. Therefore, mitigation actions may be warranted, particularly for repetitive loss properties.

E.2.14 Hazardous Materials Incidents

Location and Spatial Extent

The Town of Wallburg does not have any TRI sites shown in **Figure E.9.**

FIGURE E.9: TOXIC RELEASE INVENTORY (TRI) SITES IN WALLBURG



Source: Environmental Protection Agency

In addition to "fixed" hazardous materials locations, hazardous materials may also impact the town via roadways and rail. Many roads in the town are subject to hazardous materials transport and all roads that permit hazardous material transport are considered potentially at risk to an incident.

Historical Occurrences

There have been a total of one recorded HAZMAT incidents in the Town of Wallburg since 1978 (**Table E.26**). This event did not result in any recorded property damage.[18] **Table E.27** presents detailed information on historical HAZMAT incidents in the Town of Wallburg as reported by the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA).

TABLE E.26: SUMMARY OF HAZMAT INCIDENTS IN WALLBURG

Location	Number of Occurrences	Deaths / Injuries	Property Damage (2014)
Wallburg	1	0/0	$0

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

TABLE E.27: HAZMAT INCIDENTS IN WALLBURG

Report Number	Date	City	Mode	Serious Incident?	Fatalities / Injuries	Damages ($)*	Quantity Released
Wallburg							
I-1978020238	1/24/1978	WALLBURG	Highway	No	0/0	$0	5 LGA

*Property damage is reported in 2014 dollars.

Source: Untied States Department of Transportation Pipeline and Hazardous Materials Safety Administration

Probability of Future Occurrences

Given the prior roadway incident in the Town of Wallburg and the roads that are subject to hazardous materials transport, it is possible that a hazardous material incident may occur in the town (between 1 and 10 percent annual probability). However, town officials are mindful of this possibility and take precautions to prevent such an event from occurring. Additionally, there are detailed plans in place to respond to an occurrence.

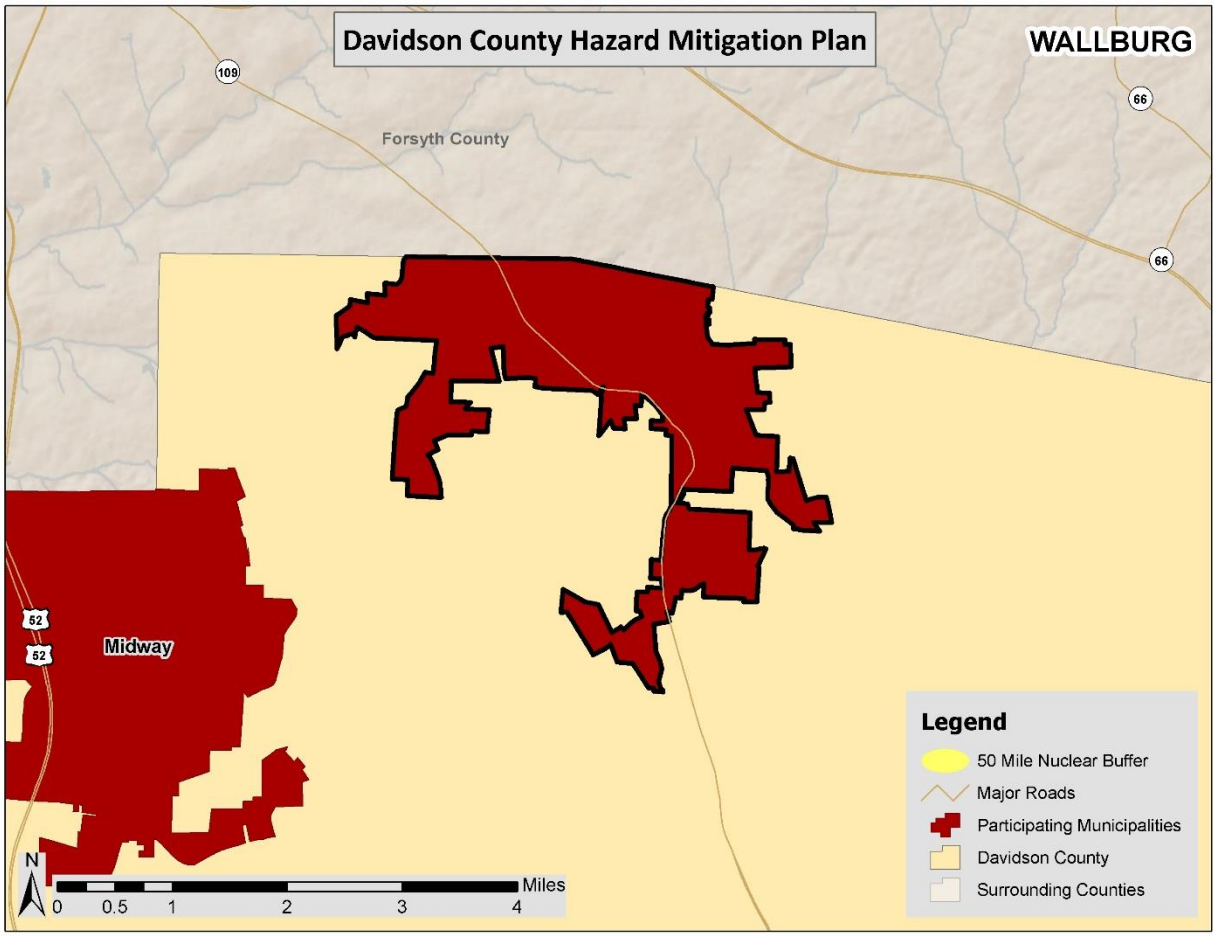
E.2.15 Nuclear Accident

Location and Spatial Extent

None of the town is susceptible to a nuclear incident due to its location outside of the 50-mile radius of the McGuire Nuclear Power Plant, which is the area considered to be at risk (**Figure E.10**).

[18] Adjusted dollar values were calculated based on the average Consumer Price Index for a given calendar year. This index value has been calculated every year since 1913.

FIGURE E.10: NUCLEAR POWER PLANT INCIDENT HAZARD ZONES IN WALLBURG



Source: International Atomic Energy Agency

Historical Occurrences

Although there have been no major nuclear events at the McGuire Nuclear Power Plant, there is some possibility that one could occur as there have been incidents in the past in the United States at other facilities and at facilities around the world.

Probability of Future Occurrences

A nuclear event is a very rare occurrence in the United States due to the intense regulation of the industry. There have been incidents in the past, but it is considered unlikely (less than 1 percent annual probability).

E.2.16 Terror Threat

Location and Spatial Extent

A terror threat could potentially occur at any location in the town. However, the very definition of a terrorist event indicates that it is most likely to be targeted at a critical or symbolic resource/location. Ensuring and protecting the continuity of critical infrastructure and key resources (CIKR) of the United States is essential to the Nation's security, public health and safety, economic vitality, and way of life. CIKR includes physical and/or virtual systems or assets that, if damaged, would have a detrimental

impact on national security, including large-scale human casualties, property destruction, economic disruption, and significant damage to morale and public confidence. **Table E.28** lists the U.S. Department of Homeland Security's (DHS) identified main critical infrastructure sectors.

TABLE E.28 U.S. DEPARTMENT OF HOMELAND SECURITY CRITICAL INFRASTRUCTURE SECTORS

- Agriculture and Food
- Banking and Finance
- Chemical
- Commercial Facilities
- Communications
- Critical Manufacturing
- Dams
- Defense Industrial Base
- Emergency Services
- Energy
- Government Facilities
- Healthcare and Public Health
- Information Technology
- National Monuments and Icons
- Nuclear Reactors, Materials, and Waste
- Postal and Shipping
- Transportation Systems
- Water

All critical facilities (see Section E.3.1) are at a heightened level of risk in the Town of Wallburg. However, there are no facilities in the town that have been identified as the likely primary targets (**Table E.29**).

TABLE E.29: FACILITIES/EVENTS AT ELEVATED RISK OF TERROR THREAT IN WALLBURG

Critical Facility
Wallburg
None Identified

Source: Local Government

Historical Occurrences

Although there have been no major terror events in the Town of Wallburg, there is some possibility that one could occur in the future as there have been incidents in the United States in the past and there are several facilities that could be potential targets.

Probability of Future Occurrences

The Town of Wallburg has no recorded terrorist events. Due to no recorded incidents against the town, the probability of future occurrences of a terrorist attack is unlikely (less than 1 percent annual probability).

E.2.17 Wildfire

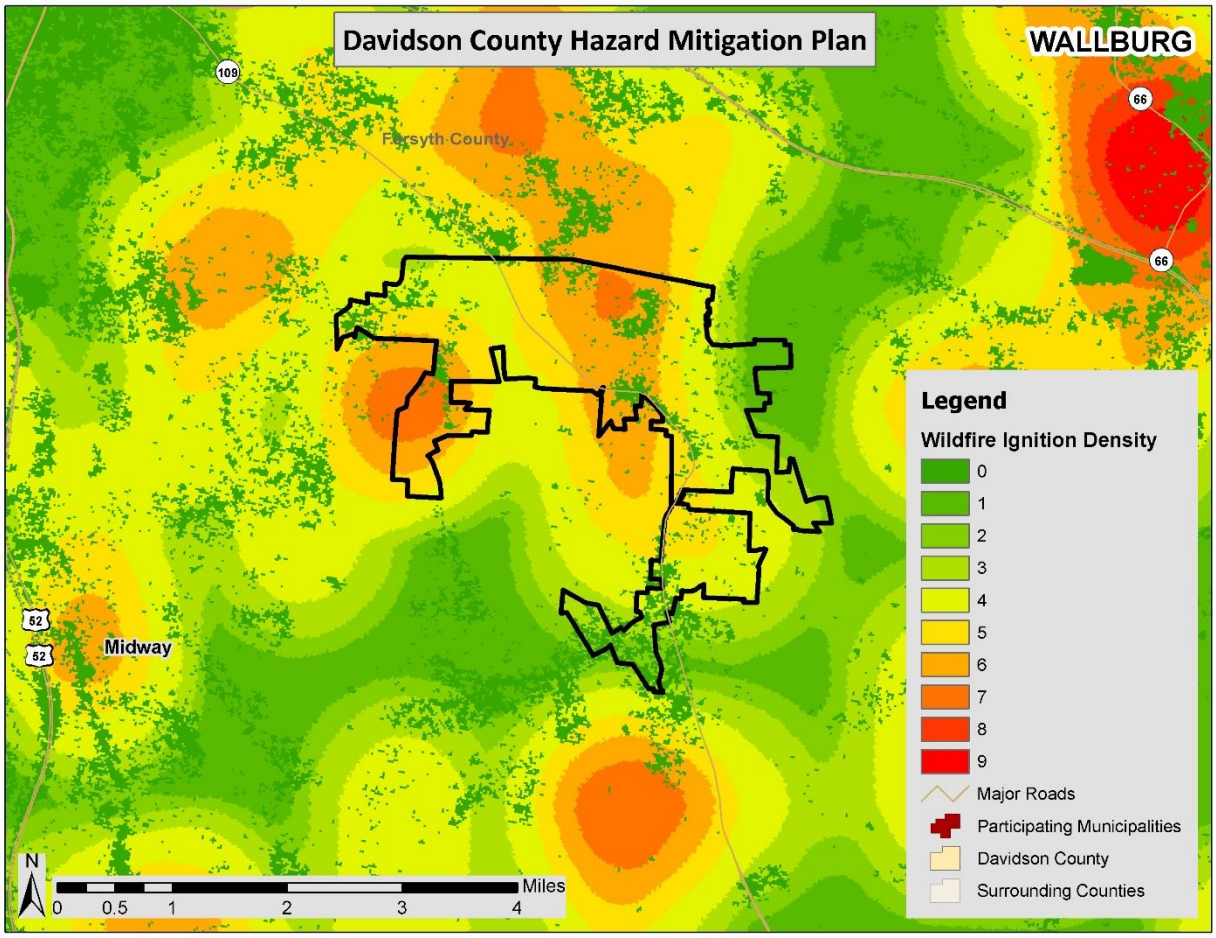
Location and Spatial Extent

The entire county is at risk to a wildfire occurrence. However, several factors such as drought conditions or high levels of fuel on the forest floor, may make a wildfire more likely. Furthermore, areas in the urban-wildland interface are particularly susceptible to fire hazard as populations abut formerly undeveloped areas. The Wildfire Ignition Density data shown in the figure below gives an indication of historic location in the Town of Wallburg.

Historical Occurrences

Figure E.11 shows the Wildfire Ignition Density in the Town of Wallburg based on data from the Southern Wildfire Risk Assessment. This data is based on historical fire ignitions and the likelihood of a wildfire igniting in an area. Occurrence is derived by modeling historic wildfire ignition locations to create an average ignition rate map. This is measured in the number of fires per year per 1,000 acres.[19]

FIGURE E.11: WILDFIRE IGNITION DENSITY IN WALLBURG



Source: Southern Wildfire Risk Assessment

Based on data from the North Carolina Division of Forest Resources from 2005 to 2014, Davidson County experienced an average of 39 wildfires annually which burn a combined average of 53.6 acres per year. The data indicates that most of these fires are small, averaging 1.4 acre per fire. **Table E.30** lists the number of reported wildfire occurrences in the county between the years 2005 and 2014.

[19] Southern Wildfire Risk Assessment, 2014.

TABLE E.30: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	27	53	47	36	16	40	48	30	47	46
Number of Acres	55.3	56.5	84.5	39.7	19	40.6	46.5	146.3	26.3	21.7

Source: North Carolina Division of Forest Resources

Since 2009, the NCDFR has also kept data on the number of structures damaged/destroyed. This information is presented in **Table E.31**.

TABLE E.31: STRUCTURES DAMAGED/DESTROYED BY WILDFIRE IN DAVIDSON COUNTY

Year	2009	2010	2011	2012	2013	2014
Davidson County						
Number of Structures	0	2	11	6	8	9
Cost of Damages to Structures	$0	$1,500	$13,600	$10,500	$14,600	$17,800

Source: North Carolina Division of Forest Resources

In addition, the North Carolina Department of Insurance collects fire data and reports it on an annual basis. This data is included in **Table E.32** to supplement the NCDFR data.

TABLE E.32: HISTORICAL WILDFIRE OCCURRENCES IN DAVIDSON COUNTY

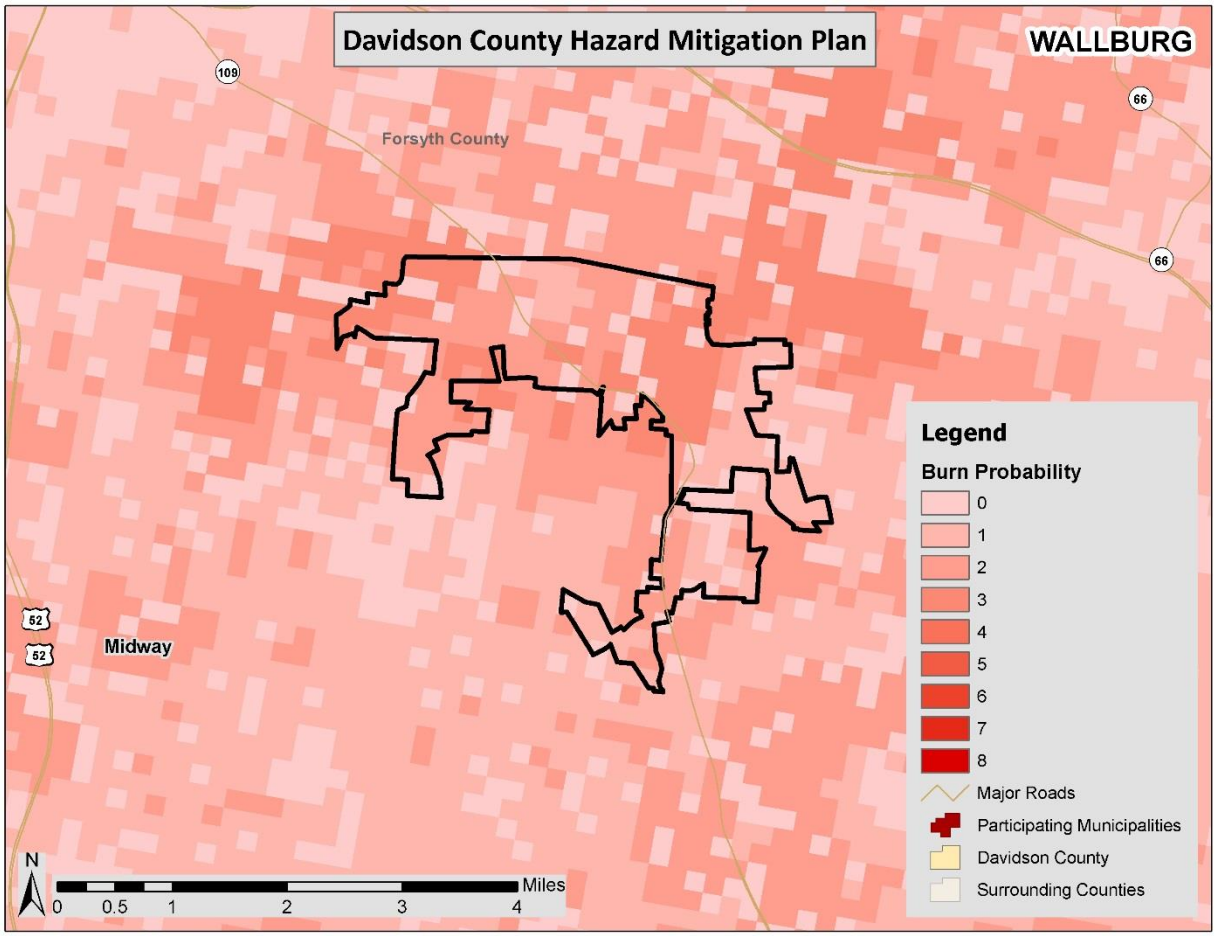
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Davidson County										
Number of Fires	28	74	195	187	120	167	176	116	141	242
Property Loss	$0	$5,300	$650	$1,050	$1,550	$230	$1,940	$1,202	$10,700	$8,380

Source: North Carolina Department of Insurance

Probability of Future Occurrences

Wildfire events will be an ongoing occurrence around the Town of Wallburg. **Figure E.12** shows that there is some probability a wildfire will occur near the town. However, the likelihood of wildfires increases during drought cycles and abnormally dry conditions. Fires are likely to stay small in size but could increase due local climate and ground conditions. Dry, windy conditions with an accumulation of forest floor fuel (potentially due to ice storms or lack of fire) could create conditions for a large fire that spreads quickly. It should also be noted that some areas do vary somewhat in risk. For example, highly developed areas are less susceptible unless they are located near the urban-wildland boundary. The risk will also vary due to assets. Areas in the urban-wildland interface will have much more property at risk, resulting in increased vulnerability and need to mitigate compared to rural, mainly forested areas. The probability assigned to the Town of Wallburg for future wildfire events is likely (10 to 100 percent annual probability).

FIGURE E.12: BURN PROBABILITY IN WALLBURG



Source: Southern Wildfire Risk Assessment

E.2.18 Conclusions on Hazard Risk

The hazard profiles presented above were developed using best available data and result in what may be considered principally a qualitative assessment as recommended by FEMA in its "How-to" guidance document titled *Understanding Your Risks: Identifying Hazards and Estimating Losses* (FEMA Publication 386-2). It relies heavily on historical and anecdotal data, stakeholder input, and professional and experienced judgment regarding observed and/or anticipated hazard impacts. It also carefully considers the findings in other relevant plans, studies, and technical reports.

Hazard Extent

Table E.33 describes the extent of each natural hazard identified for the Town of Wallburg. The extent of a hazard is defined as its severity or magnitude, as it relates to the planning area.

TABLE E.33 EXTENT OF WALLBURG HAZARDS

Atmospheric Hazards	
Drought	Drought extent is defined by PDSI classifications which include Extremely Moist, Very Moist, Mid-Range, Moderate Drought, Severe Drought, and Extreme Drought classifications (pages 5:5-5:6). According to the PDSI classifications, the most severe drought condition is Extreme. Davidson County has received this ranking 3 times over the 14-year reporting period.
Extreme Heat	The extent of extreme heat can be defined by the maximum temperature reached. The highest temperature recorded in Davidson County is 107 degrees Fahrenheit (reported on July 29, 1952).
Hailstorm	Hail extent can be defined by the size of the hail stone. The largest hail stone reported in the Town of Wallburg was 1.00 inches (reported on May 16, 2011). It should be noted that future events may exceed this.
Hurricane and Tropical Storm	Hurricane extent is defined by the Saffir-Simpson Scale which classifies hurricanes into Category 1 through Category 5 (Table 5.11). The greatest classification of hurricanes to traverse directly through Davidson County was an unnamed storm in 1893 which reached a maximum wind speed of 65 knots in the county. Although the county is much more likely to be impacted by the remnants of a hurricane or tropical storm, it is possible that a storm can impact the county directly.
Lightning	According to the Vaisala flash density map (Figure 5.5), the Town of Wallburg is located in an area that experiences 3 to 5 lightning flashes per square kilometer per year. It should be noted that future lightning occurrences may exceed these figures.
Thunderstorm Wind / High Wind	Thunderstorm extent is defined by the number of thunder events and wind speeds reported. The strongest recorded wind event in the Town of Wallburg was last reported on March 12, 2014 at 50 knots (approximately 58 mph). It should be noted that future events may exceed these historical occurrences.
Tornado	Tornado hazard extent is measured by tornado occurrences in the US provided by FEMA (Figure 5.6) as well as the Fujita/Enhanced Fujita Scale (Tables 5.18 and 5.19). The greatest magnitude reported in the town was an EF1 (last reported on March 28, 2010). It should be noted that an EF5 tornado is possible.
Winter Storm and Freeze	The extent of winter storms can be measured by the amount of snowfall received (in inches). The greatest 24-hour snowfall reported in the county was 20.3 inches on February 12, 1905. Due to unpredictable variations in snowfall throughout the county, extent totals will vary for each participating jurisdiction and reliable data on snowfall totals is not abundantly available. In addition, the lowest temperature reached in the county was -6 degrees Fahrenheit (January 21, 1985).
Geologic Hazards	
Earthquake	Earthquake extent can be measured by the Richter Scale (Table 5.25) and the Modified Mercalli Intensity (MMI) scale (Table 5.26) and the distance of the epicenter from the Town of Wallburg. According to data provided by the National Geophysical Data Center, the greatest MMI to impact the town was III (slight) with a correlating Richter Scale measurement of approximately <4.8 (reported on September 10, 1970). The epicenter of this earthquake was located 113.0 km away.

Landslide	As noted above in the landslide profile, the landslide data provided by the North Carolina Geological survey is incomplete. This provides a challenge when trying to determine an accurate extent for the landslide hazard. However, when using the USGS landslide susceptibility index, extent can be measured with incidence, which is low throughout the town except for in a very small area in the northeast corner where it is moderate. Additionally, there is moderate susceptibility throughout the Town of Wallburg.
Hydrologic Hazards	
Dam Failure	Dam failure extent is defined using the North Carolina Division of Energy, Mineral, and Land Resources criteria (Table 5.30). There are no dams in the Town of Wallburg.
Erosion	The extent of erosion can be defined by the measurable rate of erosion that occurs. There are no erosion rate records available for the Town of Wallburg.
Flood	Flood extent can be measured by the amount of land and property in the floodplain as well as flood height and velocity. The amount of land in the floodplain accounts for 5.4 percent of the total land area in the Town of Wallburg. Flood depth and velocity are recorded via United States Geological Survey stream gages throughout Davidson County. While a gage does not exist within the Town of Wallburg, there is one located relatively nearby at Lexington. The greatest peak discharge recorded at Lexington was reported on September 25, 1947. Water reached a discharge of 14,800 cubic feet per second and the stream gage height was 22.12 feet.
Other Hazards	
Hazardous Materials Incident	According to USDOT PHMSA, the largest hazardous materials incident reported in the town was 5 LGA released on the highway on January 24, 1978. It should be noted that larger events are possible.
Nuclear Accident	Although there is no history of a nuclear accident at the McGuire Power Plant, other events across the globe and in the United States in particular indicate that an event is possible. Since several national and international events were Level 7 events on the INES, the potential for a Level 7 event at McGuire is possible.
Terror Threat	There is no history of terror threats in the Town of Wallburg; however; it is possible that one of these events could occur. If this were to take place, the magnitude of the event could range on the scale of critical damage with many fatalities and injuries to the population.
Wildfire	Wildfire data was provided by the North Carolina Division of Forest Resources and is reported annually by county from 2005-2014. The greatest number of fires to occur in Davidson County in any year was 53 in 2006. The greatest number of acres to burn in the county in a single year occurred in 2012 when 146.3 acres were burned. Although this data lists the extent that has occurred, larger and more frequent wildfires are possible throughout the county.

Priority Risk Index Results

In order to draw some meaningful planning conclusions on hazard risk for the Town of Wallburg, the results of the hazard profiling process were used to generate town-wide hazard classifications according to a "Priority Risk Index" (PRI). More information on the PRI and how it was calculated can be found in Section 5.20.2.

Table E.34 summarizes the degree of risk assigned to each category for all initially identified hazards based on the application of the PRI. Assigned risk levels were based on the detailed hazard profiles developed for this section, as well as input from the Hazard Mitigation Planning Team. The results were then used in calculating PRI values and making final determinations for the risk assessment.

TABLE E.34: SUMMARY OF PRI RESULTS FOR WALLBURG

Hazard	Category/Degree of Risk					
	Probability	Impact	Spatial Extent	Warning Time	Duration	PRI Score
Atmospheric Hazards						
Drought	Likely	Minor	Large	More than 24 hours	More than 1 week	**2.5**
Extreme Heat	Possible	Minor	Large	More than 24 hours	Less than 1 week	**2.1**
Hailstorm	Highly Likely	Minor	Moderate	6 to 12 hours	Less than 6 hours	**2.5**
Hurricane and Tropical Storm	Likely	Limited	Large	More than 24 hours	Less than 24 hours	**2.6**
Lightning	Highly Likely	Limited	Negligible	6 to 12 hours	Less than 6 hours	**2.4**
Thunderstorm / High Wind	Highly Likely	Limited	Moderate	6 to 12 hours	Less than 6 hours	**2.8**
Tornado	Likely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.7**
Winter Storm and Freeze	Highly Likely	Limited	Moderate	More than 24 hours	Less than 1 week	**2.8**
Geologic Hazards						
Earthquake	Possible	Minor	Moderate	Less than 6 hours	Less than 6 hours	**2.0**
Landslide	Unlikely	Minor	Small	Less than 6 hours	Less than 6 hours	**1.5**
Hydrologic Hazards						
Dam and Levee Failure	Unlikely	Critical	Small	Less than 6 hours	Less than 6 hours	**2.1**
Erosion	Possible	Minor	Small	More than 24 hours	More than 1 week	**1.8**
Flood	Highly Likely	Minor	Moderate	6 to 12 hours	Less than 1 week	**1.9**
Other Hazards						
Hazardous Materials Incident	Highly Likely	Limited	Small	Less than 6 hours	Less than 24 hours	**2.2**
Nuclear Accident	Unlikely	Limited	Moderate	6 to 12 hours	Less than 1 week	**1.7**
Terror Threat	Unlikely	Critical	Small	Less than 6 hours	Less than 24 hours	**2.2**
Wildfire	Likely	Minor	Small	Less than 6 hours	Less than 1 week	**2.3**

E.2.19 Final Determinations on Hazard Risk

The conclusions drawn from the hazard profiling process for the Town of Wallburg, including the PRI results and input from the Hazard Mitigation Planning Team, resulted in the classification of risk for each identified hazard according to three categories: High Risk, Moderate Risk, and Low Risk (**Table E.35**). For purposes of these classifications, risk is expressed in relative terms according to the estimated impact that a hazard will have on human life and property throughout all of the Town of Wallburg. A more quantitative analysis to estimate potential dollar losses for each hazard has been performed separately, and is described in Section 6: *Vulnerability Assessment* and below in Section E.3. It should be noted that although some hazards are classified below as posing low risk, their occurrence of varying or

unprecedented magnitudes is still possible in some cases and their assigned classification will continue to be evaluated during future plan updates.

TABLE E.35: CONCLUSIONS ON HAZARD RISK FOR THE TOWN OF WALLBURG

HIGH RISK	Thunderstorm / High Wind Winter Storm and Freeze Tornado
MODERATE RISK	Hurricane and Tropical Storm Drought Hailstorm Lightning Wildfire
LOW RISK	Hazardous Materials Incident Terror Threat Extreme Heat Dam and Levee Failure Earthquake Flood Erosion Nuclear Accident Landslide

E.3 WALLBURG VULNERABILITY ASSESSMENT

This subsection identifies and quantifies the vulnerability of the Town of Wallburg to the significant hazards previously identified. This includes identifying and characterizing an inventory of assets in the town and assessing the potential impact and expected amount of damages caused to these assets by each identified hazard event. More information on the methodology and data sources used to conduct this assessment can be found in Section 6: *Vulnerability Assessment*.

E.3.1 Asset Inventory

Table E.36 lists the number of parcels, total value of parcels, total number of parcels with improvements, and the total assessed value of improvements for the Town of Wallburg (study area of vulnerability assessment).[20]

[20] Total assessed values for improvements is based on tax assessor records as joined to digital parcel data. This data does not include dollar figures for tax-exempt improvements such as publicly-owned buildings and facilities. It should also be noted that, due to record keeping, some duplication is possible thus potentially resulting in an inflated value exposure for an area.

TABLE E.36: IMPROVED PROPERTY IN WALLBURG

Location	Number of Parcels	Total Assessed Value of Parcels	Estimated Number of Buildings	Total Estimated Value of Improvements[21]
Wallburg	1,304	$196,086,180	2,545	$135,034,540

Source: Davidson County GIS Department

Table E.37 lists the fire stations, police stations, EMS/rescue stations, medical care facilities, schools, and other critical facilities located in the Town of Wallburg. These facilities were identified as primary critical facilities in that they are necessary to maintain government functions and protect the life, health, safety, and welfare of citizens. These facilities were geospatially mapped and used as the basis for further geographic analysis of the hazards that could potentially affect critical facilities. All critical facility information was provided by the local government and the Davidson County GIS department.

In addition, **Figure E.13** shows the locations of primary critical facilities in the Town of Wallburg. **Table E.52**, near the end of this section, shows a complete list of the critical facilities by name, as well as the hazards that affect each facility. As noted previously, this list is not all-inclusive and only includes information provided by the local government.

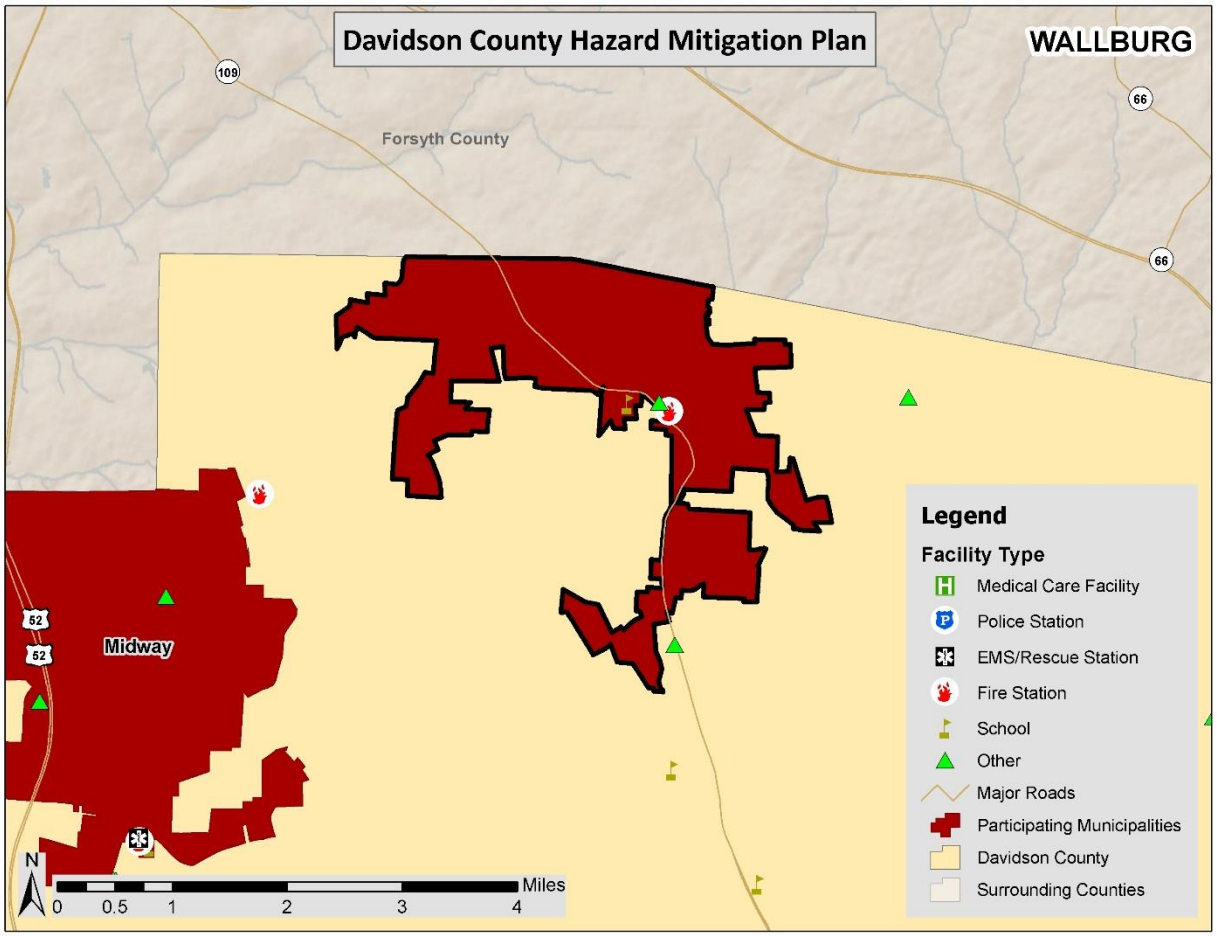
TABLE E.37: CRITICAL FACILITY INVENTORY IN WALLBURG

Location	Fire Stations	Police Stations	EMS/Rescue Stations	Medical Care Facilities	Schools	Other
Wallburg	1	0	0	0	1	1

Source: Local Government

[21] Building value for each jurisdiction is based on the dollar value of parcels with a building value greater than zero.

FIGURE E.13: CRITICAL FACILITY LOCATIONS IN WALLBURG



Source: Local Government

E.3.2 Social Vulnerability

In addition to identifying those assets potentially at risk to identified hazards, it is important to identify and assess those particular segments of the resident population in the Town of Wallburg that are potentially at risk to these hazards.

Table E.38 lists the population by jurisdiction according to U.S. Census 2010 population estimates. The total population in the Town of Wallburg according to Census data is 3,047 persons. Additional population estimates are presented above in Section E.1.

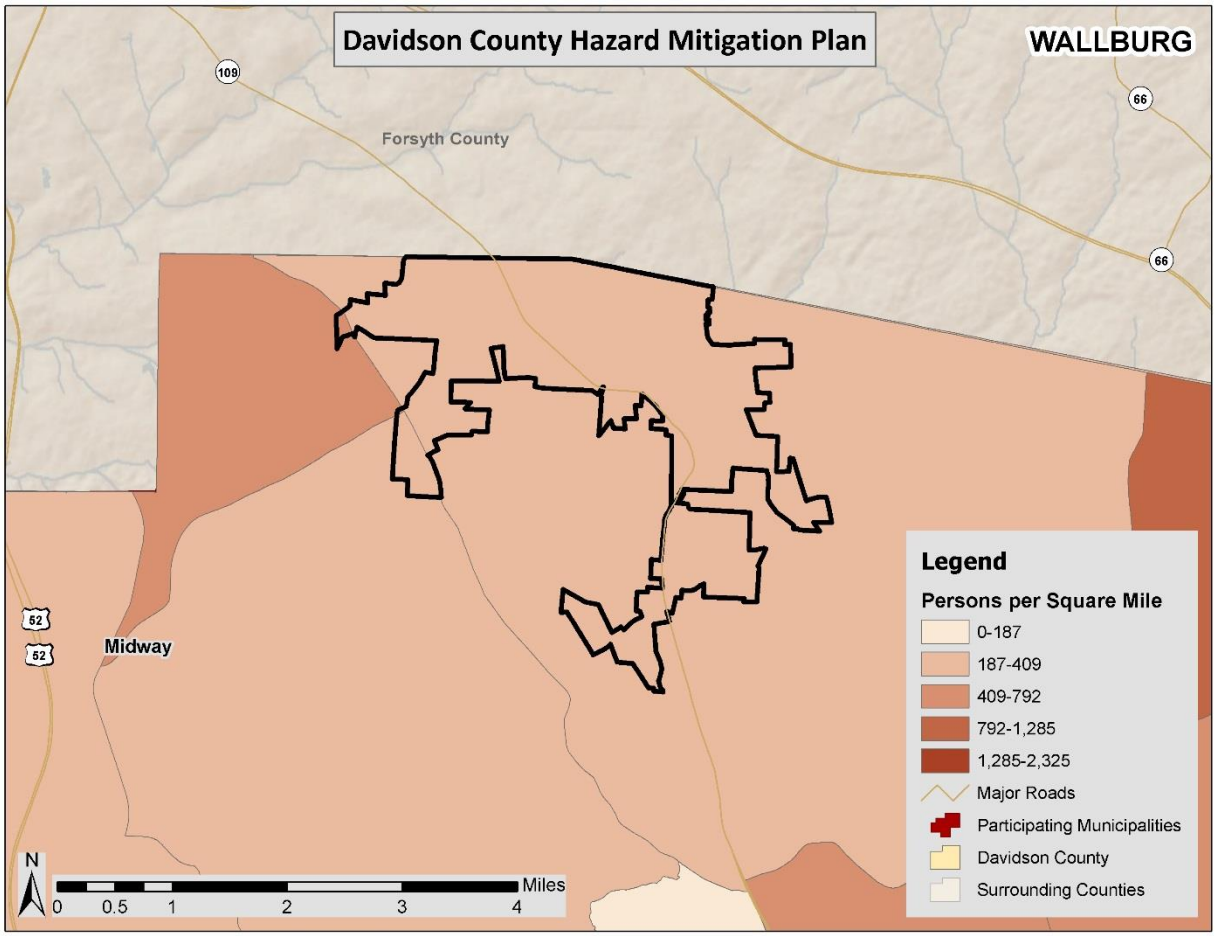
TABLE E.38: TOTAL POPULATION IN WALLBURG

Location	Total 2010 Population
Wallburg	3,047

Source: United States Census 2010

In addition, **Figure E.14** illustrates the population density by census tract as it was reported by the U.S. Census Bureau in 2010.

FIGURE E.14: POPULATION DENSITY IN WALLBURG



Source: United States Census Bureau, 2010

E.3.3 Development Trends and Changes in Vulnerability

Since the previous hazard mitigation plan was approved in 2010, the Town of Wallburg has experienced limited growth and development. **Table E.39** shows the number of building units constructed since 2010 according to the U.S. Census American Community Survey.

TABLE E.39: BUILDING COUNTS FOR WALLBURG

Jurisdiction	Total Housing Units (2013)	Units Built 2010 or later	% Building Stock Built Post-2010
Wallburg	1,355	0	0.0%

Source: United States Census Bureau

Table E.40 shows population growth estimates for the town from 2010 to 2013 based on the U.S. Census Annual Estimates of Resident Population.

TABLE E.40: POPULATION GROWTH FOR WALLBURG

Jurisdiction	Population Estimates (as of July 1)				% Change 2010-2013
	2010	2011	2012	2013	
Wallburg	3,017	3,022	3,048	3,067	1.7%

Note: July 1 population estimates were used in this table to allow comparison of annual population counts (April 1 Census estimates were used for all other population counts throughout the plan which is why the counts may differ).
Source: United States Census Bureau

Based on the data above, there has been no residential development but a low rate of population growth in the town since 2010. This has resulted in a greater number of people exposed to the identified hazards. Therefore, population growth has impacted the town's vulnerability since the previous local hazard mitigation plan was approved and there has been a slight increase in the overall vulnerability.

However, it is important to note that as development increases in the future, greater populations and more structures and infrastructure will be exposed to potential hazards if development occurs in the floodplains, moderate landside susceptibility areas, high wildfire risk areas, primary and secondary hazardous materials buffers, or McGuire Nuclear Power Plant's 50-mile buffer.

E.3.4 Vulnerability Assessment Results

As noted in Section 6: *Vulnerability Assessment*, only hazards with a specific geographic boundary, modeling tool, or sufficient historical data allow for further analysis. Those results, specific to the Town of Wallburg, are presented here. All other hazards are assumed to impact the entire planning region (drought, extreme heat, hailstorm, lightning, thunderstorm/high wind, tornado, and winter storm and freeze) or, due to lack of data, analysis would not lead to credible results (dam and levee failure, erosion, and terror threat). The total town exposure, and thus risk, was presented in **Table E.36**.

The annualized loss estimate for all hazards is presented at the end of this section in **Table E.51.**

The hazards presented in this section include: hurricane and tropical storm winds, earthquake, landslide, flood, hazardous materials incident, nuclear accident, and wildfire.

Hurricane and Tropical Storm

Historical evidence indicates that the Town of Wallburg has some risk to the hurricane and tropical storm hazard. There have been five disaster declarations due to hurricanes (Hurricane Hugo, Hurricane Fran, Hurricane Floyd, Hurricane Isabel, and Hurricane Ivan) in Davidson County. Several tracks have come near or traversed through Davidson County, as shown and discussed in Section E.2.4.

Hurricanes and tropical storms can cause damage through numerous additional hazards such as flooding, erosion, tornadoes, high winds, and precipitation, thus it is difficult to estimate total potential losses from these cumulative effects. The current Hazus-MH hurricane model only analyzes hurricane winds and is not capable of modeling and estimating cumulative losses from all hazards associated with hurricanes; therefore only hurricane winds are analyzed in this section. It can be assumed that all existing and future buildings and populations are at risk to the hurricane and tropical storm hazard. Hazus-MH 2.1 was used to determine annualized losses for the county as shown below in **Table E.41**. Only losses to buildings, contents, and inventory are reported, in order to best match annualized losses

reported for other hazards. Hazus-MH reports losses at the U.S. Census tract level, so determining participating jurisdiction losses was not possible.

TABLE E.41: ANNUALIZED LOSS ESTIMATIONS FOR HURRICANE WIND HAZARD

Location	Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$637,00	$148,000	$5,000	$790,000

Source: Hazus-MH 2.1

In addition, probable peak wind speeds were calculated in Hazus. These are shown below in **Table E.42.**

TABLE E.42: PROBABLE PEAK HURRICANE / TROPICAL STORM WIND SPEEDS (MPH)

Location	50-year event	100-year event	500-year event	1,000-year event
Wallburg	62.5	71.9	91.3	98.0

Source: Hazus-MH 2.1

Social Vulnerability

Given equal susceptibility across the Town of Wallburg, it is assumed that the total population is at risk to the hurricane and tropical storm hazard.

Critical Facilities

Given equal vulnerability across the Town of Wallburg, all critical facilities are considered to be at risk. Some buildings may perform better than others in the face of such an event due to construction and age, among other factors. Determining individual building response is beyond the scope of this plan. However, this plan will consider mitigation actions for vulnerable structures, including critical facilities, to reduce the impacts of the hurricane wind hazard. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this section.

In conclusion, a hurricane event has the potential to impact many existing and future buildings, critical facilities, and populations in the Town of Wallburg. Hurricane events can cause substantial damage in their wake including fatalities, extensive debris clean-up, and extended power outages.

Earthquake

For the earthquake hazard vulnerability assessment, a probabilistic scenario was created to estimate the annualized loss for Davidson County. The results of the analysis reported at the U.S. Census tract level do not make it feasible to estimate losses at the jurisdiction level. Since the scenario is annualized, no building counts are provided. Losses reported included losses due to building damage (structural and non-structural), contents, and inventory. However, like the analysis for hurricanes, the comparative annualized loss figures at the end of this section only utilize building losses in order to provide consistency with other hazards. **Table E.43** summarizes the findings.

TABLE E.43: ANNUALIZED LOSS ESTIMATIONS FOR EARTHQUAKE HAZARD

Location	Structural Building Loss	Non-Structural Building Loss	Contents Loss	Inventory Loss	Total Annualized Loss
Davidson County	$39,000	$96,000	$28,000	$2,000	$165,000

Source: Hazus-MH 2.1

Social Vulnerability
It can be assumed that all existing and future populations are at risk to the earthquake hazard.

Critical Facilities
The Hazus probabilistic analysis indicated that no critical facilities would sustain measurable damage in an earthquake event. However, all critical facilities should be considered at-risk to minor damage, should an event occur. A list of individual critical facilities and their risk can be found in **Table E.52**.

In conclusion, an earthquake has the potential to impact all existing and future buildings, facilities, and populations in the Town of Wallburg. Minor earthquakes may rattle dishes and cause minimal damage while stronger earthquakes will result in structural damage as indicated in the Hazus scenario above. Impacts of earthquakes include debris clean-up, service disruption and, in severe cases, fatalities due to building collapse. Specific vulnerabilities for assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available. Furthermore, mitigation actions to address earthquake vulnerability will be considered.

Landslide

In order to complete the vulnerability assessment for landslides in the Town of Wallburg, GIS analysis was used. The potential dollar value of exposed land and property total can be determined using the USGS Landslide Susceptibility Index (detailed in Section E.2.10), county-level tax parcel and building footprint data, and GIS analysis. **Table E.44** presents the potential at-risk property where available. Almost the entire Town of Wallburg is located outside of moderate and high incidence areas as determined by the USGS landslide data. However, there is a small area in the northeast corner of the town that is considered to have moderate landslide incidence. Additionally, all areas of the town have moderate landslide susceptibility. Typically, an analysis is run to determine which parcels/buildings are located within the high and moderate incidence areas, but since no high incidence areas exist in the county, only an analysis of moderate incidence areas was carried out.

TABLE E.44: TOTAL POTENTIAL AT-RISK PARCELS FOR THE LANDSLIDE HAZARD

Location	Number of Parcels At Risk	Number of Improvements At Risk	Total Value of Improvements At Risk ($)
Incidence Level	**Moderate**		
Wallburg	13	18	$1,792,950

Source: United States Geological Survey

Social Vulnerability
Given low incidence and moderate susceptibility across the most of the town, it is assumed that the total population is at a low risk to landslides.

Critical Facilities
No critical facilities are located in a moderate incidence area. However, all critical facilities are located in a moderate susceptibility area. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this section.

In conclusion, a landslide has the potential to impact all existing and future buildings, facilities, and populations in the Town of Wallburg, though most areas are at a very low risk. Due to a variety of factors such as steep slopes and modified slopes, hilly areas of the town bear a greater risk than flat areas. Specific vulnerabilities for the Town of Wallburg assets will be greatly dependent on their individual design and the mitigation measures in place, where appropriate. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates if data becomes available.

Flood

Although existing floodplains indicate that the Town of Wallburg is susceptible to flood events, there are few reports of damage. Therefore, it is difficult to calculate a reliable annualized loss figure. It is assumed that while one major event could result in significant losses, annualizing structural losses over a long period of time would most likely yield a negligible annualized loss estimate for the Town of Wallburg.

In order to assess flood risk, a GIS-based analysis was used to estimate exposure to flood events using Digital Flood Insurance Rate Map (DFIRM) data in combination with local tax assessor records for the town. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within an identified floodplain. **Table E.45** presents the potential at-risk property. Both the number of parcels and the approximate value are presented.

TABLE E.45: ESTIMATED EXPOSURE OF PARCELS TO THE FLOOD HAZARD

Location	1.0-percent ACF			0.2-percent ACF		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[22]	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[23]
Wallburg	57	15	$5,806,140	34	9	$3,460,860

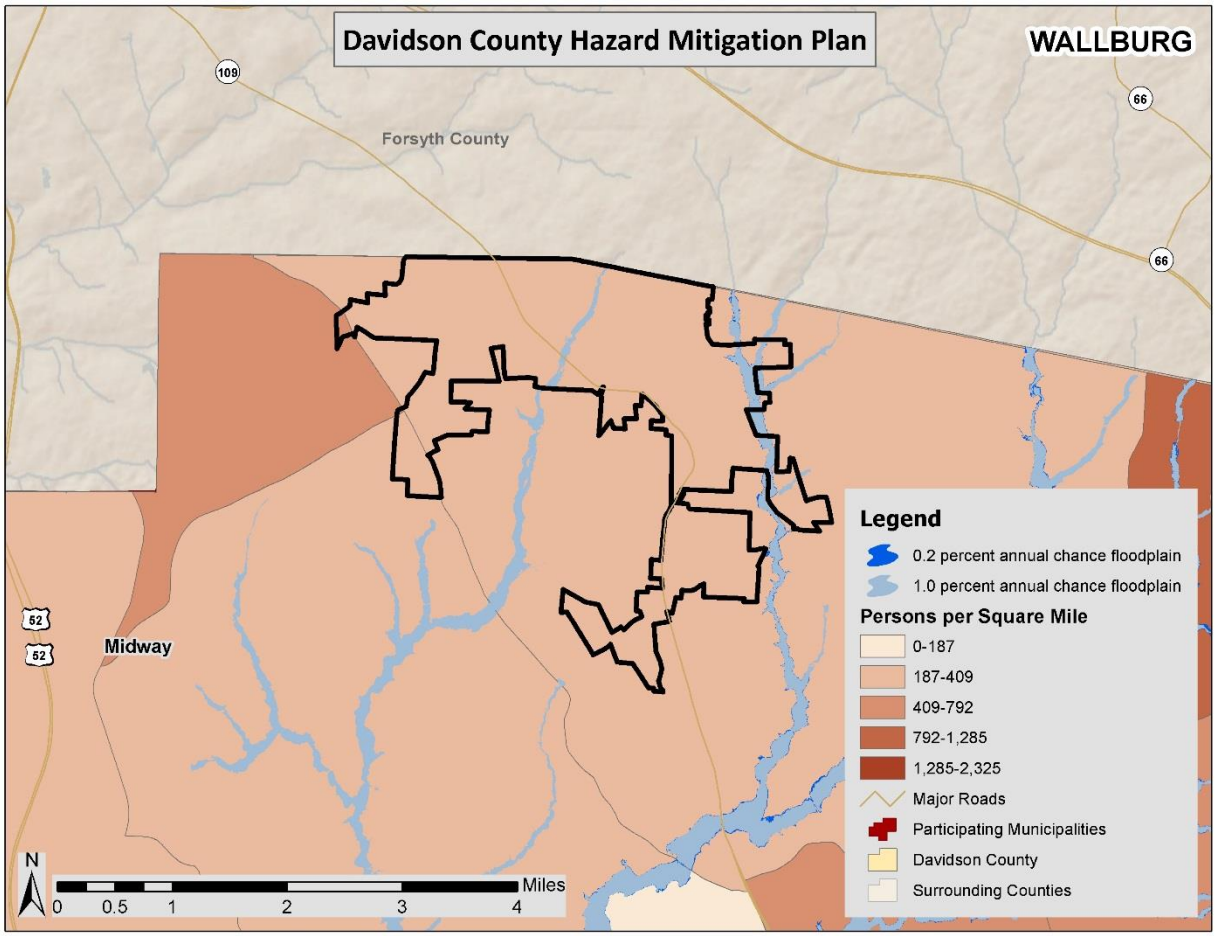
Source: Federal Emergency Management Agency DFIRM

Social Vulnerability

U.S. Census 2010 population at the tract level was used for analysis to determine where areas of high population concentration intersect with flood prone areas in the town. **Figure E.15** is presented to gain a better understanding of the at-risk population.

[22] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-percent annual chance floodplain, since building footprints were not associated with dollar value data.
[23] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 0.2-percent annual chance floodplain, since building footprints were not associated with dollar value data.

FIGURE E.15 : POPULATION DENSITY NEAR FLOODPLAINS



Source: Federal Emergency Management Agency DFIRM, United States Census 2010

Critical Facilities

The critical facility analysis revealed that there are no critical facilities in the Town of Wallburg located in the 1.0-percent annual chance floodplain or the 0.2-percent annual chance floodplain based on FEMA DFIRM boundaries and GIS analysis. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this section.

In conclusion, a flood has the potential to impact existing and future buildings, facilities, and populations in the Town of Wallburg, though some areas are at a higher risk than others. All types of structures in a floodplain are at-risk, though elevated structures will have a reduced risk. As noted, the floodplains used in this analysis include the 100-year and 500-year FEMA regulated floodplain boundaries. It is certainly possible that more severe events could occur beyond these boundaries or urban (flash) flooding could impact additional structures. Such site-specific vulnerability determinations are outside the scope of this assessment but will be considered during future plan updates. Furthermore, areas subject to repetitive flooding should be analyzed for potential mitigation actions.

Hazardous Materials Incident

Although historical evidence and existing Toxic Release Inventory sites indicate that the Town of Wallburg is susceptible to hazardous materials events, there are few reports of damage. Therefore, it is

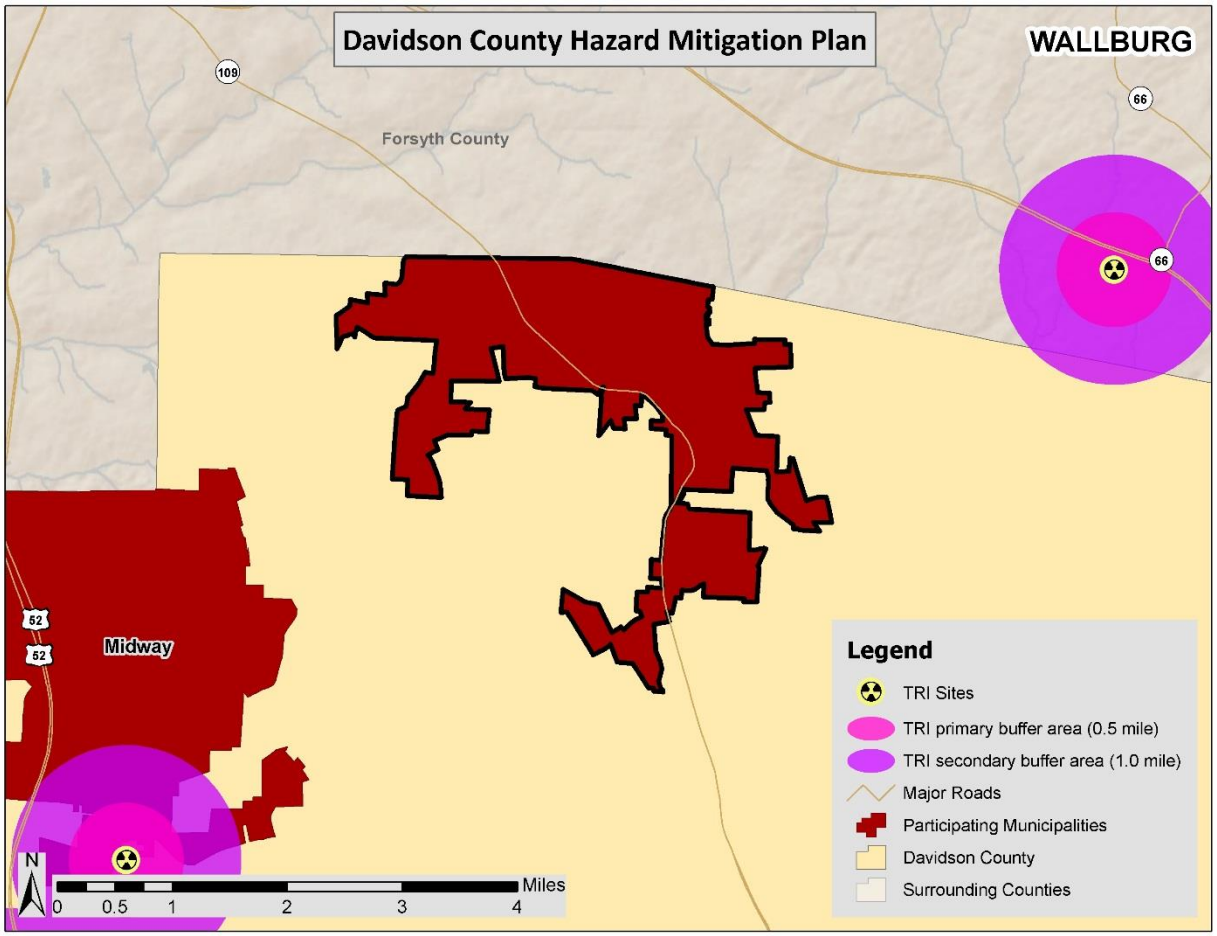
difficult to calculate a reliable annualized loss figure. It is assumed that while one major event could result in significant losses, annualizing structural losses over a long period of time would most likely yield a negligible annualized loss estimate for the Town of Wallburg.

Most hazardous materials incidents that occur are contained and suppressed before destroying any property or threatening lives. However, they can have a significant negative impact. Such events can cause multiple deaths, completely shut down facilities for 30 days or more, and cause more than 50 percent of affected properties to be destroyed or suffer major damage. In a hazardous materials incident, solid, liquid, and/or gaseous contaminants may be released from fixed or mobile containers. Weather conditions will directly affect how the hazard develops. Certain chemicals may travel through the air or water, affecting a much larger area than the point of the incidence itself. Non-compliance with fire and building codes, as well as failure to maintain existing fire and containment features, can substantially increase the damage from a hazardous materials release. The duration of a hazardous materials incident can range from hours to days. Warning time is minimal to none.

In order to conduct the vulnerability assessment for this hazard, GIS intersection analysis was used for fixed and mobile areas and parcels.[24] In both scenarios, two sizes of buffers—0.5-mile and 1.0-mile—were used. These areas are assumed to respect the different levels of effect: immediate (primary) and secondary. Primary and secondary impact sites were selected based on guidance from FEMA 426, Reference Manual to Mitigate Potential Terrorist Attacks against Buildings and engineering judgment. For the fixed site analysis, geo-referenced TRI listed toxic sites in the Town of Wallburg, along with buffers, were used for analysis as shown in **Figure E.16.** For the mobile analysis, the major roads (Interstate highway, U.S. highway, and State highway) and railroads, where hazardous materials are primarily transported that could adversely impact people and buildings, were used for the GIS buffer analysis. **Figure E.17** shows the areas used for mobile toxic release buffer analysis. The results indicate the approximate number of parcels/buildings and improved value, as shown in **Table E.46** (fixed sites), **Table E.47** (mobile road sites) and **Table E.48** (mobile railroad sites).[25]

[24] This type of analysis will likely yield inflated results (generally higher than what is actually reported after an event).
[25] Note that parcels included in the 1.0-mile analysis are also included in the 0.5-mile analysis.

FIGURE E.16 : TRI SITES WITH BUFFERS IN WALLBURG



Source: Environmental Protection Agency

TABLE E.46: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS (FIXED SITES)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[26]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[27]
Wallburg	0	0	$0	0	0	$0

[26] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[27] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

FIGURE E.17 : MOBILE HAZMAT BUFFERS IN WALLBURG

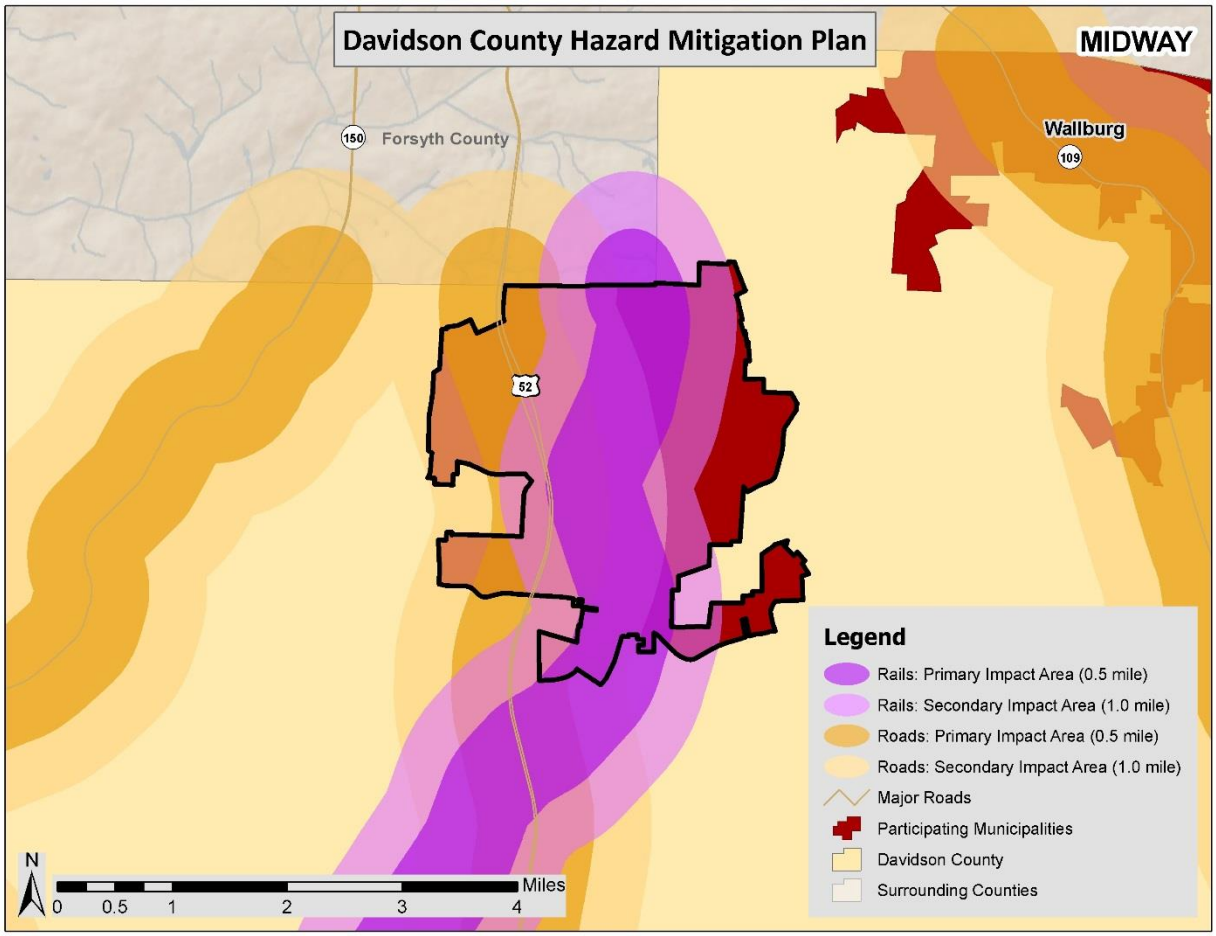


TABLE E.47: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - ROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[28]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[29]
Wallburg	664	1,220	$70,758,880	1,154	2,223	$113,986,750

[28] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.
[29] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

TABLE E.48: EXPOSURE OF IMPROVED PROPERTY TO HAZARDOUS MATERIALS SPILL (MOBILE ANALYSIS - RAILROAD)

Location	0.5-mile buffer			1.0-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[30]	Approx. Number of Parcels	Approx. Number Improved	Approx. Improved Value[31]
Wallburg	0	0	$0	0	0	$0

Social Vulnerability

Given high susceptibility across the entire town, it is assumed that the total population is at risk to a hazardous materials incident. It should be noted that areas of population concentration may be at an elevated risk due to a greater burden to evacuate population quickly.

Critical Facilities

Fixed Site Analysis:

The critical facility analysis for fixed TRI sites revealed that there are no Town of Wallburg facilities located in a HAZMAT risk zone. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this section.

Mobile Analysis:

The critical facility analysis for road and railroad transportation corridors in the Town of Wallburg revealed that there are 3 critical facilities located in the primary and secondary mobile HAZMAT buffer areas for roads and no critical facilities located in the railroad HAZMAT buffer areas. The 1.0-mile road buffer area (worst case scenario model) includes the following critical facilities: 1 fire station, 1 school, and 1 other facility. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this section.

In conclusion, a hazardous material incident has the potential to impact many existing and future buildings, critical facilities, and populations in the Town of Wallburg. Those areas in a primary buffer are at the highest risk, though all areas carry some vulnerability due to variations in conditions that could alter the impact area such direction and speed of wind, volume of release, etc. Further, incidents from neighboring counties could also impact the town.

Nuclear Accident

The location of the Town of Wallburg outside of the 50-mile radius of the McGuire Nuclear Power Plant indicates that the town is at low risk to a nuclear accident.

In order to assess nuclear risk, a GIS-based analysis was used to estimate exposure during a nuclear event within each of the risk zones described in Section 5: *Hazard Profiles*. The determination of assessed value at-risk (exposure) was calculated using GIS analysis by summing the total assessed building values for only those improved properties that were confirmed to be located within one of the risk zones. There are no properties in Davidson County located within the 10-mile risk zone, so **Table E.49** only presents the potential at-risk property in the 50-mile buffer zone for the Town of Wallburg. Both the number of parcels/buildings and the approximate value are presented.

[30] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 0.5-mile buffer, since building footprints were not associated with dollar value data.

[31] Improved value is estimated based on the building value associated with parcels that have been identified as being located in the 1.0-mile buffer, since building footprints were not associated with dollar value data.

TABLE E.49: ESTIMATED EXPOSURE OF PARCELS/BUILDINGS TO A NUCLEAR ACCIDENT

Location	50-mile buffer		
	Approx. Number of Parcels	Approx. Number Improved Buildings	Approx. Improved Value of Buildings[32]
Wallburg	0	0	$0

Source: International Atomic Energy Agency

Social Vulnerability
Since no areas of the town are within the 50-mile buffer area, the total population is considered to be at low risk to a nuclear hazard.

Critical Facilities
The critical facility analysis revealed that there are no critical facilities located in the 50-mile nuclear buffer area in the Town of Wallburg. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this section.

In conclusion, a nuclear accident has low potential to impact existing and future buildings, facilities, and populations in the Town of Wallburg since none of the town is located within the 50-mile buffer area.

Wildfire

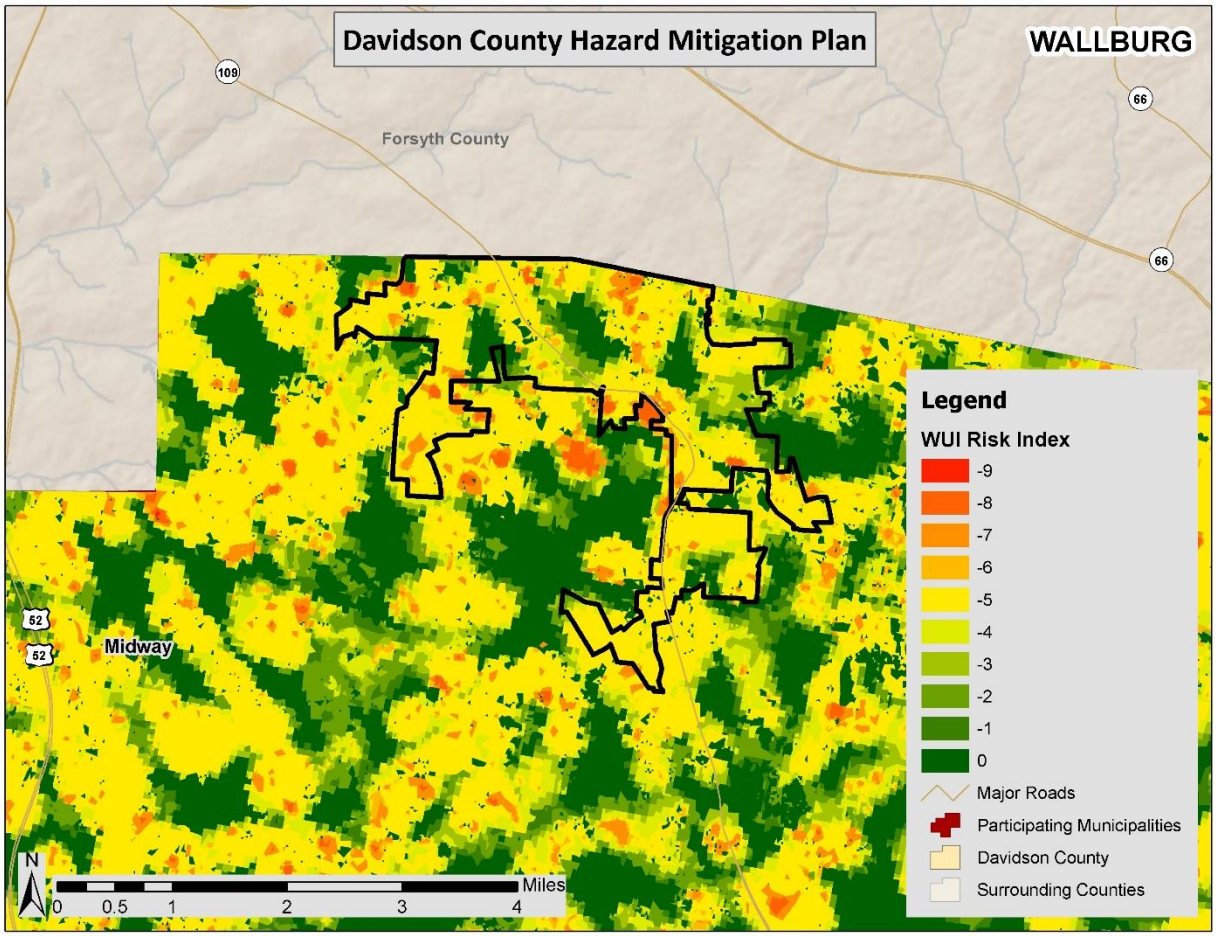
Historical evidence indicates that the Town of Wallburg is susceptible to wildfire events. A total of 227 wildfires were reported by the North Carolina Division of Forest Resources in Davidson County from 2009 to 2014 resulting in $58,000 in structure damage. On an annualized level, these damages amount to $11,600 for the county (data is only reported at the county level, so it is not possible to calculate damages specific to the town).

To estimate exposure to wildfire, the approximate number of parcels and their associated improved value was determined using GIS analysis. For the critical facility analysis, areas of risk were intersected with critical facility locations. **Figure E.18**, shows the Wildland Urban Interface Risk Index (WUIRI) data, which is a data layer that shows a rating of the potential impact of a wildfire on people and their homes. The key input, Wildland Urban Interface (WUI), reflects housing density (houses per acre) consistent with Federal Register National standards. The location of people living in the WUI and rural areas is key information for defining potential wildfire impacts to people and homes. Initially provided as raster data, it was converted to a polygon to allow for analysis. The Wildland Urban Interface Risk Index data ranges from 0 to -9 with lower values being most severe (as noted previously, this is only a measure of relative risk). **Figure E.19** shows the areas of analysis where any grid cell is than -5. Areas with a value below -5 were chosen to be displayed as areas of risk because this showed the upper echelon of the scale and the areas at highest risk.

Table E.50 shows the results of the analysis.

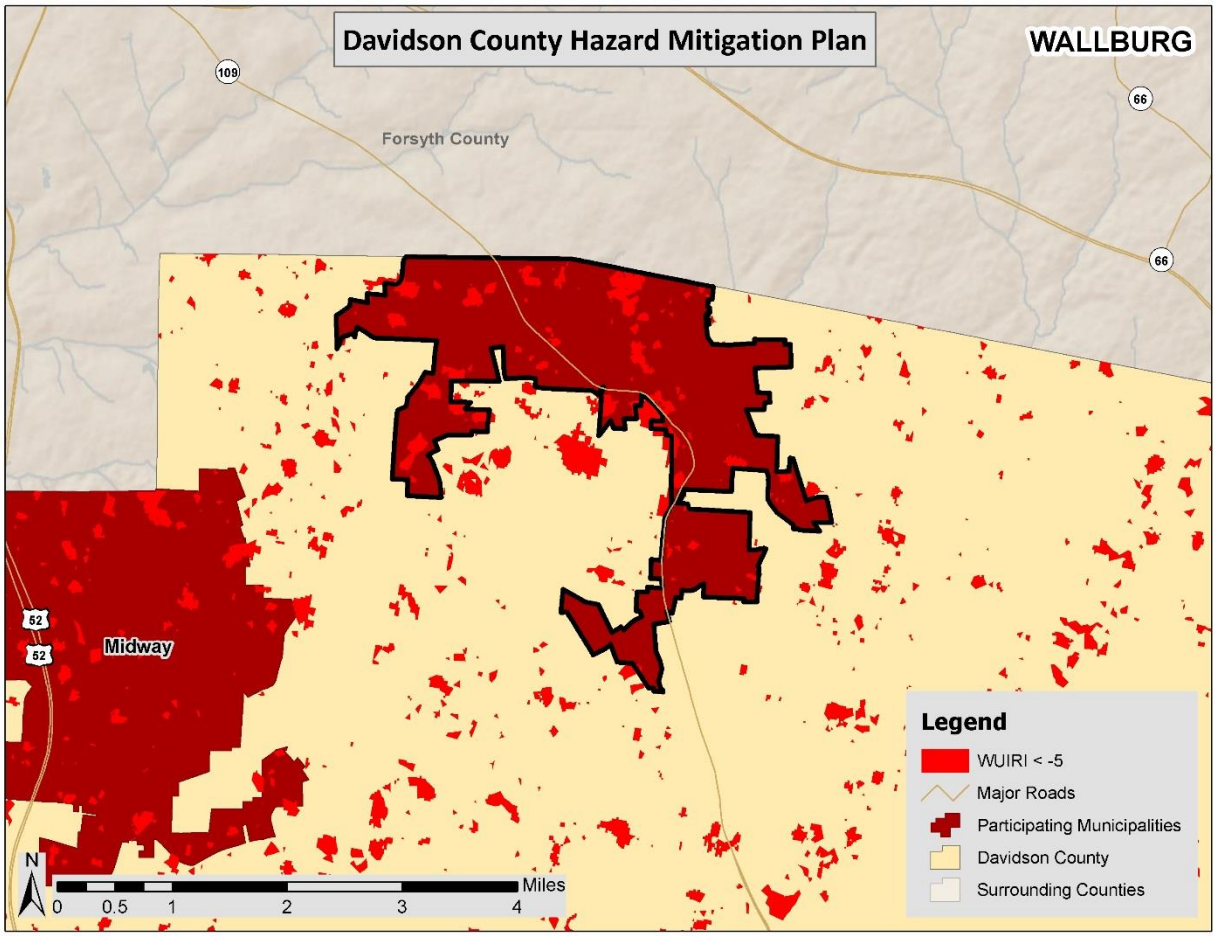
[32] Improved value of buildings is estimated based on the building value associated with parcels that have been identified as being located in the 50-mile buffer, since building footprints were not associated with dollar value data.

FIGURE E.18: WUI RISK INDEX AREAS IN WALLBURG



Source: Southern Wildfire Risk Assessment Data

FIGURE E.19: HIGH WILDFIRE RISK AREAS IN WALLBURG



Source: Southern Wildfire Risk Assessment Data

TABLE E.50: EXPOSURE OF IMPROVED PROPERTY TO WILDFIRE RISK AREAS

Location	HIGH WILDFIRE RISK AREA		
	Approx. Number of Parcels	Approx. Number of Buildings	Approx. Improved Value
Wallburg	305	313	$35,658,280

Social Vulnerability

Although not all areas have equal vulnerability, there is some susceptibility across the entire town. It is assumed that the total population is at low risk to the wildfire hazard. Determining the exact number of people in wildfire risk areas is difficult with existing data and could be misleading.

Critical Facilities

The critical facility analysis revealed that there is 1 critical facility located in the in the wildfire risk area (areas where the WUIRI is less than -5). This facility is a fire station. However, it should also be noted, that several factors could impact the spread of a wildfire putting all facilities at some risk. A list of specific critical facilities and their associated risk can be found in **Table E.52** at the end of this section.

In conclusion, a wildfire event has the potential to impact some existing and future buildings, critical facilities, and populations in the Town of Wallburg.

Conclusions on Hazard Vulnerability

Table E.51 presents a summary of annualized loss for each hazard in the Town of Wallburg. Due to the reporting of hazard damages primarily at the county level, it was difficult to determine an accurate annualized loss estimate for the town. Therefore, although an annualized loss was determined using the damage reported from historical occurrences at the municipal level (where available), it is likely that the county-wide estimate (found in Section 6: *Vulnerability Assessment*) is a better estimate. These values should be used as an additional planning tool or measure risk for determining hazard mitigation strategies throughout the town.

TABLE E.51: ANNUALIZED LOSS FOR WALLBURG*

Event	Wallburg
Atmospheric Hazards	
Drought	Negligible
Extreme Heat	Negligible
Hailstorm	Negligible
Hurricane & Tropical Storm†	$790,000
Lightning	$10,966
Severe Thunderstorm / High Wind	Negligible
Tornado	$55,429
Winter Storm & Freeze†	$344,444
Geologic Hazards	
Earthquake†	$165,000
Landslide	Negligible
Hydrologic Hazards	
Dam Failure	Negligible
Erosion	Negligible
Flood	Negligible
Other Hazards	
HAZMAT Incident	Negligible
Nuclear Accident	Negligible
Terror Threat	Negligible
Wildfire†	$11,600

*In this table, the term "Negligible" is used to indicate that no records for the particular hazard were recorded. This could be the case either because there were no events that caused dollar damage or because documentation of that particular type of event is not kept.
†Only county-wide damage estimates were reported for this hazard.

As noted previously, all existing and future buildings and populations (including critical facilities) are vulnerable to atmospheric hazards including drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind, tornado, and winter storm and freeze. Some buildings may be more vulnerable to these hazards based on locations, construction, and building type. **Table E.52** shows the critical facilities vulnerable to additional hazards analyzed in this section. The table lists those assets that are determined to be exposed to each of the identified hazards (marked with an "**X**").

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TABLE E.52: AT-RISK CRITICAL FACILITIES IN WALLBURG

FACILITY NAME	FACILITY TYPE	ATMOSPHERIC								GEOLOGIC			HYDROLOGIC		OTHER									
		Drought	Extreme Heat	Hailstorm	Hurricane and Tropical Storm	Lightning	Thunderstorm	Tornado	Winter Storm and Freeze	Earthquake	Landslide – High Incidence	Landslide- Mod. Incidence	Flood – 100 yr	Flood – 500 yr	Fixed HAZMAT 0.5-mile	Fixed HAZMAT 1-mile	Mobile HAZMT 0.5-Mile (road)	Mobile HAZMT 1.0-mile (road)	Mobile HAZMT 0.5-mile (rail)	Mobile HAZMT 1.0-mile (rail)	Nuclear Accident 10-mile	Nuclear Accident 50-mile	Terror Threat	Wildfire
WALLBURG																								
Station #61	Fire Station	X	X	X	X	X	X	X	X	X							X	X						X
NC Hwy 109 Substation	Power Station	X	X	X	X	X	X	X	X	X							X	X						
Wallburg Elementary	School	X	X	X	X	X	X	X	X	X							X	X						

E.4 TOWN OF WALLBURG CAPABILITY ASSESSMENT

This subsection discusses the capability of the Town of Wallburg to implement hazard mitigation activities. More information on the purpose and methodology used to conduct the assessment can be found in Section 7: *Capability Assessment*.

E.4.1 Planning and Regulatory Capability

Table E.53 provides a summary of the relevant local plans, ordinances, and programs already in place or under development for the Town of Wallburg. A checkmark (✓) indicates that the given item is currently in place and being implemented. An asterisk (*) indicates that the given item is currently being developed for future implementation. Each of these local plans, ordinances, and programs should be considered available mechanisms for incorporating the requirements of the Davidson County Hazard Mitigation Plan.

TABLE E.53: RELEVANT PLANS, ORDINANCES, AND PROGRAMS

Planning Tool/Regulatory Tool	Hazard Mitigation Plan	Comprehensive Land Use Plan	Floodplain Management Plan	Open Space Management Plan (Parks & Rec/Greenway Plan	Stormwater Management Plan/Ordinance	Natural Resource Protection Plan	Flood Response Plan	Emergency Operations Plan	Continuity of Operations Plan	Evacuation Plan	Disaster Recovery Plan	Capital Improvements Plan	Economic Development Plan	Historic Preservation Plan	Flood Damage Prevention Ordinance	Zoning Ordinance	Subdivision Ordinance	Unified Development Ordinance	Post-Disaster Redevelopment Ordinance	Building Code	Fire Code	National Flood Insurance Program (NFIP)	NFIP Community Rating System
Wallburg	✓							✓							✓	✓	✓			✓	✓		

A more detailed discussion on the town's planning and regulatory capabilities follows.

Emergency Management

Hazard Mitigation Plan
The Town of Wallburg was included in the county's previous hazard mitigation plan.

Emergency Operations Plan
The Town of Wallburg is included in the county's emergency operations plan.

General Planning

Zoning Ordinance
The Town of Wallburg has adopted a standalone zoning ordinance.

Subdivision Ordinance
The Town of Wallburg has adopted a standalone subdivision ordinance.

Building Codes, Permitting, and Inspections
North Carolina has a state compulsory building code which applies throughout the state. Davidson County provides building inspection services for the Town of Wallburg through contractual agreement.

Floodplain Management

Table E.54 provides NFIP policy and claim information the Town of Wallburg.

TABLE E.54: NFIP POLICY AND CLAIM INFORMATION

Jurisdiction	Date Joined NFIP	Current Effective Map Date	NFIP Policies in Force	Insurance in Force	Closed Claims	Total Payments to Date
Wallburg*	--	--	--	--	--	--

* Community does not participate in the NFIP
Source: NFIP Community Status information as of 2/12/15; NFIP claims and policy information as of 11/30/14

Flood Damage Prevention Ordinance
Although the Town of Wallburg does not participate in the NFIP, it has adopted a flood damage prevention ordinance.

E.4.2 Administrative and Technical Capability

Table E.55 provides a summary of the capability assessment results for the Town of Wallburg with regard to relevant staff and personnel resources. A checkmark (✓) indicates the presence of a staff member(s) in the town with the specified knowledge or skill.

TABLE E.55: RELEVANT STAFF / PERSONNEL RESOURCES

Staff / Personnel Resource	Planners with knowledge of land development/land management practices	Engineers or professionals trained in construction practices related to buildings and/or infrastructure	Planners or engineers with an understanding of natural and/or human-caused hazards	Emergency Manager	Floodplain Manager	Land Surveyors	Scientists familiar with the hazards of the community	Staff with education or expertise to assess the community's vulnerability to hazards	Personnel skilled in GIS and/or Hazus	Resource development staff or grant writers
Wallburg		✓		✓	✓		✓	✓		

Credit for having a floodplain manager was given to those jurisdictions that have a flood damage prevention ordinance, and therefore an appointed floodplain administrator, regardless of whether the appointee was dedicated solely to floodplain management. Credit was given for having a scientist familiar with the hazards of the community if a jurisdiction has a Cooperative Extension Service or Soil and Water Conservation Department. Credit was also given for having staff with education or expertise to assess the community's vulnerability to hazards if a staff member from the jurisdiction was a participant on the existing hazard mitigation plan's planning committee.

E.4.3 Fiscal Capability

Table E.56 provides a summary of the results for the Town of Wallburg with regard to relevant fiscal resources. A checkmark (✓) indicates that the given fiscal resource is locally available for hazard mitigation purposes (including match funds for state and federal mitigation grant funds) according to the previous county hazard mitigation plan.

TABLE E.56: RELEVANT FISCAL RESOURCES

Fiscal Tool / Resource	Capital Improvement Programming	Community Development Block Grants (CDBG)	Special Purpose Taxes (or taxing districts)	Gas/Electric Utility Fees	Water/Sewer Fees	Stormwater Utility Fees	Development Impact Fees	General Obligation, Revenue, and/or Special Tax Bonds	Partnering Arrangements or Intergovernmental Agreements	Other: HMGP, PDM, FMA, SBA, other Federal, state, and non-governmental funding sources, etc.
Wallburg	✓	✓	✓							✓

E.4.4 Political Capability

The previous hazard mitigation plan indicates that the Town of Wallburg supports hazard mitigation practices and strategies to the extent that it is able to pursue development of strategies. Public awareness has increased through the planning process. Political willpower has yet to be developed through education and awareness programs.

E.4.5 Conclusions on Local Capability

Table E.57 shows the results of the capability assessment using the designed scoring methodology described in Section 7: *Capability Assessment*. The capability score is based solely on the information found in the existing hazard mitigation plan and readily available on the town's government website. According to the assessment, the local capability score for the town is 18, which falls into the limited capability ranking.

TABLE E.57: CAPABILITY ASSESSMENT RESULTS

Jurisdiction	Overall Capability Score	Overall Capability Rating
Wallburg	18	Limited

E.5 WALLBURG MITIGATION STRATEGY

This subsection provides the blueprint for the Town of Wallburg to follow in order to become less vulnerable to its identified hazards. It is based on general consensus of the Hazard Mitigation Planning Team and the findings and conclusions of the capability assessment and risk assessment. Additional Information can be found in Section 8: *Mitigation Strategy* and Section 9: *Mitigation Action Plan*.

E.5.1 Mitigation Goals

The Town of Wallburg developed five mitigation goals in coordination with the other participating Davidson County jurisdictions. The county mitigation goals are presented in **Table E.58**.

TABLE E.58: DAVIDSON COUNTY MITIGATION GOALS

	Goal
Goal #1	To enhance local government capability to lessen the impacts of all natural hazards.
Goal #2	To identify and protect critical facilities, services, and infrastructure from the impacts of natural disasters.
Goal #3	To develop an effective public awareness/education/outreach program for natural hazards impacts.
Goal #4	To protect persons and property from damage due to natural hazards.
Goal #5	To ensure disaster resistant future development.

E.5.2 Mitigation Action Plan

The mitigation actions proposed by the Town of Wallburg are listed in the following individual Mitigation Action Plan.

Wallburg Mitigation Action Plan

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
Prevention							
P-1	Establish hazard mitigation as a component of all planning activities.	All	High	Wallburg Town Manager	n/a	2019	Although hazard mitigation has been integrated into many planning activities, the town will attempt to improve its integration into all planning activities going forward.
Emergency Services							
ES-1	Work with county to improve countywide emergency notification system by integrating cell numbers and implementing other update features.	All	High	Davidson County Emergency Services Department	Local	2017	New action
Public Education and Awareness							
PEA-1	Establish and inform local government and elected officials of the need to consider hazard mitigation in policy and budgetary planning and decision making processes.	All	High	Wallburg Town Manager, Davidson County Planning	Local	2016, Annually	Many efforts have been taken to inform local government and elected officials about the need to consider hazard mitigation in planning and policy-making decisions, however, this effort will need to be continued due to turnover of officials and to keep this on the radar of those officials
Previously Completed Mitigation Actions							
	To identify critical facilities within the town limits of Wallburg.	All	Moderate	Wallburg Town Manager, Davidson County Planning	Local	Completed	Completed in 2007. Critical facilities have been identified and mapped thus making possible advance mitigation planning to protect these facilities and maintain power.

Action #	Description	Hazard(s) Addressed	Relative Priority	Lead Agency/ Department	Potential Funding Sources	Implementation Schedule	Implementation Status (2015)
	Identify and designate at least one emergency shelter in Wallburg.	All	Moderate	Wallburg Town Manager	n/a	Completed	Completed in 2008. Shelters have been identified and designated according to the County plan. They are being "typed" according to use by general and special populations. This assures that safe and secure shelter is ready and available in multi-hazard situations.

Appendix A
PLAN ADOPTION

This appendix includes the local adoption resolutions for each of the participating jurisdictions.

U.S. Department of Homeland Security
FEMA Region IV
3003 Chamblee Tucker Road
Atlanta, GA 30341

FEMA

September 23, 2015

Mr. Chris Crew
State Hazard Mitigation Officer
North Carolina Division of Emergency Management
4238 Mail Service Center
Raleigh, North Carolina 27699

Reference: Davidson County Multi-jurisdictional Hazard Mitigation Plan Update

Dear Mr. Crew:

We are pleased to inform you that the Davidson County Hazard Mitigation Multi-jurisdictional Plan Update is in compliance with the Federal hazard mitigation planning requirements resulting from the Disaster Mitigation Act of 2000, as contained in 44 CFR 201.6. The plan is approved for a period of five (5) years, to September 22, 2020.

This plan approval extends to the following participating jurisdictions that provided copies of their resolutions adopting the plan:

- Davidson County
- City of Lexington
- Town of Midway
- Town of Wallburg

The approved participating jurisdictions are hereby eligible applicants through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)

National Flood Insurance Program (NFIP) participation is required for some programs.

We commend Davidson County for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted. For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs.

We strongly encourage each community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years.

We also encourage each community to conduct a plan update process within one (1) year of being included within a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development.

When the plan is amended or revised, it must be resubmitted through the State as a "plan update" and is subject to a formal review and approval process by our office. If the plan is not updated prior to the required five (5) year update, please ensure that the draft update is submitted at least six (6) months prior to expiration of this plan.

The State and Davidson County plan should be commended for their close coordination and communications with our office in the review and subsequent approval of the plan. If you or Davidson County have any questions or need any additional information please do not hesitate to contact Victor Geer, of the Hazard Mitigation Assistance Branch, at (770) 220-5659 or Linda L. Byers of my staff at (770) 220-5498.

Sincerely,

Robert E. Lowe, Chief
Risk Analysis Branch
Mitigation Division

NORTH CAROLINA
DAVIDSON COUNTY

RESOLUTION ADOPTING DAVIDSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the citizens and property within Davidson County are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the county are particularly vulnerable to Drought, Extreme Heat, Hailstorm, Hurricane and Tropical Storm, Lightning, Thunderstorm Wind/ High Wind, Tornado, Winter Storm and Freeze, Flood, Hazardous Material Incident, Wildfire; and

WHEREAS, the County desires to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214 --- Senate Bill 300 effective July 1, 2001), states therein in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after August 1, 2002, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, the County of Davidson has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management.

WHEREAS, it is the intent of the Board of Commissioners of Davidson County to fulfill this obligation in order that the County will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, therefore, be it resolved that the Board of Commissioners of Davidson County hereby:

1. Adopts the Davidson County Multi-Jurisdictional Hazard Mitigation Plan as submitted, and;

2. Vests Davidson County Emergency Management with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action.
(b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.

3. Appoints Davidson County Emergency Management to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the Davidson County Board of Commissioners for consideration.

4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on this day, August 25, 2015

Todd Yates, Chairman
Davidson County Board of Commissioners

Attest:

Deborah J. Harris
Clerk to the Board

Certified by: Deborah Harris

Date: 8.25.2015

SEAL :

DAVIDSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the citizens and property within Town of Denton are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the county are particularly vulnerable to Drought, Extreme Heat, Hailstorm, Hurricane and Tropical Storm, Lightning, Thunderstorm Wind/ High Wind, Tornado, Winter Storm and Freeze, Flood, Hazardous Material Incident, Wildfire; and

WHEREAS, the County desires to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214 --- Senate Bill 300 effective July 1, 2001), states therein in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after August 1, 2002, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, the Town of Denton has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management.

WHEREAS, it is the intent of the Town of Denton Board of Commissioners to fulfill this obligation in order that the County will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, therefore, be it resolved that the Town of Denton Board of Commissioners hereby:

1. Adopts the Davidson County Multi-Jurisdictional Hazard Mitigation Plan and;

2. Vests Davidson County Emergency Management with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action.
(b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.

3. Appoints the Davidson County Emergency Management to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the Town of Denton Board of Commissioners for consideration.

4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on this the 21st day, of September, 2015.

By: Larry D. Ward

Larry D Ward, Mayor

Attest: Genie M Russell

Date: 09-21-15

CITY OF LEXINGTON, NC

RESOLUTION NO. 06-16

APPROVAL OF
DAVIDSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
AS REQUIRED BY SECTION 322 OF THE
FEDERAL DISASTER MITIGATION ACT OF 2000
IN ORDER TO REMAIN ELIGIBLE FOR
STATE AND FEDERAL DISASTER RELIEF FUNDING

WHEREAS, the citizens and property within the City of Lexington are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the county are particularly vulnerable to Drought, Extreme Heat, Hailstorm, Hurricane and Tropical Storm, Lightning, Thunderstorm Wind/ High Wind, Tornado, Winter Storm and Freeze, Flood, Hazardous Material Incident, Wildfire; and

WHEREAS, Davidson County desires to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214 --- Senate Bill 300 effective July 1, 2001), states therein in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after August 1, 2002, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, the City of Lexington has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management.

WHEREAS, it is the intent of the City Council of the City of Lexington to fulfill this obligation in order that Davidson County will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, THEREFORE, BE IT RESOLVED, that the City Council of the City of Lexington hereby:

1. Adopts the Davidson County Multi-Jurisdictional Hazard Mitigation Plan and;

2. Vests Davidson County Emergency Management with the responsibility, authority, and the means to:
   (a) Inform all concerned parties of this action.
   (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map, and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.

3. Appoints the Davidson County Emergency Management to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to City Council of the City of Lexington for consideration.

4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted this the 14th day of September, 2015.

CITY OF LEXINGTON INCORPORATED 1828 NORTH CAROLINA

Newell Clark, Mayor

Rebekah C. Gainey, CMC
Deputy City Clerk

RESOLUTION NO. 03-16

RESOLUTION BY THE TOWN COUNCIL OF THE TOWN OF MIDWAY
ADOPTING THE DAVIDSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN
AS REQUIRED BY STATE SENATE BILL 300 AND IN ORDER TO REMAIN ELIGIBLE
FOR STATE AND FEDERAL DISASTER RELIEF FUNDING

WHEREAS, the citizens and property within the Town of Midway, North Carolina (the "Town of Midway") are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the County are particularly vulnerable to drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind/high wind, tornado, winter storm and freeze, flood hazardous material incident, wildfire; and

WHEREAS, the Town of Midway and Davidson County, North Carolina ("Davidson County") desire to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214 --- Senate Bill 300 effective July 1, 2001), states therein in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after August 1, 2002, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five-year cycle; and

WHEREAS, the Town of Midway has performed a comprehensive review and evaluation of such section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Manager; and

WHEREAS, it is the intent of the Town Council of the Town of Midway to fulfill this obligation in order that Davidson County and the Town of Midway will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County.

NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Midway hereby:

1. Adopts the Davidson County Multi-Jurisdictional Hazard Mitigation Plan and;
2. Vests Davidson County Emergency Management with the responsibility, authority, and the means to:
   a. Inform all concerned parties of this action; and
   b. Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.

3. Appoints the Davidson County Emergency Management to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the Town Council of the Town of Midway for consideration; and
4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

ADOPTED on this 8th day September, 2015.

Mike McAlpine

Mike McAlpine, Mayor Pro Temp

ATTEST:

Linda A. Hunt

Linda A. Hunt, Town Clerk

DAVIDSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the citizens and property within the City of Thomasville are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the county are particularly vulnerable to Drought, Extreme Heat, Hailstorm, Hurricane and Tropical Storm, Lightning, Thunderstorm Wind/ High Wind, Tornado, Winter Storm and Freeze, Flood, Hazardous Material Incident, Wildfire; and

WHEREAS, the County desires to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214 --- Senate Bill 300 effective July 1, 2001), states therein in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after August 1, 2002, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, the City of Thomasville has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management.

WHEREAS, it is the intent of the City Council of the City of Thomasville to fulfill this obligation in order that the County will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County;

NOW, therefore, be it resolved that the City Council of the City of Thomasville hereby:

1. Adopts the Davidson County Multi-Jurisdictional Hazard Mitigation Plan and;

2. Vests Davidson County Emergency Management with the responsibility, authority, and the means to:

(a) Inform all concerned parties of this action.

(b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.

3. Appoints the Davidson County Emergency Management to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the City Council of the City of Thomasville for consideration.

4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

Adopted on this 21st day of September, 2015.

Joe G. Bennett, Mayor

Attest:

Wendy S. Martin, City Clerk

STATE OF NORTH CAROLINA

COUNTY OF DAVIDSON

RESOLUTION #15-009

September 8, 2015

TOWN OF WALLBURG

RESOLUTION: DAVIDSON COUNTY MULTI-JURISDICTIONAL HAZARD MITIGATION PLAN

WHEREAS, the citizens and property within the Town of Wallburg are subject to the effects of natural hazards that pose threats to lives and cause damage to property, and with the knowledge and experience that certain areas of the county are particularly vulnerable to natural or man-made disasters including without limitation, drought, extreme heat, hailstorm, hurricane and tropical storm, lightning, thunderstorm wind/high wind, tornado, winter storm and freeze, flood, hazardous material incident, and wildfire; and

WHEREAS, the County and Town desire to seek ways to mitigate the impact of identified hazard risks; and

WHEREAS, the Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina has in Section 1 Part 166A of the North Carolina General Statutes (adopted in Session Law 2001-214 --- Senate Bill 300 effective July 1, 2001), states therein in Item (a) (2) "For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after August 1, 2002, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act"; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan in order to be eligible to receive future Hazard Mitigation Grant Program Funds and other disaster-related assistance funding and that said Plan must be updated and adopted within a five year cycle; and

WHEREAS, Davidson County has performed a comprehensive review and evaluation of each section of the previously approved Hazard Mitigation Plan and has updated the said plan as required under regulations at 44 CFR Part 201 and according to guidance issued by the Federal Emergency Management Agency and the North Carolina Division of Emergency Management; and

WHEREAS, it is the intent of the Wallburg Town Council to fulfill this obligation in order that the County and Town will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the County and Town;

NOW, THEREFORE, be it resolved this the 8th day of September, 2015, that the Wallburg Town Council hereby:

1. Adopts the Davidson County Multi-Jurisdictional Hazard Mitigation Plan and;

2. Vests Davidson County Emergency Management with the responsibility, authority, and the means to:

   (a) Inform all concerned parties of this action.
   (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map and identify floodplain areas, and cooperate with neighboring communities with respect to management of adjoining floodplain areas in order to prevent exacerbation of existing hazard impacts.

3. Appoints the Davidson County Emergency Management to assure that the Hazard Mitigation Plan is reviewed annually and every five years as specified in the Plan to assure that the Plan is in compliance with all State and Federal regulations and that any needed revisions or amendments to the Plan are developed and presented to the Wallburg Town Council for consideration.

4. Agrees to take such other official action as may be reasonably necessary to carry out the objectives of the Hazard Mitigation Plan.

ATTEST BY:

By: _____
Donna Alwine
Town Clerk

TOWN OF WALLBURG

By: _____
Allen Todd
Mayor

Appendix B
PLANNING TOOLS

This appendix includes the following:

1. Blank Public Participation Survey
2. GIS Data Inventory Sheet
3. Scoring Criteria for Capability Assessment
4. Blank Mitigation Action Worksheet

PUBLIC PARTICIPATION SURVEY
FOR HAZARD MITIGATION PLANNING

We need your help!

Davidson County is currently engaged in a planning process to become less vulnerable to natural disasters, and your participation is important to us!

The county, along with participating local jurisdictions and other participating partners, is now working to prepare a multi-jurisdictional *Hazard Mitigation Plan*. The purpose of this Plan is to identify and assess our community's natural hazard risks and determine how to best minimize or manage those risks. Upon completion, the Plan will represent a comprehensive multi-jurisdictional *Hazard Mitigation Plan* for the county.

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

Please help us by completing this survey by March 31, 2015 and returning it to:

Sara Seremak, Atkins
1616 E Millbrook Road, Suite 310
Raleigh, NC 27609

Surveys can also be faxed to: (919) 876-6848 or emailed to sara.seremak@atkinsglobal.com

If you have any questions regarding this survey or would like to learn about more ways you can participate in the development of the *Davidson County Hazard Mitigation Plan*, please contact Atkins, planning consultant for the project. You may reach Nathan Slaughter (Atkins) at 919-431-5251 or by email at nathan.slaughter@atkinsglobal.com.

1. Where do you live?

- ❑ Unincorporated Davidson County
- ❑ Denton
- ❑ Lexington
- ❑ Midway
- ❑ Thomasville
- ❑ Wallburg
- ❑ Other: _____

2. **Have you ever experienced or been impacted by a disaster?**

   - ❑ Yes
   - ❑ No

   a. **If "Yes," please explain:**

3. **How concerned are you about the possibility of our community being impacted by a disaster?**

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

4. **Please select the <u>one</u> hazard you think is the *highest threat* to your neighborhood:**

   - ❑ Dam / Levee Failure
   - ❑ Drought
   - ❑ Earthquake
   - ❑ Erosion
   - ❑ Flood
   - ❑ Hailstorm
   - ❑ Hazardous Materials Incident
   - ❑ Hurricane / Tropical Storm
   - ❑ Land Subsidence / Sink Holes
   - ❑ Landslide
   - ❑ Lightning
   - ❑ Manmade Hazards
   - ❑ Severe Thunderstorm / High Wind
   - ❑ Severe Winter / Ice Storm
   - ❑ Technological Hazards
   - ❑ Tornado
   - ❑ Wildfire

5. **Please select the <u>one</u> hazard you think is the *second highest threat* to your neighborhood:**

   - ❑ Dam / Levee Failure
   - ❑ Drought
   - ❑ Earthquake
   - ❑ Erosion
   - ❑ Flood
   - ❑ Hailstorm
   - ❑ Hazardous Materials Incident
   - ❑ Hurricane / Tropical Storm
   - ❑ Land Subsidence / Sink Holes
   - ❑ Landslide
   - ❑ Lightning
   - ❑ Manmade Hazards
   - ❑ Severe Thunderstorm / High Wind
   - ❑ Severe Winter / Ice Storm
   - ❑ Technological Hazards
   - ❑ Tornado
   - ❑ Wildfire

6. **Is there another hazard not listed above that you think is a wide-scale threat to your neighborhood?**

   - ❑ Yes (please explain): _____
   - ❑ No

7. **Is your home located in a floodplain?**

- ❑ Yes
- ❑ No
- ❑ I don't know

8. **Do you have flood insurance?**

- ❑ Yes
- ❑ No
- ❑ I don't know

   a. **If "No," why not?**

   - ❑ Not located in floodplain
   - ❑ Too expensive
   - ❑ Not necessary because it never floods
   - ❑ Not necessary because I'm elevated or otherwise protected
   - ❑ Never really considered it
   - ❑ Other (please explain): _____

9. **Have you taken any actions to make your home or neighborhood more resistant to hazards?**

- ❑ Yes
- ❑ No

   a. **If "Yes," please explain:**

10. **Are you interested in making your home or neighborhood more resistant to hazards?**

- ❑ Yes
- ❑ No

11. **Do you know what office to contact regarding reducing your risks to hazards in your area?**

- ❑ Yes
- ❑ No

12. What is the most effective way for you to receive information about how to make your home and neighborhood more resistant to hazards?

- ❑ Newspaper
- ❑ Television
- ❑ Radio
- ❑ Internet
- ❑ Mail
- ❑ Public workshops/meetings
- ❑ School meetings
- ❑ Other (please explain): _____

13. In your opinion, what are some steps your local government could take to reduce or eliminate the risk of future hazard damages in your neighborhood?

14. Are there any other issues regarding the reduction of risk and loss associated with hazards or disasters in the community that you think are important?

15. **A number of community-wide activities can reduce our risk from hazards. In general, these activities fall into one of the following six broad categories. Please tell us how important you think each one is for your community to consider pursuing.**

Category	Very Important	Somewhat Important	Not Important
1. Prevention Administrative or regulatory actions that influence the way land is developed and buildings are built. Examples include planning and zoning, building codes, open space preservation, and floodplain regulations.	❑	❑	❑
2. Property Protection Actions that involve the modification of existing buildings to protect them from a hazard or removal from the hazard area. Examples include acquisition, relocation, elevation, structural retrofits, and storm shutters.	❑	❑	❑
3. Natural Resource Protection Actions that, in addition to minimizing hazard losses, also preserve or restore the functions of natural systems. Examples include: floodplain protection, habitat preservation, slope stabilization, riparian buffers, and forest management.	❑	❑	❑
4. Structural Projects Actions intended to lessen the impact of a hazard by modifying the natural progression of the hazard. Examples include dams, levees, detention/retention basins, channel modification, retaining walls, and storm sewers.	❑	❑	❑
5. Emergency Services Actions that protect people and property during and immediately after a hazard event. Examples include warning systems, evacuation planning, emergency response training, and protection of critical emergency facilities or systems.	❑	❑	❑
6. Public Education and Awareness Actions to inform citizens about hazards and the techniques they can use to protect themselves and their property. Examples include outreach projects, school education programs, library materials, and demonstration events.	❑	❑	❑

THANK YOU FOR YOUR PARTICIPATION!

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

Name: _____

Address: _____

_____

Phone: _____ **E-Mail:** _____

GIS Data Request Sheet
Davdison County Hazard Mitigation Plan

Data requested	Available?	Received?	Potential Sources
Tax Parcel Data			Tax Assessor
including replacement value			
Building Footprints			Tax Assessor/GIS office
Critical Facilities (in GIS or list form with addresses)			Tax Assessor/GIS office
examples include:			
government buildings			
hospitals			
senior care			
police/fire/EMS/EOC			
locally significant buildings			
schools			
Local hazard studies			public works, natural resources, planning
examples include:			
Flood Studies (HEC-RAS, Risk MAP)			
Local Hazard History Articles			
Areas of Concern Studies			

If you have any questions, please contact:

Ryan Wiedenman
ryan.wiedenman@atkinsglobal.com
919-431-5295

Points System for Capability Ranking

0-19 points = Limited overall capability **20-39 points = Moderate overall capability** **40-68 points = High overall capability**

I. Planning and Regulatory Capability
(Up to 43 points)

Yes = 3 points
Under Development = 1 point
Included under County plan/code/ordinance/program = 1 point
No = 0 points

- Hazard Mitigation Plan
- Comprehensive Land Use Plan
- Floodplain Management Plan
- National Flood Insurance Program
- NFIP Community Rating System

Yes = 2 points
Under Development = 1 point
Included under County plan/code/ordinance/program = 1 point
No = 0 points

- Open Space Management Plan / Parks & Recreation Plan
- Stormwater Management Plan
- Natural Resource Protection Plan
- Flood Response Plan
- Emergency Operations Plan
- Continuity of Operations Plan
- Evacuation Plan
- Disaster Recovery Plan
- Flood Damage Prevention Ordinance
- Post-disaster Redevelopment / Reconstruction Ordinance

Yes = 1 point
No = 0 points

- Capital Improvements Plan
- Economic Development Plan
- Historic Preservation Plan
- Zoning Ordinance
- Subdivision Ordinance
- Unified Development Ordinance
- Building Code
- Fire Code

II. Administrative and Technical Capability
(Up to 15 points)

Yes = 2 points
Service provided by County = 1 point
No = 0 points

- Planners with knowledge of land development and land management practices
- Engineers or professionals trained in construction practices related to buildings and/or infrastructure
- Planners or engineers with an understanding of natural and/or human-caused hazards
- Emergency manager
- Floodplain manager

Yes = 1 point
No = 0 points

- Land surveyors
- Scientist familiar with the hazards of the community
- Staff with education or expertise to assess the community's vulnerability to hazards
- Personnel skilled in Geographical Information Systems (GIS) and/or Hazus
- Resource development staff or grant writers

III. Fiscal Capability
(Up to 10 points)

Yes = 1 point
No = 0 points

- Capital Improvement Programming
- Community Development Block Grants (CDBG)
- Special Purpose Taxes (or tax districts)
- Gas / Electric Utility Fees
- Water / Sewer Fees
- Stormwater Utility Fees
- Development Impact Fees
- General Obligation / Revenue / Special Tax Bonds
- Partnering arrangements or intergovernmental agreements
- Other

MITIGATION ACTION WORKSHEETS

Mitigation Action Worksheets are used to identify potential hazard mitigation actions that participating jurisdictions in Davidson County will consider to reduce the negative effects of identified hazards. The worksheets provide a simple yet effective method of organizing potential actions in a user-friendly manner that can easily be incorporated into the County's Hazard Mitigation Plan.

The worksheets are to be used as part of a strategic planning process and are designed to be:

a.) completed electronically (worksheets and instructions will be e-mailed to members of the Hazard Mitigation Planning Team following the Mitigation Strategy Workshop);
b.) reviewed with your department/organization for further consideration; and
c.) returned according to the contact information provided below.

Please return all completed worksheets no later than March 12, 2015 to:

Nathan Slaughter, Project Manager Atkins

Electronic copies may be e-mailed to: nathan.slaughter@atkinsglobal.com

Hard copies may be faxed to: 919-876-6848 (Attn: Nathan Slaughter)

INSTRUCTIONS

Each mitigation action should be considered to be a separate local project, policy or program and each individual action should be entered into a separate worksheet. By identifying the implementation requirements for each action, the worksheets will help lay the framework for engaging in distinct actions that will help reduce the community's overall vulnerability and risk. Detailed explanations on how to complete the worksheet are provided below.

Proposed Action: Identify a specific action that, if accomplished, will reduce vulnerability and risk in the impact area. Actions may be in the form of local policies (i.e., regulatory or incentive-based measures), programs or structural mitigation projects and should be consistent with any pre-identified mitigation goals and objectives.

Site and Location: Provide details with regard to the physical location or geographic extent of the proposed action, such as the location of a specific structure to be mitigated, whether a program will be citywide, countywide or regional, etc.

History of Damages: Provide a brief history of any known damages as it relates to the proposed action and the hazard(s) being addressed. For example, the proposed elevation of a repetitive loss property should include an overview of the number of times the structure has flooded, total dollar amount of damages if available, etc.

Hazard(s) Addressed: List the hazard(s) the proposed action is designed to mitigate against.

Category: Indicate the most appropriate category for the proposed action as discussed during the Mitigation Strategy Workshop (Prevention; Property Protection; Natural Resource Protection; Structural Projects; Emergency Services; Public Education and Awareness).

Priority: Indicate whether the action is a "high" priority, "moderate" priority or "low" priority based generally on the following criteria:

1. Effect on overall risk to life and property
2. Ease of implementation / technical feasibility
3. Project costs versus benefits
4. Political and community support
5. Funding availability

Estimated Cost: If applicable, indicate what the total cost will be to accomplish this action. This amount will be an estimate until actual final dollar amounts can be determined. Some actions (such as ordinance revisions) may only cost "local staff time" and should be noted so.

Potential Funding Sources: If applicable, indicate how the cost to complete the action will be funded. For example, funds may be provided from existing operating budgets or general funds, a previously established contingency fund, a cost-sharing federal or state grant program, etc.

Lead Agency/Department Responsible: Identify the local agency, department or organization that is best suited to implement the proposed action.

Implementation Schedule: Indicate when the action will begin and when the action is expected to be completed. Remember that some actions will require only a minimal amount of time, while others may require a long-term or continuous effort.

Comments: This space is provided for any additional information or details that may not be captured under the previous headings.

	MITIGATION ACTION
Proposed Action:	
BACKGROUND INFORMATION	
Site and Location:	
History of Damages:	

MITIGATION ACTION DETAILS	
Hazard(s) Addressed:	
Category:	
Priority (High, Moderate, Low):	
Estimated Cost:	
Potential Funding Sources:	
Lead Agency/Department Responsible:	
Implementation Schedule:	

COMMENTS

Appendix C
LOCAL MITIGATION PLAN REVIEW TOOL

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: Davidson County (Denton, Lexington, Midway, Thomasville, Wallburg, and Unincorporated Davidson County)	**Title of Plan:** Davidson County Multi-Jurisdictional Hazard Mitigation Plan	**Date of Plan:** April 2015
Local Point of Contact: Alton Hanes	**Address:** 913 Greensboro Street Lexington, NC 27292	
Title: Emergency Management Coordinator		
Agency: Davidson County Emergency Management		
Phone Number: 336-242-2270	**E-Mail:** alton.hanes@davidsoncountync.gov	

State Reviewer: **Ryan Cox**	**Title:** **Risk Mitigation Supervisor**	**Date:** **6/2/15**

FEMA Reviewer: **Edwardine S. Marrone (AR)** Linda L. Byers (QC)	**Title:** HM Program Analyst RIV Lead Planning Specialist	**Date:** July 30, 2015, September 23, 2015 August 4, 2015
Date Received in FEMA Region IV	June 17, 20115	
Plan Not Approved		
Plan Approvable Pending Adoption	August 5, 2015	
Plan Approved	September 23, 2015	

✓ Denotes FEMA Reviewer concurs with State Reviewers notations.

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 **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or page number)	**Met**	**Not Met**
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))	Section 2; App. D✓ P. 1.1, 1.3, 5.2	X	
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))	Section 2.4-2.7; App. D✓	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Section 2.6-2.7; App. B; App. D✓	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Section 7.3; Jurisdiction-specific annexes (Section X.4) ✓	X	
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Section 10.4✓ P. 4.18	X	
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))	Section 10.3✓ P. 2.13	X	
ELEMENT A: REQUIRED REVISIONS **NCEM First Review:** All Elements in Element A have been met.			
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
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)	Section 4; Section 5; Jurisdiction-specific annexes (Section X.2) ✓	X	
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))	Section 5; Jurisdiction-specific annexes (Section X.2) ✓	X	
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))	Section 5; Section 6; Jurisdiction-specific annexes (Section X.2 and X.3)✓	X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Section 5.15.5 (Table 5.36); Jurisdiction-specific annexes (Section X.2.13; Table X.2.25) P. 2.9, 5.58	X	
ELEMENT B: REQUIRED REVISIONS **NCEM First Review:** All Elements in Element B have been met.			
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))	Section 7; Jurisdiction-specific annexes (Section X.4)✓	X	
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))	Section 5.15.4 (Table 5.35); Section 7.3.4; Jurisdiction-specific annexes (Section X.2.13 and X.4.1; Table X.24) Participation: Table 7.2, P. 7.9 Compliance: Section 9	X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Section 8.2; Jurisdiction-specific annexes (Section X.5.1) ✓	X	
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))	Section 8.3-8.4; Section 9.2; Jurisdiction-specific annexes (Section X.5.2) ✓	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
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))	Section 8.1.1; Section 9.2; Jurisdiction-specific annexes (Section X.5.2)✓	X	
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))	Section 7.3.1 (Table 7.1); Section 10.1-10.2; Jurisdiction-specific annexes (Section X.4.1; Table C.53)✓	X	
ELEMENT C: REQUIRED REVISIONS **NCEM First Review:** All Elements in Element C have been met.			
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))	Section 6.4.3✓	X	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Section 2.8; Section 8.5; Section 9.2; Jurisdiction-specific annexes (Section X.5.2)✓	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Section 5.21 (Table 5.38); Section 9.2; Jurisdiction-specific annexes (Section X.2.19 and X.5.2; Table X.35)✓	X	
ELEMENT D: REQUIRED REVISIONS **NCEM First Review:** All Elements in Element D have been met.			
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))	App. A	X	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	App. A		X

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
ELEMENT E: REQUIRED REVISIONS **NCEM First Review:** The Davidson County Hazard Mitigation Plan will be sent to FEMA prior to adoption and upon conditional approval referred to as Approvable Pending Adoption (APA) the communities will adopt the plan and provide the documentation to NCEM. Upon the completion of all adoptions Davidson County, as the lead jurisdiction, is required to provide a final electronic copy of the plan to NCEM who will then provide FEMA the final plan. The final plan is required under this element to incorporate all adoption resolutions prior to final plan submission to NCEM. **FEMA REVIEW:** **E1:** The plan must include documentation of plan adoption, usually a resolution by the governing body or other authority. **E2:** Each jurisdiction that is included in the plan must have its governing body adopt the plan prior to FEMA approval, even when a regional agency has the authority to prepare such plans. At least one participating jurisdiction must formally adopt the plan within one calendar year of FEMA's designation of the plan as "Approvable Pending Adoption." 9/23/15 The City of Lexington, Davidson County, and the Towns of Midway, and Wallburg provided adoption documentation. For additional information, please see Element E, Plan Adoption, in the "Local Mitigation Plan Review Guide", October 1, 2011, Pages 28-29 and Task 8 of the Local Mitigation Planning Handbook, March 2013.			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1. Required Revisions. Check Page 2:2 last sentence of the next to last paragraph for accuracy. City of Thomasville action ES-5 references Lexington not Thomasville			
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.

COMMENTS UNDER DEVELOPMENT

Element A: Planning Process

Plan Strengths

The plans was written so that the reader could understand the approach taken by the Planning Update Committee. The Summary of Plan Contents provides an overview of the information provided in each section of the plan. The planning process demonstrates the life cycle of a living document as it is stated to be. The Hazard Mitigation Planning Team members had specific task assignments to complete the plan update in a systematic and all inclusive manner. The team members includes community members, officials and stakeholders committed to minimizing the natural hazards impacts to Davidson County. Public involvement was accomplished by public survey instruments; of which 50 were received and documented; and posting the plan to the government websites and making them available at the government offices. The meetings were open to the public and encouraged input from the general public.

Element B: Hazard Identification and Risk Assessment

Plan Strengths

The hazards were assessed to determine why or why not they would be included in the risk assessment. The description of the process and results were provided and can be used for future evaluation, should the need arise. A complete risk assessment of the identified hazards was included in the plan update and was the part of the mitigation strategies prioritization determination. The result is a clear determination of which hazards will be included in the mitigation strategies and be the focus of the community's efforts to minimize the impacts of these hazards. A Priority Risk Index was used and resulted in conclusion of high, moderate and low risk based on the probability, impact, spatial extent, warning time and duration. The primary objective of the vulnerability assessment is to quantify exposure and the potential loss estimated for each hazard. The methods used to conduct the assessment are: Stochastic risk assessment, geographic information system (GIS) based analysis and a risk modeling software analysis.

Element C: Mitigation Strategy

Plan Strengths

The mitigation strategies were designed to be comprehensive, functional, and strategic and with the goals are the Mitigation Action Plan (MAP). They were developed with community collaboration, risk and vulnerability assessments and a distinct prioritization process in mind. In addition, the effect of the mitigation action on life and property, ease of implementation, degrees of political and community support, general cost-effectiveness, and funding availability were also considered in the mitigation action selection. The prioritization process resulted in a score of high, medium, or low for each mitigation action being considered. The mitigation action table included the actions which are completed, documenting the progress made and can be moved into an archive of the actions taken and completed. The "carry-over" mitigation actions include documentation of progress made, including any roadblocks, and next steps. The result is an exhaustive list of mitigation actions which will make Davidson County a hazard mitigation focused community.

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

Plan Strengths

The Davidson County Emergency Services Director is responsible for reconvening the Hazard Mitigation Planning Team for the annual review held in March. A set of criteria has been established to conduct the review looking in particular at the progress, effectiveness, and validity of the mitigation actions and the opportunities and advancement of integrating the mitigation plan into other local planning mechanisms. This will continue the life cycle of the hazard mitigation plan making for a true living document.

B. Resources for Implementing Your Approved Plan

- **Mitigation Planning Toolkit**

This is an extensive web based tool to assist States, Local, and Tribal Communities involved in Hazard Mitigation Plan Development and Updates. The content will help guide the direction of plan development and required updates.

http://www.fema.gov/library/viewRecord.do?id=5580

- **Local Mitigation Planning Handbook**

This Handbook provides guidance to local governments on developing or updating hazard mitigation plans to meet the requirements under the Code of Federal Regulations (CFR) Title 44 – Emergency Management and Assistance §201.6.

Use the Local Plan Guide and Handbook in tandem to understand technical requirements

http://www.fema.gov/library/viewRecord.do?fromSearch=fromsearch&id=7209

- **Integrating Mitigation Strategies with Local Planning**

This resource provides practical guidance on how to incorporate risk reduction strategies into existing local plans, policies, codes, and programs that guide community development or redevelopment patterns.

http://www.fema.gov/library/viewRecord.do?id=7130

- **Mitigation Ideas**

Communities can use this resource to identify and evaluate a range of potential mitigation actions for reducing risk to natural hazards and disasters.

http://www.fema.gov/media-library/assets/documents/30627?id=6938

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.)	NFIP Community Status Book/Plan	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
1	Davidson County	County	Y/				N	Y	Y	Y	Y	
2	Denton	Town	Y/				N	Y	Y	Y	N	
3	Lexington	City	Y/				N	Y	Y	Y	Y	
4	Midway	Town	N/				N	Y	Y	Y	Y	
5	Thomasville	City	Y/				N	Y	Y	Y	N	
6	Wallburg	Town	Y/				N	Y	Y	Y	Y	

Appendix D
PLANNING PROCESS DOCUMENTATION

This appendix includes:

1. Meeting Agendas
2. Meeting Minutes
3. Meeting Sign-In Sheets
4. Public Survey Summary Results

AGENDA

Davidson County Multi-Jurisdictional Hazard Mitigation Plan
Kickoff Meeting

January 22, 2015
10:00 AM – Noon
Lexington Police Department Training Center
415 Lee Smith Rd., Lexington, NC 27295

1) **Introductions**

2) **Overview of Mitigation**
   a) **Ice Breaker Exercise**

3) **Project Overview**
   a) **Key Objectives**
   b) **Project Tasks**
   c) **Project Schedule**
   d) **Project Staffing**

4) **Data Collection**

5) **Roles & Responsibilities**

6) **Next Steps**

7) **Questions, Issues, or Concerns**

ATKINS

AGENDA

Davidson County Multi-Jurisdictional Hazard Mitigation Plan
Mitigation Strategy Meeting

March 18, 2015
10:00 AM – Noon
Lexington Police Department Training Center
415 Lee Smith Rd., Lexington, NC 27295

1) **Introductions**

2) **Mitigation Refresher**

3) **Project Schedule**

4) **Risk Assessment Findings**
   a) Hazard History and Profiles
   b) Conclusions on Risk: PRI

5) **Capability Assessment Findings**
   a) Indicators
   b) Results

6) **Public Involvement Activities**

7) **Mitigation Strategy**
   a) Current Goals/Actions
   b) New Actions
   c) Discussion

8) **Next Steps**
   a) Mitigation Actions
   b) Continue Public Outreach

9) **Questions, Issues, or Concerns**

ATKINS

Meeting Minutes
Davidson County Hazard Mitigation Plan
Project Kickoff Meeting
January 22, 2015

Nathan Slaughter, Project Manager from the project consulting team, Atkins started the meeting by welcoming the representatives from the county, participating municipal jurisdictions and other stakeholders. Mr. Slaughter led the kickoff meeting and began by providing an overview of the items to be discussed at the meeting and briefly reviewed each of the handouts that were distributed in the meeting packets (agenda, project description, and presentation slides). He then asked each of the meeting attendees to introduce themselves. Following introductions, he provided a brief overview of mitigation and discussed the Disaster Mitigation Act of 2000 and NC Senate Bill 300.

He discussed the key objectives of the planning process and gave a list of the participating jurisdictions for the plan and asked if there were any changes that needed to be made to the list. Mr. Slaughter then explained the six different categories of mitigation techniques (emergency services; prevention; natural resource protection; structural projects; public education and awareness; and property protection) and gave examples of each. This explanation culminated in an Ice Breaker Exercise for the attendees.

Mr. Slaughter instructed attendees on how to complete the exercise. Attendees were given an equal amount of fictitious FEMA money and asked to spend it in the various mitigation categories. Money could be thought of as grant money that communities received towards mitigation. Attendees were asked to target their money towards areas of mitigation that are of greatest concern for their community. Ideally, the exercise helps pinpoint areas of mitigation that the community may want to focus on when developing mitigation grants. The Ice Breaker Exercise results were to be reviewed and presented at the conclusion of the meeting.

Mr. Slaughter then explained the mitigation planning process and specific tasks to be accomplished for this project, including the planning process, risk assessment, capability assessment, mitigation strategy and action plan, and plan maintenance procedures.

The project schedule was presented along with the project staffing chart, which demonstrates the number of experienced individuals that will be working on this project. Mr. Slaughter then reviewed the roles and responsibilities of Atkins, the counties, and the participating jurisdictions. The presentation concluded with a discussion of the next steps to be taken in the project development, which included determining the members of the Hazard Mitigation Planning Team that should be present for the next meeting, addressing issues of regulation compliance, and fulfilling data collection needs.

The meeting was adjourned.

Meeting Minutes
Davidson County Hazard Mitigation Plan
Mitigation Strategy Meeting
March 18, 2015

Mr. Slaughter initiated the meeting with a review of the meeting handouts, which included an agenda, presentation slides, proposed goals for the plan, mitigation actions from the county's existing plan, and mitigation action worksheets for collecting information for any new mitigation actions. Mr. Slaughter reviewed the project schedule and stated that a draft of the Hazard Mitigation Plan would be presented to the Hazard Mitigation Council in May.

Ryan Wiedenman with Atkins then presented the findings of the risk assessment. He reviewed the Presidential Disaster Declarations that have impacted the county. He then explained the process for preparing Hazard Profiles and discussed how each hazard falls into one of four basic categories: Atmospheric, Hydrologic, Geologic, and Other. He indicated that each hazard must be evaluated and formally ruled out if it is not applicable to the study area, even where it seems obvious (such as in the case of volcano).

Mr. Wiedenman reviewed the Hazard Profiles and the following bullets summarize the information presented:

- DROUGHT. There have been eleven years (out of the past fourteen, 2000-2013) where drought conditions have been reported as severe, extreme or exceptional in Davidson County and future occurrences are likely.

- EXTREME HEAT. There has been 1 recorded extreme heat event reported by the National Climatic Data Center (NCDC) since 1998. However, heat extents of 107 degrees indicate that extreme heat is a hazard of concern for the county. Future occurrences are possible.

- HAILSTORM. There have been 90 recorded events since 1956. Future occurrences are highly likely.

- LIGHTNING. There have been 9 recorded lightning events since 1997, causing three injuries. There has been $642,697 in reported property damages. Future occurrences are highly likely.

- TORNADOES. There have been 14 recorded tornado events reported in the county since 1958. $25.8 million in property damages. 2 deaths and 22 injuries have been reported. Future occurrences are likely.

- HURRICANES AND TROPICAL STORMS. NOAA data shows that 45 storm tracks have come within 75 miles of Davidson County since 1859. 6 of these events were hurricanes, 23 were tropical storms and 16 were tropical depressions. Future occurrences are likely.

- SEVERE THUNDERSTORM WINDS. There have been 131 severe thunderstorm events reported since 1997 with $2.6 million in reported property damages. One death has been reported. Future occurrences are highly likely.

- WINTER STORM. There have been 55 recorded winter weather events in Davidson County since 1993 resulting in $6.2 million in reported property damages. Future occurrences are highly likely.

- EARTHQUAKES. There have been 3 recorded earthquake events in Davidson County since 1970. The strongest had a recorded magnitude of IV MMI. Future occurrences are possible.

- LANDSLIDE. There have been no recorded landslide events in Davidson County. Mr. Wiedenman asked the Hazard Mitigation Team to provide local information on landslide events, if available. Future occurrences are unlikely.

- DAM FAILURE. There are 112 dams in Davidson County, 15 of which are classified as high hazard dams. There have been no reported significant failures. Future occurrences are unlikely.

- EROSION. Erosion was identified in the previous county level plan, but as a relatively low concern. Future occurrences are possible.

- FLOOD. There have been 42 flood events recorded in Davidson County since 1996, resulting in $837,382 in property damage per NCDC. There have been 29 NFIP losses since 1978 and approximately $337,867 in claims. 6 repetitive loss properties in the county account for 15 of the recorded losses. Future occurrences are highly likely.

- HAZARDOUS MATERIALS INCIDENTS. There have been 182 reported hazardous materials events reported in the county. 17 serious events were reported. Future occurrences are highly likely.

- NUCLEAR ACCIDENT. Some of the county falls within the 50 mile buffer of McGuire Nuclear Station, but there have been no major incidents and future occurrences are unlikely.

- TERROR THREAT. There have been no historic terror events in the county, but several facilities were identified as potential targets and confirmed by the planning team.

- WILDFIRE. There is an average of 39 fires per year reported in Davidson County. Future occurrences are likely but major events are not common.

In concluding the review of Hazard Profiles, Mr. Wiedenman stated if anyone had additional information for the hazard profiles, or had concerns with any of the data presented, they should call or email him.

The results of the hazard identification process were used to generate a Priority Risk Index (PRI), which categorizes and prioritizes potential hazards as high, moderate or low risk based on probability, impact, spatial extent, warning time, and duration. The highest PRI was assigned to Thunderstorm/High Wind followed by Winter Storms and Freeze, Hazardous Materials Incident, Tornado, and Flood. The planning team agreed that Lightning should be moved from a low risk hazard to a moderate risk hazard as a result of the number of events being under reported.

Mr. Slaughter presented the Capability Assessment Findings. Atkins has developed a scoring system that was used to rank the participating jurisdictions in terms of capability in four major areas (Planning and Regulatory; Administrative and Technical; Fiscal; Political). Important capability indicators include National Flood Insurance Program (NFIP) participation, Building Code Effective Grading Schedule

(BCEGS) score, Community Rating System (CRS) participation, and the Local Capability Assessment Survey conducted by Atkins.

Mr. Slaughter reviewed the Relevant Plans and Ordinances, Relevant Staff/Personnel Resources, and Relevant Fiscal Resources. All of these categories were used to rate the overall capability of the participating counties and jurisdictions. Most jurisdictions are in the low to moderate range for Planning and Regulatory Capability and in the limited range for Fiscal Capability. There is variation between the jurisdictions for Administrative and Technical Capability, mainly with respect to availability of planners and staff skilled in GIS. Based upon the scoring methodology developed by Atkins, it was determined that most of the participating jurisdictions have low to moderate capability to implement hazard mitigation programs and activities.

Mr. Slaughter also discussed the results of the public participation survey that was posted on several of the participating counties' and municipal websites. As of the meeting date, 19 responses had been received, so the HMPT made a commitment to make another push to get the survey out to the public. Based on preliminary survey results, respondents felt that severe thunderstorms posed the greatest threat to their neighborhood, followed by HazMat Incident, and severe winter storm. 82 percent of the respondents were interested in making their homes more resistant to hazards. However, 44 percent don't know who to contact regarding reducing their risks to hazards.

Mr. Slaughter then reminded team members of the results of the icebreaker exercise from the first Hazard Mitigation Team meeting, where attendees were given "money" to spend on various hazard mitigation techniques. The results were as follows:

- Prevention
- Emergency Services
- Property Protection
- Structural Projects
- Public Education
- Natural Resource Protection

Mr. Slaughter gave an overview of Mitigation Strategy Development and presented the proposed goals for the plan based on a review of the goals in the existing county plan. The Hazard Mitigation Team accepted the proposed goals for the plan. Mr. Wiedenman then provided an overview and examples of suggested mitigation actions specifically tailored for Davidson County. Mr. Slaughter then asked each county and the municipalities to provide a status update for their existing mitigation actions (completed, deleted, or deferred) by March 12, 2015. Mr. Slaughter also discussed the Mitigation Action Worksheets to be completed for any new mitigation actions and requested that all worksheets be returned by March 12, 2015.

Mr. Slaughter thanked the group for taking the time to attend and the meeting was adjourned.

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Project Kickoff Meeting

January 22, 2015
10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Doug Childress	Davidson County	Purchasing	242-2030	
Lory Morrow	DCS	Supt.	249-8181	lorymorrow@davidson.k12.nc.us
LINDA ERWIN	DAVIDSON COUNTY	GIS	242-2042	lindaerwin@davidsoncountync.gov
Guy Cornman	Davidson Co.	P&Z	242-2220	guy.cornman@davidsoncountync.gov
Dale Moorefield	Davidson Co.	DSS	242-2562	dale.moorefield@davidsoncountync.gov
John Gray	Town of Denton	Town Manager	859-3082	dentontm@triad.rr.com
Roger Jones	City of Lexington	Public Services Engineering	248.3930	RDJones@LexingtonNC.Gov
Terry Bailey	Davidson Co	911	242-2047	Terry.Bailey@DavidsonCountyNC.gov

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Project Kickoff Meeting

January 22, 2015
10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Larry Ward	Denton	Mayor	336-859-8003	lward@triad.rr.com
Ricky Turtle	NCOM, CBO	DPS	(336) 462-2033	ricky.turtle@nccpg.gov
Mark Crook	~~NCDOT~~ Davidson Co	NCDOT	336-224-3200	mcrook@ncdot.gov
Donna Alwine	Wallburg	Town Clerk	331-3945	town-clerk@townofwallburg.com
Ron Sink	Davidson Water, Inc		336-731-5525	rsink@davidsonwater.com
Jed Hancock	Davidson County	Risk Mgt	336 471 9893	jed.hancock@davidsoncountync.gov
Jim Price	" "	Risk MGMT	(336) 242-2917	Jim.price@davidsoncountync.gov
Larry James	Davidson Co. Emergency Services	Emerg. Ser.	336-242-2270	Larry.James@DavidsonCountyNC.gov

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Project Kickoff Meeting

January 22, 2015

10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Roger Spach	Lexington - City Water + Sewer	Water Resources	248-3970	RASpach@lexingtonnc.gov
MACK KATTNER	Thomasville PD	Thomasville	475-4246	MACK.Kattner@Thomasville-NC.gov
Danny Ward	Davidson County	Fire Marshal	242-2281	danny.ward@davidsoncountync.gov
Paul Jarrett	City of Lexington	Fire	248-3935	tpjarrett@lexingtonnc.gov
Rex Buck	Davidson Co	Pub Services	242-2008	rex.buck@davidsoncounty
DARREN N. CECIL	DAVIDSON COUNTY	HEALTH DEPT	242 2310	Darren.Cecil@DavidsonCountygov
Travis Smith	Davidson Co. Schools	Operations	287-4853-cell	tsmith1@davidson.K12.NC.US
Scott Lounsbury	Davidson Co. Planning	Planning	242-2229	scott.lounsbury@davidsoncountygov

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Project Kickoff Meeting

January 22, 2015
10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Keith Wingke	Davidson Co	EnergyUnited	236-8401	Keithwingke@energyunited.com
Mark Robbins	Davidson Co. ES	Emergency Services	336-242-2270	Mark.Robbins@DavidsonCountyNC.gov
Phil Hartley	Lex FD	Fire	336-479-0239	pshartley@lexingtonnc.gov
William Scarboro	Lex P.D.	Police	336-243-3302	WEScarboro@lexingtonNC.
Chuck Frye	Dav. Co.	Co. Attorney	336-236-3084	Chuck.frye@davidsoncountync.gov
Robert Hyatt	Davidson Co.	Co. Mgr.	336-242-2200	robert.hyatt@davidsoncountync.gov
Margaret Erga	Davidson	Red Cross	(336) 906-2956	margaret.erga@redcross.org
Mandy Sheilds	Davison	Red Cross	336-333-2111	mandy.sheilds3@redcross.org

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Project Kickoff Meeting

January 22, 2015

10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Wynn Coolens	Davidson County	Davidson County Schools	336-247-1353	wcoolens@davidson.k12.nc.

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Project Kickoff Meeting

January 22, 2015

10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Glenn Clapp	High Point [redacted]	High Point OEM	(336) 883-3543	glenn.clapp@highpointnc.gov

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Mitigation Strategy Meeting

March 18, 2015

10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Chuck Frye	Dav. Co	Co Atty	336-236-3084	chuck.frye@davidsoncountync.gov
Joel Hartley	Dav. County	IT	242-2032	joel.hartley@davidsoncountync.gov
Scott Leonard	"	Planning	242-2229	scott.leonard@davidsoncountync.gov
Robert Hyatt	Davidson Co.	Co. Mgr office	336-242-2200	robert.hyatt@davidsoncountync.gov
Mary Jane Akerman	Thomasville	Thomasville City Schools	336-870-1627	akermanmj@tcs.k12.nc.us
Freddie Silver	Lexington Fire Dept.	Fire	336-309-2546	freddiesilver@yahoo.com
Mark Kattner	Thomasville	Police	336-475-4244	MARK.KATTNER@Thomasville-NC.Gov
Wynn Conrad	Davidson County Schools	Schools	336 249-6704	WCONRAD@DAVIDSON.K12.NC.US.

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Mitigation Strategy Meeting

March 18, 2015

10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Tracy White	Lexington	Public utilities	248-3945	tlwhite@lexingtonnc.gov
DARREN N. CECIL	DAVIDSON COUNTY	HEALTH (EH)	242-2310	Darren.Cecil@DavidsonCountyNC.gov
Ricky Tuttle	NCEM, CBO	NCEM	(336) 462-2033	ricky.tuttle@nccps.gov
Danny Ward	Davidson County	Fire Marshal	336-242-2281	danny.ward@davidsoncountync.gov
Steve Grubb	City of Lexington ~~Fire Dept~~	Lexington Fire Dept.	248-3935	JSGrubb@lexingtonnc.gov
Travis Morris	City of Lexington	Lexington Fire	336-248-3935	Tsmorris@lexingtonnc.gov
CASEY TARLETON	Davidson Co. SO.	Davidson Co. SO.	336-242-2496	casey.tarleton@davidsoncountync.gov
MARK SINK	LEXINGTON L.P.D	L.P.D	336 243 3326	JMSINK@LEXINGTONNC.GOV

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Mitigation Strategy Meeting

March 18, 2015

10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Mark Robbins	Davidson County	Davidson County ES	336-242-2967	mark.robbins@davidsoncountync.gov
Rex Buck	Davidson County	Public Services	336-242-2008	rex.buck@davidsoncountync.gov
Lillian Henderson	DCHD	DCHD	336-242-2375	Lillian.Henderson@DavidsonCountyNC.gov
Ron Sink	Davidson Water, Inc.		336-731-5525	rsink@davidsonwater.com
Rebekah Gainey	Lexington	City Manager's Office	336-248-3910	regainey@lexingtonnc.gov
Guy Cornman	Davidson Co	P&Z	336-242-2220	guy.cornman@davidsoncountync.gov
Donna Alwine	Wallburg	Clerk	331-3945	town.clerk@townofwallburg.com
LINDA ERWIN	DAVIDSON CO	GIS	242-2042	linda.erwin@davidsoncounty.g

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Mitigation Strategy Meeting

March 18, 2015

10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Larry James	Davidson Co.	Emergency Services	242-2270	larry.james@davidsoncountync.gov
Eddie Bowling	Thomasville Fire	Fire	847-8707	Eddie.Bowling@thomasvillenc.gov
Mark Crook	NC DOT - Davidson	NCDOT	224-3200	mcrook@ncdot.gov
Tod Hawcock	Davidson County	Risk mgt	242-2211	tod.hawcock@davidsoncountync.gov
Jim Price	" "	" "	242-2917	jim.price@davidsoncountync.gov
Daniel Miller	Lexington	Risk Mgt	248-3955	danielm@lexingtonnc.gov
Roger Jones	Lexington	Engineering	248.3930	RDJones@Lexingtonnc.gov
Roger Spach	"	Water + Sewer	248-3970	rspach@lexingtonnc.gov

Davidson County Multi-jurisdictional Hazard Mitigation Plan
Mitigation Strategy Meeting

March 18, 2015

10:00 AM - Noon

Name	Jurisdiction	Department	Phone Number	E-mail Address
Dwayne Childress	DC	Support Svs	242-2030	
Dale Moorefield	DC	DSS	242-2562	dale.moorefield @davidsoncountync.gov
Earl Kendall	Lexington City Schs	Education	242-1527	ekendall@lexcs.org
Paul Jarrett	City of Lexington	Fire	399 5360	tpjarrett@lexingtonnc.gov

Tornado damage (11/2011), Davidson County, NC
Photo Source: ABC11.com

Davidson County
Hazard Mitigation Plan

Public Participation Survey Results

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Public Participation Survey

- Provides an opportunity for the public to share opinions and participate in the planning process
- Link to survey posted on County website
- 50 completed surveys received

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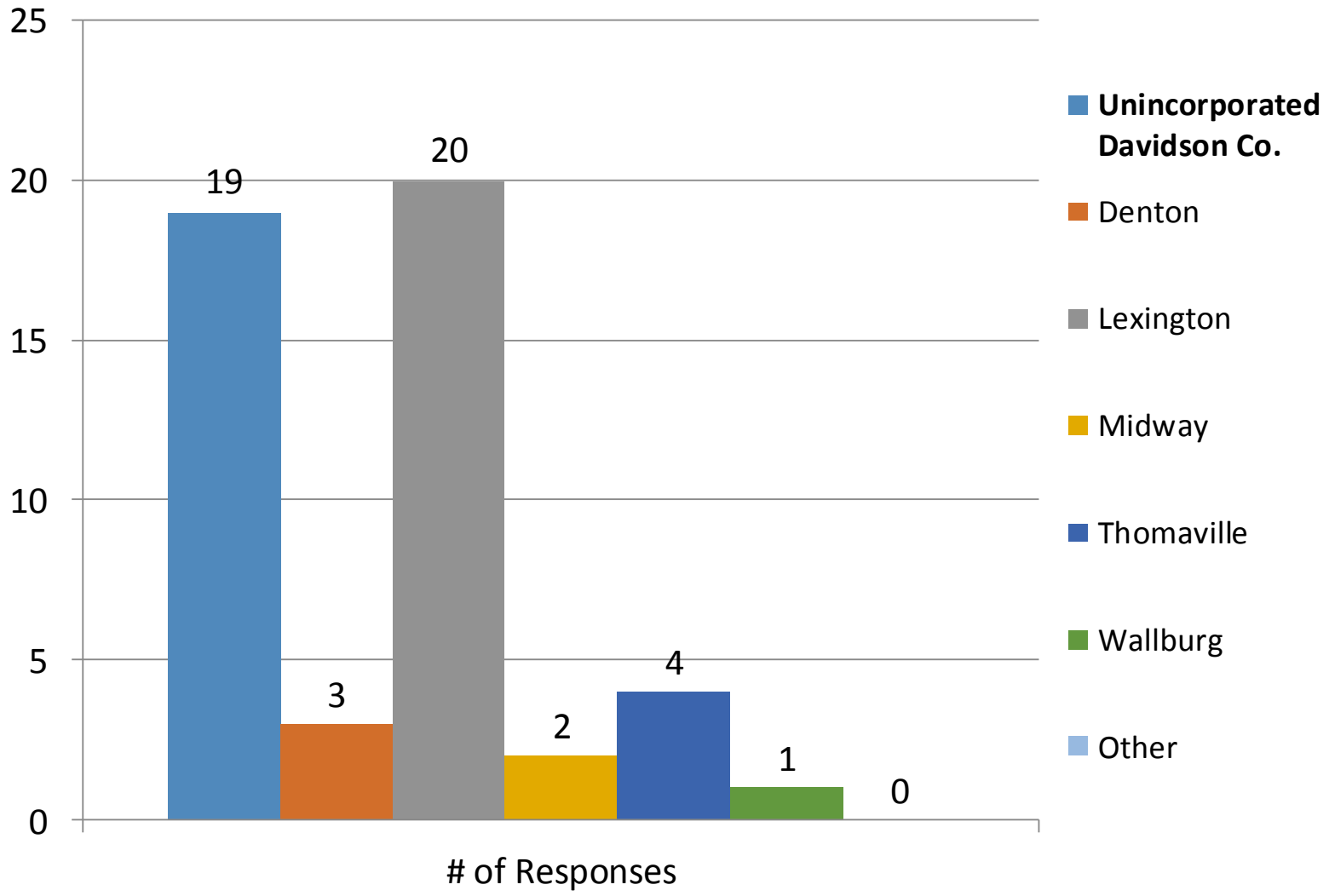
Public Participation Survey Highlights

- 84% of respondents are interested in making their homes more resistant to hazards
- 32% have already taken action to make their homes more hazard resistant
- 66% do not who to contact regarding risk reduction

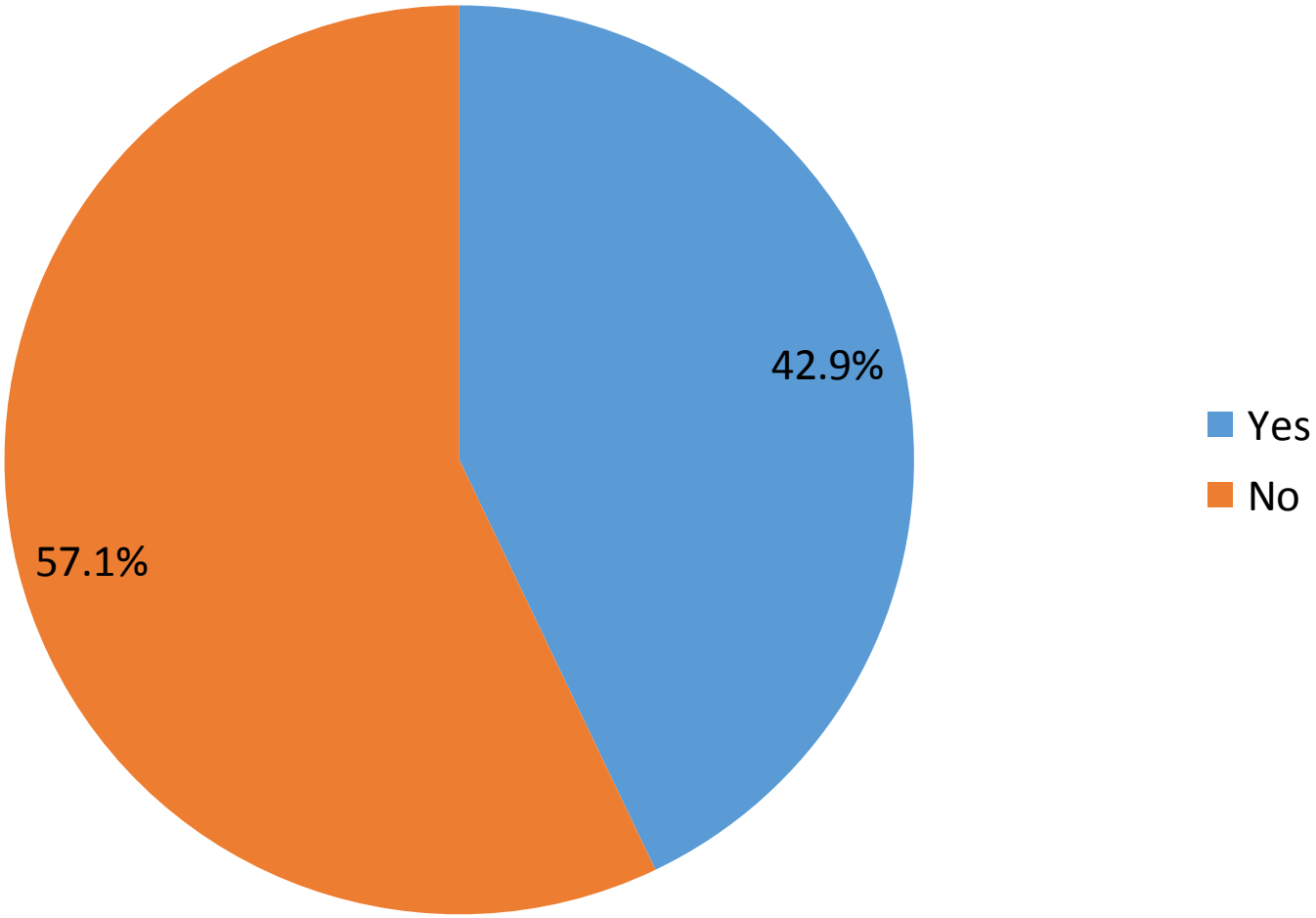
ATKINS

1. Where do you live?



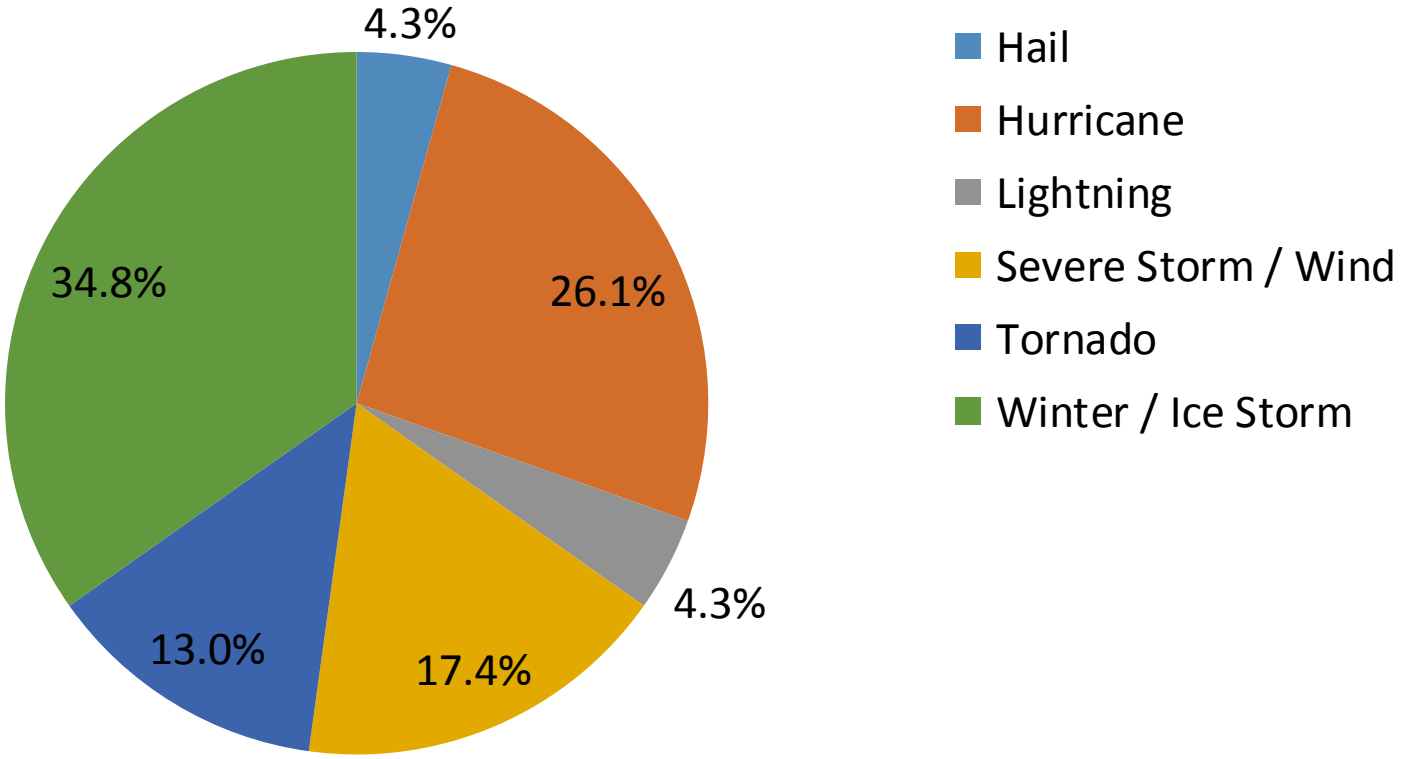
ATKINS

2. Have you experienced a disaster?



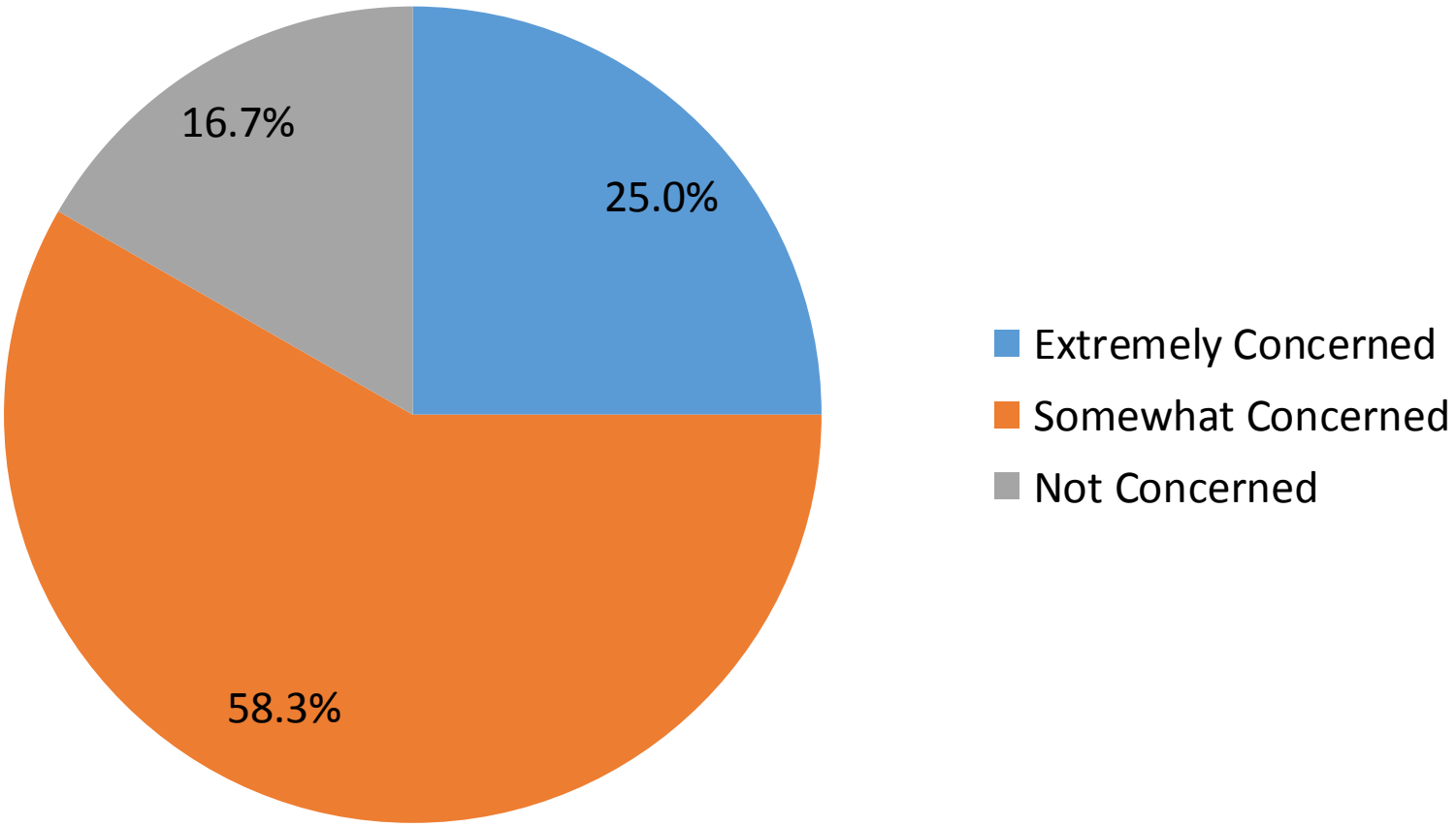
ATKINS

2. Examples of disasters experienced



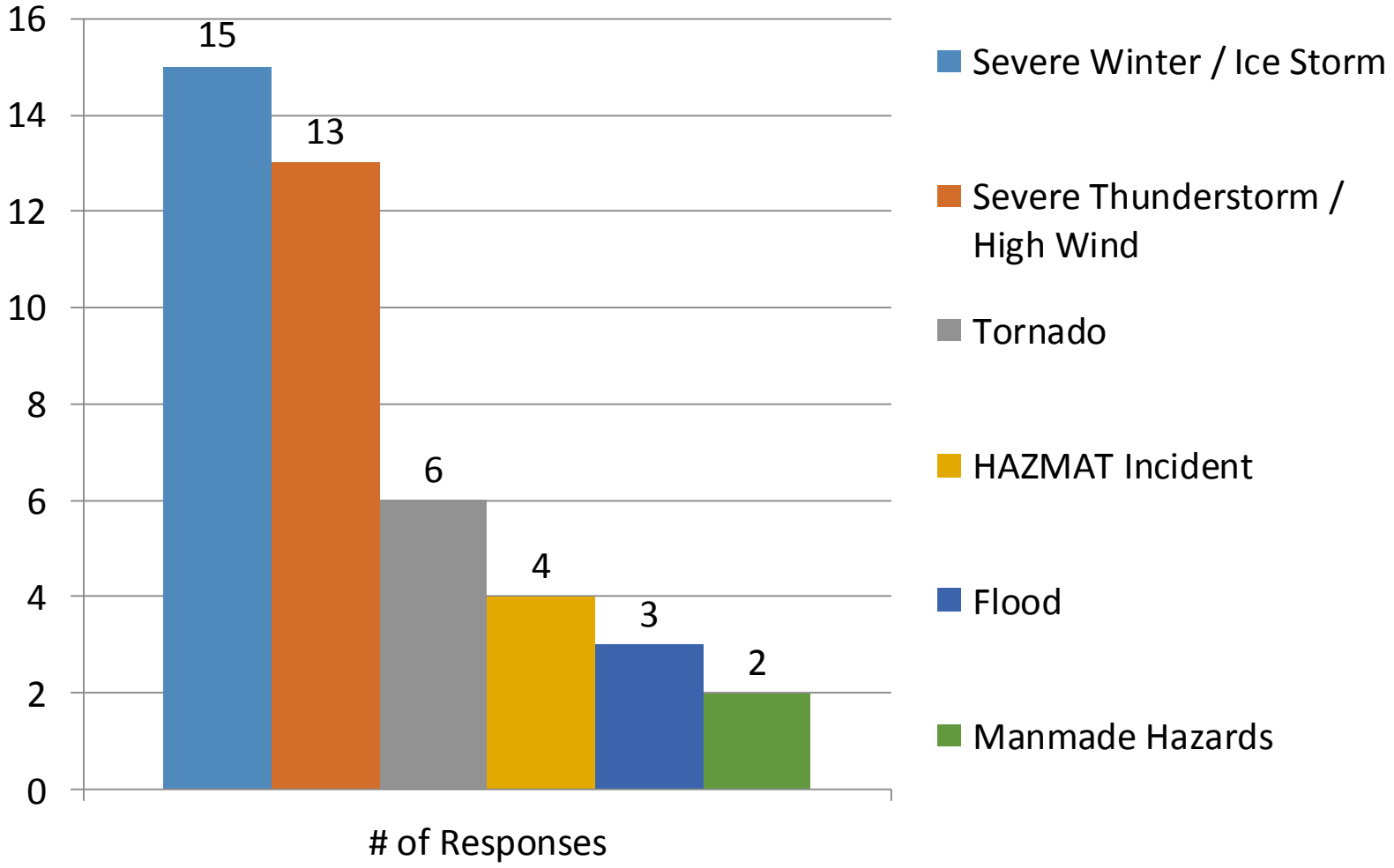
ATKINS

3. How concerned about possibility of disaster?



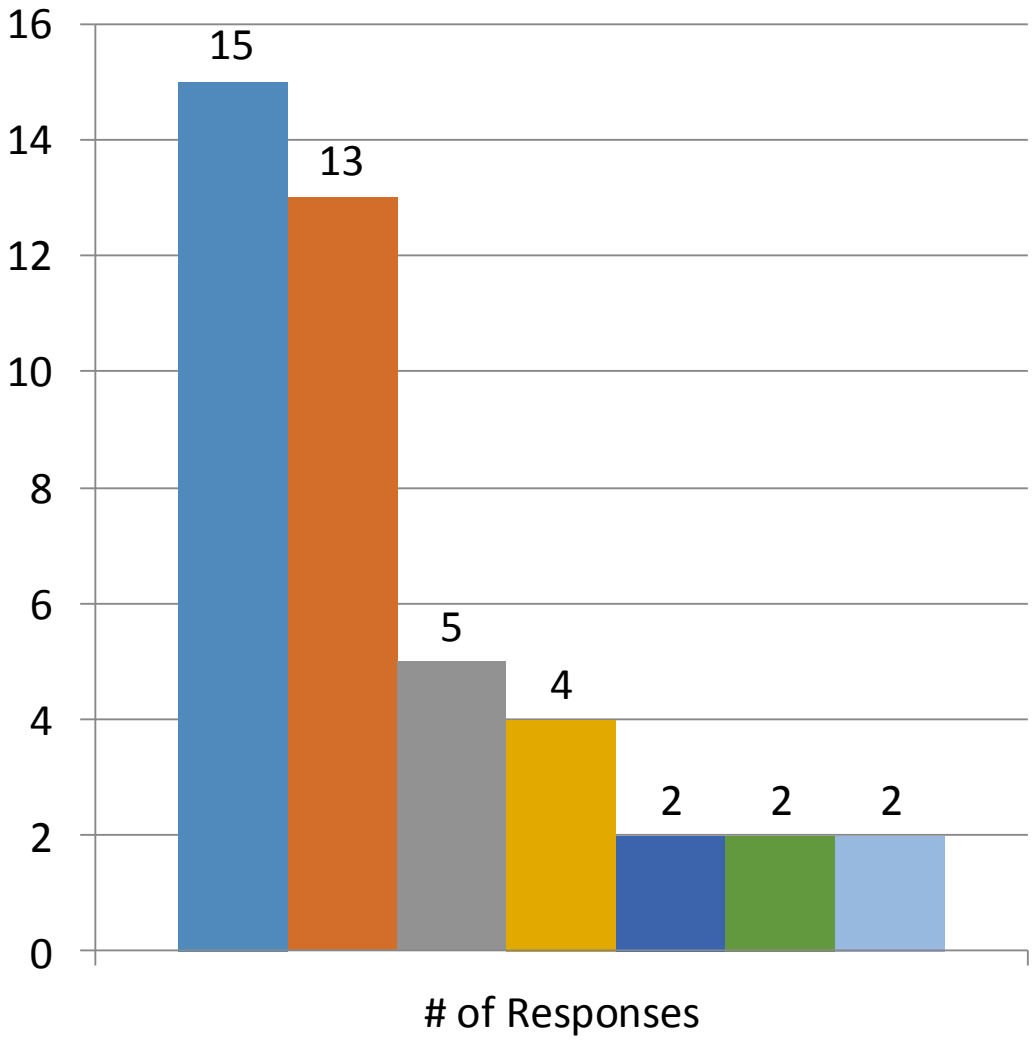
ATKINS

4. Highest hazard threat?



ATKINS

5. Second highest hazard threat?



- Severe Thunderstom / High Wind
- Severe Winter / Ice Storm
- Tornado
- Lightning
- Hailstorm
- Hurricane / Tropical Storm
- Technological Hazards

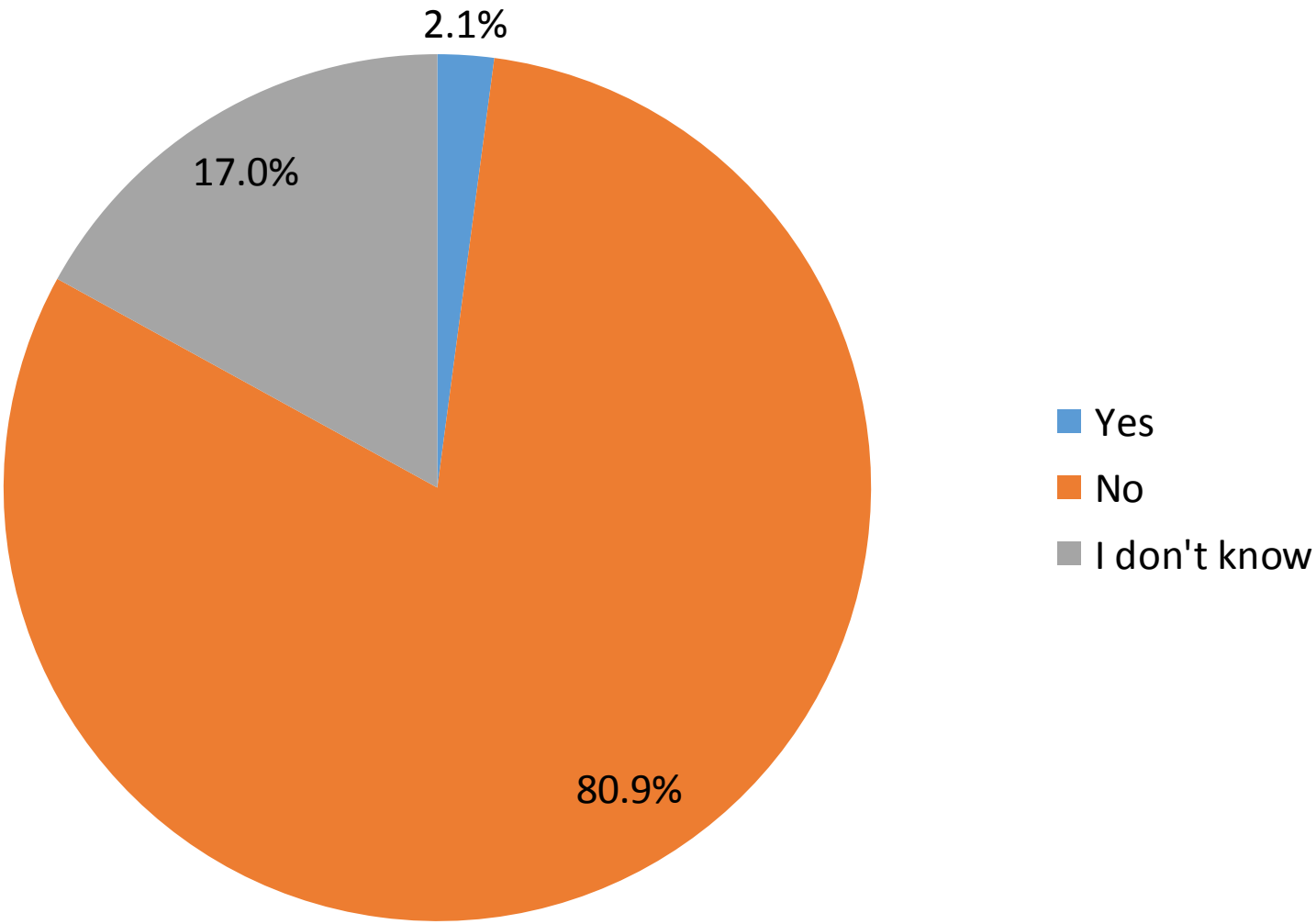
ATKINS

6. Other hazards not listed?

- Fire
- Terrorism
- Train derailment
- Drinking water contamination

ATKINS

7. Is your home in a floodplain?



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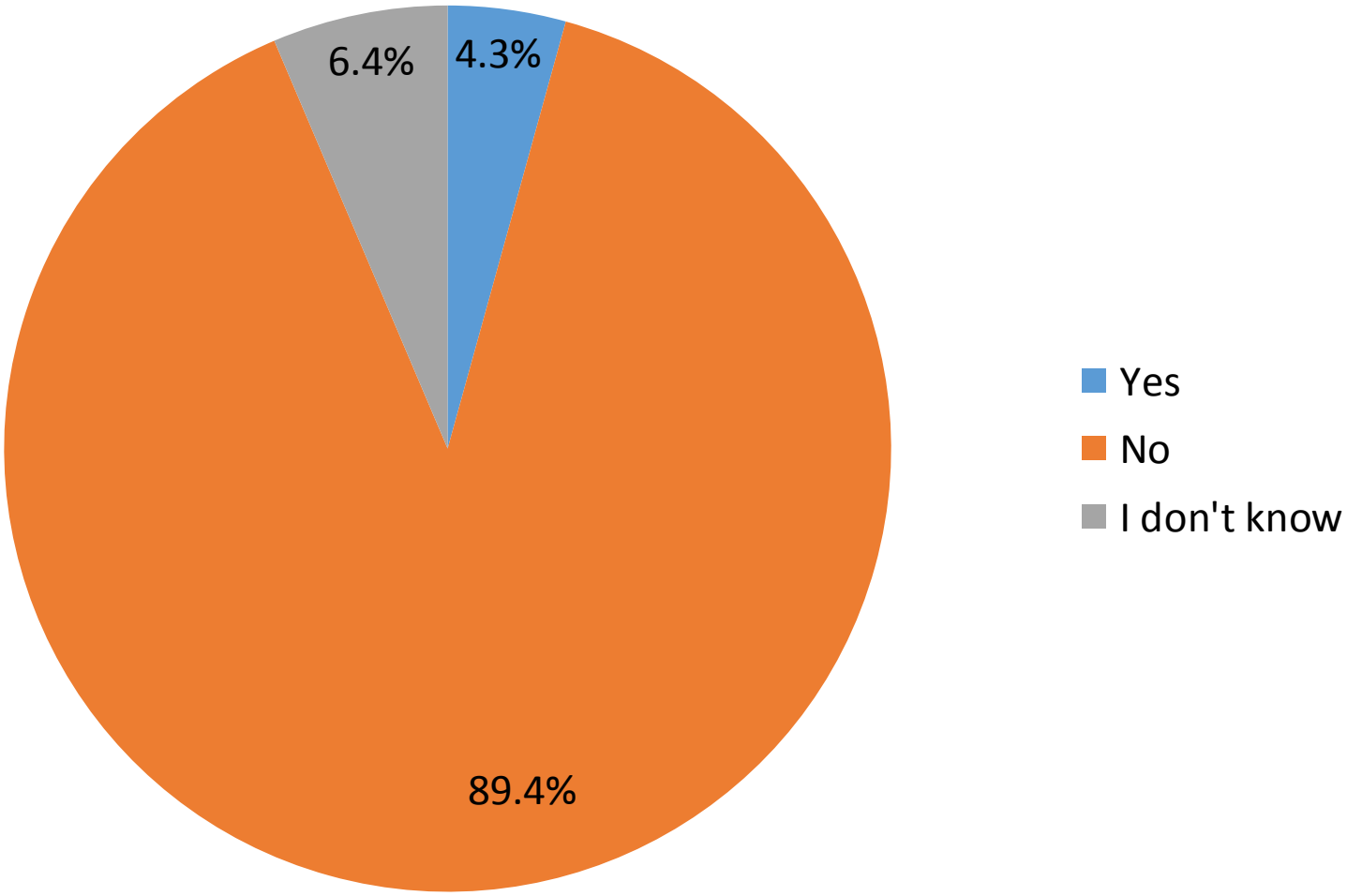
8. Do you have flood insurance?



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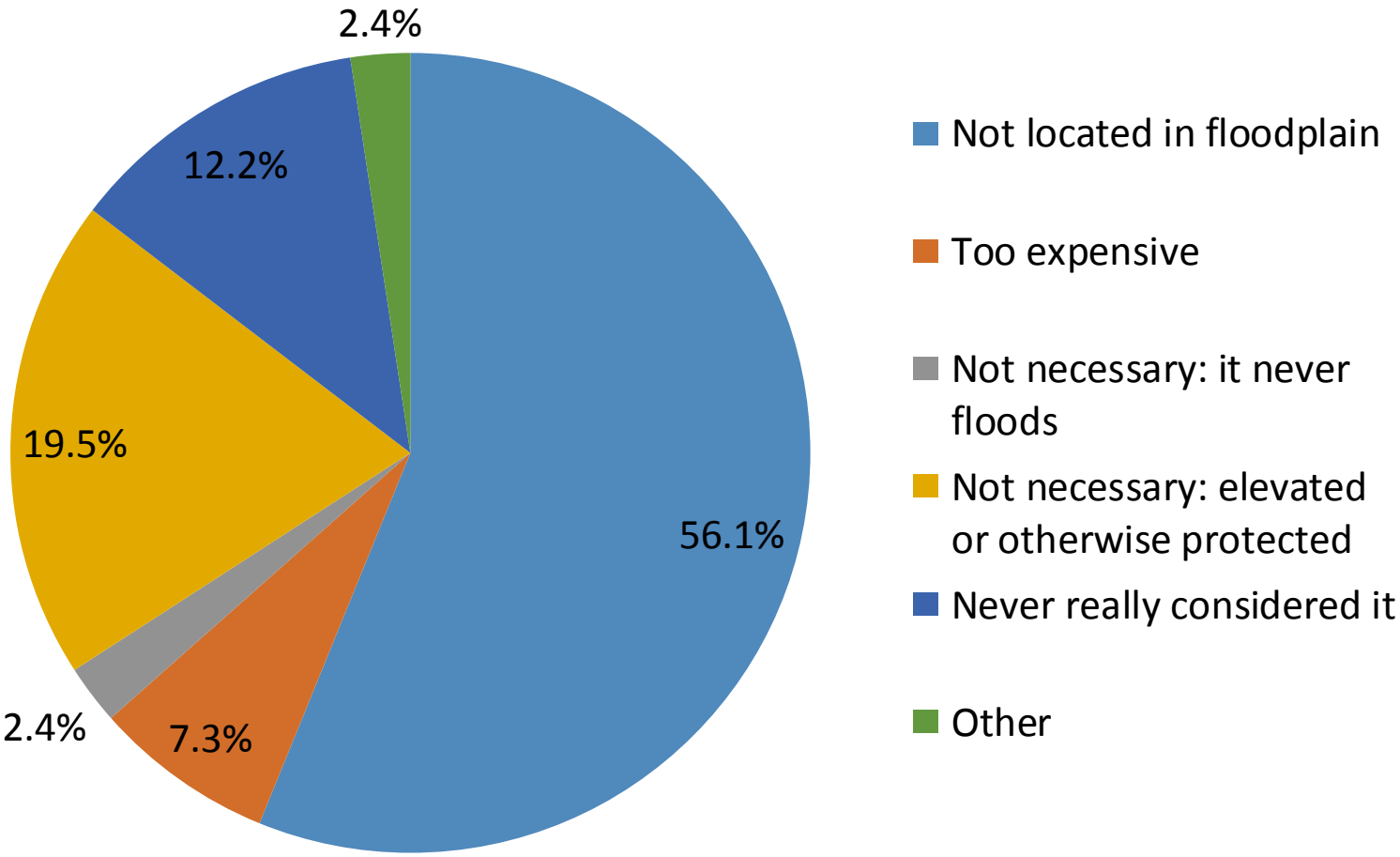
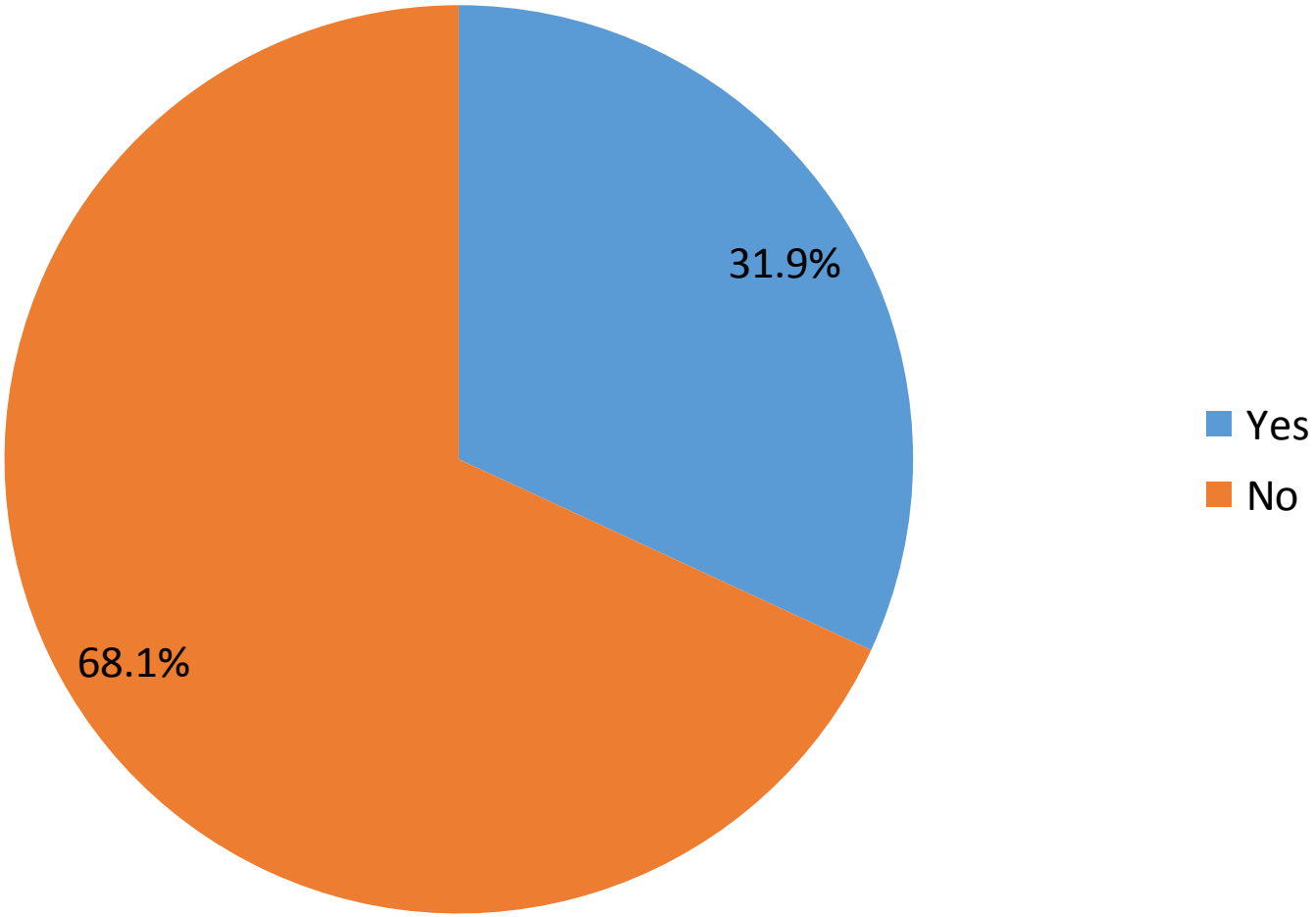
8. Why no flood insurance?



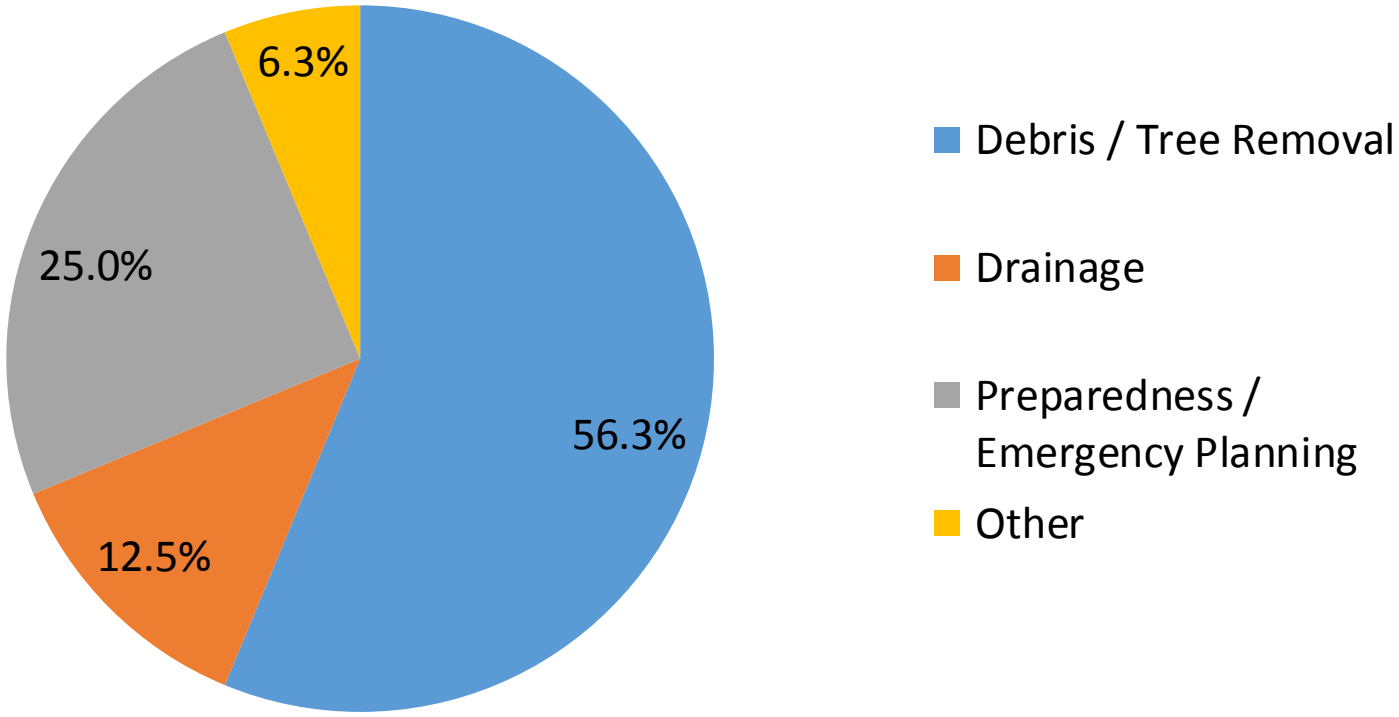
ATKINS

9. Taken action to be more hazard resistant?



ATKINS

9. Examples of actions taken



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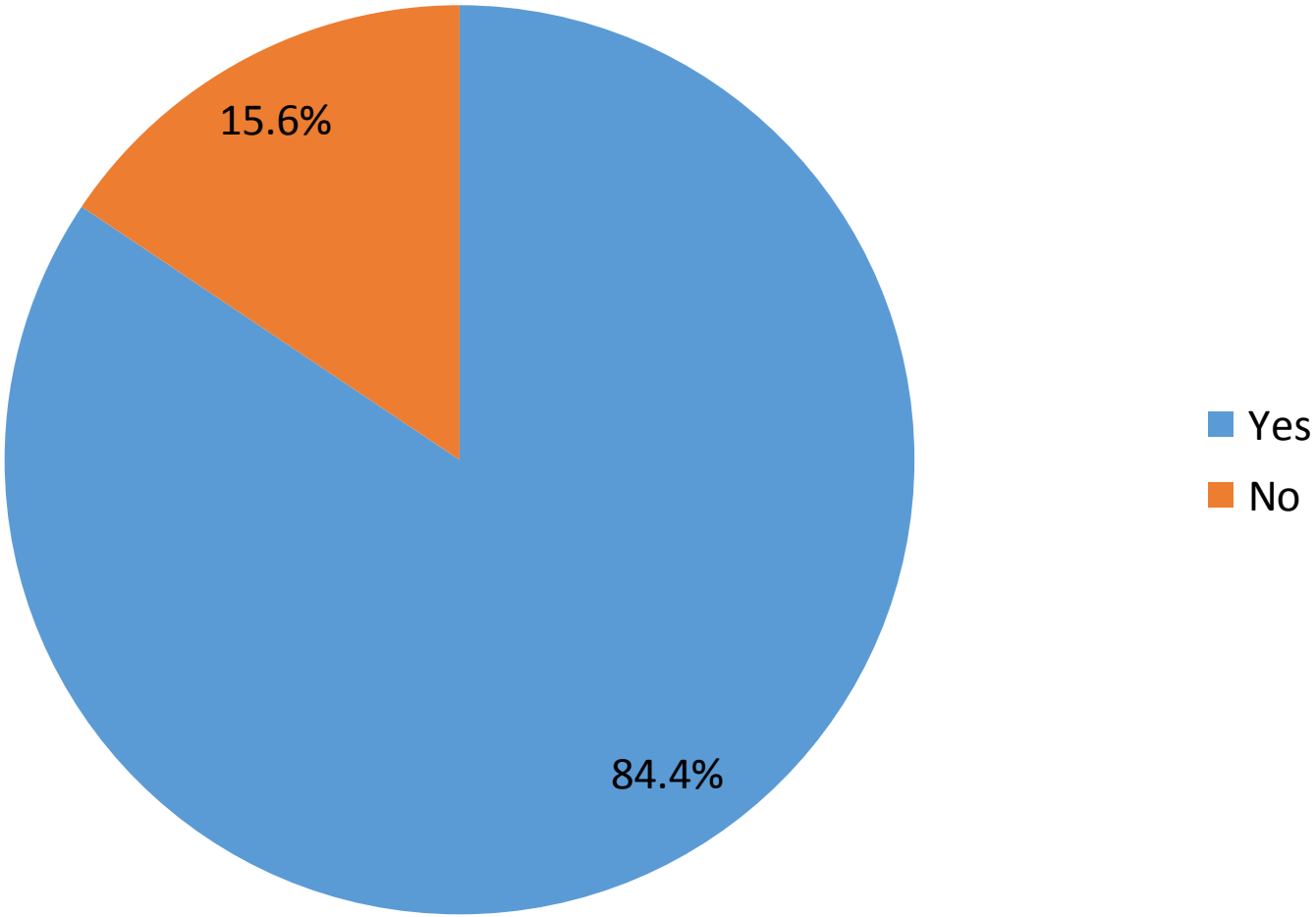
10. Interested in being more hazard resistant?



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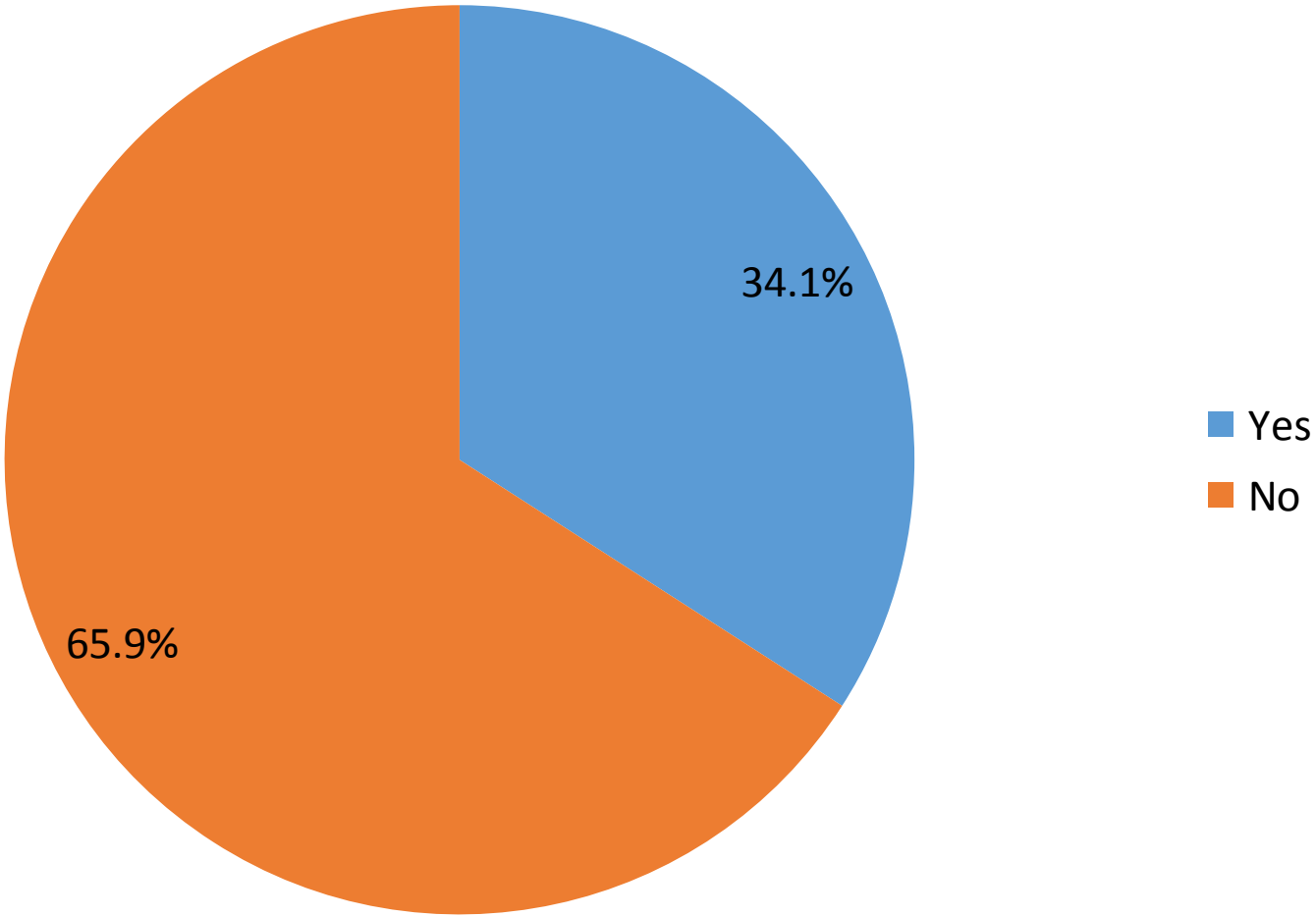
11. Know who to contact for reducing risks?



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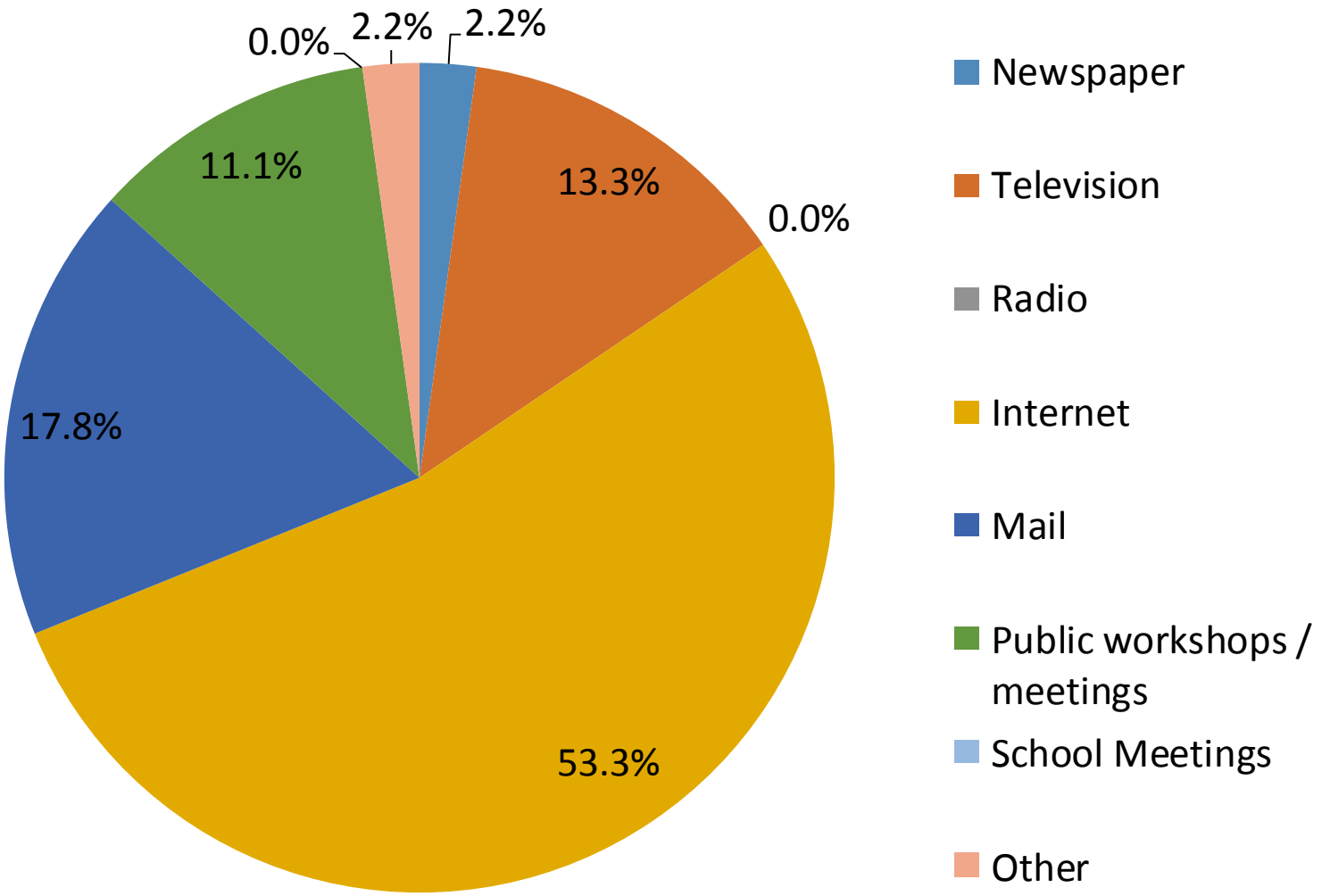
12. Most effective way to receive information?



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12. Other ways to receive information

- Social media

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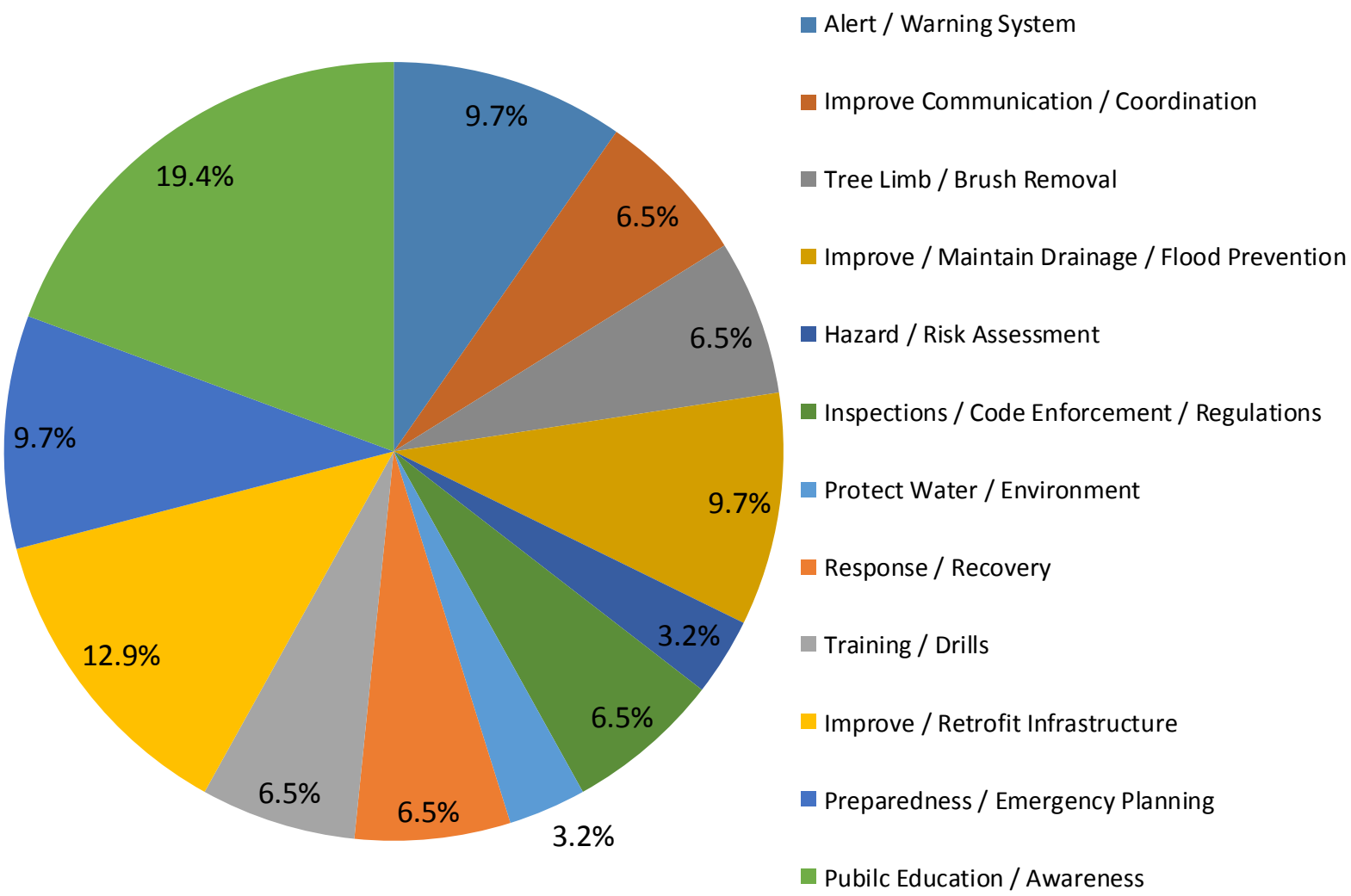
13. Steps local gov't could take to reduce risk



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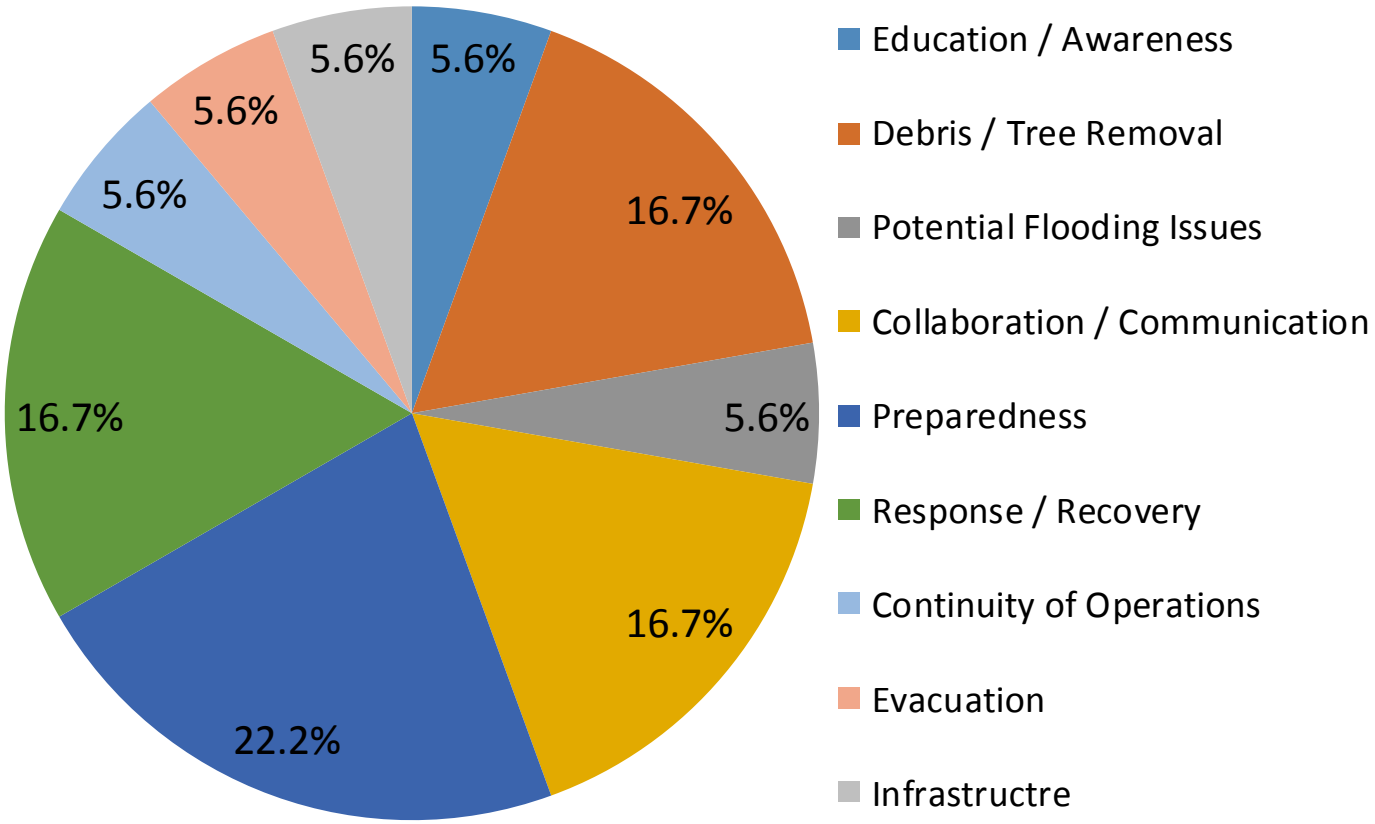
14. Other issues regarding risk and loss



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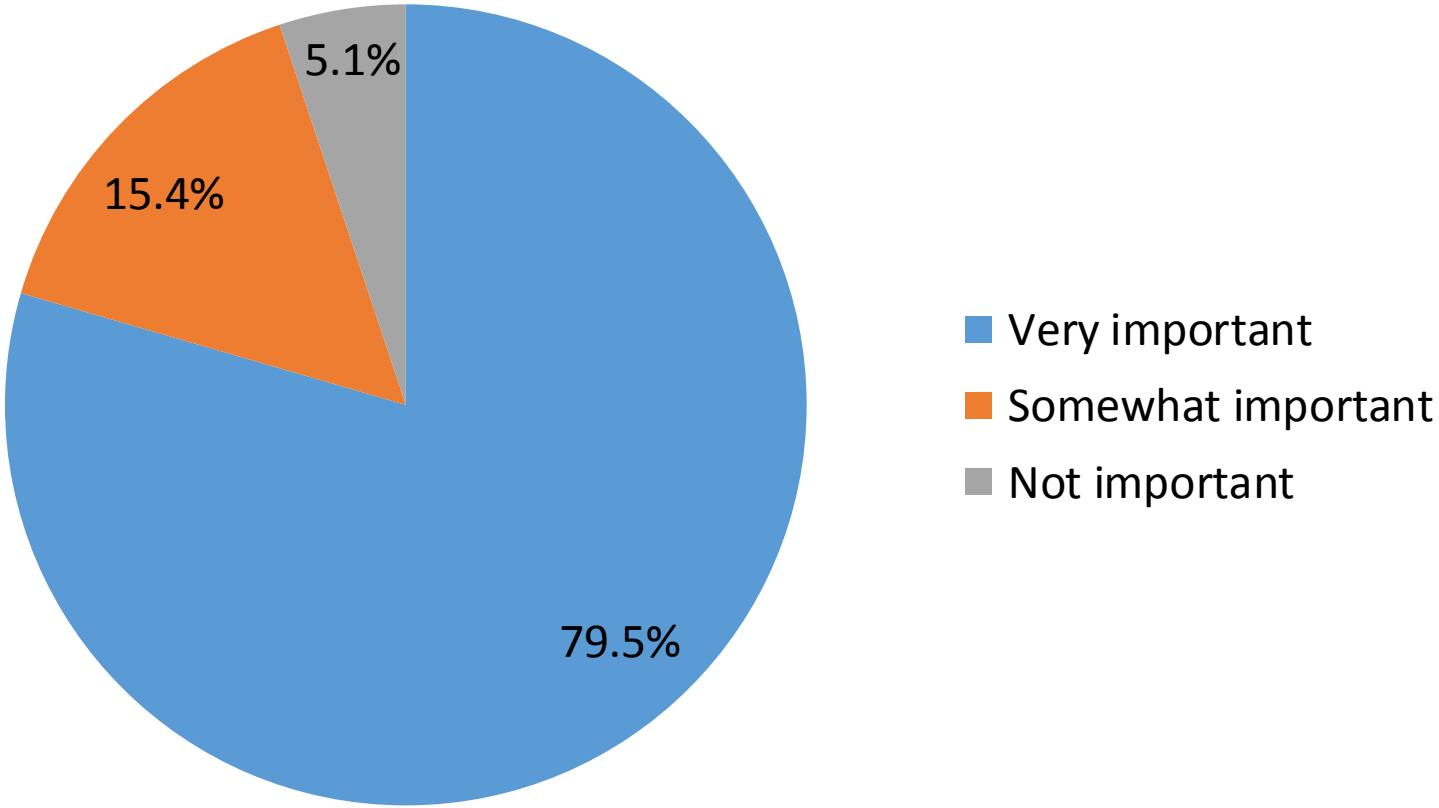
15. Mitigation Actions: Prevention



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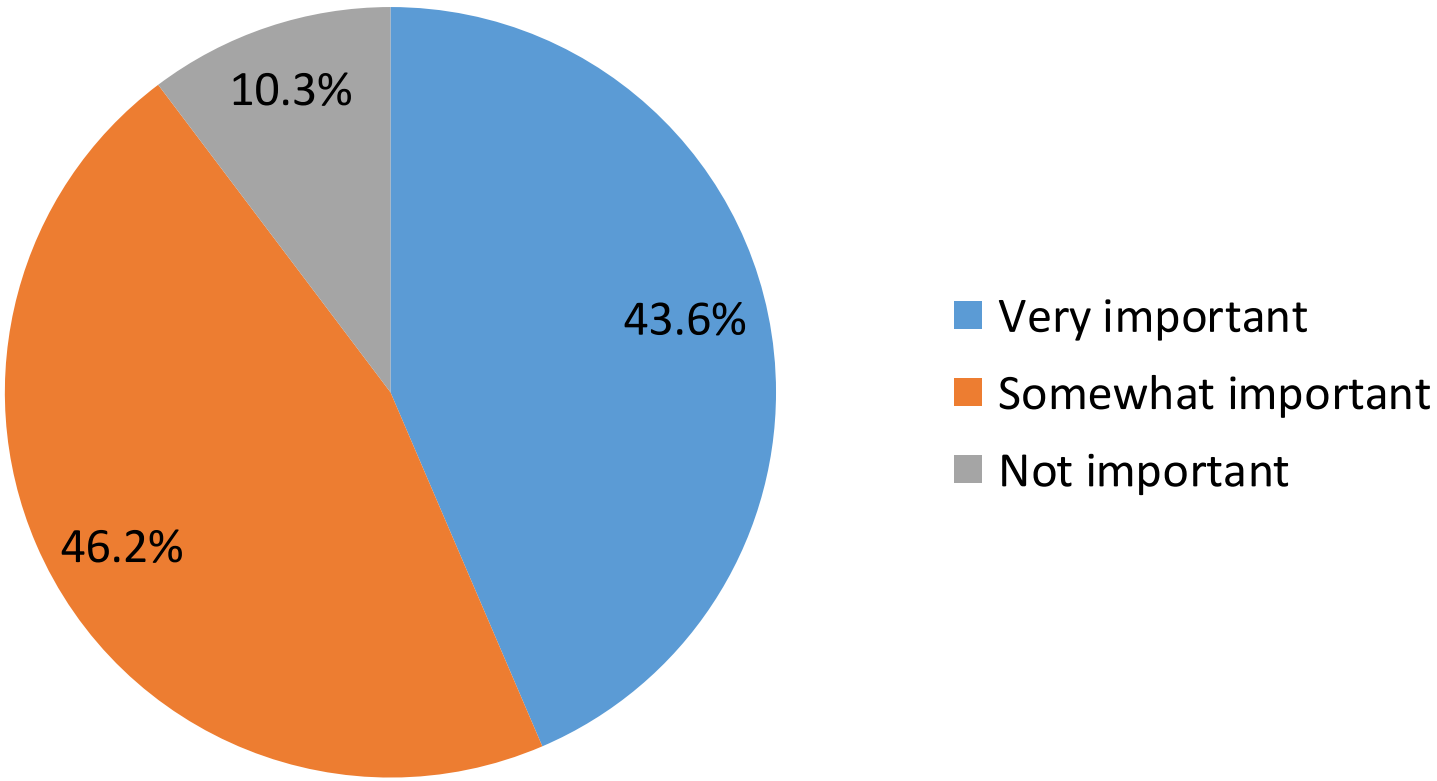
15. Mitigation Actions: Property Protection



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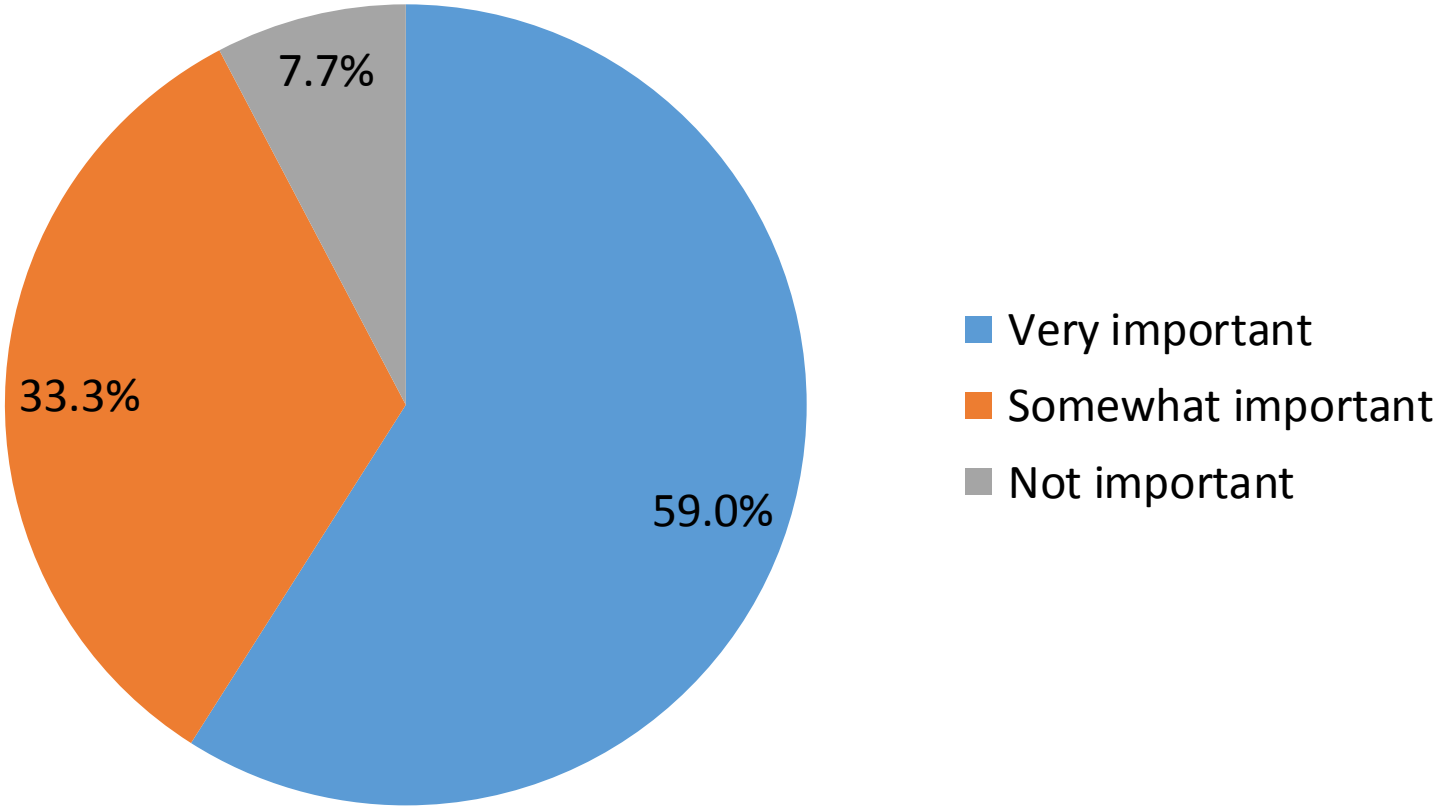
15. Mitigation Actions: Natural Resource Protection



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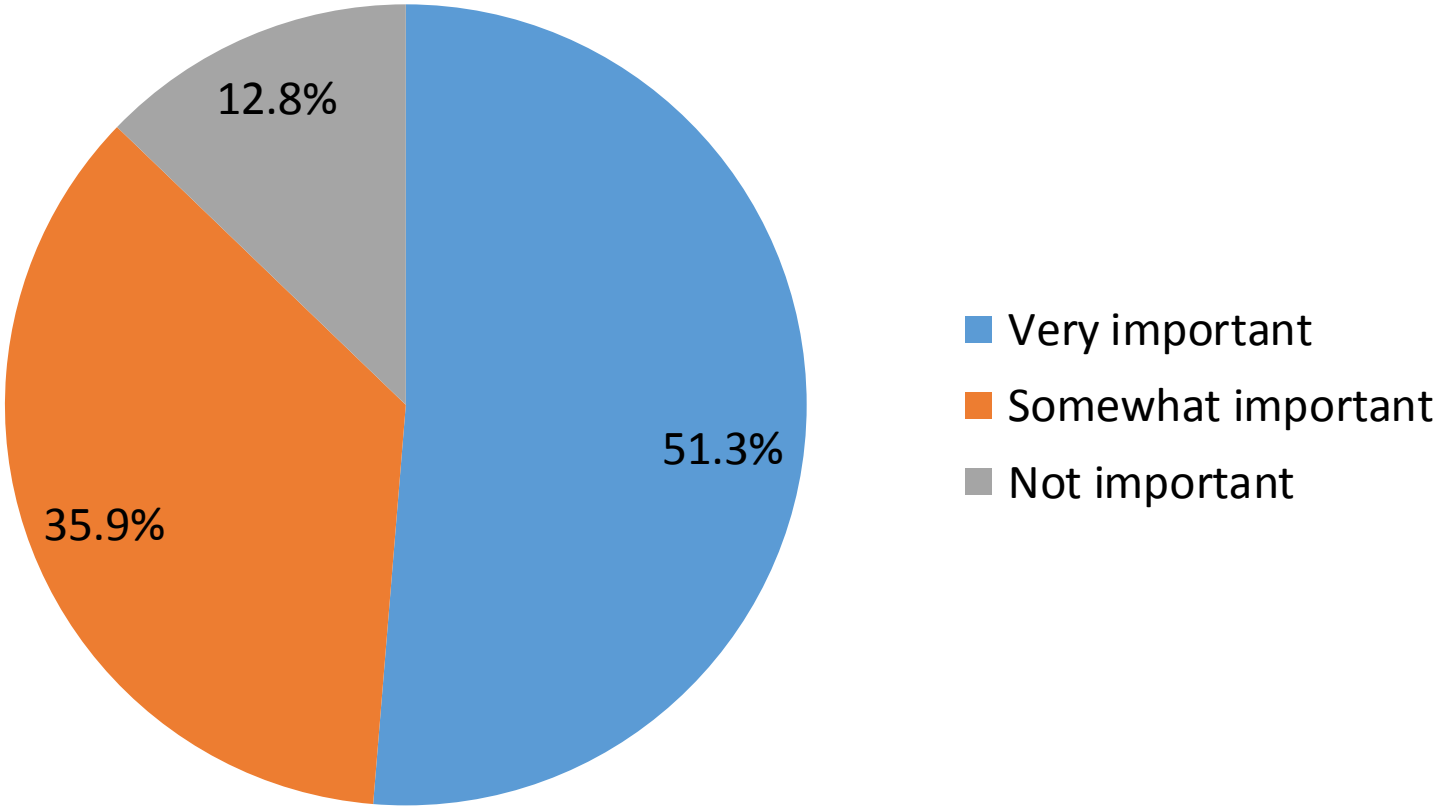
15. Mitigation Actions: Structural Projects



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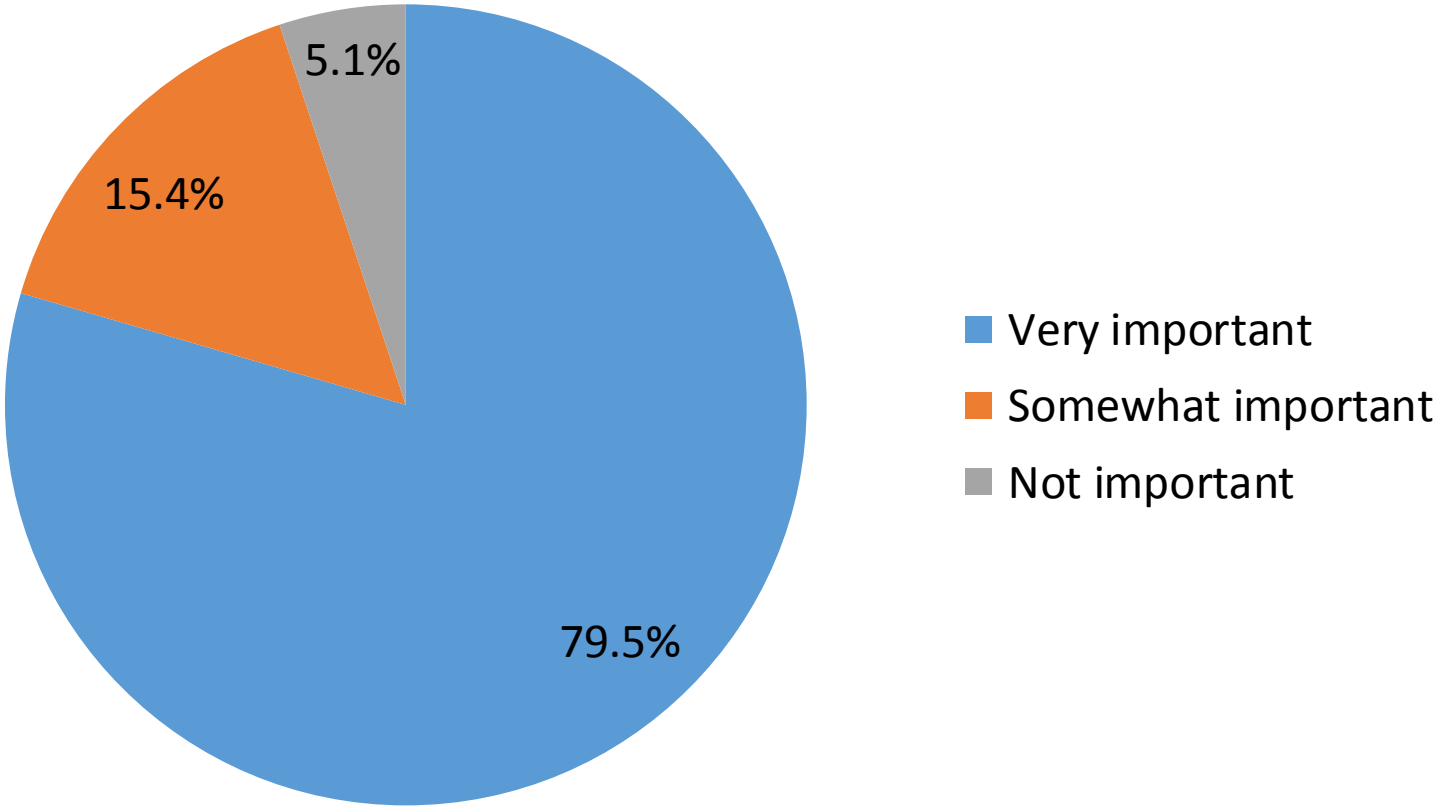
15. Mitigation Actions: Emergency Services



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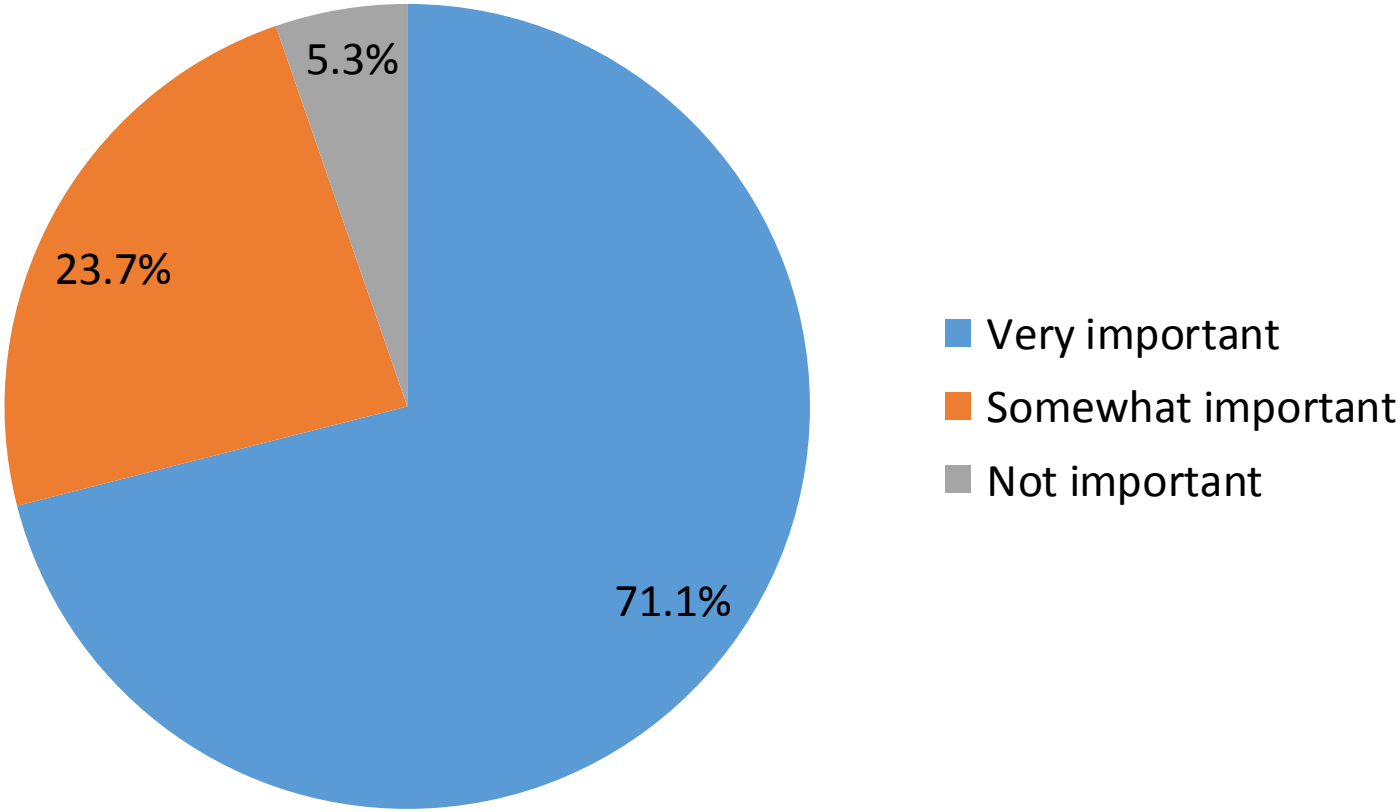
15. Mitigation Actions: Public Education & Awareness



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15. Mitigation Actions: Summary

- Highest importance
  - Prevention
  - Emergency Services
  - Public Education & Awareness
- Moderate importance
  - Natural Resource Protection
  - Structural Projects
- Lowest importance
  - Property Protection

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Tornado damage (11/2011), Davidson County, NC
Photo Source: ABC11.com

Davidson County
Hazard Mitigation Plan

Public Participation Survey Results

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